ISSN 2405-8181
VOLUME 2 ISSUE 4
December 2016

International Journal of the Cardiovascular Academy



EDITORIAL BOARD

Editor-in-Chief

Prof. Dr. Oktay Ergene — Cardiology, 9 Eylül University, Izmir, Turkey

Editorial Board Chair

Prof. Dr. Mehdi Zoghi — Cardiology, Ege University, Izmir, Turkey

Dr. Rida Berilgen — Dept. of Cardiology, Atakalp Heart Hospital, İzmir, Turkey

Prof. Dr. Ömer Kozan — Cardiology, 9 Eylül University, Izmir, Turkey

Associate Editors

Dr. Antonello Gavazzi — Cardiovascular Department, Riuniti Hospital, Bergamo, Italy

Prof. Dr. Elif Sade — Cardiology, Baskent University, Ankara, Turkey

Prof. Dr. Birhan Yılmaz — Cardiology, Cumhuriyet University, Sivas, Turkey

Prof. Dr. Bülent Görenek — Cardiology, Osmangazi University, Eskişehir, Turkey

Prof. Dr. Cemil İzgi — Cardiovascular Magnetic Resonance Unit, Royal Brompton Hospital, London, UK

Prof. Dr. Nurcan Arat — Cardiology, Florence Nightingale Hospital, Istanbul, Turkey

Prof. Dr. Barış Ökcün — Cardiology Institute, Istanbul University, Istanbul, Turkey

Assoc. Professor Hasan Güngör — Cardiology, Adnan Menderes University, Aydın, Turkey

Prof. Dr. Bülent Boyacı — Cardiology, Gazi University, Ankara, Turkey

Assoc. Professor Murat Biteker — Cardiology, Mugla Sitki Kocman University, Mugla, Turkey

Assist. Prof. Uğur Canpolat — Cardiology, Hacettepe University, Ankara, Turkey

Prof. Dr. Tevfik Ecder — Nephrology, Istanbul Bilim University Faculty of Medicine, Istanbul, Turkey

Prof. Dr. Raimund Erbel — Cardiology, West-German Heart and Vascular Center Essen, Essen, Germany

Prof. Dr. Matsatsugu Hori — Osaka Medical Center for Cancer and Cardiovascular Disease, Osaka, Japan

Dr. Firdovsi Ibrahimov — Department of Cardiology, Central Clinic Hospital, Baku, Azerbaijan

Prof. Dr. Nazmi Narin — Pediatric Cardiology, Erciyes Üniversitesi, Kayseri, Turkey

Prof. Dr. Ilgın Karaca — Cardiology, Firat University, Elazığ, Turkey

Dr. Ümit Yüksek — Dept. of Cardiology, Ödemis State Hospital, Izmir, Turkey

Dr. İbrahim Oğuz Karaca — Cardiology, Medipol University, Istanbul, Turkey

Prof. Dr. Sasko Kedev — University Clinic of Cardiology, Skopje, Macedonia

Dr. Lale Dinç Asarcıklı — Cardiology, Dışkapı Yıldırım Beyazıt Education and Research Hospital, Ankara, Tu

Prof. Dr. Güliz Kozdağ — Cardiology, Florida, USA

Prof. Dr. Enver Roshi — Faculty of Public Health, University of Tirana, Tirana, Albania

Assoc. Professor Babak Sharif-Kasahi — Cardiology, Shahid Beheshti University of Medical Sciences, Izmir, Turkey

Assoc. Professor Selahattin Kıyan — Emergency Medicine, Ege University, Izmir, Turkey

Prof. Dr. Massimo Santini — Cardiology, San Filippo Neri Hospital, Rome, Italy

Prof. Dr. Gianfranco Sinagra — Cardiovascular Department, Ospedali Riuniti and University of Trieste, Trieste, It

Prof. Dr. Bambang Budi Siswanto — Cardiology, University of Indonesia, Jakarta, Indonesia

Professor Cheuk-Man Yu — Cardiology, Prince of Wales Hospital, Sha Tin, Hong Kong, China

Statistics Consultant

Prof. Dr. Vildan Mevsim — Department of Public Health, Dokuz Eylül University, Izmir, Turkey

Language Consultant

Ms. Dina Kouveliotes

CONTENT

Genetic warfarin resistance in a patient with mechanical prosthetic aortic valve	M Ildızlı, M Karaca	155-156
Relationship between epicardial fat tissue thickness and breast arterial calcifications in premenopausal women	Cennet Yıldız, Abdulmelik Yıldız, Ahmet Karakurt	157-159
Complete resolution of huge left ventricular thrombus with apixaban treatment	Hasan Ata Bolayır, Hakan Güneş, Ömer Şahin, Dursun Akaslan, Tarık Kıvrak	160-161
Diagnosis of hyperpotassemia on electrocardiography in a youngwoman with adrenal insufficiency	Mehmet Emin Piskinpasa, Turgut Karabag, Burcugül Kaya, Yalcin Hacioglu, Fettah Sametoglu	162-164
The use of agitated saline in a patient with unroofed coronary sinus	Salim Yasar, Suat Gormel, Erkan Yildirim, Murat Celik, Uygar Cagdas Yuksel	165-166
Novel oral anticoagulants in non-valvular atrial fibrillation: Pharmacological properties, clinical trials, guideline recommendations, new antidote drugs and real-world data	Umut Kocabas, Esra Kaya, Gökhan Avcı	167-173
A rare coexistence: Type 1 congenital intrahepatic portosystemic shunt in a patient with non-compaction cardiomyopathy	Serkan Duyuler, Pınar Türker Duyuler, Ali Çoner	174-175
Effect of Angiotensin I Converting Enzyme gene polymorphism on the major adverse cardiac events, Long-term clinical outcomes	Köksal Ceyhan, Ataç Çelik	176-177
An investigation on the impact of carnosine on the myocardium in lower extremity ischemia–reperfusion injury in rats	Batur Gönenç Kanar, Aydın Keskin, Rayiha Görkem Kanar, Alper Kepez, Bülent Tünerir	176-177
Effect of Angiotensin I Converting Enzyme gene polymorphism on the major adverse cardiac events, Long-term clinical outcomes	Köksal Ceyhan, Ataç Çelik	177
Multi-drug resistance – 1 [MDR – 1, P-GL, ABC] gene polymorphism is a risk factorfor development of abdominal aortic aneurysm	BayramYağmur, Ali İhsan Tekin1, Mehmet Erdem Memetoğlu, Rasim Kutlu, Ersoy Karaca , Müslim Gül , Hasan Başçıl, Bahadır Şarlı, Öcal Berkan	178
Drug Adherence in Elder Patients Taking New Oral Anticoagulation Therapy in Turkey: NOAC-TR subgroup study	Sadık Volkan Emren, Mehdi Zoghi, Oktay Şenöz, Murat Bilgin Abdulla Aslan, Gönül Açıksarı, Uğur Taşkın, Özkan Karaca Ilgın Karaca, Lale Dinç Asarcıklı, Ümit Yaşar Sinan, Lütfü Bekar	178
"Predictive value of Ddimer assay, GRACE scores and TIMI scores for adverse outcome in patients with nonSTsegment elevation myocardial infarction"	Muhammet Hulusi Satılmışoğlu, Sinem Ozbay Ozyılmaz, Mehmet Gul, Hayriye Ak Yıldırım, Osman Kayapınar, Kadir Goktürk, Huseyin Aksu, Korhan Erkanlı, Abdurrahman Eksik	178
The Value of CHADSVASC Score in Predicting LongTermMortality in Patients With ST-Segment Elevation Myocardial Infarction Who Have Undergone Primary Percutaneous Coronary Intervention	Kudret Keskin, Süleyman Sezai Yıldız, Gökhan Çetinkal, Gökhan Aksan Hakan Kilci, Şükrü Çetin, Serhat Sığırcı, Kadriye Kılıçkesmez	179-180

CONTENT

Comparison of Quantitative and Qualitative Coronary Angiography: Computer versus Eye	Taner Şen, Celal Kilit, Mehmet Ali Astarcıoğlu, Lale Dinç Asarcıklı Tolga Aksu, Habibe Kafes, Afşin Parspur, Basri Amasyalı	180-181
The effect of patent foramen ovale on systolic pulmonary artery pressure in healthy young adults	Hasan Kadı , Birol Özkan, Eyüp Avcı, Taha Gürbüzer, Tarık Yıldırım	181
Autologous Bone Marrow Stem Cell Implantation In Treatment of Thromboangiitis Obliterans	Ali İhsan Tekin, Mehmet Erdem Memetoğlu, Rasim Kutlu, Ümit Arslan, Osman Nuri Tuncer, Bayram Yağmur, Cengiz Türkay, Mehmet Coşkun	181
The effect of trimetazidine on ventricular repolarization indexes and left ventricular diastolic function in patients with coronary slow flow	Arif Süner, Mustafa Çetin	182-183
Systolic heart failure patient profiles differ according to presence or absence of ivabradine treatment	Hakkı Kaya, Osman Beton, Mehmet Birhan Yılmaz	183
Comparison of the safety and efficacy of ivabradine, nebivolol, trimetazidine and ranolazine therapies in the treatment of stable angina pectoris patients with left ventricular dysfunction	Rasim Kutlu , Mehmet Erdem Memetoglu, Tolkun Murataliev Muratalievic	183
Is there a relationship between epicardial adipose tissue volume and coronary plaque structure in patients with diabetes mellitus	Gökhan Aksan, Serhat Sığırcı	184
Relationship Between Plateletcrit, Platelet Distribution Width and Blood Pressure Variability in Hypertensive and Normotensive Subjects	Ali Gökhan Özyıldız , Ali Çoner , Kaan Okyay, Akif Serhat Balcıoğlu, Haldun Müderrisoğlu	185
A Rare Coronary Artery Anomaly: Left Main Coronary Artery Originating From the Right Sinus of Valsalva and Successful Percutaneous Coronary Intervention of Left Anterior Descending Artery	Metin Karayakalı, Ataç Çelik	185
Hemolytic Anemia Due to Hydrochlorothiazide	Özlem Seçen	185
A Rare Cause of Repeated Syncope: Partial Anomalous Pulmonary Venous Connection	İnci Tuğçe Çöllüoğlu, Asım Oktay Ergene, Tuba Ekin	185-186
Unexpectedly finding dual right coronary artery one of which is chronic total occluded	Sadık Volkan Emren, Hakan Çakmak, Hale Çakmak	186-187
Evaluation of neutrophil to lymphocyte ratio changes between pre- and post-menopausal life for cardiovascular risk prediction	Ahmet Karakurt , Cennet Yıldız	187
Is dipyridamole useful in improving left ventricular systolic and diastolic function in patients with coronary slow flow?	Arif Süner, Mustafa Çetin	188-190
Simultenous occlusion of two major coronary arteries in a patient with ST segment myocardial infarction	Sadık Volkan Emren, Hakan Çakmak, Hale Çakmak, Muhammet Tahta Zeynal Abidin Yetgin, Fatih Oğuz, Fatma Okuş	190

CONTENT

Iatrogenic right coronary artery dissection by guidewire during transradial coronary angiography	Hatice Solmaz, Mustafa Kurşun, Ali Kemal Çabuk, Ahmet Sayın Selim Ekinci, Cenk Ekmekçi, Barış Kılıçaslan, Öner Özdoğan	190
Carotid artery stenosis severity predicts extension and severity of coronary artery disease: syntax and syntax-II score correlation study	Erhan Saraçoğlu, Ertan Vuruşkan	191
The Predictive Value Of Preoperative Serum NTproBNP Levels For The Need For Inotropic Support In The Postoperative Period In Patients Undergoing Coronary Artery Bypass Operation	Ahmet Öztekin , Mehmet Erdem Memetoğlu, Rasim Kutlu, Ali İhsan Tekin, Ozan Erbasan, Ümit Arslan, Ozan Erdem, Özgür Akkaya, Mustafa Şimşek, Murataliev Tolkun Muratalievic	191
Evaluation of the prevalence of coronary artery disease in patients with valvular heart disease	Zeynep Yapan Emren, Sadık Volkan Emren, Barış Kılıçarslan, Hatice Solmaz İbrahim Susam, Ahmet Sayın, Burçin Abud, Mehmet Aydın, Özgür Bayturan	191
Role of Red Blood Cell Distribution Width and Epicardial Fat in Atrial Fibrillation after Cardiopulmonary Bypass	Kerem Özbek, Hüseyin Katlandur, Bilal Arık, Ahmet Kuzgun Murat Yıldız, Ahmet Keser, Hüseyin Özdil	191-193
Correlation Between Cardiac Syndrome X and Serum Prolidase Activity	Gönül Açıksarı , Bülent Demir, Kurtuluş Açıksarı, Turgut Uygun Asuman Gedikbaşı , Nurşen Keleş, Orkide Kutlu, Osman Karakaya	193
The effects of Pneumoperitoneum on cardiac functions during elective laparoscopic cholecystectomy	Gülçin Ercan, Aydın Zilan, Ramazan Kuşaslan, Asım Enhoş, Sinan Varol, Kamil Gülşen, Rıfat Yıldırım, Funda Gümüş, Ertuğrul Okuyan	194
Is childhood obesity related to atrial and ventricular arrhytmia?	Metin Karayakalı, Samet Özer, Arif Arısoy, Kayıhan Karaman, Ataç Çelik	194
Is there a relationship between mean platelet volume and the severity of coronary ectasia?	Kerem Özbek, Hüseyin Katlandur, Ahmet Keser, Şeref Ulucan, Hüseyin Özdil, Mehmet Sıddık Ülgen	194-196
Prevalence of resting electrocardiography changes in patients with coronary artery ectasiaand their relationship with coronary artery disease severity	Ahmet Keser, Kerem Özbek, Şeref Ulucan, Hüseyin Katlandur Mustafa Bilgi, Hüseyin Özdil, İsmail Ateş	196
Total pulmonary vein Diameter is strong predictor of atrial fibrillation after coronary artery bypass graft surgery	Hüseyin Katlandur, Kerem Özbek, Hüseyin Özdil, Bilal Arık, Ahmet Kuzgun, Ahmet Keser, Şeref Ulucan, Mehmet Sıddık Ülgen	196-197
Arterial Stiffness Parameters in Patients With Vasovagal Syncope	Erkan Alpaslan, Ebru Özpelit, Emre Özpelit, Sedat Taş, Abdulla Arslan Reşit Yiğit Yılancıoğlu, Neryan Özgül, Asım Oktay Ergene	197-198
An Interesting and Unusual Clinical Scenario; Anomalous Origin of the Left Coronary Artery from the Right Sinus of Valsalva with Interarterial Course, Presented as Acute Myocardial Infarction Caused by the RCA	Ersin Çağrı Şimşek, Sadık Volkan Emren, Mehmet Erdinç Arıkan Emre Özdemir, Sedat Altay	198
Evaluation of neutrophil to lymphocyte ratio changes between pre- and post-menopausal life for cardiovascular risk prediction	Ahmet Karakurt, Cennet Yıldız	198
Acute pulmoner embolism mimicking acute coronary syndrome can misdirect the diagnostic approach	Fulya Avcı Demir , Yunus Okudan , Ahmet Altınbaş	199

CONTENT

Evaluation of Tp-e interval and Tp-e/QT ratio in patient with e polycystic ovary syndrom	Arif Süner, Mustafa Kaplanoğlu	199-200
Prosthetic Mitral Valve Endocarditis Presenting as Complete Heart Block	Özlem Arıcan Özlük, Mustafa Yılmaz, Tezcan Peker, Faruk Toktas, Bedrettin Boyraz	200
Comparison of heart rate variability of the nurses working in coronary care unit during working and resting time	Taner Şen, Mehmet Ali Astarcıoğlu, Celal Kilit	200-202
Functional capacity is associated with socioeconomic and medico-social status	Hakkı Kaya, Hasan Yücel, Mehmet Birhan Yılmaz	202
Usefulness of Eosinophil-Lymphocyte Ratio to Predict Stent Restenosis	Mehmet Zihni Bilik, Mehmet Ata Akil, Halit Acet, Murat Yüksel, Mustafa Oylumlu, Nihat Polat, Adem Aktan, Sait Alan	202-203
Septic coronary artery embolism treated surgically	Mustafa Kurşun, İnan Mutlu, Cüneyt Türkoğlu	203
Drug Adherence to New Oral Anticoagulant Agents in Patients with Venous thromboembolism: NOAC-TR Subgroup Study	Sadık Volkan Emren, Osman Beton, Oktay Şenöz, Yüksel Dereli, Uğur Taşkın, Hakan Çakır, Çağlar Özmen, Gönül Açıksarı, Abdulla Aslan, Barış Çelebi, Özkan Karaca, Mehdi Zoghi	203-204
Cyst hydatid as annoying neighbour	Özgen Şafak	204
Unvisible Heart In Transthoracic Echocardiography	Ahmet Oğuz Baktır, Bahadır Şarlı, Hüseyin Odabaş	204
Cardiac Fibroelastoma Case Presenting with Ischemic Cerebrovascular Accident	Semih Sürmen, Murat Uğurlucan, Berrin Umman, Hasan Kudat	204-205
Tricuspid Prosthetic Valve Thrombosis of a Patient with a History of Ebstein Anomaly	Ahmet Oğuz Baktır, Bahadır Şarlı, Hüseyin Odabaş, Eyüp Özkan	205
Rare Cooccurence of Left Atrial Mixoma and Menengioma	Zafer Yalim, Ersel Onrat, Önder Akci, Sümeyra Alan Yalım, Mustafa Aldemir	206
A large periotic abscess in a patient with metallic aortic and mitral valve	Kamil Gülşen, Gökmen Kum, Sinan Varol, Ertuğrul Okuyan	207
Late Skin Erosion Due to Implantable Cardioverter Defibrillator Generator and Migration Out of the Skin	Cemil Zencir	207

International Journal of the Cardiovascular Academy 2 (2016) 155–156

Contents lists available at ScienceDirect

International Journal of the Cardiovascular Academy

journal homepage: www.elsevier.com/locate/ijcac

Case report

Genetic warfarin resistance in a patient with mechanical prosthetic aortic valve☆

M Ildızlı [a], M Karaca [b,*]

[a] Sultanbeyli State Hospital, Türkiye
[b] Katip Çelebi Universty, Atatürk Training and Research Hospital, Türkiye

ARTICLE INFO

Article history:
Received 19 August 2016
Received in revised form 26 October 2016
Accepted 27 October 2016
Available online 31 October 2016

Keywords:
Warfarin resistance
Mechanical heart valve
Genetic testing

ABSTRACT

Warfarin resistance is a rare but an important clinical problem in patients requiring anticoagulation. Here we report a male patient with a mechanical aortic prosthetic valve who did not have a target level of therapeutic anticoagulation on warfarin. A pharmaco-genetic testing revealed VKORC1 A/G and CYP2C9 *1*1 genotype. His prothrombin time level with international normalization ratio (INR) was 1–1.3 on warfarin 80 mg per day. Phenprocoumon was not successful to increase INR level. He has been given enoxaparine BID (1 mg/kg) without any thromboembolic events at follow-up. Although VKORC1 and CYP2C9 genes are two major genetic factors responsible for this clinical situation, more studies seem to be necessary to explain this phenomenon.

The Society of Cardiovascular Academy. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Introduction

Warfarin is a widely used oral anticoagulant with a narrow therapeutic window and high inter-individual variability. Patients require different dosages of warfarin for a target international normalization ratio (INR) level, but 95% of them need more than 1 and less than 9 mg. Patients requiring 9 mg or more warfarin are therefore classified as warfarin-resistant.[1]

Case report

The subject is a 35-year-old male patient with mechanical aortic prosthetic valve. After surgery, his warfarin dose is gradually increased to 80 mg daily since an optimal INR level is not achieved at usual dosages. Accordingly, we thought the patient had warfarin resistance. We investigated possible causes of acquired resistance. He is compliant with the therapy and taked no concurrent medications which interact with warfarin. He had no gastrointestinal disorders. His diet did not contain excessive amount of vitamin K. His anticoagulant switched to phenprocoumon which has longer half-life than warfarin. However, the patient did not have targeted INR levels. He is started enoxaparine twice daily (1 mg/kg) therapy. He experienced no thromboembolic events.

Warfarin resistance can be either acquired or hereditary. Possible causes of acquired resistance include enzymatic induction of warfarin metabolism by other drugs, enhanced dietary intake of vitamin K, noncompliance with therapy and hypothyroidism.[2]

Genetic factors are contemplated to play role in determining optimum dose for an individual. Studies have demonstrated the effect of CYP2C9 (cytochrome P450) and VKORC1 (vitamin K epoxide reductase complex) gene polymorphisms on the dosages of oral coumarin anticoagulants. Cytochrome P450 2C9 enzyme is involved in the elimination of warfarin. Allelic variants of CYP2C9 gene, CYP2C9*2(Arg144Cys) and CYP2C9*3 (Ile359Leu), have less catalytic activity than the wild type CYP2C9*1(Arg144/Ile359). The presence of these variants in an individual is thus expected to lower the requirements of the drug.[3]

Several years ago, VKORC1 has been identified as the gene encoding vitamin K epoxide reductase (VKOR) - the target protein for coumarin derivatives like warfarin or phenprocoumon.[4] The vitamin K oxidoreductase (VKOR) is an integral membrane protein that reduces vitamin K to support the carboxylation and consequent activation of vitamin K-dependent proteins.[5] Heterozygous VKORC1 missense mutations have been identified in individuals who are resistant to warfarin and homozygous mutations have been reported in families with combined deficiency of vitamin-K-dependent clotting factors type 2 (MIM 607473).VKORC1 missense mutations alter vitamin-K epoxide reductase activity and, therefore, play a considerable role in the warfarin-resistant phenotype.[6]

Patients with G allele for VKORC1-1639G>A have a significantly higher number of thromboembolic complications per month during therapy. VKORC1-1639G>A, age, CYP2C9*3, and smoking status explain 43.4% of the overall variability in the warfarin dose.[7]

In recent years, Ozer et al. have studied the impact of *CYP2C9* and *VKORC1* genetic polymorphism on warfarin dose requirements in adult Turkish population. The mean warfarin daily dose requirement was higher in *CYP2C9* homozygous wild-type patients, compared to

☆ Peer review under responsibility of The Society of Cardiovascular Academy.

* Corresponding author at: Atatürk Eğitim Araştırma Hastanesi Kardiyoloji Bölümü, Basın Sitesi, 35150 Karabağlar/Izmir, Türkiye.
E-mail addresses: mildizli@yahoo.com (M. Ildızlı), mustafakaraca99@hotmail.com (M. Karaca).Peer review under responsibility of The Society of Cardiovascular Academy.

http://dx.doi.org/10.1016/j.ijcac.2016.10.003
2405-8181/The Society of Cardiovascular Academy. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

those with the variant *3 allele ($P < 0.05$), similar to those with the variant *2 allele and highest in patients with the *VKORC1*–1639 GG genotype compared to those with the GA genotype and the AA genotype. The time to therapeutic INR was longer in *CYP2C9*homozygous wild-type patients compared with those with the variant *2 and *3 alleles, and longer in patients with the *VKORC1* (position −1639) GG genotype compared with those with the GA genotype and the AA genotype.[8]

In the present case, pharmacogenetic testing revealed that our patient carried VKORC1 A/G variant and CYP2C9 *1*1 wild type. This genotype is expected to require higher doses of warfarin for adequate anticoagulation. Despite increasing warfarin doses over ranges in dose-prediction algorithms, the patient did not reach a target INR level of 2 to 3. His INR levels remained between 1.0 and 1.3, quite under therapeutic levels. His anticoagulant was switched to phenprocoumon, which has a longer half-life than warfarin. It did not increase INR levels either. Therefore, he is currently being treated with enoxaparine twice daily. He has experienced no thromboembolic events so far.

In patients requiring high dose warfarin for target anticoagulant effect, polymorphisms of VKORC1 and CYP2C9 genes should be considered and they should be investigated. Alternative anticoagulant agents like enoxaparine can be used in such patients.

References

1. Routledge PA, Shetty HGM, White JP, Collins P. Case studies in therapeutics: warfarin resistance and inefficacy in a man with recurrent thromboembolism, and anticoagulant associated priapism. *BR J Clin Pharmacol* 1998;**46**(4):343–346.
2. Hallak HO, Wedlund PJ, Modi MW, et al. High clearance of (*S*)-warfarin in a warfarin-resistant subject. *Br J Clin Pharmacol* 1993;**35**(3):327–330.
3. Kaur A, Khan F, Agrawal SS, Kapoor A, Agarwal SK, Phadke SR. Cytochrome P450 (*CYP2C9*2,*3*) & vitamin-K epoxide reductase complex (*VKORC1 -1639G<A*) gene polymorphisms & their effect on acenocoumarol dose in patients with mechanical heart valve replacement. *Indian J Med Res* 2013;**137**(1):203–209.
4. Müller E, Keller A, Fregin A, CR M, Rost S. Confirmation of warfarin resistance of naturally occurring VKORC1 variants by coexpression with coagulation factor IX and in silico protein modelling. *BMC Genet* 2014;**4**:15–17.
5. Rishavy MA, Usubalieva A, Hallgren KW, Berkner KL. Novel insight into the mechanism of the vitamin K oxidoreductase (VKOR) electron relay through Cys^{43} and Cys^{51} reduces VKOR to allow vitamin K reduction and facilitation of vitamin K-dependent protein carboxylation. *J Biol Chem* 2011;**286**(9):7267–7278.
6. Scott SA, Edelmann L, Kornreich R, RJ D. Warfarin pharmacogenetics: CYP2C9 and VKORC1 genotypes predict different sensitivity and resistance frequenciesin the Ashkenazi and Sephardi Jewish populations. *Am J Hum Genet* 2008;**82**:495–500.
7. Bazan NS, Sabry NA, Rizk A, Mokhtar S, Badary OA. Factors affecting warfarin dose requirements and quality of anticoagulation in adult Egyptian patients: role of gene polymorphism. *Ir J Med Sci* 2014;**183**(2):161–172.
8. Ozer N, Cam N, Tangurek B, et al. The impact of *CYP2C9* and *VKORC1* genetic polymorphism and patient characteristics upon warfarin dose requirements in an adult Turkish population. *Heart Vessel* 2010;**25**:155–162.

International Journal of the Cardiovascular Academy 2 (2016) 157–159

Contents lists available at ScienceDirect

International Journal of the Cardiovascular Academy

journal homepage: www.elsevier.com/locate/ijcac

Case report

Relationship between epicardial fat tissue thickness and breast arterial calcifications in premenopausal women☆

Cennet Yıldız [a,*], Abdulmelik Yıldız [b], Ahmet Karakurt [c]

[a] Tekden Hospital, Istanbul, Turkey
[b] Nisantasi University, Istanbul, Turkey
[c] Kafkas University, Kars, Turkey

ARTICLE INFO

Article history:
Received 29 August 2016
Received in revised form 15 October 2016
Accepted 18 October 2016
Available online 21 October 2016

Objective

Epicardial fat tissue (EFT) is located between myocardium and visceral pericardium. It has the same embryologic origin with the mesenteric omental fat tissue. It is very close to the myocardium and shares the same microcirculation.[1] EFT functions as a mechanical buffer against coronary arterial wave torsion, plays an important role in maintaining fatty acid homeostasis and is thought to contribute coronary artery remodelling.[2] EFT secretes several proinflammatory cytokines such as angiotensin II, tumor necrosis factor-α, monocyte chemotactic protein-1, interleukin-6, resistin and plays an active role in inflammatory and atherosclerotic processes.[3,4]

Breast arterial calcifications (BAC) are a type of medial calcification detected at mammography. Its prevalence ranges between 1% and 49% in female population.[5] Age, race and ethnicity are the most important factors influencing the prevalence of BAC.[6] BAC have been associated with hypertension,[7] diabetes mellitus,[7] coronary artery disease[8] and are a risk marker for future cardiovascular disease events.[9] Women with mammography-detected BAC are more likely to have coronary artery calcification which is an early sign of coronary artery disease.[10]

In this study starting with the possibility of existence of correlation between EFT thickness and BAC, we aimed to investigate the relationship between EFT thickness and BAC in premenopausal women.

Methods

Among 756 premenopausal women who underwent diagnostic mammography between November 2015 and March 2016, 171 of these premenopausal women enrolled in this prospective study. Clinical indication for mammography was either routine screening mammography for women with no presenting complaints or diagnostic mammography for women with suspicious findings on breast ultrasound. The study protocol was approved by the Medipol University Ethics Committee and all subjects gave informed consent prior to participation. The study group consisted of 80 women with mammography detected BAC and the control group consisted of 86 women without BAC (an example of BAC is shown in Fig. 1.) Women with hypertension, diabetes mellitus, hyperlipidemia, ischemic heart disease, congestive heart failure, thyroid dysfunction, anemia, renal or hepatic failure, stroke or other chronic medical disorders were excluded from the study.

Blood samples were collected from antecubital vein after an overnight fast. Serum total cholesterol (TC), triglycerides (TG), high-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C), fasting glucose were analysed.

Each subject underwent a full-field digital mammographic examination using a Mammomat 3000 Nova equipment (Siemens AG, Germany). All mammograms had craniocaudal and mediolateral oblique images of the two breasts. All images were interpreted by an experienced radiologist who was blinded to the echocardiography results. BAC were described as deposits of parallel lines of calcium when the arterial wall was imaged longitudinally or as calcific rings when the arterial wall was imaged transversely.[11]

All the subjects underwent full transthoracic echocardiographic examination using Vivid 3 pro (GE Vingmed Ultrasound AS, Horten, Norway) in accordance with the recommendations of the American Society of Echocardiograpy.[12] Left ventricular ejection fraction (LVEF) was measured by using Simpson rule. Epicardial fat tissue was identified as echo free space between myocardium and visceral pericardium and its thickness was measured perpendicularly on the free wall of right ventricle from parasternal long-axis and short axis views at end diastole by an experienced cardiologist who was blinded to the clinical results of the patients.[13] The average of three measurements was used for statistical analysis.

☆ Conflict of interest: None declared.

* Corresponding author at: Konaklar mah, Org. Izzettin Aksalur cad, Oyak sitesi sok, 38 Blok Daire 2. Besiktas, Istanbul, Turkey.
E-mail addresses: firdevsi2010@gmail.com (C. Yıldız), drmelik@hotmail.com (A. Yıldız), karakurt38@hotmail.com (A. Karakurt).

Peer review under responsibility of The Society of Cardiovascular Academy.

http://dx.doi.org/10.1016/j.ijcac.2016.10.002

2405-8181/© 2016 The Society of Cardiovascular Academy. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).



Fig. 1. An example of BAC.

Statistical analysis

Continuous variables were expressed as mean and standard deviation. Categorical variables were expressed as percentages. Parametric continuous variables and categorical variables were compared by Student's *t*-test and, the chi square test respectively. Multiple regression analysis was used to evaluate the possible associations of weight, BMI, glucose, LDL-C, HDL—C, TC, TG, EFT with BAC. *P* values <0.05 were considered significant. All statistical studies were carried out by using the SPSS program (version 15.0; SPSS Inc., Chicago, Illinois, USA).

Results

Among 756 women who underwent screening and diagnostic mammography, 168 subjects met the entry criteria and were enrolled in the study. 80 women with BAC were accepted as the study group, and 86 women without BAC were accepted as the control group. No significant difference was detected between the two groups with respect to age, weight, height, BMI, LVEF, fasting glucose, TC, HDL-C and TG levels. LDL-C level and EFT thickness were statistically significantly higher in the study group compared to the control group (3.65 ± 0.73 mm vs. 2.94 ± 0.67 mm, $p < 0.001$, respectively). Clinical and biochemical parameters of the patients are shown in Table 1.

Multiple regression analysis showed that EFT thickness, TC, LDL-C and BMI were important associations of BAC (Table 2).

Discussion

Our study showed an association between EFT thickness and BAC in patients without structural heart disease. EFT thickness was significantly higher in patients with BAC. There was a strong association between EFT thickness and BAC. We also found positive associations between EAT thickness and TC, BMI, LDL-C.

Anatomically EFT, located between myocardium and visceral pericardium, is mainly concentrated in the atrioventricular and interventricular grooves and shares the same microcirculation with the myocardium and coronary arteries.[14] EFT has paracrine and vasocrine activities, have both harmful and protective effects on heart through release of variety of adipocytokines.[15] Recently, it has been demonstrated that increased EFT thickness occurs with disorders such as hypertension,.[16]insulin resistance,[17] metabolic syndrome,[18] and coronary atherosclerosis.[4] Several studies have assessed the relationship between EFT and coronary artery disease.[3,4,15,19] The pathophysiological mechanisms responsible for CAD development through EFT are not clearly elucidated. In patients with CAD, inflammatory pathways within EFT are activated and EFT secretes more chemokines and cytokines that mediate inflammation.[20] EFT may act as an endocrine organ by secreting various factors in the circulation thus contributing coronary lesion formation.

Vascular calcifications occur in the intima or media layers of the vessel wall. Intimal calcification is almost always associated with atherosclerosis, whereas BAC are a form of medial arterial sclerosis which is independent of atherosclerosis.[21,22] These two types of calcification represent pathophysiological different mechanisms. Intimal calcification is related to chronic inflammatory changes which involve growth factors, inflammatory cells, lipid deposition and macrophage accumulation.[21] Medial arterial calcification is almost always associated with aging, chronic renal failure or diabetes and involves the differentiation of vascular smooth muscle cells into osteoblast like cells.[22] BAC are correlated with subsequent development of coronary artery calcifications,[23–25] Kemmeren et al. found that presence of BAC was associated with a 30% and 90% increase in cardiovascular mortality in non-diabetic and diabetic women, respectively.[26] Rotter et al. showed that mammographically detected BAC was associated with an increased prevalence of cardiovascular risk factors and cardiovascular morbidity.[11] A recent study has shown that presence of BAC are stronger risk factor than other cardiovascular risk factors such as diabetes, hypertension and hyperlipidemia for coronary artery calcification.[27]

Until several decades ago, it had been thought that coronary artery disease was primarily a man's disease. Today, it is recognised that this

Table 1
Clinical and biochemical parameters of the patients.

	Study group ($n = 80$)	Control group ($n = 86$)	P
Age	44.7 ± 3.7	45.1 ± 3.3	0.36
Height (m)	1.64 ± 0.08	1.65 ± 0.07	0.37
Weight (kg)	74.3 ± 10.7	72.8 ± 9.2	0.33
BMI	27.8 ± 5.1	26.8 ± 4.1	0.16
Smokers, n (%)	15 (18)	18 (20.4)	0.44
Alcohol, n (%)	8 (9.6)	9 (10.2)	0.57
Fasting Glucose (mg/dl)	99.7 ± 10.3	96.9 ± 8.3	0.06
TC (mg/dl)	190.7 ± 36.7	188.3 ± 26.6	0.64
LDL-C (mg/dl)	133.7 ± 25.9	125.1 ± 27.8	0.04
HDL-C (mg/dl)	43.4 ± 9.8	41.8 ± 9.9	0.30
TG (mg/dl)	157.2 ± 58.9	156.6 ± 59.3	0.94
SBP (mmHg)	131.4 ± 11.6	130.1 ± 18.2	0.59
DBP (mmHg)	81.8 ± 8.7	82.3 ± 8.1	0.72
LVEF (%)	62.7 ± 4.1	63.3 ± 3.5	0.36
EFT thickness (mm)	3.65 ± 0.73	2.94 ± 0.67	<0.001

TC: Total cholesterol; LDL-C: Low density lipoprotein cholesterol; HDL-C:High density lipoprotein cholesterol; TG: Triglyceride; SBP: Systolic blood pressure DBP: Diastolic blood pressure; LVEFF: Left ventricular ejection fraction; EFT: Epicardial Fat tissue.

Table 2
Parameters that have associations with BAC.

	OR	95% C.I.	P
TC	0.962	0.938–0.986	0.002
LDL-C	0.955	0.924–0.987	0.007
BMI	0.631	0.510–0.782	<0.001
EFT thickness	869.4	97.91–7719.8	<0.001

BAC: Breast arterial calcifications; BMI: Body mass index; TC: Total cholesterol; LDL-C: Low density lipoprotein cholesterol; HDL-C: High density lipoprotein cholesterol; TG: Triglyceride.

belief is not true, as cardiovascular disease is the most common cause of death among women throughout the world; In addition cardiovascular mortality rate among young women is still on the rise. Prevention and diagnosis of coronary artery disease are of great importance, because not only it increases the chances of cure, but it also reduces the major complications that could be avoided at an early stage. Traditional risk factors such as hyperlipidemia, hypertension, family history, diabetes mellitus and smoking are commonly used to assess the cardiovascular disease risk. Besides traditional risk factors, several new coronary risk factors have been identified and play significant roles in the atherosclerosis development.[28,29]One of those risk factors is BAC. Recent studies have shown that presence of BAC on mammograms indicates a greater risk for coronary artery disease.[27] As the EFT thickness was positively correlated with BAC and LDL-C levels, risk factors for coronary artery disease, in our study, EFT thickness measurement might play an important role in coronary artery risk stratification for premenopausal women in clinical practice.

Study limitations

Visual scoring of conventional mammography was applied in BAC assessment, the calcification mass scoring which is used at the digital mammography was not performed.

References

1. Fei J, Mazzoccoli G. Epicardial fat is an important visceral adipose depot influencing cardiovascular disease and metabolic syndrome. *J Clin Exp Cardiolog* 2013;**4**(3)e121.
2. Rabkin SW. Epicardial fat: properties, function and relationship to obesity. *Obes Rev* 2007;**8**(3):253–261.
3. Fitzgibbons TP, Czech MP. Epicardial and perivascular adipose tissues and their influence on cardiovascular disease: basic mechanisms and clinical associations. *J Am Heart Assoc* 2014;**3**(2)e000582.
4. Yerramasu A, Dey D, Venuraju S, et al. Increased volume of epicardial fat is an independent risk factor for accelerated progression of sub-clinical coronary atherosclerosis. *Atherosclerosis* 2012;**220**(1):223–230.
5. Iribarren C, Molloi S. Breast arterial calcification: a new marker of cardiovascular risk? *Curr Cardiovasc Risk Rep* 2013;**7**(2):126–135.
6. Reddy J, Son H, Smith SJ, Paultre F, Mosca L. Prevalence of breast arterial calcifications in an ethnically diverse population of women. *Ann Epidemiol* 2005;**15**(5):344–350.
7. Cetin M, Cetin R, Tamer N, Kelekçi S. Breast arterial calcifications associated with diabetes and hypertension. *J Diabetes Complications* 2004;**18**(6):363–366.
8. Schnatz PF, Marakovits KA, O'Sullivan DM. The association of breast arterial calcification and coronary heart disease. *Obstet Gynecol* 2011;**117**(2 Pt 1):233–241.
9. Kemmeren JM, van Noord PA, Beijernick D, Frachebound J, Banga JD, van der Graaf Y. Arterial calcifications found on breast screening mammograms and cardiovascular mortality in women. *Am J Epidemiol* 1998;**147**(4):333–341.
10. Margolies L, Salvatore M, Hecht HS, et al. Digital mammography and screening for coronary artery disease. *J Am Coll Cardiol Img* 2016;**9**(4):350–360.
11. Rotter MA, Schnatz PF, Currier Jr AA, O'Sullivan DM. Breast arterial calcifications (BACs) found on screening mammography and their association with cardiovascular disease. *Menopause* 2008;**15**:276–281.
12. Gottdiener JS, Bednarz J, Devereux R, et al. American Society of Echocardiography recommendations for use of echocardiography in clinical trials. *J Am Soc Echocardiogr* 2004;**17**(10):1086–1119.
13. Iacobellis G, Assael F, Ribaudo MC, et al. Epicardial fat from echocardiography: a new method for visceral adipose tissue prediction. *Obes Res* 2003;**11**:304–310.
14. Sacks HS, Fain JN. Human epicardial adipose tissue: a review. *Am Heart J* 2007;**153**(6):907–917.
15. Katsiki N, Mikhailidis DP, Wierzbicki AS. Epicardial fat and vascular risk: a narrative review. *Curr Opin Cardiol* 2013;**28**:458–463.
16. Dicker D, Atar E, Kornowski R, Bachar GN. Increased epicardial adipose tissue thickness as a predictor for hypertension: a cross-sectional observational study. *J Clin Hypertens (Greenwich)* 2013;**15**:893–898.
17. Iacobellis G, Leonetti F. Epicardial adipose tissue and insulin resistance in obese subjects. *J Clin Endocrinol Metab* 2005;**90**(11):6300–6302.
18. Yorgun H, Canpolat U, Hazırolan T, et al. Increased epicardial fat tissue is a marker of metabolic syndrome in adult patients. *Int J Cardiol* 2013;**165**(2):308–313.
19. Börekçi A, Gür M, Özaltun B, et al. Epicardial fat thickness in stable coronary artery disease: its relationship with high-sensitive cardiac troponin T and N-terminal pro-brain natriuretic peptide. *Coron Artery Dis* 2014 Dec;**25**(8):685–690.
20. Mazurek T, Zhang L, Zalewski A, et al. Human epicardial adipose tissue is a source of inflammatory mediators. *Circulation* 2003;**108**:2460–2466.
21. Mackey RH, Venkitachalam L, Sutton-Tyrrell K. Calcifications, arterial stiffness and atherosclerosis. *Adv Cardiol* 2007;**44**:234.
22. Leopold JA. Vascular calcification: mechanisms of vascular smooth muscle cell calcification. *Trends Cardiovasc Med* 2015;**25**(4):267–274.
23. Hendriks EJ, de Jong PA, van der Graaf Y, Mall WP, van der Schouw YT, Beulens JW. Breast arterial calcifications: a systematic review and meta-analysis of their determinants and their association with cardiovascular events. *Atherosclerosis* 2015;**239**(1):11–20.
24. Maas AH, van der Schouw YT, Atsma F, et al. Breast arterial calcifications are correlated with subsequent development of coronary artery calcifications, but their aetiology is predominantly different. *Eur J Radiol* 2007;**63**(3):396–400.
25. Topal U, Kaderli A, Topal NB, et al. Relationship between the arterial calcification detected in mammography and coronary artery disease. *Eur J Radiol* 2007 Sep;**63**(3):391–395.
26. Kemmeren JM, Beijerinck D, van-Noord PA, et al. Breast arterial calcifications: association with diabetes mellitus and cardiovascular mortality. *Radiology* 1996;**201**:75–78 (4).
27. Nasir K, McEvoy JW. Recognizing breast arterial calcification as atherosclerotic CVD equivalent. From evidence to action. *J Am Coll Cardiol Img* 2016;**9**(4):361–363.
28. Elisaf M. The treatment of coronary heart disease: an update. Part 1: an overview of the risk factors for cardiovascular disease. *Curr Med Res Opin* 2001;**17**:18–26.
29. John JM, Bhatt DL. Emerging risk factors for atherosclerosis. *Indian Heart J* 2007;**59**:28–37.

International Journal of the Cardiovascular Academy 2 (2016) 160–161

Contents lists available at ScienceDirect

International Journal of the Cardiovascular Academy

journal homepage: www.elsevier.com/locate/ijcac

Case report

Complete resolution of huge left ventricular thrombus with apixaban treatment

Hasan Ata Bolayır *, Hakan Güneş, Ömer Şahin, Dursun Akaslan, Tarık Kıvrak

Sivas Numune Hospital, Cardiology Department, Sivas, Turkey

ARTICLE INFO

Article history:
Received 16 September 2016
Received in revised form 9 October 2016
Accepted 11 October 2016
Available online 18 October 2016

Keywords:
Thrombus
Apixaban
Dilated cardiomyopathy

ABSTRACT

A 70-year-old male patient was admitted to our Cardiology Department because of shortness of breath. An intravenous furosemide infusion showed that volume load had been decreased. A transthoracic echocardiography was performed after the patient was able to lie in the supine position. The ejection fraction was 25%, and there was moderate mitral regurgitation. The end diastolic diameter was 60 mm, and a 4 × 3 cm apical thrombus was detected. Surgical removal of the apical thrombus was not considered because of the high risk of the procedure. IV thrombolytic treatment was suggested, but the patient rejected this approach due to the risks associated with thrombolytic resolution of the thrombus. Warfarin treatment had not been started because the patient was unable to come to INR (international normalized ratio) follow-up. The patient was discharged from the hospital with a prescription, including apixaban 2 × 5 mg, metoprolol 1 × 50 mg, ramipril 1 × 2.5 mg and spironolactone/hydrocholorothiazide 1 × 25 mg. Complete disappearance of thrombus was observed on transthoracic echocardiography approximately one month later when the patient came in for polyclinic control. He had no active cardiac symptoms, and his functional capacity was I.

© 2016 The Society of Cardiovascular Academy. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Introduction

Left ventricular (LV) thrombus is usually observed in dilated cardiomyopathy (CMP) and LV aneurysms.[1] Anticoagulant treatment is recommended to reduce embolization risk.[2] New oral anticoagulants (NOACs) were found to be satisfactory compared to warfarin for preventing thromboembolic disorders with non-valvular atrial fibrillation.[2] Nevertheless, we have very little data about apixaban treatment to resolve LV thrombus.

Case report

A 70-year-old male patient with a history of smoking was admitted to our cardiology department due to shortness of breath. He complained about difficulty breathing for two months. His functional capacity was III. The ECG was in atrial fibrillation rhythm. In his initial evaluation, the consecutive two troponin levels were lower than the upper reference limit. There was bilateral pleural effusion in a chest X-ray, and the cardiothoracic index was elevated. An intravenous (IV) furosemide infusion showed that volume load had been decreased. Transthoracic echocardiography (ECHO) was performed after the patient was able to lie in a supine position. In his transthoracic ECHO, we detected severe global hypokinesia with an LV ejection fraction of 25%, moderate mitral regurgitation and a 4 × 3 cm thrombus in the LV. The end diastolic diameter was 60 mm (Dilated CMP) (Fig. 1). Surgical removal of the apical thrombus was not considered because of the high risk of the procedure. IV thrombolytic treatment was suggested, but the patient rejected this offer due to the risks of thrombolytic resolution of the thrombus. Warfarin treatment had not been initiated because the patient was unable to come to an INR follow-up. The patient was discharged from the hospital with a prescription including apixaban 2 × 5 mg tablet (tb), metoprolol 1 × 50 mg tb, ramipril 1 × 2.5 mg tb and spironolactone/hydrocholorothiazide 1 × 25 mg tb. Complete disappearance of the thrombus was observed on transthoracic ECHO one month later when the patient came for polyclinic control (Fig. 2). We performed coronary angiography on the patient because of the depressed ejection fraction. He had no flow-limiting stenosis on his coronary angiogram. He had no active cardiac symptoms, and his functional capacity was I.

Discussion

We believed this apical mass was a thrombus because the patient had no anti-thrombotic therapy, his ECG was in atrial fibrillation rhythm and he had dilated CMP that created a tendency for thrombosis. In this report, we treated LV thrombus with apixaban successfully. LV thrombus resolution with warfarin therapy was demonstrated in previous studies.[3] The role of NOACs in reducing thromboembolic risk in

* Corresponding author.
E-mail addresses: habolayir@hotmail.com (H.A. Bolayır), drhakangunes@hotmail.com (H. Güneş), drosahin@hotmail.com (Ö. Şahin), dursun_akaslan@yahoo.com (D. Akaslan), tarikkivrak@gmail.com (T. Kıvrak).

Peer review under responsibility of The Society of Cardiovascular Academy.

http://dx.doi.org/10.1016/j.ijcac.2016.10.001

2405-8181/© 2016 The Society of Cardiovascular Academy. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

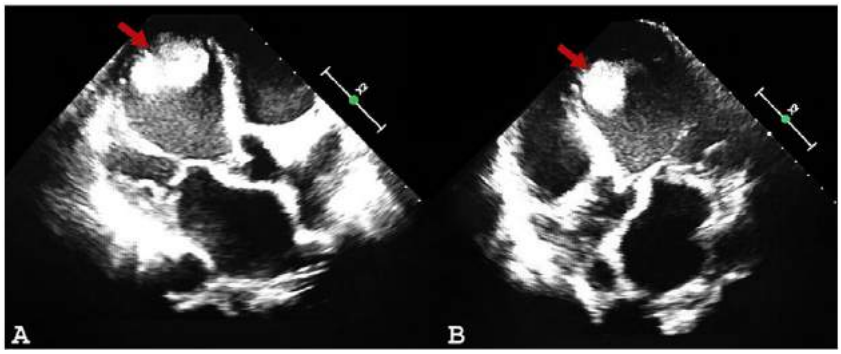


Fig. 1. Before apixaban treatment.

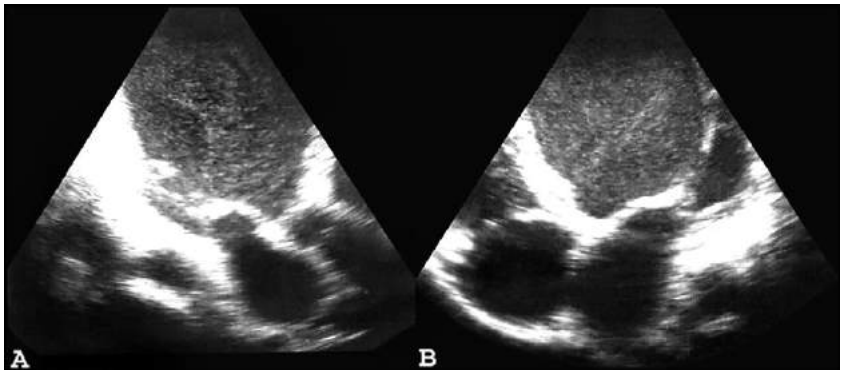


Fig. 2. After apixaban treatment.

patients with LV mural thrombus needs to be clarified. Vitamin K antagonists have many limitations, such as the slow onset of action, dietary restrictions and a need for dose adjustments.[4] NOACs do not have these types of limitations and may also reduce the risk of hemorrhagic stroke.[4] Apixaban has been shown to have superior efficacy for treating systemic embolism, reducing stroke and all causes of mortality compared to warfarin.[5] We could not start warfarin with this patient because he was unable to come to an INR follow-up. Therefore, we started apixaban 5 mg 2 × 1 tb, and then one month later, the LV thrombus was found to be completely resolved. There are several limitations to the use of NOACs. Careful use in elderly and patients with renal impairment is recommended.[6] The data are scant regarding the use of NOACs in pregnant women, pediatric patients and patients with valvular disease.[6] For apixaban, the absence of approved antidotes in the case of life-threatening hemorrhage or surgery is another limitation for its use.[7] This case report showed that LV thrombus can be completely resolved by apixaban treatment. However, randomized clinical trials are needed to elucidate and confirm the use of NOACs as an alternative to warfarin.

References

1. Haugland JM, Asinger RW, Mikell FL, Elsperger J, Hodges M. Embolic potential of left ventricular thrombi detected by two-dimensional echocardiography. *Circulation* 1984;**70**:588–598.
2. Heidbuchel H, Verhamme P, Alings M, et al. European Heart Rhythm Association practical guide on the use of new oral anticoagulants in patients with non-valvular atrial fibrillation. *Europace* 2013;**15**:625–651.
3. Vaitkus PT, Barnathan. ES. Embolic potential, prevention and management of mural thrombus complicating anterior myocardial infarction: A meta-analysis. *J Am Coll Cardiol* 1993;**22**:1004–1009.
4. Savelieva I, Camm AJ. Practical considerations for using novel oral anticoagulants in patients with atrial fibrillation. *Clin Cardiol* 2014;**37**:32–47.
5. Granger CB, Alexander JH, McMurray JJ, et al. Apixaban versus warfarin in patients with atrial fibrillation. *N Engl J Med* 2011;**365**:981–992.
6. Hanley CM, Kowey PR. Are the novel anticoagulants better than varfarin for patients with AF? *J Thorac Dis* 2015;**7**:165–171.
7. Yıldırım E, Kalkan K, et al. Successful resolution of left ventricular thrombus with apixaban treatment. *Int J Cardiovasc Acad* 2016;**2**:57–58.

International Journal of the Cardiovascular Academy 2 (2016) 162–164

Contents lists available at ScienceDirect

International Journal of the Cardiovascular Academy

journal homepage: www.elsevier.com/locate/ijcac

Case report

Diagnosis of hyperpotassemia on electrocardiography in a young woman with adrenal insufficiency

Mehmet Emin Piskinpasa [a], Turgut Karabag [b,*], Burcugül Kaya [a], Yalcin Hacioglu [c], Fettah Sametoglu [a]

[a] Department of Internal Medicine, Istanbul Education and Research Hospital, Istanbul, Turkey
[b] Department of Cardiology, Istanbul Education and Research Hospital, Istanbul, Turkey
[c] Department of Family Medicine, Istanbul Education and Research Hospital, Istanbul, Turkey

ARTICLE INFO

Article history:
Received 26 June 2016
Received in revised form 9 September 2016
Accepted 9 September 2016
Available online 17 September 2016

Keywords:
Hyperpotassemia
Adrenal insufficiency
Electrocardiography

Introduction

Severe hyperpotassemia is defined as a serum potassium level (K+) of 6.0 mmol/L or greater with electrocardiographic (ECG) changes or a serum potassium level of 6.5 mmol/L or greater without ECG changes.[1] Hyperpotassemia is caused by an inability of the kidneys to excrete potassium and/or the impairment of mechanisms that transport potassium from the circulation into the cells. Acute episodes of hyperpotassemia are usually triggered by the introduction of a medication that can affect potassium homeostasis, an illness, or dehydration.[2] Hyperpotassemia can cause various changes ranging from nonspecific changes on ECG to fatal cardiac arrhythmias.[3] Emergency treatment is necessary to prevent the development of fatal arrhythmias. This report presents the case of a young patient presenting with acute adrenal insufficiency who developed hypotension, hyponatremia and hyperpotassemia and discusses hyperpotassemia-induced ECG changes and treatment methods.

Case report

A 21-year old female patient with no previous disease presented to the emergency department with complaints of fatigue, dizziness, indigestion, and heartburn. The patient reported having lost 15 kg of weight within the last 6 months and had increased pigmentation of the skin and oral mucosa. The patient was not pregnant and had no history of drug, tobacco or alcohol use. There was no family history of chronic disease. A physical examination showed that blood pressure was 85/60 mm Hg, and heart rate was 96 beats/min. A chest x-ray was unremarkable. There was increased pigmentation in the oral mucosa and various areas of the body. Abdominal examination revealed midline tenderness. There was no defence or rebound. The results of other systemic examinations were normal. Wide QRS complexes were recorded on ECG. The rhythm was atrioventricular rhythm with peaked T-waves, and QRS complexes had merged with the S-wave (Fig. 1). Laboratory results conducted on venous blood sample revealed that potassium was 8.3 mmol/L and sodium was 118 mmol/L. Blood gas analysis showed a pH of 7.25 and bicarbonate of 14. Blood glucose was 72 mg/ld. The patient was hospitalized with initial diagnoses of adrenal insufficiency and acute adrenal crisis for further investigation, observation and treatment. Hyperpotassemia was planned to be treated first. Accordingly, the patient was given 1 ampule (225 mg) of calcium gluconate. Subsequently, 20% dextrose buffered with insulin was infused. Further examination of the patient revealed decreased cortisol (1.96 μg/mL) and increased ACTH. (60 pg/ml). Her thyroid function test and parathormone level were normal. The synacthen test showed low cortisol level (7 μg/mL). Antinuclear antibodies and anti-DNA antibodies were negative. Other laboratory findings were unremarkable. Abdominal ultrasound and tomography were unremarkable. Cranial magnetic resonance imaging revealed no evidence to suggest hypophyseal tumour or Sheehan Syndrome. The final diagnosis was primary adrenal insufficiency. The patient was given potassium lowering therapy (20% dextrose buffered with insulin) as well as 500 mg of sodium hydrogen carbonate and 20 mg of methylprednisolone for 4 days. A follow-up examination after 2 days revealed a potassium level of 7.2 mmol/l, and a sodium level of 118 mmol/l, upon which, methylprednisolone was administered as 40 mg for 4 days. In addition, fludrocortisone was administered in a dose of 0.4 mg. There was no change in sodium level on day 4 (122 mmol/L) but potassium level was 5.7 mmol/L. At the 4-day follow-up, an ECG showed normal sinus rhythm. The PR interval and QRS duration were normal (Fig. 2).

Discussion

Hyperpotassemia is a medical emergency that requires rapid diagnosis and treatment[4]. Hyperpotassemia is usually associated with

* Corresponding author at: Istanbul Eğitim Araştırma Hastanesi, Kardiyoloji Bölümü, Kat:6 Samatya-fatih, İstanbul, Turkey.
E-mail address: turgutkarabag@hotmail.com (T. Karabag).
Peer review under responsibility of The Society of Cardiovascular Academy.

http://dx.doi.org/10.1016/j.ijcac.2016.09.002
2405-8181/© 2016 The Society of Cardiovascular Academy. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

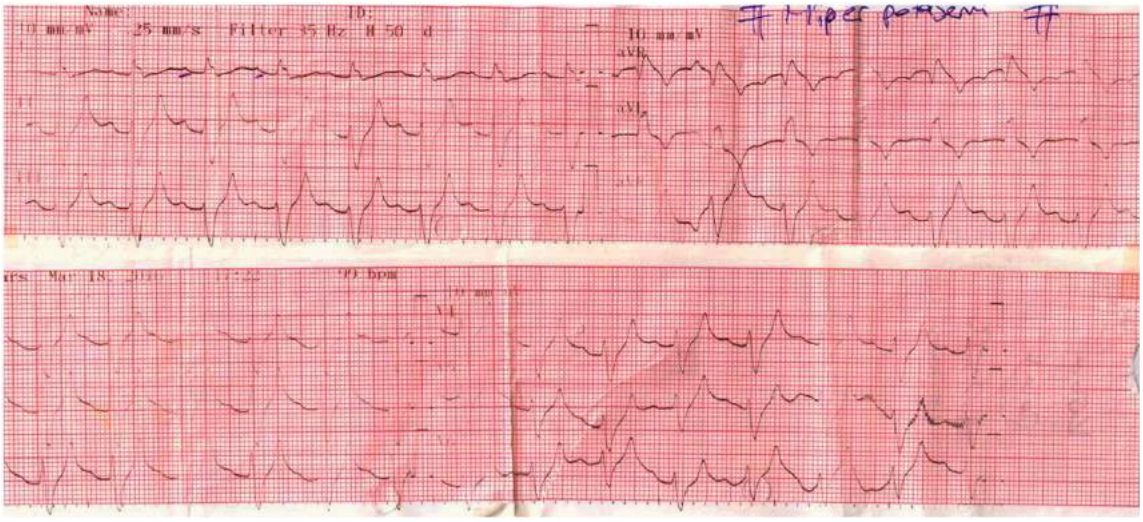


Fig. 1. Electrocardiograph showing idioventricular rhythm in a 21-year-old woman with 8.3 mmol/L potassium.

various ECG changes and these changes can be used to follow the effects of potassium on the heart[5]. As serum level of potassium increases, transmembrane permeability of cardiac cells also increases and potassium influx into the cells occurs. As a result, the resting membrane potential is less negative, the action potential is shortened, and conduction between myocytes is suppressed.[6] As potassium levels rise above normal, the earliest ECG change is usually peaked, symmetric, narrow-based T waves.[7] A further increase in potassium levels results in declined conduction velocity, widened and flattened P wave, lengthened PR segment and wide QRS complex with slurring of the S wave into a rapidly ascending limb of the T wave. P wave disappears and the QRS complex resembles "sine wave" that may result in ventricular fibrillation or asystole.[7] In the case presented here, the potassium level was 8.3 mmol/L. An electrocardiogram showed flattened P waves as well as peaked T waves. The PR interval was lengthened and there were wide QRS complexes reaching 0.16 s in some leads and the S wave of the QRS complex had merged with the ascending limb of the T wave. We considered that the clinical picture of the young patient with no previous structural heart disease and electrolyte imbalance resulting in abnormal ECG were associated with adrenal insufficiency. The physical examination and ECG findings were of guidance in establishing the aetiological diagnosis of primary adrenal insufficiency.

In the emergency treatment of hyperpotassemia, intravenous calcium gluconate and insulin-buffered hypertonic glucose facilitate the transport of potassium from the extracellular space into the cells. Intravenous sodium bicarbonate can also be useful. The sodium-cycle cation exchange resin polystyrene sulfonate given with 70% sorbitol as a retention enema is usually the next step and if necessary can be followed by oral doses[8,9]. It is also of significant importance to treat the primary cause of hyperpotassemia. In our patient, even though calcium gluconate and insulin-buffered gluconate led to a decrease in potassium levels, the most effective decrease appears to have been observed after steroid replacement.

In conclusion, hyperpotassemia is an important clinical condition that requires urgent diagnosis and treatment. ECG findings play an important role in diagnosis and treatment in patients with hyperpotassemia, particularly in patients presenting with nonspecific symptoms. Echocardiographic findings can be of great help in diseases presenting with various nonspecific symptoms such as adrenal insufficiency, as in the case presented here.

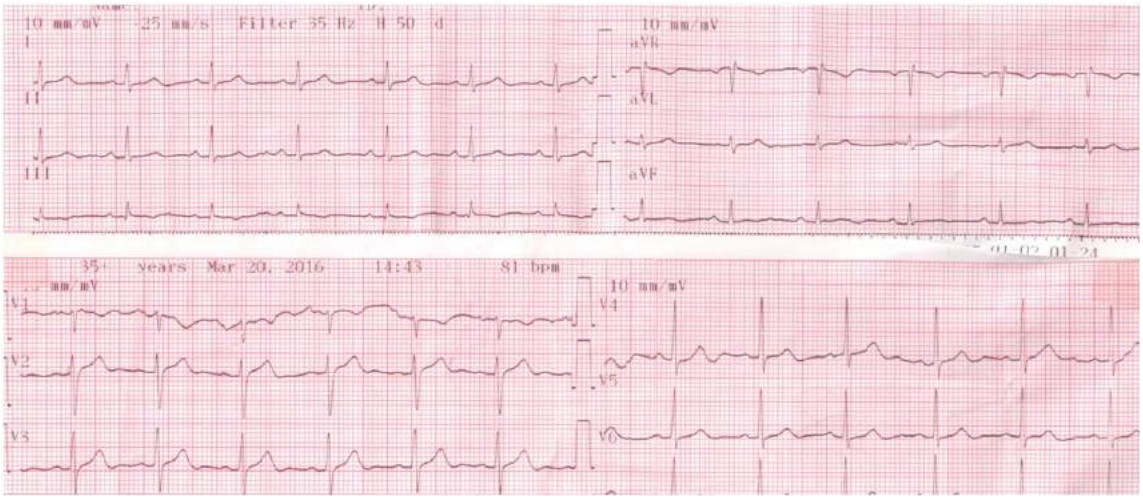


Fig. 2. Electrocardiograph after the treatment (potassium level 5.7 mmol/L).

References

1. Nyirenda MJ, Tang JI, Padfield PL, Seckl JR. Hyperpotassemia. *BMJ* 2009;**339**:b4114.
2. Hashem A. Hyperkalemia revisited. *Saudi J Kidney Dis Transpl* 2007;**18**(4):577–584.
3. Chon SB, Kwak YH, Hwang SS, Oh WS, Bae JH. Severe hyperkalemia can be detected immediately by quantitative electrocardiography and clinical history in patients with symptomatic or extreme bradycardia: a retrospective cross-sectional study. *J Crit Care* 2003;**28**:1112.e7–1112.e13.
4. Massin MM. Visual diagnosis of severe hyperkalemia in a young infant. *Pediatr Cardiol* 2012;**33**:1216–1217.
5. Khattak HK, Khalid S, Manzoor K, Stein PK. Recurrent life-threatening hyperkalemia without typical electrocardiographic changes. *J Electrocardiol* 2014;**47**:95–97.
6. Diercks DB, Shumaik GM, Harrigan RA, Brady WJ, Chan TC. Electrocardiographic manifestations: electrolyte abnormalities. *J Emerg Med* 2004;**27**:153–160.
7. Kawji MM, Glancy DL. Electrocardiogram in a 35-year-old man. *Am J Cardiol* 2015;**116**:162.
8. VanderArk CR, Balantyne F, Reynolds Jr EW. Electrolytes and the Electrocardiogram. In: Fisch C, editor. Complex Electrocardiography. Philadelphia: FA Davis; 1973. p. 269–294.
9. Marriott HJL. Emergency Electrocardiography: A Vademecum for Every Caretaker of Cardiac Crises. Naples, FL: Trinity Press; 1997;47–48.

International Journal of the Cardiovascular Academy 2 (2016) 165–166

Contents lists available at ScienceDirect

International Journal of the Cardiovascular Academy

journal homepage: www.elsevier.com/locate/ijcac

Case report

The use of agitated saline in a patient with unroofed coronary sinus☆

Salim Yasar [a], Suat Gormel [b], Erkan Yildirim [c], Murat Celik [c,*], Uygar Cagdas Yuksel [c]

[a] Etimesgut Military Hospital, Service of Cardiology, Ankara, Turkey
[b] Beytepe Military Hospital, Service of Cardiology, Ankara, Turkey
[c] Gulhane Military Medical Faculty, Department of Cardiology, Ankara, Turkey

ARTICLE INFO

Article history:
Received 19 June 2016
Received in revised form 4 September 2016
Accepted 5 September 2016
Available online 21 September 2016

Keywords:
Unroofed coronary sinus
Echocardiography
Agitated saline
Negative contrast effect

ABSTRACT

Although it is difficult to diagnose with transthoracic echocardiography, a negative right atrial echo-contrast effect might be an indicator of unroofed coronary sinus in patients with dilated right heart chambers and without obvious atrial and/or ventricular septal defect.

© 2016 The Society of Cardiovascular Academy. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Introduction

Unroofed coronary sinus (UCS) is an infrequent congenital cardiac anomaly, Partial or complete deficiency of the roof of the coronary sinus might result in a communication between right and left atriums. It is usually associated with persistent left sided superior vena cava (LSVC), which is the most common anomaly of systemic venous drainage, and other forms of complex congenital heart disease, typically heterotaxy syndromes.[1]

Although imaging techniques plays a fundamental role in the diagnosis of UCS, it might be difficult to diagnose with transthoracic echocardiography, because of its limited ability in evaluation of posterior structures of the heart. Transesophageal echocardiography and cardiac MRI can evaluate more properly posterior cardiac structures. Nonetheless, computed tomography (CT) can more accurately assess the posterior structures of the heart and can be useful to identify the UCS due to its excellent spatial resolution.[2] We herein report a case of a patient with unroofed coronary sinus.

Case report

A 21-year old man presented to our cardiology clinic with a shortness of breath and mild exercise intolerance. His past medical history was unremarkable. His physical examination was within normal limits and 12-lead surface ECG was normal. Transthoracic echocardiography showed dilated right heart chambers, mildly dilated pulmonary artery, pulmonary artery systolic pressure of 45 mmHg, and Qp/Qs ratio was more than 1.5. However, we did not observe any defect on IAS or IVS. Afterwards, we performed an agitated saline study via patient's left antecubital vein, and bubbles were not seen in the coronary sinus or the left cardiac chambers, and persistent left sided superior vena cava (LSVC) was excluded. Interestingly, during agitated saline study, we detected a negative right atrial echo contrast effect as an indicator of left-to-right shunt. To confirm the diagnosis, we performed a transesophageal echocardiography. Nevertheless, we could not find any abnormality that may cause cardiac enlargement and all pulmonary veins were drained normally. Again, we observed a negative right atrial echo contrast effect, even though we did not show any ASD, VSD or abnormal pulmonary venous drainage (Fig. 1A). We suspected that the patient would be UCS. Afterwards, a multi detector CT (MDCT) was performed and revealed an abnormal communication between the base of the left atrium and the roof of the coronary sinus, consistent with an UCS (Fig. 1B). There was no suggestion of persistent LSVC. Initially, the patient's symptoms were not severe and he was managed conservatively and periodically echocardiographic screening was recommended. However, the patient reported that the complaint of shortness of breath was increased 's complaints was increased compared to 3 months ago. Therefore, the patient referred to surgery and UCS was corrected by minimal-invasive cardiac surgery. At 3-month follow-up, his complaints were totally resolved.

Discussion

UCS is the uncommon type of atrial septal defect. The UCS is classified into 4 groups: type 1, completely UCS with persistent LSVC; type

☆ Peer review under responsibility of The Society of Cardiovascular Academy.

* Corresponding author at: Department of Cardiology, Gulhane Military Medical Academy, 06018 Etlik-Ankara, Turkey.
E-mail address: drcelik00@hotmail.com (M. Celik).

Peer review under responsibility of The Society of Cardiovascular Academy.

http://dx.doi.org/10.1016/j.ijcac.2016.09.001

2405-8181/© 2016 The Society of Cardiovascular Academy. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

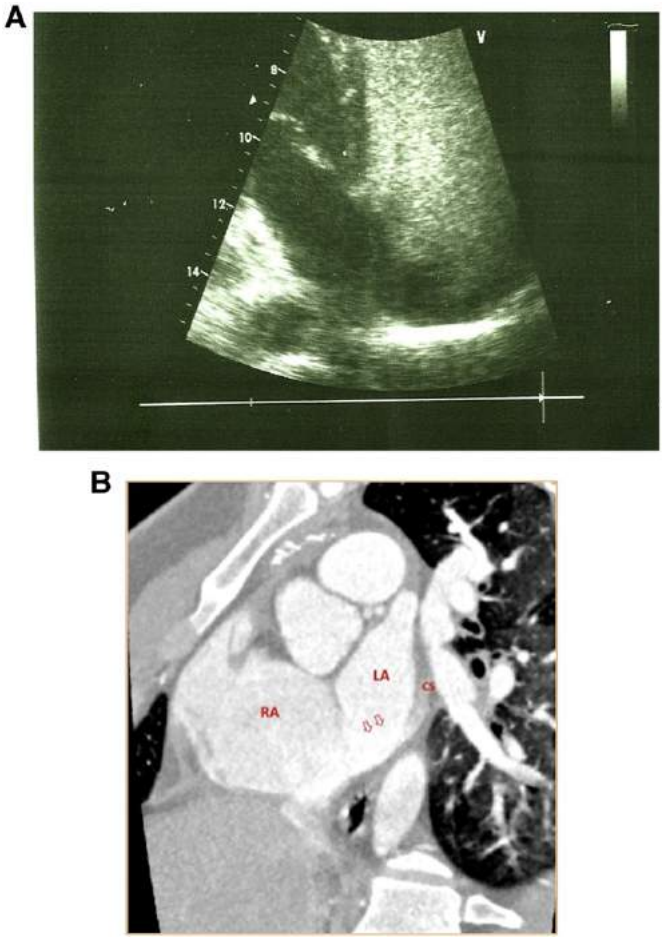


Fig. 1. Transthoracic Echocardiography; "*" shows a negative right atrial echo contrast effect (A), Sagittal oblique reformatted image demonstrates the unroofing of the coronary sinus (B).

2, completely UCS without persistent LSVC; type 3, partially unroofed mid portion; and type 4, partially unroofed terminal portion. Our case seems to be consistent with type 2. Although it might be difficult to diagnose with transthoracic echocardiography, a negative right atrial echo-contrast effect might be an indicator of UCS in patients with dilated right heart chambers and without obvious ASD or VSD on transthoracic and/or transesophageal echocardiography.

Generally clinical presentation depends on the size of the defect and the degree of left to right shunt. The spectrum of symptoms may range from asymptomatic nonspecific complaints to severe dyspnea due to overt right-sided heart failure from chronic right ventricular volume overload. Nonetheless, UCS diagnosis should be thought during the evaluation of an unknown cardiac murmur, right-sided heart enlargement, transient cyanosis or hypoxia, or paradoxical embolism.[3] Management depends on the clinical symptoms, which are related to the size of the defect, and the severity of the inter-atrial shunt, and surgical intervention would be considered if the symptoms couldn't be improved medically.

Conflict of interest

None.

References

1. Ramos N, Fernandez-Pineda L, Tamariz-Martel A, Villagra F, Egurbide N, Maitre MJ. Absent right superior vena cava with left superior vena cava draining to an unroofed coronary sinus. *Rev Esp Cardiol* 2005;**58**(8):984–987.
2. Thangaroopan M, Truong QA, Kalra MK, Yared K, Abbara S. Images in cardiovascular medicine. Rare case of an unroofed coronary sinus: diagnosis by multidetector computed tomography. *Circulation* 2009;**119**(16):e518–e520.
3. Ootaki Y, Yamaguchi M, Yoshimura N, Oka S, Yoshida M, Hasegawa T. Unroofed coronary sinus syndrome: diagnosis, classification, and surgical treatment. *J Thorac Cardiovasc Surg* 2003;**126**(5):1655–1656.

International Journal of the Cardiovascular Academy 2 (2016) 167–173

Contents lists available at ScienceDirect

International Journal of the Cardiovascular Academy

journal homepage: www.elsevier.com/locate/ijcac

Review

Novel oral anticoagulants in non-valvular atrial fibrillation: Pharmacological properties, clinical trials, guideline recommendations, new antidote drugs and real-world data☆

Umut Kocabas [a,*], Esra Kaya [b], Gökhan Avcı [c]

[a] Department of Cardiology, Soma State Hospital, Manisa, Turkey
[b] Department of Cardiology, Turgutlu State Hospital, Manisa, Turkey
[c] Department of Cardiology, Çanakkale State Hospital, Çanakkale, Turkey

ARTICLE INFO

Article history:
Received 11 July 2016
Received in revised form 28 August 2016
Accepted 29 August 2016
Available online 8 September 2016

Keywords:
Apixaban
Dabigatran
Direct thrombin inhibitors
Edoxaban
Factor Xa inhibitors
Rivaroxaban

ABSTRACT

Atrial fibrillation (AF) is the most common sustained cardiac arrhythmia. Ischemic stroke and systemic thromboembolism are the most fatal complications of AF. Vitamin K antagonists (VKA) are used in the prevention of AF-related stroke and systemic thromboembolism. However, the use of VKAs is associated with limitations such as their narrow therapeutic index, the need for monitoring, and numerous food-drug interactions. Novel oral anticoagulants (NOACs) developed by researchers do not have those limitations and are better tolerated in patients with non-valvular atrial fibrillation. In this review, the pharmacological properties of NOACs, the results of NOAC clinical trials, the guideline recommendations, the important aspects of patient selection and clinical practice, new antidote drugs for NOACs and real-world data of NOACs in patients with non-valvular atrial fibrillation have been discussed.

© 2016 The Society of Cardiovascular Academy. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Contents

Introduction . . . 168
Novel oral anticoagulants . . . 168
Dabigatran . . . 168
Rivaroxaban . . . 168
Apixaban . . . 168
Edoxaban . . . 169
Limitations to NOACs . . . 169
Novel oral anticoagulants in light of guidelines . . . 170
Monitoring novel oral anticoagulants . . . 170
Bleeding management . . . 170
Converting from anticoagulant treatment to NOACs and the perioperative approach . . . 170
Drug interactions . . . 171
New antidotes for novel oral anticoagulants . . . 171
Dabigatran and idarucizumab . . . 171
Factor Xa inhibitors and andexanet alfa . . . 171
Real-world data of NOACs . . . 171
Conclusions . . . 172
Conflict of interest . . . 172
References . . . 172

☆ Funding and support: Nothing to declare.
* Corresponding author at: Department of Cardiology, Soma State Hospital, Manisa 45500, Turkey.
E-mail address: umutkocabas@hotmail.com (U. Kocabas).
Peer review under responsibility of The Society of Cardiovascular Academy.

http://dx.doi.org/10.1016/j.ijcac.2016.08.006
2405-8181/© 2016 The Society of Cardiovascular Academy. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Introduction

Atrial fibrillation (AF) is the most common sustained cardiac arrhythmia and is seen in 1–2% of the general population.[1] The number of patients with AF in the United States was 2.2 million in 2010 and is expected to rise to 12 million by 2050.[2] Ischaemic stroke and systemic thromboembolism are the most severe and fatal complications of AF. AF is responsible for 15% of the ischaemic stroke cases among all age groups and this rate increases up to 30% in people older than 80 years.[3] Warfarin is a vitamin K antagonist (VKA) that has been used in the prevention of AF for over 50 years. Randomised trials have shown that warfarin is superior to placebo, aspirin and the combination of aspirin–clopidogrel in preventing stroke.[4,5,6] Warfarin use is challenging due to its narrow therapeutic index and it has many food and drug interactions. Thus, only 50 to 60% of the patients with AF are prescribed warfarin therapy and in 30 to 50% of these patients the international normalised ratio (INR) levels cannot be maintained within the therapeutic index.[7,8] Although the efficacy of warfarin and other VKAs has been proven, the low and suboptimal use has led to the development of novel oral anticoagulants (NOACs).

Novel oral anticoagulants

Vitamin K antagonists affect the vitamin K dependent factors II, VII, IX, and X of the coagulation cascade and novel oral anticoagulants (NOACs) affect specific steps. They are classified according to their effects as the direct thrombin inhibitors dabigatran and AZD0837, and the direct factor Xa inhibitors rivaroxaban, apixaban, edoxaban, betrixaban, LY-517,717 and ym-150 (Table 1).[9] This review focuses on dabigatran, rivaroxaban, apixaban and edoxaban that are approved by the American Food and Drug Administration (FDA) for the prevention of stroke and systemic embolism in patients with non-valvular AF.

Dabigatran

Dabigatran etexilate is an oral pro-drug and is converted to its active form dabigatran, a reversible, direct and competitive thrombin inhibitor by serum esterases.[10] Its half-life is 12–17 h, and 80% of the drug is excreted renally.[11] The RE-LY (Randomized Evaluation of Long-term Anticoagulation TherapY) trial, is a prospective, randomised controlled and open-labelled trial that compares the efficacy and safety of 110 mg and 150 mg doses of dabigatran to warfarin with respect to stroke and systemic embolisms. The trial was designed as a non-inferiority trial. 18,113 patients with mean $CHADS_2$ scores of 2.1 were included in the trial and were randomised to receive dabigatran (110 mg or 150 mg, twice a day) or warfarin (INR 2–3). The primary endpoint was stroke or systemic embolism. With respect to the primary endpoint, the dose of 110 mg dabigatran (1.53% events/year) was non-inferior ($p < 0.001$) to warfarin and the dose of 150 mg dabigatran (1.1% events/year) was superior to warfarin ($p < 0.001$).[12] The rate of major and life-threatening bleeding in the group of 150 mg doses of dabigatran was similar to warfarin (3.11% vs. 3.36% events/year respectively, $p = 0.31$) and the 110 mg dose of dabigatran was associated with a 20% risk reduction (2.7% vs. 3.4% events/year, $p = 0.003$). When the major bleedings were evaluated independently according to their locations, the rate of intracranial haemorrhages was seen to be significantly lower in both of the dabigatran arms (110 mg BID and 150 mg BID) than it was in the warfarin arm (0.23%, 0.35% and 0.74% events/year respectively, $p < 0.001$ for both groups). On the other hand, it was seen that the 150 mg dose of dabigatran increased the risk for gastrointestinal bleeding when compared to warfarin (1.51% and 1.02% respectively, $p < 0.001$), and the 110 mg dose of dabigatran was similar to warfarin (1.12% and 1.02% respectively, $p = 0.43$).[13]

Rivaroxaban

Rivaroxaban is a direct factor Xa inhibitor. Its half-life is 5–9 h (9–13 h in the elderly) and 60–70% of the drug is excreted renally.[11] The ROCKET-AF (Rivaroxaban Once daily oral direct factor Xa inhibition compared with vitamin K antagonism for prevention of stroke and Embolism Trial in Atrial Fibrillation) trial is a prospective, randomised, double-blind trial comparing rivaroxaban and warfarin in patients with non-valvular AF. Total of 14,264 patients with non-valvular AF with mean $CHADS_2$ scores of 3.48 were included in the trial. Patients were randomised to receive 20 mg/day doses of rivaroxaban (15 mg/day if the creatinine clearance is 30–49 mL/min) or warfarin (target INR: 2–3). The primary end points were stroke and systemic embolism. When the trial was completed, it was shown that rivaroxaban was non-inferior to warfarin with respect to the primary endpoint (2.1% vs. 2.4% respectively, for non-inferiority $p < 0.001$). There was no difference between the rates of major and clinically significant non-major bleeding rates between rivaroxaban and warfarin groups (14.9% vs. 14.5% events respectively, $p =$ non-significant). In addition, the rate of intracranial haemorrhages was significantly lower in the rivaroxaban group (0.5% and 0.7% events/year, $p = 0.02$).[14]

Apixaban

Apixaban is an oral drug and is a direct competitive factor Xa inhibitor. It is absorbed rapidly, has a half-life of 10–14 h and 27% of the drug is excreted renally.[15] The AVERROES trial (Apixaban Versus Acetylsalicylic Acid to Prevent Stroke in Atrial Fibrillation Patients Who Have Failed or Are Unsuitable for Vitamin K Antagonist Treatment) is a double-blind randomised trial including 5599 patients with AF for whom vitamin K antagonist therapy is inappropriate. The patients were randomised to receive apixaban (5 mg, twice a day) or aspirin (80–325 mg). The mean follow-up was 1.1 years. The rate of stroke or systemic embolism was 1.6% in the apixaban group and 3.7% in the aspirin group (HR 0.45, 95% CI 0.32–0.62, $p < 0.001$). It was recommended to terminate the trial early because a significant benefit in favour of apixaban was demonstrated. There was no significant difference in major bleeding rates between apixaban and aspirin groups. In addition, it was shown that apixaban was tolerated better than aspirin as more cases in the aspirin group discontinued their treatment.[16]

Table 1
Comparison of pharmacokinetic profiles for the novel oral anticoagulants.[12,14,15,20]

	Dabigatran	Rivaroxaban	Apixaban	Edoxaban
Mechanism of action	Direct thrombin (factor IIa) inhibition	Direct factor Xa inhibition	Direct factor Xa inhibition	Direct factor Xa inhibition
Dosing	110 mg oral, twice daily 150 mg oral, twice daily	20 mg oral daily 15 mg oral daily (if CrCl 30–49 mL/min)	5 mg oral, twice daily 2.5 mg oral, twice daily (if creatinine > 133 mmol/L)	60 mg oral daily 30 mg oral daily
Elimination	80% renal	~66% renal	~27% renal	50% renal
Pro-drug	Yes	No	No	No
Half-life (h)	12–17	5–9 (9–13 h in the elderly)	10–14	9–11
Tmax (h)	1	2–4	3–4	1–4

CrCl: creatinine clearance.

Table 2
Comparison of data from major trials for the novel oral anticoagulants.[12,14,15,20]

	RE-LY	ROCKET-AF	ARISTOTLE	ENGAGE AF-TIMI 48
Treatment arms	Dabigatran (110 mg or 150 mg, twice a day) vs. warfarin (target INR: 2–3)	Rivaroxaban 20 mg/day (15 mg/day if the creatinine clearance is 30–49 mL/min) vs. warfarin (INR: 2–3)	Apixaban (5 mg, twice a day) vs. warfarin (target INR: 2–3)	Edoxaban (30 mg/d or 60 mg/d) vs. warfarin (target INR: 2–3)
Trial design	Randomised, open-label	Randomised, double-blind	Randomised, double-blind	Randomised, double-blind
Number of patients	18.113	14.264	18.201	21.105
Mean age	71.5	73	70	72
TTR of warfarin (%)	64	55	62	68
Mean $CHADS_2$ score	2.1	3.48	2.1	2.8
Primary endpoint: stroke/ systemic embolism (%/year)	1.53 in 110 mg dabigatran group, 1.11 in 150 mg dabigatran group 1.69 in warfarin group ($p < 0.001$ for non-inferiority for both dabigatran groups)	2.1 in rivaroxaban group and 2.4 in warfarin group ($p < 0.001$ for non-inferiority)	1.27 in apixaban group and 1.6 in warfarin group ($p < 0.001$ for non-inferiority and $p = 0.01$ for superiority)	1.61 in 30 mg edoxaban group, 1.18 in 60 mg edoxaban group and 1.50 in warfarin group ($p = 0.005$, $p < 0.001$ for non-inferiority respectively)

INR: international normalised ratio; TTR: time-in-therapeutic range.

Another trial ARISTOTLE (Apixaban for Reduction in Stroke and Other Thromboembolic Events in Atrial Fibrillation) compared apixaban to warfarin. This trial was a double-blind, randomised, controlled non-inferiority trial and included 18,201 patients with non-valvular AF with $CHADS_2$ scores of 2.1 from 39 countries. The mean follow-up was 1.8 years. Patients were randomised to receive apixaban (5 mg, twice a day) or warfarin. Patients who met two or more of the following criteria were administered half doses of apixaban: being over 80 years of age, weighing 60 kg and less or having serum creatinine levels higher than 1.5 mg/dL. The primary composite endpoint, stroke or systemic embolism occurred in 212 (1.27%) patients in the apixaban arm and 265 (1.6%) patients in the warfarin arm ($p < 0.001$ for non-inferiority, $p = 0.01$ for superiority).

According to the results, apixaban was superior to warfarin in preventing stroke and systemic embolisms in patients with non-valvular AF. Apixaban was also superior to warfarin with respect to all-cause mortality rates (3.52% vs. 3.94%, $p = 0.047$). Regarding the safety endpoints, major bleeding occurred less in the apixaban arm (2.13%) than the warfarin arm (3.09%) ($p < 0.001$). The rate of intracranial haemorrhages was 0.33% event/year in the apixaban group and 0.80% event/year in the warfarin group ($p < 0.001$).[15]

Edoxaban

Edoxaban is a direct, specific and reversible inhibitor of factor Xa, delivered orally. Edoxaban has a half-life of approximately 9–11 h and its absolute oral bioavailability is 62%. It quickly reaches peak plasma concentrations in 1.5 h and 50% of drug elimination is via the kidneys.[17] The Effective Anticoagulation with Factor Xa Next Generation in Atrial Fibrillation-Thrombolysis in Myocardial Infarction 48 (ENGAGE AF-TIMI 48) is a randomised, double-blind, multicentre trial comparing warfarin and edoxaban for thromboembolism and stroke prophylaxis in non-valvular atrial fibrillation. From 1393 hospitals in 46 countries, 21.105 subjects with a average $CHADS_2$ score of 2.8 were randomized to edoxaban high dose (60 mg daily), edoxaban low dose (30 mg daily), or warfarin titrated to an international normalised ratio of 2.0 to 3.0. The primary compound endpoint was systemic embolism and stroke. Annual rate of the primary end point was 1.50% with warfarin (time-in-therapeutic range (TTR), 68%), when compared to 1.18% with 60 mg edoxaban ($p < 0.001$ for non-inferiority) and 1.61% with 30 mg edoxaban ($p = 0.005$ for non-inferiority). Annual rate of major bleeding was 3.43% in warfarin, 2.75% and 1.61% for 60 mg and 30 mg edoxaban treatment respectively ($p < 0.001$ for both doses). Both doses of edoxaban were shown to be as efficient as warfarin for systemic embolism and stroke prophylaxis in non-valvular AF and were associated with significantly lower rates of bleeding and death from cardiovascular causes. On the other hand gastrointestinal bleeding rates were significantly higher in edoxaban 60 mg group compared to warfarin therapy (1.51% vs 1.23%; $p = 0.03$).[18]

We can summarise the four randomised controlled novel oral anticoagulant trials as follows:

1- In patients with non-valvular AF, novel oral anticoagulants are at least as effective as warfarin for the prevention of stroke and systemic embolism.[12,14,15,18]
2- When compared to warfarin, 150 mg doses of dabigatran reduced the relative risk by 34% and apixaban reduced it by 21%. Both of these drugs were superior to warfarin in preventing the primary endpoint.[12,15]
3- The rates of intracranial haemorrhages and haemorrhagic stroke were significantly lower with novel oral anticoagulants. However, only 150 mg doses of dabigatran were proven to be superior to warfarin in preventing ischemic stroke (relative risk reduction 24%).[12,14,15,18]
4- Only apixaban is superior to warfarin with respect to mortality of all causes ($p = 0.047$).[15]
5- With respect to other major bleedings except gastrointestinal bleeding, apixaban, 110 mg doses of dabigatran and both doses of edoxaban are safer than warfarin (superior). Rivaroxaban and 150 mg doses of dabigatran are at least as safe as warfarin (non-inferior).[12,14,15,18]
6- Rivaroxaban, 150 mg doses of dabigatran and 60 mg doses of edoxaban increase the risk of gastrointestinal bleeding when compared to warfarin. Apixaban, 110 mg doses of dabigatran and 30 mg doses of edoxaban are similar to warfarin (Table 2).[12,14,15,18]

Limitations to NOACs

The novel oral anticoagulant drugs have become popular in patients with non-valvular AF for the prevention of stroke and ischaemic embolisms because they do not require monitoring, they are easy to use and they cause fewer drug and food interactions. However, the different designs and inclusion criteria of the trials comparing NOACs, and the lack of trials comparing all three NOACs with each other raise controversy. The four large phase III trials (RE-LY, ROCKET-AF, ARISTOTLE and ENGAGE AF-TIMI 48) were all designed as non-inferiority trials. The RE-LY trial was an open-labelled trial but the ROCKET-AF, ARISTOTLE and ENGAGE AF-TIMI 48 trials were double-blind.[12,14,15,18] In current guidelines, effective warfarin therapy is defined as an "INR level between 2.0 and 3.0 and the TTR as at least 70% of the entire treatment duration".[1] The TTR in these trials differs significantly, the TTR is 55% in the ROCKET-AF trial, 62% in the ARISTOTLE trial, 64% in the RE-LY trial and 68% in the ENGAGE AF-TIMI 48 trial. Due to suboptimal time-in-therapeutic range the efficacy of warfarin could have been calculated lower than it should have been, thus, NOACs may have been determined as relatively non-inferior and/or superior to warfarin.[19] Another important topic for discussion is the inclusion of patients from different risk groups for stroke. The mean $CHADS_2$ scores in the

RE-LY, ARISTOTLE, ENGAGE AF-TIMI 48 and ROCKET-AF trials were 2.1, 2.1, 2.8 and 3.5 respectively. This may be one of the reasons why rivaroxaban was not superior to warfarin with respect to the primary endpoints although apixaban and 150 mg doses of dabigatran were superior. Another discussion topic is the association of dabigatran therapy with ischaemic myocardial events. This discussion was raised because the number of myocardial infarctions (MI) was higher in the dabigatran arm of the RE-LY trial than the warfarin arm. Due to this, MI, unstable angina, cardiac arrest and cardiac death rates on dabigatran treatment were analysed and published. The annual MI rates in the arms receiving 110 mg or 150 mg of dabigatran or apixaban were 0.82%, 0.81% and 0.64% respectively and there was no statistically significant difference. There was no significant difference between the rates of the primary composite endpoints unstable angina, MI, cardiac arrest and cardiac death either.[20]

Novel oral anticoagulants in light of guidelines

In the AF guideline and updates published by the European Society of Cardiology (ESC) in 2010 and 2012 it is stated that AF patients must undergo risk classification for stroke and the anticoagulant treatment requirements should be determined accordingly. For this purpose, instead of the $CHADS_2$ score it is recommended to use the CHA_2DS_2-VASc score that allows better differentiation of the "real low risk" cases.[1] The ESC guideline does not recommend anticoagulant treatment for non-valvular AF patients in the real low-risk groups — i.e. patients under 65 years of age with no risk factors (with a CHA_2DS_2-VASc score of 0). Oral anticoagulants are offered as the single treatment option for cases with CHA_2DS_2-VASc scores ≥1. Female patients are given 1 point for gender under any circumstance, however, they are not suitable candidates for anticoagulant therapy if they are under 65 years and have no risk factors. In other words, anticoagulant treatment is indicated for all patients with AF over the age of 65. If the patient has a rheumatoid heart disease (especially mitral stenosis), a history of prosthetic valvular operations or mitral valve repair, and if the creatinine clearance is under 30 mL/min the only suitable oral anticoagulant (OAC) is warfarin. In the rest of the patients with non-valvular AF, warfarin and all three NOACs are suitable for the same indications and have equivalent proof levels.[21]

The American College of Cardiology and the American Heart Association (ACC/AHA) have updated the guidelines they published in 2014 to recommend using the CHA_2DS_2-VASc score for risk classification instead of the $CHADS_2$ score in a similar fashion to the ESC guidelines.[22] The common aspects and differences between the guidelines important for clinical practice issued by the ESC and ACC/AHA can be summarised as follows:

* The ESC guidelines recommend OAC treatment for patients with CHA_2DS_2-VASc scores of 1, the ACC/AHA guidelines state that treatment may not be necessary, OAC treatment can be administered or treatment with aspirin may be considered.[21,22]
* In patients with CHA_2DS_2-VASc scores of 0 both guidelines state that treatment is not required.[21,22]
* The ESC guidelines do not recommend using NOACs in patients who have renal failure with CrCl (creatinine clearance) <30 mL/min, the ACC/AHA guidelines state that NOACs should not be used in end-stage chronic renal failure patients (CrCl < 15 mL/min) or in cases in haemodialysis programs and that warfarin is the drug of choice for these patients.[21,22]
* The ESC guidelines recommend using a 110 mg dose of dabigatran twice a day for patients with renal failure and CrCl = 30–49 mL/min. The ACC/AHA guidelines state that 150 mg or 75 mg BID doses of dabigatran can be used in this patient group.[21,22]
* The ACC/AHA guidelines state that 75 mg doses of dabigatran twice a day or 15 mg/day doses of rivaroxaban can be used in renal failure patients with CrCl = 15–30 mL/min. However, it is stated that this recommendation is not based on data from prospective studies.[22]

Monitoring novel oral anticoagulants

Unlike warfarin, the novel oral anticoagulants do not require routine monitoring. It may be necessary to assess the efficacy of NOACs in some specific clinical situations such as bleeding, newly developed or deteriorating renal failure, stroke or systemic embolism.[23] However, there is no specific coagulation test that can be used to determine the efficacy of the NOAC drugs in these clinical conditions. The most useful approach used for this purpose is measuring the thrombin or ecarin clotting times. Especially during emergencies, the activated partial thromboplastin time is another measure that can be used during dabigatran treatment. However, it must not be forgotten that high blood levels of the drugs may lead to erroneous activated partial thromboplastin time readings.[24] The coagulation test used for rivaroxaban patients is the prothrombin test.[25] The factor Xa levels can also be used to monitor rivaroxaban, apixaban and edoxaban.[25,26]

Bleeding management

There are a few novel antidotes used to antagonise drug effects in bleedings induced by NOACs. Treatment with plasma is ineffective because the bleeding is not due to factor deficiency; thrombin and factor Xa inhibitors are already present in the patient's blood. It is thought that cryoprecipitate may be useful in dabigatran-induced bleedings and that prothrombin concentrates may be useful in apixaban or rivaroxaban-induced bleedings. The only emergency approach proven to be useful in the treatment of dabigatran-induced bleeding is the use of activated charcoal followed by haemodialysis to remove the drug from the body.[27] Currently, there is a few new specific antidote drugs to treat major bleedings associated with new generation oral anticoagulants. Thus, the most important point that needs to be considered by the physician is the selection of the most suitable drug and dose regimen.

Converting from anticoagulant treatment to NOACs and the perioperative approach

The use of novel oral anticoagulants is increasing as they have advantages over warfarin. Their onset of effect is rapid, they do not cause significant food and drug interactions and they do not require monitoring. If a patient on NOAC therapy is going to have surgery the most important question is when to stop the drug before the surgery. The definitive issue is the functional capacity of the patient's kidneys. According to current consensus reports it is recommended to assess the creatinine clearance at least seven days before the surgery before making a decision. Important aspects to consider when deciding when to stop NOAC therapy before surgery are given in Table 3.

When converting from warfarin to one of the novel oral anticoagulants, the novel oral anticoagulant must be started when the INR is below 2, in the opposite case double-treatment must be continued until INR reaches efficient levels. When converting from low molecular weight heparin (LMWH) to new generation oral anticoagulants heparin must be discontinued after delivering the final dose, and the new generation oral anticoagulant must be started 2 h before the time of the next dose of heparin that was to have been administered. In the opposite case, the first dose of heparin must be delivered 12 or 24 h after the last dose of the novel oral anticoagulant.[27] When it is desired to convert to NOACs from infusions of unfractionated heparin the first NOAC dose should be administered at the time of the discontinuation of the infusion.

In the postoperative period it is recommended to restart the NOAC therapy as soon as possible once haemostasis is maintained. Intravenous heparin or LMWH bridge treatment is not required in the postoperative period as the effects of NOACs end rapidly and once restarted they rapidly reach therapeutic efficacy within 2 h.[28]

Table 3
Preoperative interruption of novel oral anticoagulants.[45,46,47]

Drug	Renal function	Low bleeding risk surgery (last dose)	High bleeding risk surgery (last dose)
Dabigatran (150 mg twice daily)	Normal or mild impairment (CrCl ≥ 50 mL/min)	24 h before surgery	48–72 h before surgery
	Moderate impairment (CrCl 30–49 mL/min)	48–72 h before surgery	96 h before surgery
Rivaroxaban (20 mg once daily)	Normal or mild impairment (CrCl ≥ 50 mL/min)	24 h before surgery	48–72 h before surgery
	Moderate impairment (CrCl 30–49 mL/min)	48 h before surgery	72 h before surgery
Apixaban (5 mg twice daily)	Normal or mild impairment (CrCl ≥ 50 mL/min)	24 h before surgery	48–72 h before surgery
	Moderate impairment (CrCl 30–49 mL/min)	48 h before surgery	72 h before surgery

CrCl: creatinine clearance.

Drug interactions

The drug interactions of NOACs are another important issue. Although NOACs cause less drug interactions than warfarin, the drug interactions of NOACs must be known and a detailed pharmaceutical history of the patient must be obtained before prescribing these drugs.

Dabigatran requires an acidic medium for absorption because it contains tartaric acid. While antacids and H2 receptor antagonists do not affect the absorption of dabigatran; pantoprazole, a proton-pump inhibitor prevents the formation of an acidic medium and reduces the absorption of dabigatran.[29]

The inhibition and induction of P-glycoprotein (P-gp) play an important role in the metabolism of dabigatran and also affect its blood levels. In patients using drugs like amiodarone, verapamil, quinidine, ketoconazole that inhibit P-gp, dabigatran must be avoided or used with caution at low doses. On the other hand, it must not be forgotten that concomitant use of the P-gp inducer rifampicin may reduce the therapeutic efficacy of dabigatran. In patients using ketoconazole, clarithromycin, ritonavir and other protease inhibitors that inhibit CYP3A4, apixaban and rivaroxaban must be used with caution because the blood levels and efficacy of the drugs may increase.[29]

New antidotes for novel oral anticoagulants

Life-threatening bleeding is the most important complication of NOACs. Lack of antidotes for NOACs is another crucial point when urgent intervention or surgery is needed.[30] That brings the necessity of a fast-affecting and specific antidote for reversal of anticoagulation. Clinical trials in progress are evaluating the efficacy and safety of idarucizumab and andexanet alpha.[31]

Dabigatran and idarucizumab

Idarucizumab (aDabi-Fab, BI 655075) which is a human monoclonal antibody is the first specific dabigatran antidote. Binding specifically to dabigatran, idarucizumab antagonises its effects. Compared to thrombin it has a 350-fold increased affinity to dabigatran.[32] 'The Study of the REVERSal Effects of Idarucizumab in Patients on Active Dabigatran (RE-VERSE AD)' is a phase 3 trial investigating the efficacy and safety of idarucizumab in patients with life-threatening bleeding and/or patients require urgent surgery or intervention.[33] In this prospective cohort study, anticoagulation reversal capacity of 5 mg of idarucizumab is evaluated by measuring diluted thrombin time (dTT) and ecarin clotting time (ECT) before and 4 h after administration of idarucizumab. According to the pre-analysis results of the study, in patients with an increased coagulation profile (elevated dTT in 68; elevated ECT in 81 patients) median maximum reversal rate was 100%.[34]

Factor Xa inhibitors and andexanet alfa

Andexanet alfa (PRT064445, r-Antidote; Portola Pharmaceuticals) is an enzymatically inactive modified recombinant human factor Xa decoy protein which has an increased affinity to factor Xa inhibitors (rivaroxaban, apixaban and edoxaban) and antagonises the anticoagulant effects.[35] Andexanet Alfa, a Novel Antidote to the Anticoagulation Effects of FXA Inhibitors Apixaban (ANNEXA-A) and Rivaroxaban (ANNEXA-R) trials are designed to evaluate the efficacy and safety of andexanet alfa, which is used to antagonise the anticoagulant effects of apixaban and rivaroxaban in healthy volunteers. In this randomised, placebo controlled, double-blind trial 101 participants between ages 50–75 years (48 patients in apixaban and 53 patients in rivaroxaban arm) were randomised to either andexanet alfa or placebo. In andexanet alfa arm, following the administration of the antidote, the activity of anti-factor Xa decreased rapidly and significantly within minutes (2–5 min) compared to placebo (andexanet alfa vs. placebo, decreasing of anti-faactor Xa for apixaban [mean ± SD] 94 ± 2% vs. 21 ± 9%; $p < 0.001$, for rivaroxaban için 92 ± 11% vs 18 ± 15%; $p < 0.001$).[36]

Real-world data of NOACs

Current guidelines recommend NOAC drugs for prevention of stroke in non-valvular AF patients. Recommendations and level of evidences of the guidelines are based on randomised trials of NOACs. Nevertheless, as some patient groups which are common in routine daily practice are not included in those trials, real-world data investigating the safety and efficacy of NOACs is needed. Designed for that purpose, XANTUS trial is an international, large-scaled, prospective, observational study collecting the real-world data of rivaroxaban which is used in stroke prevention in non-valvular AF patients. A total of 6784 patients (mean age: 71.5 years, 59% male) who were treated with rivaroxaban for non-valvular AF were included in the study and were followed up for one year independent of the risk of stroke. Mean $CHADS_2$ score was 2.0. Mild to severe renal insufficiency (CrCl < 50 mL/min) was seen in 9.4% of patients. In safety results of the trial, fatal bleeding (0.2 events per 100 p/y) in 0.2% of patients and major bleeding ($n = 128$, 2.1 events per 100 p/y) in 1.9% of patients occurred. Symptomatic thromboembolism (stroke, transient ischaemic attack, systemic embolism, MI) was seen in 1.6% of patients (n:108). In comparison with ROCKET-AF trial, mean $CHADS_2$ score (3.5 for ROCKET-AF and 2.0 for XANTUS), all-cause mortality rates, major bleeding, stroke and MI rates were lower in XANTUS trial.[37]

United States Department of Defence Post-marketing Safety Surveillance (PMSS) trial is a retrospective, observational study designed to identify the major bleeding incidence associated with rivaroxaban. A total of 39.052 patients who were treated with rivaroxaban for total hip/knee surgery or non-valvular AF were included in the study.

Rivaroxaban associated major bleeding incidence was 2.89 events per 100 person-years (n = 970). Most of the major bleedings were gastrointestinal bleedings (846 patients, 87.2%). Fatal bleeding incidence was 0.1% (n = 35). Intracranial haemorrhages were responsible for 74.3% of fatal bleeding.[38] Results of the study were consistent with ROCKET-AF trial. The results of XANTUS and PMSS trials analysing the real-world data confirmed the results of ROCKET-AF trial.[39]

Effectiveness and Safety of Dabigatran and Warfarin in Real-world US Patients With Non-Valvular Atrial Fibrillation: A Retrospective Cohort Study is a retrospective, observational study, conducted between 2010 and 2012, including patients with non-valvular AF on vitamin K antagonists or dabigatran therapy. A total of 64.935 patients were included in the study of whom 32.5% were on dabigatran therapy. Compared to warfarin, dabigatran was associated with lower risks of ischaemic stroke or systemic embolism (composite adjusted HR: 0.86, 95% CI: 0.79 to 0.93), haemorrhagic stroke (HR: 0.51, 95% CI: 0.40 to 0.65) and MI (HR: 0.88, 95% CI: 0.77 to 0.99). Conversely dabigatran was associated with increased risk of GI bleeding (HR: 1.11, 95% CI: 1.02 to 1.22).[40] Supportively, Graham et al. conducted a study with real-world data to find that 150 mg dabigatran was associated with lesser death, ischaemic stroke, intracranial haemorrhage risks and therefore increased GI bleeding risk.[41] On the contrary, in a trial by Hernandez et al. Dabigatran was associated with increased risks of bleeding (HR: 1.30, 95% CI: 1.20–1.41), major bleeding (HR: 1.58, 95% CI: 1.36–1.83) and GI bleeding (HR: 1.85, 95% CI: 1.64–2.07). Intracranial haemorrhage was significantly lesser in dabigatran arm, similar to RE-LY trial. Investigators emphasize that bleeding risk was higher especially in patients with co-dominant comorbidities and that dabigatran should be used with caution in those patients.[42] In a recent report published by FDA which was based on real-world data, dabigatran was associated with lower risks of stroke, death and intracranial haemorrhage.[43] In a trial which was conducted between 2007 and 2010 and was evaluating real-world data of non-valvular AF patients, NOACs were associated with lower rates of stroke compared to warfarin. It was emphasised that when excluding intracranial haemorrhages, apixaban was the only NOAC decreasing major bleeding rates. Numbers needed to treat (NNT) values for net clinical benefit (stroke plus major bleeding except intracranial haemorrhage) were 32 and 84 for apixaban and dabigatran respectively.[44]

Conclusions

The novel oral anticoagulant drugs for prevention of stroke in non-valvular AF have been evolved and adding new options and advantages for patients and physicians such as fewer frequency of drug and food interactions, no need for monitoring, broad therapeutic index and tolerated better by patients.

Large-scale phase III trials are completed for dabigatran, rivaroxaban, apixaban, edoxaban and all these trials ended up with non-inferiority of these new anticoagulant drugs compared with warfarin for prevention of stroke for patients with non-valvular atrial fibrillation. Additionally, compared with VKA, dabigatran 150 mg and apixaban twice daily were superior and associated with significant reductions in the incidence of stroke. Intracranial haemorrhages and haemorrhagic stroke occurred significantly less with novel oral anticoagulants. Especially in patients with poorly controlled INR values in follow-up, the potential advantages of the NOACS are likely to be most manifest.

Conflict of interest

We have no commercial, financial, and other relationships in any way related to the subject of this article that might create any potential conflict of interest.

References

1. Camm AJ, Kirchhof P, Lip GY, et al. Guidelines for the management of atrial fibrillation: the Task Force for the Management of Atrial Fibrillation of the European Society of Cardiology (ESC). *Eur Heart J* 2010;**31**:2369–2429.
2. Singer DE, Albers GW, Dalen JE, et al. Antithrombotic therapy in atrial fibrillation: American College of Chest Physicians Evidence-based Clinical Practice Guidelines. *Chest* 2008;**133**:546–592.
3. Wolf PA, Abbott RD, Kannel WB. Atrial fibrillation: a major contributor to stroke in the elderly. The Framingham Study. *Arch Intern Med* 1987;**147**:1561–1564.
4. Hart RG, Benavente O, McBride R, et al. Antithrombotic therapy to prevent stroke in patients with atrial fibrillation: a meta-analysis. *Ann Intern Med* 1999;**131**:492–501.
5. Mant J, Hobbs FD, Fletcher K, et al. Warfarin versus aspirin for stroke prevention in an elderly community population with atrial fibrillation (the Birmingham Atrial Fibrillation Treatment of the Aged Study, BAFTA): a randomised controlled trial. *Lancet* 2007;**370**:493–503.
6. ACTIVE Writing Group of the ACTIVE Investigators, Connolly S, Pogue J, et al. Clopidogrel plus aspirin versus oral anticoagulation for atrial fibrillation in the atrial fibrillation clopidogrel trial with Irbesartan for prevention of vascular events (ACTIVE W): a randomised controlled trial. *Lancet* 2006;**367**:1903–1912.
7. Connolly SJ, Eikelboom J, O'Donnell M, et al. Challenges of establishing new antithrombotic therapies in atrial fibrillation. *Circulation* 2007;**116**:449–455.
8. van Walraven C, Jennings A, Oake N, et al. Effect of study setting on anticoagulation control: a systematic review and metaregression. *Chest* 2006;**129**:1155–1166.
9. Eriksson BI, Quinlan DJ, Weitz JI. Comparative pharmacodynamics and pharmacokinetics of oral direct thrombin and factor Xa inhibitors in development. *Clin Pharmacokinet* 2009;**48**:1–22.
10. Connolly SJ, EzekowitzMD YS, et al. Dabigatran versus warfarin in patients with atrial fibrillation. *N Engl J Med* 2009;**361**:1139–1151.
11. Cabral KP, Ansell J, Hylek EM. Future directions of stroke prevention in atrial fibrillation: the potential impact of novel anticoagulants and stroke risk stratification. *J Thromb Haemost* 2011;**9**:441–449.
12. Ezekowitz MD, Connolly S, Parekh A, et al. Rationale and design of RE-LY: randomized evaluation of long-term anticoagulant therapy, warfarin, compared with dabigatran. *Am Heart J* 2009;**157**:805–810.
13. Eikelboom JW, Wallentin L, Connolly SJ, et al. Risk of bleeding with 2 doses of dabigatran compared with warfarin in older and younger patients with atrial fibrillation: an analysis of the randomized evaluation of long-term anticoagulant therapy (RE-LY) trial. *Circulation* 2011;**123**:2363–2372.
14. ROCKET AF Study Investigators. Rivaroxaban-once daily, oral, direct factor Xa inhibition compared with vitamin K antagonism for prevention of stroke and embolism trial in atrial fibrillation: rationale and design of the ROCKET AF study. *Am Heart J* 2010;**159**:340–347.
15. Lopes RD, Alexander JH, Al-Khatib SM, et al. Apixaban for reduction in stroke and other thromboembolic events in atrial fibrillation (ARISTOTLE) trial: design and rationale. *Am Heart J* 2010;**159**:331–339.
16. Eikelboom JW, O'Donnell M, Yusuf S, et al. Rationale and design of AVERROES: apixaban versus acetylsalicylic acid to prevent stroke in atrial fibrillation patients who have failed or are unsuitable for vitamin K antagonist treatment. *Am Heart J* 2010;**159**:348–353.
17. Ogata K, Mendell-Harary J, Tachibana M, et al. Clinical safety, tolerability, pharmacokinetics, and pharmacodynamics of the novel factor Xa inhibitor edoxaban in healthy volunteers. *J Clin Pharmacol* 2010;**50**:743–753.
18. Ruff CT, Giugliano RP, Antman EM, et al. Evaluation of the novel factor Xa inhibitor edoxaban compared with warfarin in patients with atrial fibrillation: design and rationale for the effective anticoagulation with factor xA next GEneration in atrial fibrillation-thrombolysis in myocardial infarction study 48 (ENGAGE AF-TIMI 48). *Am Heart J* 2010;**160**:635–641.
19. Xu B, Whitbourn R. Novel anticoagulants for non-valvular atrial fibrillation. *Heart Lung Circ* 2012;**21**:463–467.
20. Hohnloser SH, Oldgren J, Yang S, et al. Myocardial ischemic events in patients with atrial fibrillation treated with dabigatran or warfarin in the RE-LY (randomized evaluation of long-term anticoagulation therapy) trial. *Circulation* 2012;**125**:669–676.
21. Camm AJ, Lip GY, De Caterina R, et al. 2012 focused update of the ESC guidelines for the management of atrial fibrillation: an update of the 2010 ESC guidelines for the management of atrial fibrillation. Developed with the special contribution of the European Heart Rhythm Association. *Eur Heart J* 2012;**33**:2719–2747.
22. January CT, Wann LS, Alpert JS, et al. 2014 AHA/ACC/HRS guideline for the management of patients with atrial fibrillation: executive summary: a report of the American College of Cardiology/American Heart Association Task Force on practice guidelines and the Heart Rhythm Society. *Circulation* 2014;**130**:2071–2104.
23. Tran H, Joseph J, Young L, et al. New oral anticoagulants: a practical guide on prescription, laboratory testing and peri-procedural/bleeding management. Australasian Society of Thrombosis and Haemostasis. *Intern Med J* 2014;**44**:525–536.
24. van Ryn J, Stangier J, Haertter S, et al. Dabigatran etexilate—a novel, reversible, oral direct thrombin inhibitor: interpretation of coagulation assays and reversal of anticoagulant activity. *Thromb Haemost* 2010;**103**:1116–1127.
25. Harenberg J, Krämer S, Du S, et al. Measurement of rivaroxaban and apixaban in serum samples of patients. *Eur J Clin Investig* 2014;**44**:743–752.
26. Douxfils J, Chatelain C, Chatelain B, et al. Impact of apixaban on routine and specific coagulation assays: a practical laboratory guide. *Thromb Haemost* 2013;**110**:283–294.
27. Douketis JD, Spyropoulos AC, Spencer FA, et al. Perioperative management of antithrombotic therapy: antithrombotic therapy and prevention of thrombosis, 9th ed: American College of Chest Physicians Evidence-based Clinical Practice Guidelines. *Chest* 2012;**141**:326–350.

28. Hankey GJ. Anticoagulant therapy for patients with ischaemic stroke. *Nat Rev Neurol* 2012;**8**:319–328.
29. Walenga JM, Adiguzel C. Drug and dietary interactions of the new and emerging oral anticoagulants. *Int J Clin Pract* 2010;**64**:956–967.
30. Das A, Liu D. Novel antidotes for target specific oral anticoagulants. *Exp Hematol Oncol* 2015;**4**:25.
31. Bauer KA. Targeted anti-anticoagulants. *N Engl J Med* 2015;**373**:569–571.
32. Schiele F, van Ryn J, Canada K, et al. A specific antidote for dabigatran: functional and structural characterization. *Blood* 2013;**121**:3554–3562.
33. Pollack Jr CV, Reilly PA, Bernstein R, et al. Design and rationale for RE-VERSE AD: a phase 3 study of idarucizumab, a specific reversal agent for dabigatran. *Thromb Haemost* 2015;**114**:198–205.
34. Pollack Jr CV, Reilly PA, Eikelboom J, et al. Idarucizumab for dabigatran reversal. *N Engl J Med* 2015;**373**:511–520.
35. Gomez-Outes A, Suarez-Gea ML, Lecumberri R, et al. Specific antidotes in development for reversal of novel anticoagulants: a review. *Recent Pat Cardiovasc Drug Discov* 2014;**9**:2–10.
36. Siegal DM, Curnutte JT, Connolly SJ, et al. Andexanet alfa for the reversal of factor Xa inhibitor activity. *N Engl J Med* 2015;**373**:2413–2424.
37. Camm AJ, Amarenco P, Haas S, et al. XANTUS: a real-world, prospective, observational study of patients treated with rivaroxaban for stroke prevention in atrial fibrillation. *Eur Heart J* 2016;**37**:1145–1153.
38. Tamayo S, Patel M, Yuan Z, et al. Post-marketing pharmacovigilance study for the active detection and evaluation of majör bleeding in rivaroxaban users with nonvalvular atrial fibrillation. *J Am Coll Cardiol* 2015;**65**:10.
39. Camm J. International, large-scale, real-world clinical data confirm the safety profile of rivaroxaban. *EMJ Cardiol* 2015;**3**:82–88.
40. Lauffenburger JC, Farley JF, Gehi AK, et al. Effectiveness and safety of dabigatran and warfarin in real-world US patients with non-valvular atrial fibrillation: a retrospective cohort study. *J Am Heart Assoc* 2015;**4** [pii: e001798].
41. Graham DJ, Reichman ME, Wernecke M, et al. Cardiovascular, bleeding, and mortality risks in elderly Medicare patients treated with dabigatran or warfarin for nonvalvular atrial fibrillation. *Circulation* 2015;**131**:157–164.
42. Hernandez I, Baik SH, Piñera A, et al. Risk of bleeding with dabigatran in atrial fibrillation. *JAMA Intern Med* 2015;**175**:18–24.
43. Drug Safety Communication FDA. FDA study of Medicare patients finds risks lower for stroke and death but higher for gastrointestinal bleeding with Pradaxa (dabigatran) compared to warfarin. [Available at:] http://www.fda.gov/Drugs/DrugSafety/ucm396470.htm.
44. Amin A, Stokes M, Wu N, et al. Abstract 261: applying clinical trial data to real-world: apixaban, dabigatran, and rivaroxaban. [Available at:] http://circoutcomes.ahajournals.org/content/7/Suppl_1/A261.abstract.
45. Kubitza D, Becka M, Wensing G, et al. Safety, pharmacodynamics, and pharmacokinetics of BAY 59-7939 – an oral, direct factor Xa inhibitor – after multiple dosing in healthy male subjects. *Eur J Clin Pharmacol* 2005;**61**:873–880.
46. Levy JH, Faraoni D, Spring JL, et al. Managing new oral anticoagulants in the perioperative and intensive care unit setting. *Anesthesiology* 2013;**118**:1466–1474.
47. Spyropoulos AC, Douketis JD, Gerotziafas G, et al. Periprocedural antithrombotic and bridging therapy: recommendations for standardized reporting in patients with arterial indications for chronic oral anticoagulant therapy. *J Thromb Haemost* 2012;**10**:692–694.

International Journal of the Cardiovascular Academy 2 (2016) 174–175

Contents lists available at ScienceDirect

International Journal of the Cardiovascular Academy

journal homepage: www.elsevier.com/locate/ijcac

Case report

A rare coexistence: Type 1 congenital intrahepatic portosystemic shunt in a patient with non-compaction cardiomyopathy☆,☆☆

Serkan Duyuler [a,*], Pınar Türker Duyuler [b], Ali Çoner [c]

[a] Acıbadem Ankara Hospital, Department of Cardiology, Ankara, Turkey
[b] Ankara Numune Education and Research Hospital, Department of Cardiology, Ankara, Turkey
[c] Başkent University Alanya Practice and Research Center, Department of Cardiology, Antalya, Turkey

ARTICLE INFO

Article history:
Received 10 June 2016
Received in revised form 25 August 2016
Accepted 26 August 2016
Available online 31 August 2016

Keywords:
Non-compaction
Cardiomyopathy
Liver
Portosystemic shunt

ABSTRACT

Non-compaction cardiomyopathy is described by the spongy appearance of myocardium and this condition frequently exists with other cardiac or extracardiac abnormalities. However, coexistence of non-compaction cardiomyopathy with congenital intrahepatic porto-systemic shunt was not reported previously. Here we presented a 22-year-old male patient with Type 1 congenital intrahepatic porto-systemic shunt and non-compaction cardiomyopathy.

© 2016 The Society of Cardiovascular Academy. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Case

A 22-year-old male patient was admitted to our clinic with fatigue and palpitation. He had no known personal or family history of cardiac disease. He was asthenic in appearance, a slight clubbing was observed on fingers and varicose dilatation of lower extremity veins was noted (Fig. 1, *Panel A*). Physical examination was otherwise normal. Electrocardiography showed left ventricular hypertrophy. Transthoracic echocardiography revealed normal left ventricular ejection fraction and increased apical trabeculations compatible with non-compaction cardiomyopathy and right ventricle was normal in appearance (Fig. 1, *Panel B*). Sizes of cardiac chambers were in normal limits and no significant valvular pathology was observed. However, on subcostal views, echocardiography showed an unexpected dilatation of inferior vena cava since right cardiac functions were normal. Evaluation with ultrasonography demonstrated an abnormal venous connection between portal vein and inferior vena cava (Fig. 1, *Panel C*). Blood test revealed normal ALT, AST, bilirubin and albumin levels and viral serology was negative for hepatitis viruses. Patient had no history of trauma, liver biopsy or surgery. Computed tomography and portal magnetic resonance venography confirmed type 1 congenital intrahepatic portosystemic shunt (Fig. 1, *Panel D*).

Discussion

Non-compaction cardiomyopathy is described by spongy morphological appearance of the myocardium occurring particularly in the apical portion of the left ventricle. This condition is frequently associated with other cardiac and/or extra-cardiac (neurologic, visual and facial) abnormalities.[1] However coexistence of non-compaction cardiomyopathy with congenital intrahepatic porto-systemic shunt was not reported before. Congenital porto-systemic shunts are rare developmental abnormalities resulting in drainage of porto-mesenteric blood into systemic circulation partially or totally by passing the liver. Development of portal venous system occurs 4th to 10th week of embryogenesis and congenital anomalies of portal venous system are derived from abnormal coalescence of the vitello-umbilical venous plexus. Park et al. described 4 types of intrahepatic shunts. According to this classification; in Type 1 shunt one large connection between portal vein and inferior vena cava, in Type 2 shunt one or more connection between peripheral branches of portal vein and hepatic vein, in Type 3 shunt an aneurysmal connection between peripheral portal vein and hepatic vein, in Type 4 shunt multiple connections between portal vein and hepatic vein are

☆ Study was done at Hakkari State Hospital, Department of Cardiology.
☆☆ **Funding**: None.
* Corresponding author at: Acıbadem Ankara Hastanesi, Turan Güneş Bulvarı, 630.sokak, No: 6, Or-an, Çankaya, 06450 Ankara, Turkey.
E-mail addresses: serkanduyuler@yahoo.com (S. Duyuler), turkerpinar1982@hotmail.com (P. Türker Duyuler), conerali@hotmail.com (A. Çoner).
Peer review under responsibility of The Society of Cardiovascular Academy.

http://dx.doi.org/10.1016/j.ijcac.2016.08.005
2405-8181/© 2016 The Society of Cardiovascular Academy. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

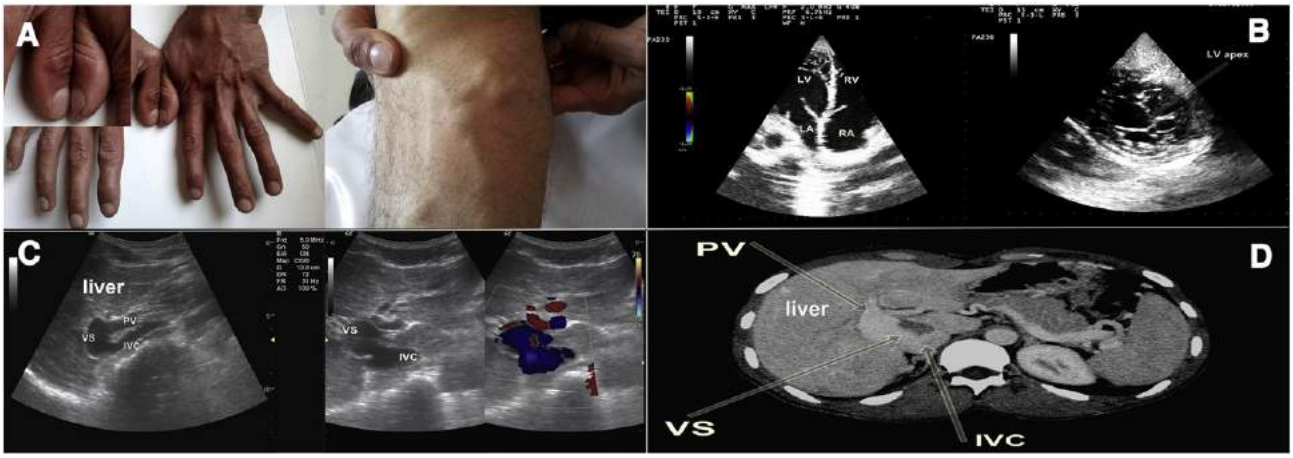


Fig. 1. *Panel A*. Slight clubbing of fingers and varicose veins on lower extremity. *Panel B*. Apical four chamber and parasternal short axis view showing hypertrabeculation of left ventricle compatible with non-compaction cardiomyopathy. LA; left atrium, LV; left ventricle, RA; right atrium, RV; right ventricle. *Panel C*. Ultrasonography showing an abnormal venous connection between portal vein and inferior vena cava. *Panel D*. Computed tomography portal venography showing intrahepatic portosystemic shunt. IVC; inferior vena cava, PV; portal vein, VS; venous shunt.

described.[2] Although the detection of portosystemic shunt in this patient might be incidental finding, possibility of association of non-compaction cardiomyopathy with other vascular abnormalities would not be underestimated. On the other hand, several growth factors (i.e. vascular endothelial growth factor), intracellular signaling pathways and, cell adhesion molecules (i.e. vascular cell adhesion molecule-1) play critical role in both left ventricular non-compaction and portosystemic shunt development.[3,4] As known, heart muscle is non-compacted between 4th and 18th week of development and any environmental or genetic impact during this period which may affect the common processes of differentiation in myocardium and vitello-umbilical venous plexus may result in both non-compaction cardiomyopathy and congenital porto-systemic shunts. Noticing the subcostal views in cases with non-compaction cardiomyopathy may provide the initial clue for such rare coexistences.

Conflict of interest

None declared.

References

1. Finsterer J, Stöllberger C, Fazio G. Neuromuscular disorders in left ventricular hypertrabeculation/noncompaction. *Curr Pharm Des* 2010;**16**:2895–2904.
2. Park JH, Cha SH, Han JK, Han MC. Intrahepatic portosystemic venous shunt. *AJR Am J Roentgenol* 1990;**155**:527–528.
3. van Steenbeek FG, Van den Bossche L, Grinwis GC, et al. Aberrant gene expression in dogs with portosystemic shunts. *PLoS One* 2013;**8**e57662.
4. Zhang W, Chen H, Qu X, Chang CP, Shou W. Molecular mechanism of ventricular trabeculation/compaction and the pathogenesis of the left ventricular noncompaction cardiomyopathy (LVNC). *Am J Med Genet C Semin Med Genet* 2013 Aug;**163C**(3): 144–156.

2016

2nd Cardiovascular Academy Society Congress

Oral Presentations

06-09 November 2016, Antalya - Turkey

Effect of Angiotensin I Converting Enzyme gene polymorphism on the major adverse cardiac events, Long-term clinical outcomes

Köksal Ceyhan, Ataç Çelik
Department of Cardiology, Gaziosmanpaşa University, Tokat, Turkey
dretaci@yahoo.com

INTRODUCTION: Renin angiotensin system (RAS) is known to play key role in inflammatory reaction, tendency to thrombosis, plaque calcification, proliferation of smooth muscle cells in blood vessels and formation of intimal fibrosis. Serum and tissue ACE levels are closely associated with insertion/deletion (I/D) polymorphism of ACE gene. ACE and angiotensin II levels are higher in people with homozygous D allele (DD genotype) compared to people with heterozygous or homozygous I alleles (ID and II genotypes, respectively). High levels of serum and tissue ACE levels accelerate atherosclerosis development. Conflicting results have been obtained in clinical studies regarding the effects of ACE gene polymorphism on cardiovascular diseases. Although many studies showed that cardiovascular events are more common in people with D allele compared to people with I allele, some other studies failed to confirm those results. There are various reports about ACE gene polymorphism and cardiovascular diseases in Turkish population, but there is no study about stent restenosis and coronary lesion progression to our best knowledge.

AIM: The present study was to investigate the effect of ACE gene polymorphism on cardiovascular events, stent restenosis, lesion progression and development of new coronary lesion in Turkish population.

Method: A total of 268 patients (98 female and 170 male) who had coronary angiography because of coronary artery disease risk and were confirmed to have the condition and to whom stent was placed were included in the study. ACE genotyping was carried out in all cases via polymerase chain reaction (PCR) and gel electrophoresis. Clinical and laboratory tests were conducted for all cases. Patients were prospectively monitored regularly in 3 or 6 month periods for 7±2 years. Associations between ACE genotypes (DD, DI and II) and cardiovascular events, in-stent restenosis, new lesion development and lesion progression were studied.

RESULTS: Average age of the cases was 61 (± 7). Frequencies of DD, DI and II genotypes were 26%, 51% and 23%, respectively. Systolic blood pressure and serum ACE levels in patients with DD genotype were higher than patients with II genotype (P<0.01). Frequencies of myocardial infarction and death due to any reason were similar among the groups, but frequency of unstable angina were significantly higher in patients with DD genotypes compared to patients with II genotype (OR=1.41; 95% CI, 1.22–1.64; P=0.021). Similarly, stent restenosis (OR=1.12; 95 % CI, 0.94–1.39; P = 0.018) and lesion progression rates (OR=1.16; 95 % CI, 1.04–2.69; P = 0.012) were higher in patients with DD genotype than the ones with II or ID genotypes.

CONCLUSION: In the present study in which limited number of patients were monitored for a long time, ACE gene polymorphism was found to be associated with stent restenosis and lesion progression in patients with coronary artery disease.

An investigation on the impact of carnosine on the myocardium in lower extremity ischemia–reperfusion injury in rats

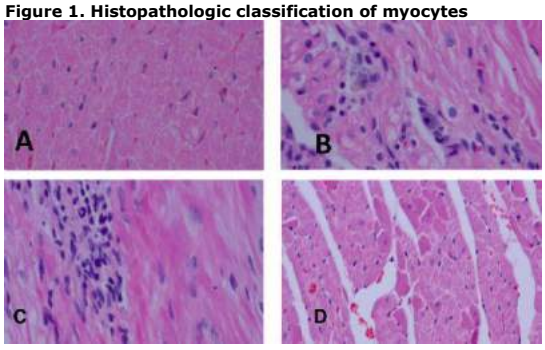
Batur Gönenç Kanar[1], Aydın Keskin[2], Rayiha Görkem Kanar[2], Alper Kepez[3], Bülent Tünerir[4]
[1]Sureyyapasa Chest medicine Research and Trainning Hospital
baturkanar@hotmail.com
[2]Van Research and Trainning Hospital
[3]Marmara Unviversity Research and Trainning Hospital
[4]Eskişehir Osmangazi University Medicine School

INTRODUCTION: The purpose of this study is to investigate the effect of carnosine (CAR) on ischemia-reperfusion (I-R) injury on myocardium occurring after occlusion-reperfusion of infrarenal abdominal aorta (IAA) in rats. MATERIALS-METHOD: In the study; 30 Sprague-Dawleys rats were randomly divided into three equal groups. Laparotomy and IAA dissection were performed in all groups; occlusion was not performed in control group. In control group process was completed in 90 minutes. In I-R and I-R+KAR groups; IAA was occluded by microvascular clamps; first 30 minutes was ischemia period followed by declamping and 60 minutes of reperfusion period. After I-R period rats were sacrificed.

RESULTS: Heart specimens and blood samples were taken for histopathological and biochemical evaluation (figure-1). Statistically, significant alterations were observed in control group against other groups in histopathological analyses. Although, there was no significant difference between groups I-R and I-R+CAR regarding histopathological findings; group I-R+CAR displayed more favorable histopathological findings(p<0.001) compared with group I-R (table-1 and table-2). There were also significant alterations between groups I-R and I-R+CAR regarding aspartate aminotransferase (AST), creatine kinase (CK), lactate dehydrogenase (LDH) enzyme levels (table-3 and table-4). I-R+CAR group had significantly lower enzyme levels compared with I-R group (p<0.001).

In CONCLUSİON: Early diagnosis and early revascularization has the highest importance to reduce lower extremity ischemia-reperfusion injury and minimize local and distant effects. In addition, elucidation of the mechanism responsible for ischemia-reperfusion injury would ensure rapid and effective blocking of the injury. In the study, carnosine showed to be an effective agent in avoiding myocardial I-R injury, particularly on a biological basis. Even if its role in reducing I-R injury was not found statistically significant at histopathological assessment, it was considered that the detection of lower histopathological changes in the I-R+CAR group relative to I-R group is significant. The reason for the failure to obtain a statistically significant result may be the small sample size of the study. Thus, it was believed that the study may guide the way for more comprehensive future studies.

Figure 1. Histopathologic classification of myocytes



A: normal myocardium, B: swelling of cardiomyocyte, C: neutrophils infiltration, D: intertisial edema

Table 1. Histopathological classification of groups

	Control group (n:10)										I-R group (n:10)										I-R+CAR group (n:10)									
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
0	+	+	+	+	+	+	+	+	+	+	-	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	+	-	-	-
1	-	-	-	-	-	-	-	-	-	-	+	-	+	+	+	+	+	+	+	+	+	-	+	+	+	+	-	+	+	+
2	-	-	-	-	-	-	-	-	-	-	+	-	-	+	+	+	-	-	+	-	-	-	-	+	-	-	+	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

0, no change. 1, intertisial edema. 2, Swelling of cardiomyocyte. 3, neutrophils infiltration. 4, Necrosis. n: number.

Table 2. Comparision of all groups with Kruskall-Wallis test

histopathology	median	(25-75)	p value
Control (n:10)	0.00	(0.00-0.00)	p<0.001ᵞᵠ
I-R (n:10)	1.50	(1.00-2.00)	p<0.001ᵞᵠ
I-R+CAR (n:10)	1.00	(1.00-1.00)	p<0.001ᵞᵠ

ᵞ: statistical comparision of control and I-R groups. ᵠ: statistical comparision of control and I-R+CAR groups.

Table 3. Statistical analysis of CK blood sample by Kruskall-Wallis test

Creatini kinase	median	(25-75)	p value
Control (n:10)	2979.50	(2841.00-3341.00)	p<0.001ᵞᵠ
I-R (n:10)	6566.50	(4548.00-7018.00)	p<0.001ᵞᵠ
I-R+CAR(n:10)	3889.00	(3387.00-4126.00)	p<0.001ᵞᵠ

ᵞ: statistical comparision of control and I-R groups. ᵠ: statistical comparision of control and I-R+CAR groups.

Table 4. Statistical analysis of AST and LDH blood samples by One-way ANOVA test

AST	X±SD	p value
Control (n:10)	269.20±43.04	p<0.001ᵞᵠ³
I-R (n:10)	448.10±49.23	p<0.001ᵞᵠ³
I-R+CAR (n:10)	344.70±46.57	p<0.001ᵞᵠ³
LDH		
Control (n:10)	5298.40±258.99	p<0.001ᵞᵠ³
I-R (n:10)	6081.80±324.27	p<0.001ᵞᵠ³
I-R+CAR (n:10)	5487.30±322.33	p<0.001ᵞᵠ³

ᵞ: statistical comparison of control and I-R groups. ᵠ: statistical comparison of control and I-R+CAR groups. ³: statistical comparison of I-R and I-R+CAR groups. SD: standart deviation

Multi-drug resistance – 1 [MDR – 1, P-GL, ABC] gene polymorphism is a risk factor for development of abdominal aortic aneurysm

Bayram Yağmur[1], Ali İhsan Tekin[1], Mehmet Erdem Memetoğlu[2], Rasim Kutlu[3], Ersoy Karaca[4], Müslim Gül[5], Hasan Başçıl[5], Bahadır Şarlı[1], Öcal Berkan[6]

[1]Kayseri Educating and Training Hospital, Department of Cardiovascular Surgery, Kayseri, Turkey.

[2]Dr.Siyami Ersek Cardiovascular and Thoracic Surgery Hospital, Department of Cardiovascular Surgery, İstanbul, Turkey.

[3]Giresun University of Medical School, Department of Cardiology, Giresun, Turkey. dr.rasim@mail.ru

[4]Çorlu State Hospital, Department of Cardiovascular Surgery Tekirdağ, Turkey.

[5]Sivas Numune Hospital, Department of Cardiovascular Surgery, Sivas, Turkey.

[6]Cumhuriyet School of Medicine, Department of Cardiovascular Surgery, Sivas, Turkey.

OBJECTIVE: Aim of this prospective study is to investigate the frequency of multi-drug resistance-1 [MDR-1,P-gl, ABC] gene polymorphism in patients with abdominal aortic aneurysm (AAA) and their first degree relatives and to determine if this gene polymorphism is a risk factor for disease development in these patients.

METHOD: We scanned the MDR-1 gene polymorphisms of the75 patients (53 males (70.6 %), 22 females (29.4 %); mean age 65.34±7.29) who were surgically or medically treated and were followed-up for AAA at our institution (Group I), a group of 75 individuals (49 males (65.3 %), 26 females (34.7 %); mean age 50.45±15.67) who were first degree relatives of patients volunteering to participate in this study (Group II) and a volunteer group of 75 healthy individuals (48 males (64 %), 27 females (36 %); mean age 56.33±14.35) whose abdominal aortic diameters were in the normal range in computerized tomographic examination were included in this study (Group III). Genomic DNAs were obtained of these individuals from the peripheral blood. The relationship between abdominal aortic aneurysm and MDR-1 C3435T gene polymorphism were investigated, along with heterozygous and homozygous mutations of DNAs of these groups with Cycler system Real Time PCR (polymerase chain reaction) techniques.

RESULTS: Gene mutations in groups I, II and III of MDR-1 CC (Wild Type), CT (Heterozygous) and TT (Homozygous) were compared. When the groups were evaluated according to the presence of MDR-1 TT (Homozygous) gene mutations and MDR-1 CT (Heterozygous) gene mutations, MDR-1 TT (Homozygous) and MDR-1 CT (Heterozygous) Gene mutations were found to be significantly more frequent in Group I and II in comparison with Group III.(33.3% and 38.6% vs 8%, p<0.001). MDR-1 CT (Heterozygous) gene mutations were also significantly more frequent in Group I and Group II in comparison with the controls (44% and 42.6% vs 25.3%, p<0.01).

CONCLUSION: The results of this study showed an association between patients with AAA, those patients' first-degree relatives and MDR-1 gene polymorphism.

Drug Adherence in Elder Patients Taking New Oral Anticoagulation Therapy in Turkey: NOAC-TR subgroup study

Sadık Volkan Emren[1], Mehdi Zoghi[2], Oktay Şenöz[3], Murat Bilgin[4], Abdulla Aslan[5], Gönül Açıksarı[6], Uğur Taşkın[7], Özkan Karaca[8], Ilgın Karaca[8], Lale Dinç Asarcıklı[4], Ümit Yaşar Sinan[9], Lütfü Bekar[10]

[1]Department of Cardiology, Afyonkarahisar State Hospital, Afyonkarahisar, Turkey vemren@hotmail.com

[2]Department of Cardiology, Ege University Faculty of Medicine, Izmir, Turkey

[3]Department of Cardiology, Artvin State Hospital, Artvin, Turkey

[4]Department of Cardiology, Dısksapı Research and Education Hospital, Ankara, Turkey

[5]Department of Cardiology, Dokuz Eylül University Faculty of Medicine, Izmir, Turkey

[6]Department of Cardiology, Istinye State Hospital, Istanbul, Turkey

[7]Department of Cardiology, Akşehir State Hospital, Konya, Turkey

[8]Department of Cardiology, Fırat university Faculty of Medicine, Elazıg, Turkey

[9]Department of Cardiology, Istanbul University Institute of Cardiology, Istanbul, Turkey

[10]Department of Cardiology, Hitit University Faculty of Medicine, Çorum, Turkey

BACKGROUND: We assessed self-reported patient adherence to medication of elder patients (pts) who used the NOACs, factors influencing adherence and negative side effects and adverse events as conveyed by the pts in Elder Turkish population.

PATIENTS/METHODS: Cross-sectional study, drug adherence of elder pts using NOACs available in Turkey (rivaroxaban, dabigatran and apixaban). We retrospectively studied 2059 pts over 65 year old (mean age: 75.09±6.5 yrs, 59% female) with non-valvular AF who had taken any NOAC, with >60 days of supply and ≥180 days of continuous. We used the 8-item Morisky Medication Adherence Scale and analyzed it in relation to age, sex, levels of education, socioeconomic status, patient knowledge, NOAC dosing regimen (once or twice daily), number of using drugs and comorbid conditions.

RESULTS: A total of 45.6% Dabigatran, 38.7% Rivaroxaban and 15.7% Apixaban users were identified. The mean CHA2DS2VASc score was 3.7±1.3, 3.7±1.2 and 3.9±1.3 respectively in 3 NOAC groups. 54% of pts had poor adherence to medications (Morisky score >3). The predictors of poor adherence were living in a village (OR:2.90 %95CI:1.50-5.59 P=0.001), demans (OR:2.67 %95CI:1.99-3.58 P<0.001), using 3 and more type of drugs (OR:1.78 %95 CI:1.24-2.57 P=0.002), depression (OR:1.68 %95CI:1.22-2.31 P=0.001), experienced side effect (OR:1.48 %95 CI:1.09-2.02, P=0.012) twice daily use (OR:1.42 %95 CI:1.18-1.72, P<0.001), and and University education versus illeterate (OR:0,28 95% CI 0.14-0.58 P=0.001).

CONCLUSION:
The adherence rate was poor in elder patients. Many factors such as socio-economic, demographic and clinical factors play role in drug adherence. Therefore patient based factors should be evaluated before starting NOAC treatment in elder patients

Predictive value of Ddimer assay, GRACE scores and TIMI scores for adverse outcome in patients with nonSTsegment elevation myocardial infarction

Muhammet Hulusi Satılmışoğlu[1], Sinem Ozbay Ozyılmaz[1], Mehmet Gul[1], Hayriye Ak Yıldırım[2], Osman Kayapınar[3], Kadir Goktürk[4], Huseyin Aksu[1], Korhan Erkanlı[5], Abdurrahman Eksik[1]

[1]Department of Cardiology, Mehmet Akif Ersoy Thoracic and Cardiovascular Surgery Training and Research Hospital, Istanbul
hulusim@gmail.com

[2]Department of Biochemistry, Mehmet Akif Ersoy Thoracic and Cardiovascular Surgery Training and Research Hospital,Istanbul

[3]Department of Cardiology, Duzce University Faculty of Medicine, Duzce,

[4]Department of Infectious Diseases, Mehmet Akif Ersoy Thoracic and Cardiovascular Surgery Training and Research Hospital, Istanbul

[5]Department of Thoracic and Cardiovascular Surgery, Mehmet Akif Ersoy Thoracic and Cardiovascular Surgery Training and Research Hospital, Istanbul; Turkey

BACKGROUND: To determine predictive value of Ddimer assay, Global Registry of Acute Coronary Events (GRACE) and Thrombolysis in Myocardial Infarction (TIMI) risk scores for adverse outcome in patients with nonSTsegment elevation myocardial infarction (NSTEMI).

METHODS: A total of 234 patients (mean (SD) age: 57.2(11.7) years, 75.2% were males) hospitalized with the diagnosis of NSTEMI were included in this crosssectional prospective study. Data on patient characteristics, cardiac interventions, routine blood biochemistry and hemogram, Ddimer assay and GRACE and TIMI risk scores were recorded at the time of hospitalization. Cardiac death was evaluated during 14month follow up and logistic regression analysis was made to determine risk factors predicting increased mortality.

RESULTS: GRACE score was correlated positively with both Ddimer (r=0.215, p=0.01) and TIMI scores (r=0.504, p=0.000). Multivariate logistic regression analysis revealed that older age (OR, 1.286, 95% CI: 1.165 to 1.419, p=0.000), lower diastolic BP (OR, 0.942, 95% CI: 0.899 to 0.988, p=0.014) and being a nonsmoker (OR, 0.5671, 95% CI: 1.169 to 27.523, p=0.031) were significant predictors of increased risk for higher Grace score, while higher creatinine levels (OR, 18.465, 95% CI: 1.059 to 322.084, p=0.046) was the only significantly predictor of increased mortality risk.

CONCLUSION: In conclusion, our findings revealed higher Ddimer levels in nonsurvivors than in survivors and higher Ddimer levels and TIMI score in patients with high GRACE scores. Serum creatinine levels was the sole independent determinant of mortality risk, with no significant value of Ddimer levels, GRACE or TIMI scores for predicting risk of mortality in NSTEMI patients.

Figure1. Receiver operating characteristic (ROC) curve analysis for area under ROC curve (AUC) and optimal cut-off value of D-dimer to discriminate non-survivors from survivors in NSTEMI

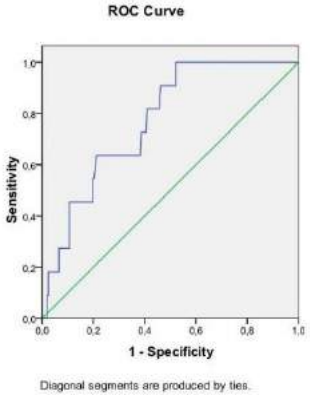


Table 1.

Correlation between D-dimer, Grace and TIMI scores

		Grace Score	D-dimer	TIMI score
Grace score	r	1	0.215	0.504
	p	-	**0.001**	**<0.001**
	n	234	228	234
D-dimer	r	0.215	1	.253
	p	**0.001**	-	**<0.001**
	n	228	228	228
TIMI score	r	0.504	.253	1
	p	**<0.001**	**<0.001**	-
	n	234	228	234

r: correlation coefficient, Pearson correlation analysis

Table 2.

Demographic and laboratory parameters in patients with high vs. low GRACE scores

	GRACE Score		
	Low (n=193)	High (n=41)	p value[a]
Gender	**n(%)**	**n(%)**	
Female	44(22.8)	14(34.2)	**0.126[b]**
Male	149(77.2)	27(65.8)	
Smoking status			
None-smoker	47(24.4)	18(43.9)	**0.038[b]**
Active smoker	94(48.7)	14(34.1)	
Ex-smoker	52(26.9)	9(22.0)	
Diabetes mellitus	90(46.6)	22(53.7)	0.413
Previous CABG/PCI	14(7.3)	7(17.1)	**0.07**
Current treatment			
CABG	35(18.1)	12(29.3)	
PCI	12(6.2)	14(34.1)	**0.193**
Medical treatment	98(50.8)	15(36.6)	
	Mean(SD)	**Mean(SD)**	
Age	54.1(10.0)	72.2(6.5)	**<0.001**
Cardiovascular parameters			
D-dimer (ng/mL)	572.4(865.3)	1157.7(1537.7)	**0.001**
TIMI Score	2.9(1.1)	4.1(1.2)	**<0.001**
SBP (mmHg)	140.4(23.8)	134.8(20.2)	0.159
DBP (mmHg)	81.4(14.2)	74.7(14.5)	**0.011**
Heart rate (bpm)	75.5(16.3)	86.5(23.9)	**<0.001**
Complete blood count			
Hemoglobin (g/dL)	14.4(1.9)	12.7(2.0)	0.988
Hematocrit (%)	43.9(5.2)	39.1(5.6)	**<0.001**
WBC count (10^3/mm^3)	9.8(2.8)	9.6(3.2)	0.733
Platelet count (10^3/mm^3)	248.4(80.5)	261.8(110.9)	0.368
Blood biochemistry			
Glucose (mg/dL)	149.9(89.2)	146.3(78.6)	0.816
HbA1c (%)	6.6(1.8)	6.7(1.5)	0.863
Sodium (mmol/L)	138.7(3.4)	138.2(4.1)	0.122
Potassium (mmol/L)	4.4(0.5)	4.6(0.5)	0.330
Albumin (g/dL)	4.3(0.3)	3.9(0.4)	**<0.001**
Creatinine (mg/dL)	0.9(0.2)	1.0(0.3)	**0.002**
GGT (U/L)	34.9(34.0)	34.0(45.4)	0.875
AST (U/L)	36.4(40.8)	30.9(19.3)	0.404
ALT (U/L)	26.7(28.7)	17.8(9.6)	0.051
Uric acid (mg/dL)	5.5(1.5)	6.0(1.9)	0.079
HDL-cholesterol (mg/dL)	40.5(14.1)	43.7(14.5)	0.191
LDL-cholesterol	123.7(43.3)	107.0(33.8)	0.241
Total-cholesterol (mg/dL)	203.9(48.3)	178.1(40.0)	0.427
Triglyceride (mg/dL)	232.0(177.0)	147.7(115.3)	**0.033**

ALT: alanine aminotransferase, AST: aspartate aminotransferase; bpm: beats per minute; CABG: coronary artery bypass grafting; DBP: diastolic blood pressure; GGT: gamma glutamyl transferase; HDL: high density lipoprotein; SBP: systolic blood pressure; WBC: white blood cell
[a]Independent samples t test [b]χ^2 test.

The Value of CHADSVASC Score in Predicting Long-TermMortality in Patients With ST-Segment Elevation Myocardial Infarction Who Have Undergone Primary Percutaneous Coronary Intervention

Kudret Keskin, Süleyman Sezai Yıldız, Gökhan Çetinkal, Gökhan Aksan, Hakan Kilci, Şükrü Çetin, Serhat Sığırcı, Kadriye Kılıçkesmez
Şişli Hamidiye Etfal Eğitim ve Araştırma Hastanesi

BACKGROUND: Acute coronary syndrome is the most common cause of cardiac morbidity and death. Various scoring systems have been developed in order to identify patients who are at risk for adverse outcome and may benefit from more aggressive and effective therapies.

OBJECTIVES: This study was designed to evaluate CHADSVASC score as a predictor of mortality in patients with ST-elevation myocardial infarction(STEMI) undergoing primary percutaneous coronary intervention (p-PCI).

METHODS: We evaluated 300 patients diagnosed with STEMI who underwent p-PCI, and CHADSVASC scores were calculated for all patients. According to their CHADSVASC scores, patients were divided into three groups as follows: Group 1: 0–1 points(n=101), Group 2: 2–3 points(n=129), and Group 3: 4–9 points(n=70). The mean, median, and minimum duration of follow-up were 21.7 ±9.4, 21, and 12 months, respectively. All-cause mortality was defined as the primary end point of the study.

RESULTS: All-cause mortality occurred in 4% of patients with CHADSVASC=1, 8.5% of those with CHADSVASC= 2–3, and 27.1% of those with CHADSVASC≥4 (p < 0.001). Kaplan–Meier analysis showed that the CHADSVASC ≥ 4 group had a significantly higher incidence of death (p [log-rank] <0.001). CHADSVASC ≥ 4 was identified as an independent predictor of all-cause mortality (hazard ratio 3.18, 95% confidence interval1.07–9.46 p = 0.03).

CONCLUSION: CHADSVASC score can be used for predicting both in-hospital and long-term mortality in patients with STEMI who have undergone p-PCI.

Figure 1. Rates of in-hospital and long term mortality according to the CHADSVASC score

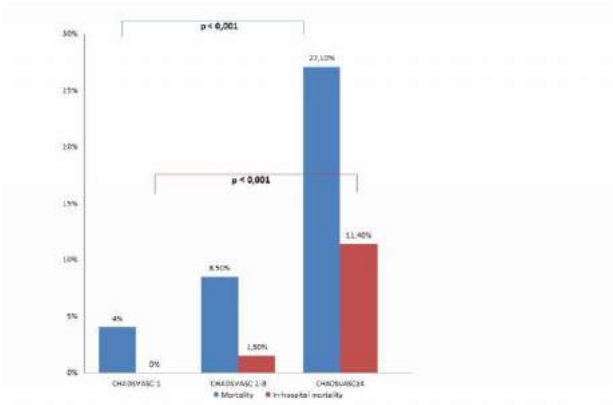


Figure-2. Kaplan Meier curves for all-cause death at long term follow-up

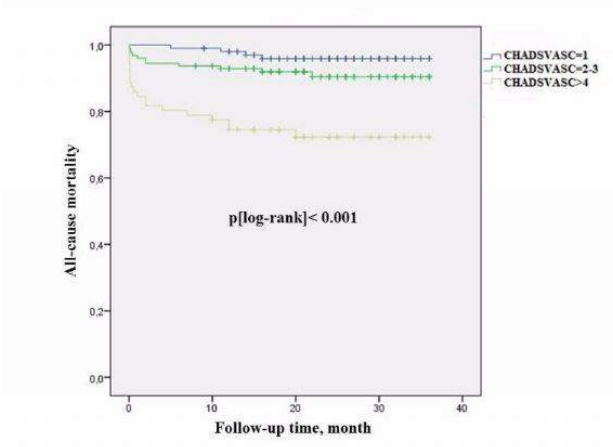


Table 4-a. Multivariable predictors of mortality, Model A AF: Atrial fibrillation, CI: Confidence interval, HR: Hazard ratio

Model A	HR	95 % CI	p value	Chi-square 10,03
CHADSVASC ≥2	3,18	1,07-9,46	0,03	
Previous AF	1,47	0,19-11,14	0,70	
Serum glucose level on admission	1,00	0,99-1,008	0,21	
Hyperlipidemia	1,32	0,46-3,81	0,61	

Table 4-b. Multivariable predictors of mortality, Model B CI: Confidence interval, HR: Hazard ratio, HF: heart failure

Model B	HR	95 % CI	p value	Chi-square 41,20
Age	1,04	1,009-1,078	0,01	
Female gender	2,25	1,04-4,88	0,04	
Hypertension	1,15	0,48-2,75	0,75	
Diabetes Mellitus	1,81	0,87-3,77	0,11	
Previous HF	3,83	1,15-12,7	0,03	
Previous stroke	1,97	0,53-7,34	0,31	

Comparison of Quantitative and Qualitative Coronary Angiography: Computer versus Eye

Taner Şen[1], Celal Kilit[1], Mehmet Ali Astarcıoğlu[1], Lale Dinç Asarcıklı[2], Tolga Aksu[3], Habibe Kafes[4], Afşin Parspur[1], Basri Amasyalı[1]

[1]Dumlupinar University Kutahya Evliya Celebi Education and Research Hospital medicineman_tr@hotmail.com

[2]Diskapi Yildirim Beyazit Education and Research Hospital

[3]Derince Education and Research Hospital

[4]Ankara Yuksek Ihtisas Hospital

BACKGROUND: Many patients underwent coronary revascularization according to visual estimation of their coronary stenosis.Unfortunately, visual estimation may vary between operators. In this study we aim to investigate both inter observer variability and consistency between estimation of an operator and quantitative coronary analysis (QCA) measurements.

METHODS: 147 elective percutaneous coronary intervention patients and 155 lesions were enrolled in the study consecutively. These patients were evaluated for visual estimation of the lesion severity by 3 operators who were blinded to the estimation of each other. The lesions were also evaluated by QCA with a blind fashion. Reference diameter, minimal lumen diameter, percent diameter stenosis, percent area stenosis and lesion length from proximal lesion free segment to distal lesion free segment in diameter were calculated using computerized QCA software program

RESULTS: There was moderate degree concordance in the category of 70-89% (k: 0.406) and 90-99% (k: 0.5813), in the category of <50% and 50-69% while there was low degree concordance between the operators (k: 0.323) and (k: 0.261) respectively. Concordance between visual estimation and QCA was investigated with Kappa analysis. There was low-moderate grade concordance between categorized visual estimation and categorized percent area stenosis (k: 0.30). But there was not a concordance between categorized visual estimation and categorized percent diameter stenosis (k: - 0.061). Also, there was a statistically significant difference between QCA parameters of percent diameter stenosis and percent area stenosis (58.4 ± 14.5% versus 80.6 ± 11.2 %)(p<0.001).

CONCLUSION: Visual estimation may overestimate a coronary lesion and may lead to unnecessary coronary intervention. There is low concordance in the category of <50% and 50-69% between the operators. Percent area stenosis had low-moderate grade concordance with visual estimation. Percent area stenosis more closely reflects the visual estimation of lesion severity than percent diameter stenosis.

Figure. Quantitative coronary analysis of a lesion in the left circumflex coronary artery.



Table 1: Characteristics of the patients and lesions

	Total: 147 patients/155 lesions
Age Mean	64.7±11.3
Sex Female male	40 (27.2%) 107(72.8%)
Vessel LAD Cx RCA intermediate	68(46.4%) 39 (25.2%) 42(27.1%) 2 (1.3%)
Percent stenosis (%) Mean range	84 55-99
Intervention Stent Balloon	159 5
Stent type BMS DES BMS+DES	92 56 2
Stent size (mm) Length (mean) Diameter (mean)	19.1 ± 6.6 3.13 ± 0.49
QCA Minimal lumen diameter (mm) Mean Range Reference diameter (mm) Mean Range	1.19 ± 0.48 0.09-2.53 2.90 ± 0.58 1.75-5.22

BMS; bare metal stent, DES; drug eluting stent, QCA; quantitative coronary analysis

Table 2. Visual estimations of three operators

Primary operator Percent stenosis (mean) Categorized percent stenosis >50 % 50-69% 70-89% 90-99%	84.0% 0 (0%) 6 83.9%) 75 (48.4%) 74 (47.7%)
2nd operator Percent stenosis (mean) Categorized percen stenosis <50% 50-69% 70-89% 90-99%	80.4% 3 (1.9%) 12 (7.7%) 82 (52.9%) 58 (37.4%)
3rd operator Percent stenosis (mean) Categorized percent stenosis <50% 50-69% 70-89% 90-99%	80.4% 3 (1.9%) 20 (12.9%) 73 (47.1%) 59 (38.1%)

Table 3. Evaluation of concordance between operators with Kappa analysis

Group	Kappa	Concordance
<50%	0,261	low-moderate
50-69%	0,406	moderate
70-89%	0,581	moderate
90-99%	0,323	low-moderate
Total	0,458	moderate

Table 4. Comparison between quantitative analysis and visual estimation

	Mean	Std deviation	t	p
percent visual percent mla	84.01 80.61	10.846 11.229	3.996	0.000**
percent visual percent mld	84.01 58.42	10.846 14.513	25.440	0.000**
stent diameter refd	3.13 2.91	0.491 0.586	6.611	0.000**
stent length lesion length	19.15 17.36	6.647 8.135	3.891	0.000**
percent area stenosis percent diameter stenosis	80.61 58.42	11.229 14.513	60.500	0.000**

*mla; minimal lumen area, mld; minimal lumen diameter, refd; reference diameter **:p<0,01*

Table 5. Comparison of concordance between visual estimation and percent area stenosis with Kappa analysis

			Percent area stenosis	Percent area stenosis	Percent area stenosis	Total	Kappa	p
Visual percent stenosis	50-69%	N %	2 33.3	4 66.7	0 0.0	6 100	0,300	0,000**
Visual percent stenosis	70-89%	N %	17 22.7	53 70.7	5 6.7	75 100	0,300	0,000**
Visual percent stenosis	90-99%	N %	6 8.1	32 43.2	36 48.6	74 100	0,300	0,000**
Total		N %	25 15.6	89 57.8	41 26.6	155 100		

***:p<0,01*

Table 6. Comparison of concordance between visual estimation and percent diameter stenosis with Kappa analysis

			Percent diameter stenosis <50%	Percent diameter stenosis 50-69%	Percent diameter stenosis 70-89%	Percent diameter stenosis 90-99%	Total	Kappa	p
Visual percent stenosis	<50%	N %	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	- 0.061	0,000**
Visual percent stenosis	50-69%	N %	3 50.0	3 50.0	0 0.0	0 0.0	6 100	- 0.061	0,000**
Visual percent stenosis	70-89%	N %	29 38.7	42 56.0	4 53.0	0 0.0	75 100	- 0.061	0,000**
Visual percent stenosis	90-99%	N %	11 14.9	31 41.9	27 36.5	5 6.8	74 100	- 0.061	0,000**
Total		N %	43 27.7	76 49.0	31 20.0	5 3.2	155 100	- 0.061	0,000**

***:p< 0,01*

The effect of patent foramen ovale on systolic pulmonary artery pressure in healthy young adults

Hasan Kadı[1], Birol Özkan[2], Eyüp Avcı[1], Taha Gürbüzer[1], Tarık Yıldırım[3]
[1]Balikesir University Faculty of Medicine Cardiology Department
drhkadi@gmail.com
[2]Kartal Kosuyolu Heart Education and Research Center Cardiology Clinic
[3]Balikesir State Hospital Cardiology Clinic

BACKGROUND: Foramen ovale is a normal interatrial communication during fetal life and closure of the foramen ovale occurs in first year of infant in the majority of the population. The closure is incomplete approximately in one of four adults. Shunt direction is predominantly from left to right in case of patent foramen ovale (PFO). Persistent exposure of the pulmonary circulation to increased blood flow might be lead to increase in pulmonary artery pressure (PAP).
PURPOSE: The aim of this study was to investigate whether the elevation in pulmonary artery pressure in healthy young adults with PFO.

METHODS: Subjects who underwent transesophageal echocardiography (TEE) for suspected PFO were evaluated for possible inclusion in the study. The exclusion criteria: 1-Patients with cardiovascular or other systemic disease (according to physical examination, transthoracic echocardiography, ECG, and laboratory result), 2-Cardiovascular drug or narcotic use, smoking, and obesity (body mass index>36 kg/m2), 3-Younger than 18 or older than 40 years, 4-Subjects without tricuspid regurgitation in transthoracic echocardiography. Systolic pulmonary artery pressure was estimated from the peak systolic velocity of the tricuspid regurgitation obtained with continuous-wave Doppler using the modified Bernoulli equation and adding the estimated right atrial pressure (5 mmHg in all subjects). Presence of PFO was determined by TEE during a standardized procedure of infused agitated saline contrast with Valsalva maneuver. Subjects with PFO were named as PFO (+) group and subjects without PFO were named as PFO (-) group.

RESULTS: Sixty-six subjects who met the study criteria were enrolled in the study. There were 23 subjects in the PFO (+) and 43 subjects in the PFO (-) group. Age, gender and body mass index were similar in the two groups. The tricuspid regurgitant jet peak velocity (cm/s) was significantly higher in the PFO (+) group (237±20 versus 191±25, p<0.001). We found that systolic pulmonary artery pressure (mmHg) was higher in the PFO (+) group (20.3±3.6 versus 28±3.7, p<0.001).

CONCLUSION: Our study result shown that sPAP was significantly higher in the subjects with PFO compared to the subjects without PFO.

Table 1. Demographic and echocardiographic charactheristics of subjects in the groups

Variable/Group	PFO (-) Group n=43	PFO (+) Group n=23	p
Age, year (mean± SD)	30.7±8	29.8±7.6	0.652
Female, n (%)	31 (72)	17 (74)	0.842
BMI, kg/m2 (mean±SD)	22.9±2.18	23.5±1.9	0.328
TRJPV, cm/s (mean± SD)	191±25	237±20	<0.001
sPAP, mmHg (mean± SD)	20.3±3.6	28±3.7	<0.001

SD: Standard deviation, BMI: Body mass index, TRJPV:Tricuspid regurgitant jet peak velocity, sPAP: Systolic pulmonary artery pressure, PFO: Patent foramen ovale

Autologous Bone Marrow Stem Cell Implantation In Treatment of Thromboangiitis Obliterans

Ali İhsan Tekin[1], Mehmet Erdem Memetoğlu[2], Rasim Kutlu[3], Ümit Arslan[4], Osman Nuri Tuncer[5], Bayram Yağmur[1], Cengiz Türkay[5], Mehmet Coşkun[2]
[1]Kayseri Educating and Training Hospital, Department of Cardiovascular Surgery, Kayseri, Turkey.
[2]Dr.Siyami Ersek Cardiovascular and Thoracic Surgery Hospital, Department of Cardiovascular Surgery, İstanbul, Turkey.
[3]Giresun University of Medical School, Department of Cardiology, Giresun, Turkey. dr.rasim@mail.ru
[4]Erzurum State Educating and Training Hospital, Department of Cardiovascular Surgery, Erzurum, Turkey.
[5]Akdeniz University of Medical School, Department of Cardiovascular Surgery, Antalya, Turkey.

OBJECTIVE: The aim of this study was to assess the effectiveness and safety of autologous bone marrow stem cell (ABMMNC) treatment in patients with thromboangiitis obliterans (TAO, Buerger's disease).
MATERIALS-METHODS: In this prospective study, twenty-two male patients with TAO were treated with ABMMNC implantation. All patients were Class II and III according to Rutherford Classification with a mean age of 48.27 ±11.55 years. The mean follow up period was 30±22.12 (range 9-64) months. Control visits were at weeks 4, 12 and 24. At each control visit, collateralization scores with digital substrat angiography (DSA) or computerised tomography (CT) angiography, treadmill maximum walking distance test, ankle brachial pressure index (ABPI) measurement and visual analogue scale (VAS) evaluation were performed.

RESULTS: The treadmill painless walking distance test was found 272.27 ± 164.96 meter (m) before implantation, and 310 ± 172.54 m, six months after the ABMMNC implantation (p=0.003*, p<0.008); the mean VAS scores before implantation, and after 6 months were 6.25 ±1.50, and 5.01±0.86. (p=0.003*, p<0.008). The mean ABPI (demonstrating the tissue perfusion) before and 6 months after implantation were 0.507 ±0.06 and 0.66 ±0.1 (p=0.003*, p<0.016). Six months after implantation, new collateral development was evaluated by angiography and collateralization scores were +3 in 8 patients, +2 in 4 patients, +1 in 8 patients and +0 in 2 patients.

CONCLUSION: The findings of this study suggest that ABMMNC implantation in the treatment of patients with TAO might be safe and effective option for treating ischaemic limbs.

The effect of trimetazidine on ventricular repolarization indexes and left ventricular diastolic function in patients with coronary slow flow

Arif Süner, Mustafa Çetin
Department of Cardiology, Adıyaman University, Adıyaman, Turkey
arifsuner@gmail.com

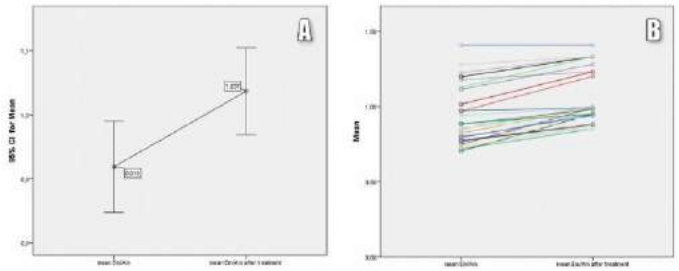
OBJECTIVES: Coronary slow flow (CSF) is associated with an increased incidence of adverse cardiovascular events. Previous studies have shown increases in P wave dispersion, QT dispersion, and the Tp-e/QT ratio, and a prolonged Tp-e interval, as well as left ventricular diastolic dysfunction in patients with CSF. We aimed to examine the effect of trimetazidine (TMZ) on these arrhythmia predictors and diastolic function of the left ventricle.

METHODS:Our study included 30 patients with CSF and 30 individuals with normal coronary arteries. Twelve-lead ECG and echocardiography were used to evaluate patients before and 4 weeks after treatment with TMZ.

RESULTS:Compared with the control group, corrected Pd (29.3±9.1 vs. 22.9±11.6, P=0.022), corrected QT dispersion (32.3±11.1 vs. 27.4±6.8, P=0.032), corrected Tp-e interval (103.1±18.6 vs. 93.4±11.5, P=0.017), and Tp-e/QT ratio (0.236±0.03 vs. 0.210±0.02, P=0.001) were significantly longer, and the E/A ratio (0.905±0.16 vs. 0.986±0.12, P=0.037) and the mean Em/Am ratio (0.918±0.19 vs. 1.095±0.20, P=0.006) were lower in patients with CSF. Corrected Pd, corrected Tp-e interval, and the Tp-e/QT ratio were significantly decreased (29.3±9.12 vs. 22.5±9.20, P=0.022; 97.3±16.6 vs. 88.2±16.4, P=0.031; 0.22±0.03 vs. 0.20±0.31, P=0.042 respectively), and left ventricle mitral annular mean Em/Am velocity was significantly increased (0.918±0.19 vs. 1.095±0.20, P=0.017) after treatment with TMZ.

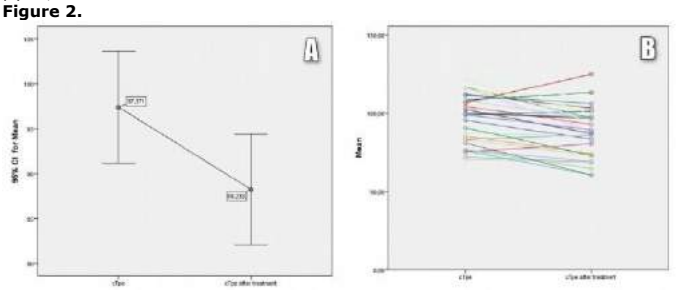
CONCLUSION:CSF may be related to increased P wave and QT dispersion, a prolonged Tp-e interval, and Tp-e/QT ratio, in addition to impaired diastolic filling. TMZ may be useful in restoring these findings.

Figure 1.



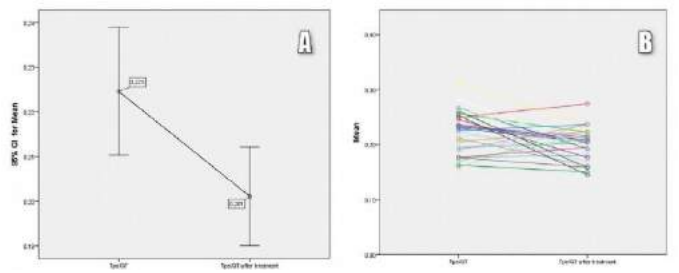
Error bars graphic showing the mean values for pre-Em/Am and post-Em/Am ratio (A). Multiple line graphic showing the mean values of pre-Em/Am and post-Em/Am ratio for each participant (B). CI, confidence interval.

Figure 2.



Error bars graphic showing the mean values for pre-cTp-e and post-cTp-e interval (A). Multiple line graphic showing the mean values of pre-cTp-e and post-cTp-e interval for each participant (B). CI, confidence interval.

Figure 3.



Error bars graphic showing the mean values for pre-Tp-e/QT and post-Tp-e/QT ratio after treatment (a). Multiple line graphic showing the mean values of pre-Tp-e/QT and post-Tp-e/QT ratio for each participant (b). CI, confidence interval.

Table 1. Clinical characteristics and angiographic findings of groups

Variables	Patients with CSF (N=30)	Control group (N=30)	P value
Age (years)	51.3 ± 8.9	51.5 ± 4.5	0.863
Sex (male/female)	19/11	21/13	0.585
BMI (kg/m2)	27.0 ± 3.4	26.5 ± 3.0	0.835
Diabetes mellitus	10 (33.3)	9 (30)	0.785
Hypertension	9 (30)	7 (23.3)	0.560
Cigarette smoking	14 (46.6)	10 (33.3)	0.297
Heart rate (beats/min)	79.8	77.6	0.594
Systolic blood pressure (mmHg)	129.8 ± 7.5	127.9 ± 6.8	0.112
Diastolic blood pressure (mmHg)	71.7 ± 4.8	73.3 ± 4.7	0.673
TIMI frame count (frame/s)			
Left anterior descending artery	49.8 ± 13.5	29.9 ± 5.1	<0.001
Left circumflex artery	31.6 ± 10.7	20.5 ± 2.7	<0.001
Right coronary artery	39.9 ± 8.2	19.7 ± 1.7	<0.001
Mean TIMI frame count	37.7 ± 7.4	22.8 ± 2.1	<0.001

Data are presented as mean ± SD and numbers (%). CSF, coronary slow flow; TIMI, thrombolysis in myocardial infarction.

Table 2. Electrocardiographic and echocardiographic findings of groups

Variables	Patients with CSF (N=30)	Control group (N=30)	P value
LV end diastolic diameter (mm)	47.7 ± 2.5	47.0 ± 2.4	0.665
LV end systolic diameter (mm)	32.1 ± 2.1	32.6 ± 2.6	0.589
LV ejection fraction (%)	60.9 ± 1.7	62.8 ± 2.8	0.121
Septum wall thickness (mm)	10.8 ± 1.0	10.5 ± 0.8	0.127
Posterior wall thickness (mm)	8.13 ± 1.1	7.8 ± 1.3	0.315
CDI findings			
IVRT (ms)	78.5 ± 7.2	80.1 ± 8.5	0.131
E (cm/s)	67.8 ± 11.4	76.1 ± 11.3	0.006
A (cm/s)	75.4 ± 7.1	77.2 ± 6.1	0.293
E/A ratio	0.905 ± 0.16	0.986 ± 0.1	0.037
DT (ms)	231.16 ± 2.8	219.13 ± 25	0.590
TDI findings of mitral annulus			
Mean Em (cm/s)	10.5 ± 0.8	11.5 ± 1.5	0.005
Mean Am (cm/s)	11.7 ± 1.5	10.9 ± 1.7	0.044
Mean Em/Am ratio	0.918 ± 0.19	1.095 ± 0.20	0.006
ECG examination			
Corrected P dispersion	29.3 ± 9.1	22.9 ± 11.6	0.022
Corrected QT dispersion	32.3 ± 11.1	27.4 ± 6.8	0.032
Corrected Tp-e interval	103.1 ± 18.6	93.4 ± 11.5	0.017
Tp-e/QT ratio	0.236 ± 0.03	0.210 ± 0.02	0.001

Data are presented as mean ± SD and numbers (%).
A, mitral inflow contraction velocity; Am, atrial contraction wave using TDI; CDI, conventional Doppler imaging; CSF, coronary slow flow; DT, deceleration time; E, mitral velocity of early diastolic filling from transmitral flow; Em, early diastolic filling using TDI; IVRT, isovolumic relaxation time; LV, left ventricle; TDI, tissue Doppler imaging; Tp-e, between the peak and the end of the T wave.

Table 3. Pretreatment and post-treatment echocardiographic parameters of the study groups

		TMZ (N=30)			Control (N=30)	
	Basline	Follow-up	P	Basline	Follow-up	P
CDI findings						
IVRT (ms)	78.5 ±	77.3 ± 7.22	0.46	80.1 ±	81.4 ± 7.81	0.55

	7.23			8.51		
E (cm/s)	75.4 ± 7.11	68.4 ± 11.3	0.83	76.1 ± 11.3	77.1 ± 11.3	0.45
A (cm/s)	75.4 ± 7.11	74.1 ± 6.4	0.70	77.2 ± 6.1	76.2 ± 6.1	0.74
E/A ratio	0.90 ± 0.16	0.92 ± 0.15	0.71	0.986 ± 0.1	0.976 ± 0.2	0.35
DT (ms)	230.2 ± 23.4	230.0 ± 21.8	0.93	393.2 ± 22.6	391.5 ± 23.4	0.71
TDI findings						
Inferior Em/Am	0.97 ± 0.17	1.08 ± 0.17	0.020	369.0 ± 22.1	367.8 ± 21.9	0.84
Anterior Em/Am	0.85 ± 0.20	1.01 ± 0.21	0.004	418.7 ± 39.9	417.5 ± 40.4	0.90
Lateral Em/Am	0.97 ± 0.26	1.08 ± 0.24	0.059	24.2 ± 4.51	23.6 ± 6.55	0.74
Septal Em/Am	0.90 ± 0.20	1.08 ± 0.24	0.006	27.4 ± 6.85	26.7 ± 7.34	0.72
Mean Em/Am	0.918 ± 0.19	1.095 ± 0.20	0.017	82.5 ± 9.96	82.5 ± 9.96	0.35

Data are presented as mean ±SD.
A, mitral inflow contraction velocity; Am, atrial contraction wave using TDI; CDI, conventional Doppler imaging; DT, eceleration time; E, mitral velocity of early diastolic filling from transmitral flow; Em, early diastolic filling using TDI; Em/Am, diastolic myocardial motion velocities using TDI (early and late phase); IVRT, isovolumic relaxation time; TDI, tissue Doppler imaging; TMZ, trimetazidine.

Table 4. Pretreatment and post-treatment ECG parameters of the study groups

		TMZ (N=30)			Control(N=30)	
	Basline	Follow-up	P	Basline	Follow-up	P
Heart rate	79.8 ± 10.5	78.9 ± 11.0	0.871	77.5 ± 8.52	77.6 ± 8.01	0.961
P minimum	79.8 ± 13.5	80.1 ± 12.3	0.913	80.1 ± 8.51	81.4 ± 7.82	0.550
P maximum	107.5 ± 14.3	100.0 ± 14.3	0.020	100.2 ± 8.71	99.1 ± 8.11	0.592
P dispersion	25.6 ± 8.31	20.4 ± 8.11	0.081	20.1 ± 9.92	17.6 ± 9.91	0.340
cPd	29.3 ± 9.12	22.5 ± 9.20	0.022	22.9 ± 11.6	20.1 ± 11.5	0.352
QT maximum	411.3 ± 24.2	408.4 ± 24.3	0.650	393.2 ± 22.6	391.5 ± 23.4	0.711
cQTmax	459 ± 34.3	456.4 ± 34.2	0.721	446.2 ± 41.6	444.3 ± 42.3	0.861
QT minimum	386.2 ± 26.5	375.9 ± 29.0	0.160	369. 0 ± 22.1	367.8 ± 21.9	0.841
cQTmin	429.7 ± 36.6	413.6 ± 41.5	0.122	418.7 ± 39.9	417.5 ± 40.4	0.900
QT dispersion	28.0 ± 9.71	25.8 ± 5.92	0.272	24.2 ± 4.55	23.6 ± 6.51	0.741
cQTd	32.9 ± 11.1	28.3 ± 20.1	0.180	27.4 ± 6.82	26.7 ± 7.32	0.722
Tp-e interval	87.1 ± 14.5	74.7 ± 10.4	<0.001	82.5 ± 9.93	80.2 ± 8.31	0.352
cTp-e interval	97.3 ± 16.6	88.2 ± 16.4	0.031	93.4 ± 11.5	90.9 ± 10.4	0.381
Tp-e/QT ratio	0.22 ± 0.03	0.20 ± 031	0.042	0.20 ± 0.03	0.20 ± 0.02	0.543

Increased Tp-e defined as >85 ms and increased Tp-e/QT ratio defined as >0.21. cPd, corrected P dispersion; cQT, corrected QT interval; cTp-e, corrected transmural dispersion of repolarization; QTmin, minimum QT duration; QTmax, maximum QT duration; Tp-e interval, transmural dispersion of repolarization; TMZ, trimetazidine.

Systolic heart failure patient profiles differ according to presence or absence of ivabradine treatment

Hakkı Kaya, Osman Beton, Mehmet Birhan Yılmaz, On Behalf Of Treat Hf Investigators
Department of Cardiology, Cumhuriyet University, Sivas, Turkey
drhakkikaya84@gmail.com

BACKGROUND: Chronic heart failure with reduced ejection fraction (HFREF) is a progressive disease with considerable success of overall management. However, ivabradine is an agent which is being suggested by ESC and has recently been accepted by FDA.

METHODS: Turkish Research Team-HF (TREAT-HF) network has been testing a questionnaire to investigate several aspects of HFREF outpatients including medications. TREAT-HF 1 and 2 cohorts were recorded in 2013 and 2014 overall reaching 975 outpatients with HFREF out of 17 HF centers. In the whole group, ivabradine data were recorded in 884 HFREF patients.

RESULTS: 109 patients out of 884 patients (12.3%) with HFREF were under ivabradine therapy during index questionnaire. Overall, mean age of the whole group was 62.1±13.4 years with a mean EF of 31.8%. Patients who were on ivabradine were younger (58±14 vs 63±13 years, p=0.003), had lower EF (29±8 vs 31±9%, p=0.002) compared to those who were not. Gender and NYHA class distribution, BUN, creatinine, sodium, hemoglobin were similar in between the two groups. Patients who were on ivabradine stated that they were more likely to be informed by their primary physicians with regard to their disease (72% vs 56%, p=0.038) and medications (82% vs 73%, p=0.034) and hence they were more likely to feel that they had enough information with regard to their disease (57% vs 46%, p=0.048) compared to those who were not on ivabradine. Patients who were on ivabradine more frequently designated HF as a dangerous disease than those who were not (86% vs 66%, p<0.001). When the attitudes were asked, it was noticed that regular physician visits (84% vs 74%, p=0.034), regular weight measurement (64% vs 45%, p=0.001), regular physical activity (33% vs 21%, p=0.015) were more frequently noted in patients who were on ivabradine compared to those who were not. Patients who were on ivabradine stated that media influenced their disease management more frequently than those who were not on ivabradine (14% vs 7%, p=0.008).

CONCLUSION: It seems in a cohort of 884 HFREF outpatients, bidaily ivabradine use were associated with overall desired patient attitudes and better awareness.

Comparison of the safety and efficacy of ivabradine, nebivolol, trimetazidine and ranolazine therapies in the treatment of stable angina pectoris patients with left ventricular dysfunction

Rasim Kutlu[1], Mehmet Erdem Memetoglu[2], Tolkun Murataliev Muratalievic[3]
[1]Department of Cardiology, Giresun University, Giresun, Turkey
dr.rasim@mail.ru
[2]Dr. Siyami Ersek Thoracic and Cardiovascular Surgery Hospital. Cardiovascular Surgery, Istanbul, Turkey.
[3]Kyrgyz State Medical Academy, National Cardiology Institute of Medicine, Cardiology United States Bishkek, Kyrgyzstan.

GOAL: The goal of this study is to examine the mono effects of Ivabradin, Nebivolol, Trimetazidin and Ranolazin in those patients with stable angina pectoris, whose Left ventricular ejection fraction (LVEF) is %40 and below.
METHOD: The comparative effects of Ivabradin, Nebivolol, Trimetazidin and Ranolazin on antianginal, anti-ischemic, anti-tachycardiac, LVEF, Metabolic Equivalent Task, and diastolic function parameters is performed. Moreover, the life quality of these patients was measured using Seattle SAP (SAQ) survey. The ratio of hospital admission during their treatment was calculated. The drug interaction, reliability and side effect profile of Ivabradin, Nebivolol, Trimetazidin and Ranolazin were examined.

FINDINGS: According to the data, while each group displayed symptomatic improvements in life quality, there was no comparative advantage among the groups in terms of drug interaction. The patients were compared in terms of their LVEF before and 6 months after the treatment. The following measures were acquired: Nebivolol (3%), İvabradin (3%), Trimetazidin (1%), Ranolazin (2%). Improvement in LVEF is not significant at (p<0.05). The admission of the patients into hospital was compared intra group. Each group displayed reduced number of hospital admission. This change was significant (p<0.01) with patients who use Nabivolol, Ivabradin and was insignificant (p<0.05) with patients who used Trimetazidin and Ranolazin. In comparing the pre and post treatment groups a meaningful improvement in existing diastolic indexes was observed. According to this, those patients who have used Nebivolol, İvabradin it was found significant at (P< 0.01) and those who have used Trimetazidin and Ranolazin it was found insignificant at (P< 0.05). Those groups, which we included in the study based on effort tests analysis of MET, showed improvement. This change in MET level was found statistically significant at (P< 0.01) in groups that used Nebivolol İvabradin Ranolazin and Trimetazidin. In pre-treatment patients that we observed in six month periods the effects of groups on patients' cardiac rhythm was looked to. According to this, the change in patients who used Nebivolol and İvabradin was found significant at P< 0.01 and in those patients who used Trimetazidin and Ranolazin the change in cardiac rhythm was found statistically insignificant P< 0.05.

CONCLUSION: It can be assumed that Nebivolol, İvabradin, Trimetazidin and Raonolazin are safe agents in terms of their antianginal effects in patients with SAP, who has left ventricle systolic and diastolic dysfunction and Nebivolol, İvabradin can safely be used to drop the cardiac rhythm.

Is there a relationship between epicardial adipose tissue volume and coronary plaque structure in patients with diabetes mellitus

Gökhan Aksan, Serhat Sığırcı
Şişli Hamidiye Etfal Training and Research Hospital
aksan55@yahoo.com

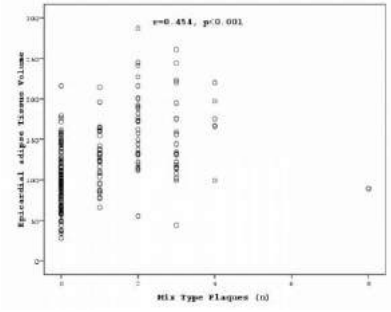
OBJECTIVES: Epicardial adipose tissue (EAT) contributes to the development and progression of coronary artery disease (CAD). We aimed to evaluate the relationship between EAT volume, coronary atherosclerosis, coronary plaque burden and plaque structure in diabetic patients.

MATERIAL-METHODS: 196 DM patients who were evaluated with 128-slice dual-source coronary computed tomography angiography (CCTA) for suspected CAD were included in the study. The CCTA examination was used to assess the total plaque burden, number of diseased segments, plaque characteristics and EAT volume. The study population was divided into two groups [a CAD group (Group I) and non-CAD group (Group II)]. The plaque characteristics were analyzed on a per-segment.

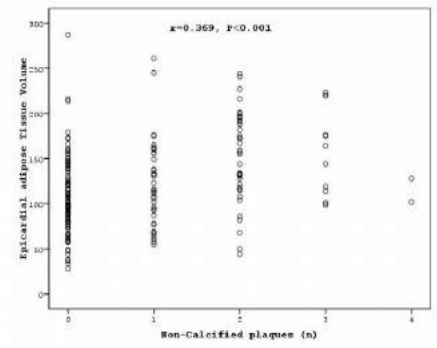
RESULTS: EAT volume was found to be significantly higher among diabetic patients with CAD compared to those without CAD (138.7±49.1 ml vs 98.6±34.7 ml, p<0.001). In the correlation analysis, EAT volume showed significant positive correlation with BMI (r=0.369, p<0.001), total plaque burden (r=0.424, p<0.001), mixed plaques (r=0.454, p<0.001), non-calcified plaques (r=0.369, p<0.001), calcified plaques (r=0.191, p=0.007) and number of diseased segment (r=0.449, p<0.001). Also, multivariate logistic regression analysis revealed that EAT volume as a significant and independent predictor of the presence of CAD in patients with DM (OR=1.023, 95% CI: 1.014-1.032; p<0.001).

DISCUSSION: We have determined that EAT volume is an independent predictor among diabetic patients for the presence of CAD. Moreover, EAT volume showed moderate correlation with total plaque burden and the number of mixed and non-calcified plaques but weak correlation with calcified plaques.

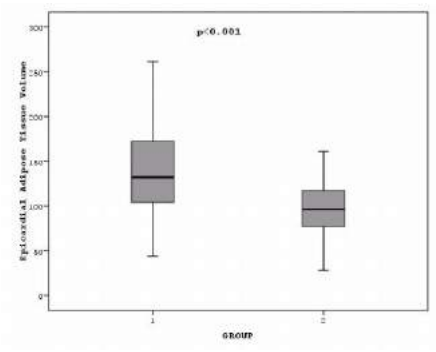
Correlation between epicardial adipose tissue (EAT) volume and mixed plaques



Correlation between epicardial adipose tissue (EAT) volume and non calcified plaques



Epicardial adipose tissue volume in CAD group (Group I) and non CAD group (Group II) in patients with diabetes mellitus



CAD, coronary artery disease.

Baseline clinical and biochemical characteristics of study groups

Variables	Group I (N=114)	Group II (N=82)	P value
Age (years)	56.5±9.4	54.2±9.7	0.080
Male sex, n (%)	54 (47.4)	31 (37.8)	0.183
BMI (kg/m2)	29.1±4.5	27.8±4.8	0.075
Hypertension, n (%)	70 (61.4)	47 (57.3)	0.565
Smoking, n (%)	28 (24.6)	22 (26.8)	0.719
White blood cell (x103/mm3)	7.6±2.0	7.7±1.9	0.960
Hemoglobin (g/dL)	13.2±1.5	13.3±1.6	0.544
Platelet (x103/mm3)	251.5±60.7	241.9±58.3	0.269
Serum glucose (mg/dL)	147.3±50.5	148.3±62.6	0.898
Serum creatinine (mg/dL)	0.86±0.23	0.85±0.22	0.853
HbA1c (%)	7.2±1.3	7.2±1.4	0.951
Triglyceride (mg/dL)	171.4±86.1	179.9±104.1	0.533
Total cholesterol (mg/dL)	210.8±48.5	202.6±39.9	0.210
LDL- C (mg/dL)	128.4±40.3	122.8±31.5	0.292
HDL-C (mg/dL)	44.9±12.4	43.8±10.8	0.524
EAT volume (ml)	138.7±49.1	98.6±34.7	<0.001
CCTA findings			
Number of plaques	4.59±2.42		
Distribution of plaque sub-types			
Mixed type, n (%)	184/524 (35.1)		
Non calcified type, n (%)	157/524 (29.9)		
Calcified type, n (%)	183/524 (34.9)		
Medical treatments			
ACE inh./ARB, n (%)	55 (48.2)	29 (35.4)	0.072
B-blocker, n (%)	39 (34.2)	27 (32.9)	0.851
Statin, n (%)	29 (25.4)	19 (23.2)	0.716

Correlation analysis between Epicardial Adipose Tissue Volume and various parameters in patients with coronary artery disease

Variables	r value	p value
Age	0.127	0.077
Male sex	-0.186	0.009
BMI	0.369	<0.001
HbA1c	-0.053	0.464
Total plaque burden	0.424	<0.001
Mixed plaques	0.454	<0.001
Non calcified plaques	0.369	<0.001
Calcified plaques	0.191	0.007
Number of diseased segment	0.449	<0.001

Relationship Between Plateletcrit, Platelet Distribution Width and Blood Pressure Variability in Hypertensive and Normotensive Subjects

Ali Gökhan Özyıldız[1], Ali Çoner[2], Kaan Okyay[1], Akif Serhat Balcıoğlu[2], Haldun Müderrisoğlu[1]
[1]Department of Cardiology, Baskent University, Ankara, Turkey
aligokhanozyildiz@gmail.com
[2]Department of Cardiology, Başkent University Alanya Training and Research Center, Antalya, Turkey

Background and AIM: Plateletcrit (PCT) and platelet distribution width (PDW) have been reported to be useful in the diagnosis and follow up of many inflammatory processes and metabolic diseases. Blood pressure variability (BPV) and lack of nocturnal blood pressure fall is a good predictor of cardiovascular prognosis. In this study, we aimed to evaluate the relationship between PCT, PDW and BPV with left ventricular mass index (LVMI) in hypertensive and normotensive subjects.

METHODS: In this multi-central clinical trial, we examined 668 patient's ambulatory blood pressure (ABP) records retrospectively between March 2012 and April 2015. According to ABP values, patients were divided into 3 categories; normotensive (n= 91), dipper hypertensive (n= 188) and non-dipper hypertensive (n= 389). PCT and PDW levels were recorded from patient's files and LVMI was calculated using a regression equation.

RESULTS: Neither PCT (p=0.103) nor PDW (p=0.480) levels were different between the groups. There was a significant association between LVMI and 3 categorical groups (p<0.001). However, the difference between normotensives with dippers was not significant (p=0.198) for LVMI. We found slight correlation between PCI and LVMI (r=-0.137, p=0.056). But there was no correlation between PDW and LVMI (r=-0.064, p=0.377).

CONCLUSION: We showed that PCT and PDW might not associate with BPV in hypertensive and normotensive subjects.

A Rare Coronary Artery Anomaly: Left Main Coronary Artery Originating From the Right Sinus of Valsalva and Successful Percutaneous Coronary Intervention of Left Anterior Descending Artery

Metin Karayakalı, Ataç Çelik
Gaziosmapaşa University Medicine Faculty, Tokat, Turkey
drmk5170@gmail.com

CASE: A 66-year-old male presented with rest angina and dyspnea. Risk factor for coronary artery disease was only family history. Electrocardiography showed atrial fibrillation, with negative T wave in the precordial leads. Cardiac troponin levels were high. Transthoracic echocardiography revealed no regional wall motion abnormalities at rest.

FINDINGS: The patient underwent angiography. Right coronary artery revealed dominant and free of significant disease. Afterwards, aortography performed in RAO position to find left main coronary artery (LMCA) origin and its origin was the right coronary sinus of valsalva with a different ostium and it had a long retroaortic course. Cannulation of the anomalous LMCA could be achieved by standard 6F Judkins right diagnostic catheter. Multiple views showed that the proximal left anterior descending coronary artery (LAD) had a 90 % obstructive lesion. Lesion was evaluated feasible for percutaneous coronary intervention (PCI) because of the lesion properties and the course of the artery. Lesion was crossed with a 0.014 F angioplasty guidewire (HI Torque Pilot 50). Direct stenting was performed successfully with a 2.75x18 mm drug-eluting stent at 12 atm (Everolimus, Xience, Abbott). The procedure was finished without complication and TIMI 3 flow achieved.

DISCUSSION: Coronary Artery Anomalies (CAA) are rare but have received much attention due to some types are associated with myocardial ischemia and sudden cardiac death (SCD). The incidence of CAA and its subgroup origin and distribution anomalies are %1,33 and %1,15, respectively. An anomalous LMCA originating from the right sinus of valsalva, as in our case, is quite rare anomaly, with an incidence %0.017 in a large angiographic series. This anomalous artery originating from the opposite sinus of valsalva is classified into 4 common courses by their anatomic relation to the ascending aorta and the pulmonary trunk: interarterial or preaortic (between the aorta and pulmonary trunk), posterior or retro-aortic, prepulmonic or anterior, septal or subpulmonic. Surgical therapy is favour in case of interarterial course but the other subgroups therapy is less clear in current guidelines. A few case reports have described PCI in patients with CAA, even less in setting an ACS. Our patient's clinic was Non–STEMI and there was a significant obstruction of the proximal part of the LAD. The PCI was undertaken because of favourable properties of the lesion, the course of the artery and the predicted successful procedure outcome. In conclusion, we reported a rare case of coronary anomaly that LMCA originating from the right sinus of valsalva and a drug-eluting stent was successfully implanted LAD proximal lesion in case of ACS. Thus, PCI is feasible, safety and it can be especially considered in ACS with anamolous LMCA originating from the right sinus of valsalva having retroaortic course.

Hemolytıc Anemıa Due to Hydrochlorothıazıde

Özlem Seçen
Department of Cardiology, Elazig Training and Research Hospital, Elazig / Turkey
ozllemsecen@hotmail.com

Drug-associated hemolytic anemia is very rare. Hydrochlorothiazides are commonly used diuretic or antihypertensive agents. In this report, we present an eighty-year-old male patient who developed hemolytic anemia 20 days after using a combination of angiotensin receptor blocker and hydrochlorothiazide for the treatment of hypertension.

CASE: Eighty-year-old male patient admitted to the emergency unit for paleness, icterus of sclera, shortness of breath, weakness, fatigue, and chest pain that started twenty days ago and increased gradually. According to his medical history, he underwent aorto-coronary by-pass surgery 15 years ago and had a stent implanted 3 years ago. ECG showed ST depression in derivations V1–V6. Troponin showed a normal level of 0.01 µg/L. The patient was diagnosed with acute coronary syndrome and taken to the coronary intensive care unit where anti-ischemic therapy was started. His hemoglobin (Hb) and hematocrit (Hct) values were 7.5 g/dL (normal range: 13.2-17.4 g/dL) and 21% (normal range: 39-51%), respectively. Fragmented normochromic red blood cells and anisocytosis were seen in the peripheral blood smear. One unit of red blood cell suspension was given. Hb and Htc levels were increased to 9.6 g/dL and 24.6%, respectively; and then to 10.7 g/dl and 26.8%, respectively, following the administration of a second suspension of red blood cells. Vitamin B12 level was normal, folic acid level was low and ferritin level was high which were 242 pg/mL (normal range: 191-663 pg/mL), 4.5 ng/mL (normal range: 4.6-18.7 ng/mL) and 1080 ng/mL (normal range: 30-400 ng/mL), respectively. Control complete blood count values at day 2 were 8.5 g/dL for Hb and 22.1% for Hct. Consultation was requested from internal medicine department. Occult blood test in the stool was negative. Endoscopy was performed to exclude gastrointestinal bleeding. Thus, active gastrointestinal hemorrhage was excluded. Abdominal ultrasound revealed no intra-abdominal hematoma, mass, or hepatomegaly or splenomegaly. Indirect Coombs test was negative, but direct Coombs was positive as IgG +2. Lactate dehydrogenase (LDH) was increased to 741 U/L (normal range: 240-480 U/L). Haptoglobine was <0,3 g/L (normal range: 0.3-2 g/L). Yes, total bilirubin and direct bilirubin levels were high which were 2.6 mg/dL (normal range: 0-1.2 mg/dL) and 1.1 mg/dL (normal range: 0-0.3 mg/dL), respectively. Urine analysis revealed proteinuria, and (+) bilirubin and (+++) hemoglobin. ANA serum dilution was negative. It was understood from his medical records that hemoglobin and Hct levels were 13.1 g/dL and 38.7%, respectively, 20 days ago. When his medical history was reviewed, it was seen that he was started on daily irbesartan 150 mg plus hydrochlorothiazide 12.5 mg for high blood pressure. The patient was then transferred to internal medicine clinic with the current findings for hemolytic anemia due to thiazide. Then, hydrochlorothiazide was stopped. After that, trandolapril was started for treatment of hypertension. The patient was put on follow-up program with periodic complete blood count analysis. At the end of next following two weeks, a negative Coombs test result and a hemoglobin value of 10.5 g/dL was obtained. During follow-up, the hemoglobin values were 13.1 g/dL and 13.3 g/dL, one month later and three month later, respectively.

RESULT: Drug-associated hemolytic anemia is seen approximately in one out of a million individual. It may be lethal, possibly with no diagnosis established. It should be considered that hemolytic anemia related to hydrochlothiazide might mostly occur from used dıuretic and antihypertensive agents.

A Rare Cause of Repeated Syncope: Partial Anomalous Pulmonary Venous Connection

İnci Tuğçe Çöllüoğlu, Asım Oktay Ergene, Tuba Ekin
Department of Cardiology,Dokuz Eylül University,İzmir,Turkey
tugcecolluoglu48@gmail.com

INTRODUCTION: Partial Anomalous Pulmonary Venous Connection (PAPVC) is a rare congenital defect and acts as a left to right shunting. PAPVC is often clinically silent, symptoms such as exercise tolerance, dyspnea, atrial arrhythmias, right heart failure and pulmonary hypertension may occur like intracardiac shunting. The severity of symptoms depends upon the flow ratio of pulmonary to systemic blood flow (Qp/Qs). So, syncope is an uncommon presentation of the patient with PAPVC. Herein, we aim to describe a patient who admitted with repeated syncope and diagnosed with PAPVC, which a very rare condition owes not to excess pressure loading to the right side of the heart.

CASE:A 49-year-old man was admitted with repeated syncope. A few weeks prior to admission he had syncopal episodes, the patient's symptoms have been associated with mildly elevated pulmonary hypertension, which condition is not explained secondary to specific etiology. As the patient still complained persistent symptoms, he presented to our hospital. A 12 lead electrocardiography (ECG) showed an incomplete right bundle branch block (RBBB) with nonspecific T wave changes in the anterior leads. Baseline TTE and following transesophageal echocardiography revealed dilated right ventricle with trabecular thickening and

was negative for atrial septal defect (ASD), ventricular septal defect (VSD). Coronary angiography and left heart catheterization did later show normal coronaries and left ventricle. Chamber saturations from heart catheterization detected with cardiac output, a left-to-right shunt in the SVC with a pulmonary-to-systemic flow ratio of 2.17 and mild pulmonary hypertension (Table 1,2). After that, pulmonary venous catheterization showed that two branches of the right upper pulmonary vein (RUPV) draining into the SVC. MCTA and C-MRI confirmed the diagnosis of PAPVC which evidenced by lack of pulmonary veins to the left atrium, the presence of anomalously routed pulmonary veins and enlarged right atrium and right ventricle (Figure1A,1B,2A,2B,2C). Due to patient's persistent clinical state, the multidisciplinary heart team considers surgical correction of PAPVC. One week after the diagnosis, PAPVC repair was performed successfully.

CONCLUSION : PAPVC is a rare congenital disease. Individuals with isolated PAPVC have a normal life span and usually are asymptomatic. Symptoms are dependent on Qp/Qs. Repeated syncope is rarely seen in patients with isolated PAPVC. The development mechanism of syncope is uncertain but due to mostly arrhythmic reasons. But, our patient did not describe palpitation or bradyarrhytmic events in the prior to his syncopal episode and has not severe right sided heart failure. The interesting event in our patient was that he has not described any syncopal events for a month at the post-procedural time. Furthermore, we decide to write this case report after one month procedure, we think that repeated syncopal episodes may be descriptive of isolated PAPVC. Particularly, we consider PAPVC when individuals with atypical symptoms is performed TTE or TEE delineating enlarged right sided heart structures, unexplained pulmonary hypertension with negative for any intracardiac shunting. Maybe, as long as continuing to publish the similar case reports, the precise pathophysiology of syncope may describe in PAPVC.

Figure 1A. C-MRI showing right ventricular enlargement

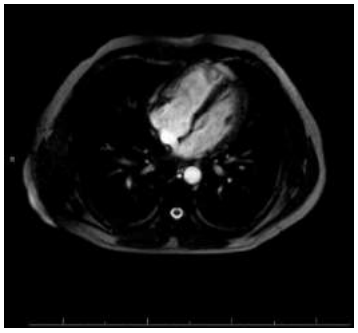


Figure 1B. C-MRI showing anomalous right upper pulmonary vein (RUPV) and right middle pulmonary vein (RMPV) return to superior vena cava (SVC)

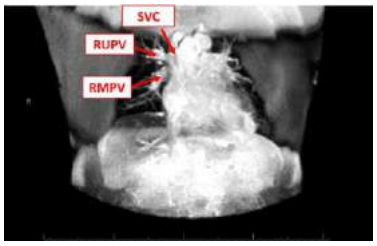


Figure 2A. MCTA showing anomalous RUPV return to SVC

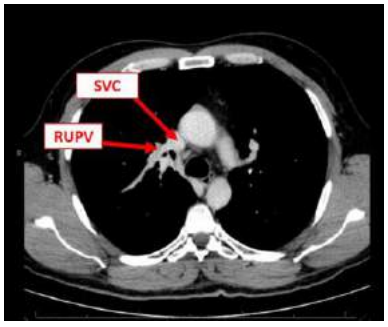


Figure 2B. MCTA showing anomalous RMPV return to SVC

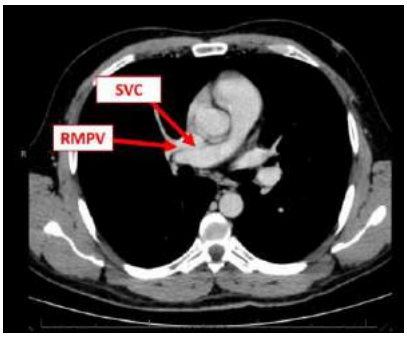


Figure 2C. MCTA showing RMPV, SVC, RA

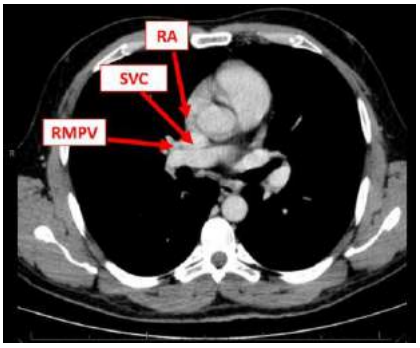


Table 1. Measurements of cardiac pressures and oxygen-saturation sampling

	Pressure (mmHg)	Saturation O2 (%)
IVC		79.6
SVC		69.3
RA-upper	11/10 (8)	93.6
RA-lower	11/10 (8)	78.0
RV	44/2 (9)	83.4
PA	34/10 (22)	82.7
PCW	8	
LV		95.9

Table 2. Cardiac output measurements by Thermodilution method and Fick method

	Thermodilution Method	Fick Method
Cardiac Output (L/min)	5.1	4.96

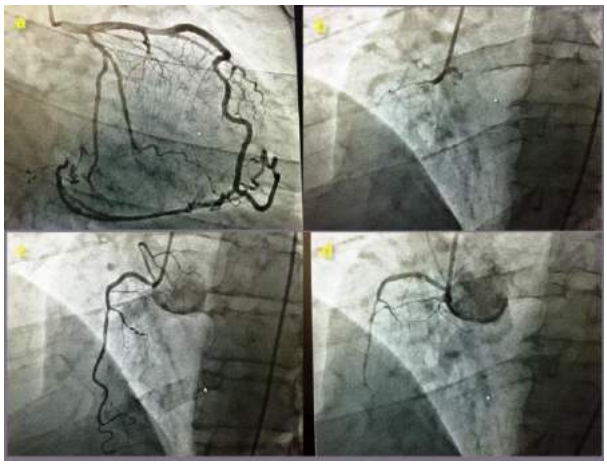
Unexpectedly finding dual right coronary artery one of which is chronic total occluded

Sadık Volkan Emren, Hakan Çakmak, Hale Çakmak
Department of Cardiology, Afyonkarahisar State Hospital, Afyonkarahisar, Turkey
vemren@hotmail.com

CASE: 50 year old male patient with a background of type 2 Diabetes mellitus and hypertension admitted to our clinic wtih angina pectoris of three months duration. Cardiovascular system examination was unremarkable. The blood pressure 140/80 and pulse rate was 80 beats per minute respectively. Electrocardiogram revaled Q waves in DII,DIII and AVF derivation. Troponin value was within normal range. Transthoracic echocardiography was done which showed inferior and posterior wall motion abnormality with 50% ejection fraction. He underwent selective coronary angiography which revealed coronary plaque in left anterior descending (LAD) artery and circumflex (CX) coronay artery. Right coronary artery (RCA) retrogradely was filled from LAD. As we hope to find occluded right coronary artery we unexpectedly found another right coronary artery with plaque in mid region which is arising from different ostium. The other right coronary artery was occluded from osteal region. Since the right coronary occlusion might have been chronic we monitorized myocardium via myocardial perfusion scintigraphy if there was alive tissue. However myocardial perfusion scan showed infarct tissue. Therefore we decided to treat patient medically.

DISCUSSION: Congenital coronary artery anomalies are present in 0.2–1.4% of the general population. Dual right coronary artery is one of the rarest congenital coronary anomalies which is seen 0.01% of the conventional coronary angiographies. There is no standard definition of double right coronary artery. It has been described as a right coronary system formed of two distinct branches and the two double right coronary arteries have similar diameters. It might originate from either single or different ostium. It is almost always accidentally detected during angiography. Dual right coronary artery can present as a stable coronary vascular disease or acute coronary syndrome due to atherosclerotic lesion. One should investigate double right coronary artery in case if conventional angiography revaled no significant coronary stenosis in LAD, CX and RCA otherwise echocardiography showed segmental wall motion abnormality.

Figure. 1a: Left angiogram showed LAD filling the distal RCA retrogradely. 1b: RCA is occluded from osteal region. 1c: The other non-occluded RCA is arising from different ostium 1d: Both these right sided arteries are arising from different ostium.



Evaluation of neutrophil to lymphocyte ratio changes between pre- and post-menopausal life for cardiovascular risk prediction

Ahmet Karakurt[1], Cennet Yıldız[2]
[1]Department of Cardiology, Kafkas University, Kars, Turkey
karakurt38@hotmail.com
[2]Department of Cardiology, Tekden Hospital, Istanbul, Turkey

AIM: Neutrophil to lymphocyte ratio (NLR) has demonstrated in various clinical studies to identify the increased atherosclerotic cardiovascular risk. However, the prognostic value of NLR is unknown in healthy postmenopausal women. The aim of this study to evaluate the relationship between and premenopausal and postmenopausal healthy women regarding the NLR.

METHOD: The study population included 295 premenopausal (median age 37 years, range 33-42 years) and 153 postmenopausal (median age 56 years, range 52-62 years) healthy women who have admitted cardiology clinic between March-2013 and May-2014. The complete blood count was obtained from all patients. Total leukocytes were counted and differential count obtained for neutrophil, lymphocyte and NLR were evaluated.

RESULTS: There were no significant differences between premenopausal and postmenopausal healthy women regarding NLR [median: 1.77, (interquartile range (IQR): 1.38 - 2.25) and 1.68 (IQR: 1.24 - 2.07), p=0.240, respectively]. Similarly, there were no significant differences between two groups in terms of neutrophil and lymphocyte counts [median: 3,7x103/mm3 (IQR: 3.04 - 4.50) vs. 3.63x103/mm3 (IQR: 2.79 - 4.33), p=0.393 and 2.12 x103/mm3 (IQR: 1.79-2.52) vs. 2.10 x103/mm3 (IQR: 1.70-2.60), p=0.624, respectively].

CONCLUSION: This study demonstrated that there is no difference regarding NLR between the premenopausal and healthy postmenopausal women. These findings have also revealed that the NLR, neutrophil and lymphocyte counts do not change in menopausal life, and thus can not be used as a marker for atherosclerosis in these groups.

Table 1. Neutrophil to lymphocyte ratio and other circulatory blood cells count of two groups are given.

Parameters	Premenopausal (n=295)	Postmenopausal (n=153)	p
WBC (103/mm3)	6.58 (5.63-7.84)	6.23 (5.47-7.51)	0.075
Nc (103/mm3)	3.70 (3.04-4.50)	3.63 (2.79-4.33)	0.393
Lc (103/mm3)	2.12 (1.79-2.52)	2.10 (1.70-2.60)	0.624
NLR	1.77 (1.38-2.25)	1.68 (1.24-2.07)	0.240
Pc (103/mm3)	261 (220-306.75)	257 (225.50-288)	0.508
MPV (µm3)	10.36 ± 1.20	10.39 ± 0.92	0.781
RDW (%)	14.02 ± 2.08	13.80 ± 1.78	0.284

WBC: White blood cell count; Nc: Neutrophil count; Lc: Lymphocyte count; NLR: Neutrophil to lymphocyte ratio; Pc, Platelets count; MPV: Main platelet volume. RDW: Erythrocyte distribution width; Data are expressed as mean ± SD or median [interquartile range (IQR) (25th-75th)]. P value is significant less than at the 0.05 level in the between groups.

Table 2. A linear relationship between neutrophil to lymphocyte ratio and the other continuous variables.

Parameters	r	p
FBG (mg/dL)	-0.114	0.016
Hb (g/dL)	-0.100	0.035
MCHC (g/dL)	-0.120	0.011
RDW (%)	-0.094	0.021
TC (mg/dL)	-0.109	0.021
LDL(mg/dL)	-0.093	0.049
TG (mg/dL)	-0.109	0.021
LDL/HDL	-0.105	0.026
TC/HDL	-0.122	0.010

FBG: Fasting blood glucose; Hb: Hemoglobin; MCHC: Mean corpuscular hemoglobin concentration; RDW: Erythrocyte distribution width; TC: Total cholesterol; LDL: Low-density lipoprotein; TG: Triglyceride; HDL: High density lipoprotein.

2016

2nd Cardiovascular Academy Society Congress

Oral Poster Presentations

06-09 November 2016, Antalya - Turkey

Is dipyridamole useful in improving left ventricular systolic and diastolic function in patients with coronary slow flow?

Arif Süner, Mustafa Çetin
Department of Cardiology, Adıyaman University, Adıyaman, Turkey
arifsuner@gmail.com

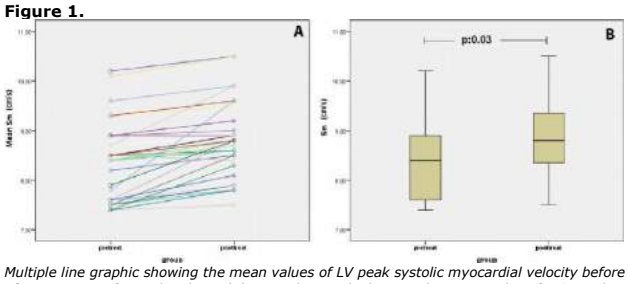
BACKGROUND:Coronary slow flow (CSF) is an angiographic finding characterized by delayed opacification of epicardial coronary arteries without obstructive coronary disease. Previous studies have shown greater impairment of left ventricular (LV) systolic and diastolic function in patients with CSF. We aimed to examine the effect of dipyridamole on these functions.

METHODS:Our study included 40 patients with CSF and 40 subjects with normal coronary arteries. Conventional echocardiography Doppler imaging (CDI) and tissue Doppler echocardiography imaging (TDI) were used to evaluate LV systolic and diastolic function before and 2 months after treatment with dipyridamole.

RESULTS:Using CDI, we observed that early diastolic velocity (E) was significantly lower in patients with CSF, while late diastolic velocity (A), E/A ratio, isovolumic relaxation time, and myocardial performance index (MPI) were significantly higher in CSF patients compared with controls. Similarly, while early myocardial velocity (Em) was significantly lower, late myocardial velocity (Am), Em/Am ratio, isovolumic relaxation time (IRT), and MPI were significantly higher in CSF patients according to TDI measurements. Although there was no significant improvement in conventional Doppler parameters, there was significant normalization in tissue Doppler parameters after treatment with dipyridamole.

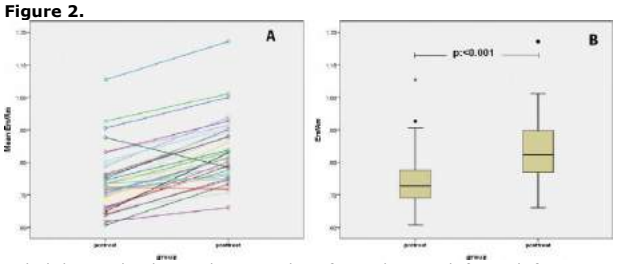
CONCLUSION: Left ventricular systolic and diastolic function may be negatively affected by CSF. Dipyridamole may improve these functions, especially at the tissue level.

Figure 1.



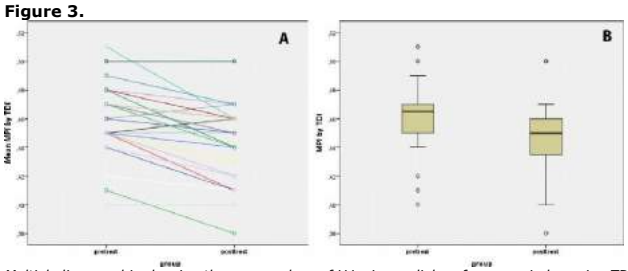
Multiple line graphic showing the mean values of LV peak systolic myocardial velocity before and after treatment for each subject (A). Box-plot graph showing the mean values for Sm velocity before and after treatment (B). LV = left ventricle; Sm = peak systolic myocardial velocity.

Figure 2.



Multiple line graphic showing the mean values of LV Em/Am ratio before and after treatment for each subject (A). Box-plot graph showing the mean values for Em/Am ratio using TDI, before and after treatment (B). Em/Am = diastolic myocardial motion velocities; LV = left ventricle; TDI = tissue Doppler imaging.

Figure 3.



Multiple line graphic showing the mean values of LV miyocardial performance index using TDI before and after treatment for each subject (A). Box-plot graph showing the mean values for MPI using TDI before and after treatment (B). LV = left ventricle; MPI = miyocardial performance index; TDI = tissue Doppler imaging.

Table 1. Clinical characteristics and angiographic findings of groups

Variables	Patients with CSF (n = 40)	Control group (n = 40)	P value
Age (years)	47.2 ± 7. 4	46.7 ± 5.3	0.950
Gender (male)	32	28	0,632
Body mass index (kg/m²)	24.5 ± 5.2	24.1 ± 3.3	0.911
Diabetes mellitus n (%)	12 (30)	10 (25)	0.815
Hypertension n (%)	13 (32.5)	10 (25)	0.760
Cigarette smoking n (%)	19 (47.5)	14 (35)	0.151
Heart rate (beat/min)	76.5 ± 10.3	77.8 ± 9.3	0.771
Systolic blood pressure (mmHg)	137.8 ± 5.9	131.8 ± 7.4	0.323
Diastolic blood pressure (mmHg)	74.5 ± 9.3	72.3 ± 4.1	0.458
TIMI frame count (frame/s)			
Left anterior descending artery	48.6 ± 13.4	32.9 ± 3.3	<0.001
Left circumflex artery	33.2 ± 11.5	21.5 ± 1.9	<0.001
Right coronary artery	36.9 ± 6.2	20.7 ± 1,1	<0.001
Mean TIMI frame count (frame/s)	36.7 ± 7.2	25.5 ± 4.1	<0.001

Data are presented as mean ± standard deviation and numbers (percentages).

Table 2. Eelectrocardiographic and echocardiographic findings of groups

Variables	Patients with CSF (n = 40)	Control group (n = 40)	P value
LV end diastolic diameter (mm)	47.9 ± 3.5	46.5 ± 3.5	0.503
LV end systolic diameter (mm)	33.7 ± 3.2	32.9 ± 3.8	0.687
LV ejection fraction (%)	61.8 ± 2.5	62.0 ± 2.0	0.786
Septum wall thickness (mm)	10.5 ± 1.1	10.1 ± 0.7	0.765
Posterior wall thickness (mm)	8.18 ± 1.0	8.02 ± 1.1	0.860
Left atrial diameter (mm)	33.0 ± 2.1	33.2 ± 2.3	0.652
CDI findings			
E (cm/s)	70.0 ± 11.2	76.7 ± 12.1	0.015
A (cm/s)	78.4 ± 7.1	75.2 ± 6.0	0.045
E/A ratio	0.897 ± 0.15	1.02 ± 0.7	0.001
IVRT (ms)	96.5 ± 8.2	90.7 ± 8.1	0.002
DT (ms)	224.1 ± 21.0	216.0 ± 26.4	0.135
MPI	0.523 ± 0.04	0.493 ± 0.04	0.003
TDI findings of Mitral Annulus			
Sm (cm/s)	8.44 ± 0.8	9.16 ± 0.9	0.001
Em (cm/s)	7.36 ± 0.6	7.91 ± 0.54	<0.001
Am (cm/s)	9.96 ± 0.9	9.27 ± 1.0	0.003
Em/Am ratio	0.74 ± 0.0	0.86 ± 0.1	<0.001
IVRT	76.2 ± 4.6	73.8 ± 4.21	0.018
MPI	0.470 ± 0.02	0.458 ± 0.02	0.043

Data are presented as mean ± standard deviation and numbers (percentages). A = mitral inflow contraction velocity; Am = atrial contraction wave using TDI; CDI = conventional Doppler imaging; DT = deceleration time; E = mitral velocity of early diastolic filling from transmitral flow; Em = early diastolic filling using TDI; IVRT = isovolumic relaxation time; MPI = Miyocardial performance index; LV = left ventricle; Sm = systolic wave using TDI; TDI = tissue Doppler imaging.

Table 3. Pretreatment and posttreatment echocardiographic parameters of the study groups

		Dipyridamol (n = 40)			Control (n = 40)	
	Basline	Follow-Up	P	Basline	Follow-up	P
CDI Findings						
E (cm/s)	70.0 ± 10.1	71.1 ± 11.2	0.641	76.7 ± 12.9	77.0 ± 12.9	0.839
A (cm/s)	78.6 ± 8.5	77.6 ± 8.6	0.597	75.2 ± 6.03	74.9 ± 6.00	0.839
E/A ratio	0.89 ± 0.15	0.92 ± 0.15	0.431	1,02 ± 0.17	1.03 ± 0.17	0.843
IVRT (ms)	96.4 ± 8.05	93.8 ± 8.02	0.153	90.7 ± 7.81	89.9 ± 7.74	0.637
DT (ms)	224.0± 21.0	224.5 ± 22.3	0.922	216.0 ± 26.4	215.4 ± 26.0	0.929
MPI	0.523± 0.04	0.515 ± 0.04	0.409	0.493 ± 0.04	0.492 ± 0.04	0.868
TDI Findings						
Sm	8.44 ± 0.84	8.71 ± 0.85	0.030	9.16 ± 0.98	9.21 ± 0.95	0.818
Em	7.36 ± 0.67	7.83 ± 0.64	0.002	7.91 ± 0.54	7.95 ± 0.53	0.725
Am	9.96 ± 0.92	9.42 ± 0.86	0.005	9.27 ± 1.07	9.13 ± 1.02	0.566
Em/Am	0.74 ± 0.89	0.83 ± 0.95	<0.001	0.86 ± 0.11	0.88 ± 0.11	0.520
IVRT	76.2 ± 4.69	72.7 ± 4.71	0.001	73.8 ± 4.21	74.1 ± 7.74	0.352
MPI	0.462 ± 0.02	0.447 ±0.02	0.010	0.458 ± 0.02	0.454 ± 0.03	0.609

Data are presented as mean ± standard deviation and numbers (percentages). A =mitral inflow contraction velocity; Am = atrial contraction wave using TDI; CDI = conventional Doppler imaging; DT = deceleration time of mitral valve; E = mitral velocity of early diastolic filling from transmitral flow; Em = early diastolic filling using TDI; Em/Am: Diastolic myocardial motion velocities using TDI (early and late phase); IVRT = isovolumic relaxation time; MPI = miyocardial performance index; Sm = systolic wave using TDI; TDI = tissue Doppler imaging.

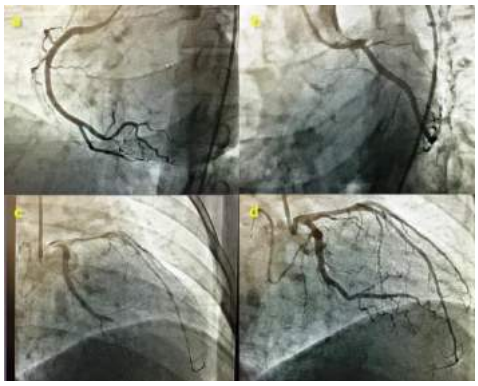
Simultenous occlusion of two major coronary arteries in a patient with ST segment myocardial infarction

Sadık Volkan Emren, Hakan Çakmak, Hale Çakmak, Muhammet Tahta, Zeynal Abidin Yetgin, Fatih Oğuz, Fatma Okuş
Department of Cardiology, Afyonkarahisar State Hospital, Afyonkarahisar, Turkey
vemren@hotmail.com

CASE: A 37 year- old male admitted to our emergency department with a chest pain lasting for 3 hours. He had a risk factor of smoking in his background. Systolic and diastolic cardiac sounds were normal. Blood pressure 130/80 mmHg and and pulse rate was 75 beats per minute respectively. Electrocardiogram showed ST segment elevation in anterolateral derivations. The patient underwent coronary angiography immediately and angiogram revealed plaque formation in right coronary artery. Left angiogram from left caudal position revealed proksimal occlusion of left anterior descending (LAD) artery and no signficant lession in circumflex artery (CX) until the distal region. As the LAD accepted culprit vessel for myocardial infarction, the lesion with thrombus formation was passed with soft guidewire. Following angiogram from right caudal view showed simultenous occlusion in distal part of CX. For anticoagulation, unfractionated heparin was used during the procedure and the patient was loaded with Ticagrelor 180 mg and acetylsalicylic acid orally. Balloon angioplasty of the LAD lesion was performed and 3.0*24 mm bare-metal stent was then employed to treat the lesion. At the same session distal CX occlusion was passed with soft gudewire and treated with balloon angioplasty followed by 2.75*16 and 2.5* 12 mm bare-metal stent implantation with overlap formation. He was observed as an inpatient for 4 days and discharged with acetylsalicylic acid 100mg, ticagrelor 90 mg twice daily, atorvastatin 20mg, ramipril 2.5 mg and metoprolol 50 mg treatment.

DISCUSSION: About 40–50% of patients presenting with STEMI have multivessel disease. However simultaneous formation of the thrombi in two different coronary arteries is very rare. Main pathphysiologic explanation of STEMI is plaque disruption leading to platelet activation and to thrombin generation in culprit artery. Atherosclerotic plaques in multiple sites may be weakened nearly simultaneously by global coronary vessel inflammation, the state of hypercoagulability and vasospasm which may lead to thrombus formation and acute occlusion in both coronary artery. In this case report we recommend that simultenous occlusion of different coronary arteries should be investigated carefully in case wide area of myocardium effected by STEMI.

Figure 1a. Non-significant stenosis with atherosclerotic plaque formation in right coronary artery, 1b. Proksimal occlusion of left anterior descending artery, 1c. Simultenous occlusion of distal circumflex artery, 1d. Final coronay angiography showed succesfully revascularized circumflex and left anterior descending artery



Iatrogenic right coronary artery dissection by guidewire during transradial coronary angiography

Hatice Solmaz, Mustafa Kurşun, Ali Kemal Çabuk, Ahmet Sayın, Selim Ekinci, Cenk Ekmekçi, Barış Kılıçaslan, Öner Özdoğan
Tepecik Training and Research Hospital
hatice.solmaz@gmail.com

CASE: Fifty-eight year-old male patient was referred to our clinic with exertional angina in the last two months. Exercise stress testing was positive and the patient was hospitalised for coronary angiography. Angiography of the right coronary artery showed a non-significant atherosclerotic plaque. While advancing the diagnostic catheter for cannulation of the left coronary system, 0.38 inch guidewire penetrated the right coronary artery and was suddenly pulled back to the root of the aorta. Following cannulation of the ostium of the left main coronary artery, angiography showed critical stenosis of proximal segments of the left anterior descending and circumflex arteries. Thus, coronary artery by-pass grefting surgery was planned and the patient was taken out of angiography laboratory without any complaint. Five minutes after the procedure, the patient suffered retrosternal pain. Arterial blood pressure was 85/50 mmHg, and the electrocardiogram showed ST segment elevation in the inferior derivations and ST segment depression in the anteroseptal derivations. Coronary angiography was re-performed and dissection was detected in the proximal portion of the right coronary artery. Successful intervention was performed with bare metal stent implantation and final TIMI 3 flow. In the follow up, the patient did not suffer any complaint and was discharged for elective coronary surgery.

DISCUSSION: Transradial approach for coronary angiography and percutanous coronary intervention is accepted as a practical alternative for transfemoral approach due to less bleeding and access site complications, thereby less cardiac morbidity and mortality. This approach is recommended especially in patients with STEMI by American and European guidelines. Several advantages of radial approach for coronary interventions such as less adverse clinical events, and shorter intensive care unit and hospital stays may be negated by anatomical and technical difficulties. These include significant tortuosity, considerable dilatation and distortion of radial or brachial arteries. These difficulties may necessitate some specific catheter manipulations, torque maneuvers and hand-eye coordinations which operator needs to simply look at the screen. This approach is associated with a learning curve and it is well known that success rate depends on the experience of the operator. Therefore, indications for this approach should always be carefully evaluated by considering complications; which remain rare but unless managed urgently, may cause life threatening complications such as coronary artery dissection.

CONCLUSION: We report a case of iatrogenic right coronary artery dissection by 0.38 inch guide wire during coronary angiography via transradial route, managed invasively without any sequela.

Carotid artery stenosis severity predicts extension and severity of coronary artery disease: syntax and syntax-ıı score correlation study

Erhan Saraçoğlu, Ertan Vuruşkan
Dr. Ersin Arslan Eğitim Araştırma Hastanesi
erhansaracoglu@hotmail.com

INTRODUCTION: Atherosclerosis is a panvascular phenomenon affecting all the arterial vasculature. Carotid artery disease is a well-established risk factor for concomitant coronary artery disease (CAD).

AIM: There are studies in the literature which investigated the carotid artery disease prevalance in multivessel coronary artery patients. But there is no published data comparing both Syntax and Syntax-II scores in the same patient population for estimating predictive value and correlation of carotid artery lesions to coronary artery patients.

MATERIAL-METHODS: The study population consisted of 155 patients who underwent carotid diagnostic angiography for assessment of carotid artery disease and had no previously known diagnosis of CAD. Coronary angiography was done in all patients at the same session and Syntax and Syntax II scores were calculated.

RESULTS: We found significant positive correlation between carotid stenosis severity and Syntax score and surprisingly a less prominent but positive correlation for the Syntax-II score ($p<0.001$). A cut-off value of ''62%'' for carotid stenosis severity was found for estimating high risk Syntax subgroup (85% sensitivity, 51% specificity, $p<0.001$). Left main stenosis patients had clearly higher carotid lesion severity. Symptomatic neuroliogical patients also found to have higher Syntax and Syntax-II scores compared to asymptomatic ones.

CONCLUSION: We strongly recommend performing coronary angiography for the symptomatic carotid and severe carotid lesions. A carotid stenosis severity of more than ''62%'' is the useful cut-off value. More severe carotid lesions seem to have the possibility of sever left main lesions.

The Predictive Value Of Preoperative Serum NT-proBNP Levels For The Need For Inotropic Support In The Postoperative Period In Patients Undergoing Coronary Artery Bypass Operation

Ahmet Öztekin[1], Mehmet Erdem Memetoğlu[2], Rasim Kutlu[3], Ali İhsan Tekin[1], Ozan Erbasan[1], Ümit Arslan[4], Ozan Erdem[1], Özgür Akkaya[1], Mustafa Şimşek[2], Murataliev Tolkun Muratalievic[5]
[1]Akdeniz University School of Medicine, Department of Cardiovascular Surgery, Antalya,Turkey
[2]Dr.Siyami Ersek Cardiovascular and Thoracic Surgery Hospital, Department of Cardiovascular Surgery, İstanbul, Turkey.
[3]Giresun Universty, Department of Cardiology, Giresun, Turkey. dr.rasim@mail.ru
[4]Erzurum State Educating and Training Hospital, Department of Cardiovascular Surgery, Erzurum, Turkey.
[5]National Cardiology and Internal Medicine Institude, Department of Cardiology, Bishkek, Kyrgyzstan.

OBJECTIVE: To investigate the predictive value of serum NT-proBNP levels undergoing coronary artery bypass operation for the need for inotropic support. Patients and METHOD: In this prospective study, preoperative serum NT-proBNP levels were obtained in 51 patients [80.4% (n=42) were males and 19.6% (n=9) were females] undergoing isolated coronary artery bypass operation. The study patients were divided into three groups depending on NT-proBNP levels as low NT-proBNP (<100 pg/ml, Group-1, 29.4%, n=15) group, moderately high NT-proBNP (NT-proBNP <500 pg/mL and >100 pg/mL, Group-2, 29.4%, n=15) group, and high NT-proBNP (>500 pg/mL, Group-3, 41.2%, n=21) group. The mean NT-proBNP level was 920.69±1497.11 pg/mL in the whole study group, 42.41±15.25 pg/ml (maximum value: 68 pg/mL, minimum value: 20.69 pg/mL) in Group 1, 221.87± 131.96 pg/mL (maximum value: 494 pg/mL, minimum value: 100 pg/mL) in Group 2, and 2047.17±1820 pg/mL (maximum value: 7249 pg/mL, minimum value: 503 pg/mL) in Group 3.

RESULTS: At postoperative day 0, the mean adrenalin, dopamine, dobutamin, and noradrenalin consumptions were 0.1±0.7 microgram/kg/min, 0.08±0.56 microgram/kg/min, 2.1±3.01 microgram/kilogram/min, and 1.35±3.45 microgram/kg/min, respectively. There were no statistically significant differences between the groups in terms of the use of adrenalin ($p=0.50$, $p>0.05$), dopamine ($p=0.31$ $p>0.05$), dobutamine ($p=0.59$ $p>0.05$), and noradrenalin ($p=0.24$ $p>0.05$) at postoperative day 0. The doses of inotropic agents used at postoperative days 1 and 2 did not show significant differences between the groups for the three inotropic agents.

CONCLUSION: Preoperative serum NT-proBNP levels in patients undergoing coronary artery bypass operation are not associated with the need for inotropic support in the postoperative period.

Evaluation of the prevalence of coronary artery disease in patients with valvular heart disease

Zeynep Yapan Emren[1], Sadık Volkan Emren[2], Barış Kılıçarslan[3], Hatice Solmaz[3], İbrahim Susam[3], Ahmet Sayın[3], Burçin Abud[4], Mehmet Aydın[3], Özgür Bayturan[5]
[1]Department of Cardiology,Sandıklı State Hospital, Afyonkarahisar, Turkey zeynepyapan@hotmail.com
[2]Department of Cardiology, Afyonkarahisar State Hospital, Afyonkarahisar, Turkey
[3]Department of Cardiology,Izmir Tepecik Research and Training Hospital, İzmir,Turkey
[4]Department of Cardiovascular surgery,Izmir Tepecik Research and Training Hospital, İzmir,Turkey
[5]Department of Cardiology, Manisa Celal Bayar University Medical Faculty Hafsa Sultan Research Hospital Manisa/Turkey

OBJECTIVES: In this study we investigated retrospectively the frequency of coronary heart disease in patients who had been operated due to severe valvular heart disease. In subgroup we also investigated if there is a difference the frequency of coronary artery disease, according to the type of valve pathology.

MATERIALS-METHODS: In this study we included a total of 241 patients including 123 women (51%), 118 men (49%) who have had heart valve surgery. We included patients who have had surgery only a single valve. We examined patients into four groups who have had prosthetic valve replacement due to severe mitral stenosis (MS), severe mitral regurgitation (MR), severe aortic regurtgitation (AR), severe aortic stenosis (AS).

RESULTS: 72 (29,8%) patients who underwent MVR due to mitral stenosis, 93 (38,5%) patients who underwent MVR due to severe mitral regugitation, 40 (16,5%) patients who underwent AVR due to severe aortic stenosis, 36 (14,9%) patients who underwent AVR due to severe aortic regurgitation were assesed. Coronary artery disease was detected in 26,4% patients with mitral stenosis and 57,7% patients with aortic stenosis. Also coronary artery disease was detected in 41,9% patients with severe mitral regurgitation, 44,4% patients with severe aortic regurgitation.

CONCLUSION: When AS and MS groups were compared in terms of CAD, AS group had higher CAD which is statistically significant. When MS and MR groups were compared in terms of CAD, MR group had significantly higher CAD which is statistically significant. Also when this two groups of patients compared in terms of extensivenes of coronary artery disease, MY group had significantly higher Gensini score. DM, HT and LDL variables were related CAD in a multivariete analyses the most related variable was DM.

Role of Red Blood Cell Distribution Width and Epicardial Fat in Atrial Fibrillation after Cardiopulmonary Bypass

Kerem Özbek, Hüseyin Katlandur, Bilal Arık, Ahmet Kuzgun, Murat Yıldız, Ahmet Keser, Hüseyin Özdil
Mevlana University Medicine School
keremozbek@doctor.com

OBJECTIVES: Postoperative atrial fibrillation (POAF) is a common complication after cardiac surgery, and it remains a challenge for cardiac surgeons despite advances in medicine. A number of studies have been performed to examine various parameters to predict which patients will develop POAF. The present study was performed to investigate the roles of epicardial adipose tissue (EAT) volume and red blood cell distribution width (RDW) as predictors of POAF.

METHODS: The medical records of 350 patients undergoing coronary artery bypass grafting in one or more vessels at the Tertiary Cardiac Center, Cardiovascular Surgery Department, Mevlana (Rumi) University Private Hospital (Konya, Turkey), were screened between December 2011 and May 2015. The study population consisted of 149 patients fulfilling the inclusion criteria and undergoing a preoperative evaluation by computed chest tomography. All patient demographics and laboratory parameters were obtained from medical records.

RESULTS: A total of 350 patients who underwent cardiopulmonary bypass surgery between December 2011 and May 2015 at the Tertiary Cardiac Center, Cardiovascular Surgery Department, Mevlana University Hospital, were screened. After excluding 201 patients according to the criteria outlined above, 149 patients were enrolled in this retrospective cross-sectional study (Figure 2). The baseline characteristics and procedural differences between patients that developed POAF and those that maintained sinus rhythm are shown in Table 1. Age, postoperative RDW, and tomography variables, including the left atrial

volume, left atrial horizontal diameter, and EAT volume, were significantly higher while the hemoglobin level and hematocrit were significantly lower in patients developing atrial fibrillation after cardiopulmonary bypass. The preoperative hematological and biochemical parameters, as well as the radiological parameters, of the groups are summarized in Table 2. The patients that developed POAF had a significantly greater left atrium (LA) diameter, LA volüme and EAT volume.Postoperative hematological parameters 24 hours after cardiopulmonary bypass are summarized in Table 3. The postoperative RDW ratio was significantly higher in the POAF group than the sinus rhythm group (14.46 ± 1.79 vs. 13.60 ± 1.37, respectively, p = 0.004). A logistic multivariate regression analysis was performed on age, postoperative RDW, and tomography variables, including left atrial volume, left atrial horizontal diameter, and EAT volume. Only age (OR 1.0731, 95% CI 1.012–1.138; p = 0.018) was an independent predictor of the development of POAF (Table 4).

CONCLUSIONS: Although the EAT volume was high in patients developing atrial fibrillation after surgery, age was the only significant predictor of POAF on multivariate analysis. Additional studies regarding the predictive roles of epicardial fat and RDW in POAF are needed.

Study Flow Diagram

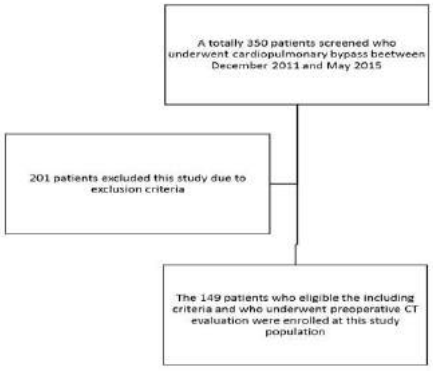


Table 1. Baseline characteristics and procedural differences between patients that developed POAF and those with maintenance of sinus rhythm

	POAF (n:35)	Sinus Rhythm (n:114)	P
Hematological and biochemical parameters			
Glucose (mg/dl)	129.33±63.03	155.48±85.58	0.060
Urea (mg/dl)	20.05±10.70	18.19±7.90	0.348
Creatinine (mg/dl)	0.88±0.39	0.98±0.56	0.251
WBC (x103)	8.04±2.71	7.93±1.72	0.076
Hemoglobin (g/dl)	13.62±1.38	14.14±1.73	0.299
Hematocrit (%)	40.68±3.90	41.49±4 .46	0.299
Platelet (x103)	251.49±68.38	239.21±57.48	0.341
Neutrophil (x103)	5.27±2.54	4.94±1.76	0.474
MPV (fL)	10.38±0.85	10.25±0.93	0.454
RDW (%)	13.73±1.14	13.40±0.93	0.160
CRP	7.74±11.64	7.36±11.55	0.880
Radiologic Parameters			
EAT vol (cm3)	135.71±46.78	118.71±42.85	0.046
LA Horizontal (d) mm	47± 8.3	41 ± 6.2	<0.001
LA Vertical (d) mm	60.51±8.06	54.42±7.65	<0.001
LA (vol) mm3	72.9±27.2	56.8 ± 15.2	0.030

Tomographic measurement of epicardial adipose tissue volume. Pericardial fat was highlighted in orange after three-dimensional reconstruction

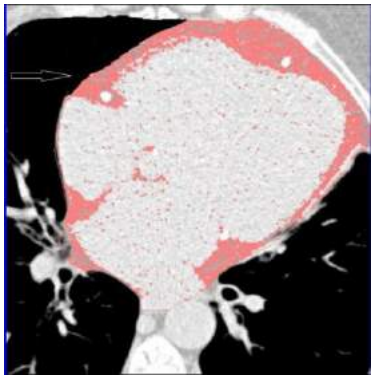


Table 2. Preoperative hematological and biochemical parameters, and the radiological parameters of the two groups

Variables	POAF (n:35)	Sinus Rhythm (n:114)	P
Baseline Characteristics			
Age (years)	69.2 ± 8.3	62,1 ± 9.1	<0.01
Sex; Female n (%)	12 (34.3)	23 (20.2)	0.465
Diabetes mellitus n (%)	12 (34.3)	49 (43)	0.362
Hypertension n (%)	21 (60)	62 (54.4)	0.492
BMI (kg/m2)	29,3 ± 5.8	28,1 ± 3,9	0.460
LVEF (%)	54±13	56±11	0.498
Beta blocker therapy n (%)	27 (77)	74 (64)	0.965
Operative and post-operative variables			
Off-pump Bypass n (%)	3 (8.6)	23 (20.2)	0.115
RCA Bypass n (%)	19 (54.3)	61 (53.5)	0.355
Cross Clamp Time (minutes)	69.7 ± 37.3	59.3 ± 24.3	0.697
Pump Time (minutes)	94.7 ± 47.4	84.5 ± 32	0.697
Number of grafts	2.73±1.12	2.90±1.06	0.413
Stay in hospital (Days)	11 ± 3.9	9.4 ± 3	0.03
ICU period (Days)	1.9 ± 0.8	3.3 ± 2.9	<0.01
Transfusion (Erythrocytes, U)	1.09±0.78	0.77±0.93	0.072

LVEF; Left ventricle ejection fraction, BMI: Body Mass Index, RCA; Right coronary artery, ICU: Intensive care unit Bolded data indicate significance

Table 3. Hematological parameters 24 hours after cardiopulmonary bypass

	POAF (n:35)	Sinus Rhythm (n:114)	P
Hematologic Parameters			
WBC	14.65±6.40	14.58±4.82	0.947
Hemoglobin	9.14±1.35	9.95±1.42	0.003
Hematocrit	26.85±3.65	29.16±4.13	0.004
Platelet	177.66±63.11	192.72±52.33	0.220
Neutrophil	12.31±5.42	12.52±4.63	0.823
MPV	10.67±0.89	10.39±0.92	0.115
RDW	14.46±1.79	13.60±1.37	0.004

WBC: White blood cell, MPV: Mean platelet volume, RDW: Red cell distribution width

Table 4. Independent predictors of postoperative atrial fibrillation in a multivariate logistic regression analysis

Multivariate Analysis			
Variables	OR	%95 CI	P
Age	1.073	1.012-1.138	0.018
EAT volume	1.008	0.997-1.019	0.139
LA volume	0.994	0.952-1.038	0.789
LA vertical (d)	1.052	0.958-1.155	0.288
LA horizontal (d)	1.065	0.969-1.170	0.190
RDW (post-op)	1.215	0.873-1.691	0.248

RDW: Red cell distribution width, EAT; Epicardial adipose tissue; LA: Left atrium, (d): diameter mm, (vol): volume Bolded data indicate significance, OR; odds ratio; CI; confidence interval

Correlation Between Cardiac Syndrome X and Serum Prolidase Activity

Gönül Açıksarı[1], Bülent Demir[2], Kurtuluş Açıksarı[3], Turgut Uygun[2], Asuman Gedikbaşı[4], Nurşen Keleş[1], Orkide Kutlu[5], Osman Karakaya[2]

[1]Medeniyet Üniversitesi Göztepe Eğitim ve Araştırma Hastanesi, Kardiyoloji, İstanbul drgonulkutlu@hotmail.com

[2]Bakırköy Dr. Sadi Konuk Eğitim ve Araştırma Hastanesi, Kardiyoloji, İstanbul

[3]Medeniyet Üniversitesi, Acil Tıp Anabilim Dalı, İstanbul

[4]Bakırköy Dr. Sadi Konuk Eğitim ve Araştırma Hastanesi, Biyokimya, İstanbul

[5]Okmeydanı Eğitim ve Araştırma Hastanesi, Dahiliye, İstanbul

AIM: We aimed to evaluate the association between Cardiac Syndrome X (CSX) and Serum Prolidase Activity (SPA), which is suggested to be related to microvascular dysfunction and endothelial dysfunction in the etiopathogenesis of the CSX.

MATERIALS-METHODS: Our study involved 62 CXS patients (37 were female, 25 were male and the average age was 55,03±8,82) and control group consisted of 61 healthy volunteers (30 were female, 31 were male and the mean age was 42±8.07). Serum prolidase activities of both groups were detected by Enzyme-Linked ImmunoSorbent Assay test (ELİSA).

RESULTS: In the comparison of patient and control groups, the mean age, the frequency of diabetes mellitus, hypertension, hyperlipidaemia and SPA were found to have statistically significant different in the patient group. In reduced multivariate model SPA has been shown to be significantly and independently effective in distinguishing CSX patients and control groups.

DISCUSSION: As a result in patients with CSX, SPA was significantly increased. To define the role of SPA in pathogenesis of CSX patients more clearly, further large-scaled randomised studies are needed.

Figure 1. Comparison of serum prolidase activity (SPA) between cardiac syndrome X patient group and control group.

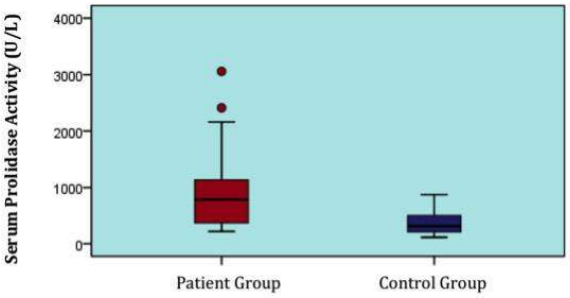


Table 1. Demographic, clinical, laboratory and echocardiographic characteristics of the study participants.

		CSX Group (n=62)	Control Group (n=61)	P value
Gender (n)	Male	25	31	0.242
	Female	37	30	0.242
Age (years), mean (SD)		55.03±8.82	43.42±8.07	0.000
BMI (kg/m2), mean (SD)		27.04±3.58	25.40±2.09	0.002
Systolic BP (mmHg), mean (SD)		123.63±17.28	110.98±12.24	0.000
Diastolic BP (mmHg), mean (SD)		75.48±10.59	69.34±9.15	0.001
Hypertension (n), (%)		32 (%51.6)	0 (% 0.0)	0.000
Diabetes mellitus (n), (%)		31 (%50.0)	0 (% 0.0)	0.000
Hyperlipidemia (n), (%)		32 (%51.6)	7 (%11.5)	0.000
Smoking (n), (%)		9 (%22.5)	8 (%20)	0.320
Family history of CAD (n), (%)		16 (%25.8)	0 (% 0.0)	0.000
LVEF (%), mean (SD)		62.44 ± 3.32	62.47 ± 3.36	0.733

CSX, cardiac syndrome X; CAD, coronary artery disease; BP, blood pressure; BMI, body mass index; LVEF, left ventricular ejection fraction. Values are express as mean ± SD.

Table 2. Comparison of laboratory data between cardiac syndrome X patient and controls.

	CSX Group (n=62)	CSX Group (n=62)	CSX Group (n=62)
Total cholesterol (mg/dl), mean (SD)	188.84 ±37.87	175.77 ±46.43	0.090
LDL-cholesterol (mg/dl), mean (SD)	118.16±32.79	105.20±45.40	0.073
HDL-cholesterol (mg/dl), mean (SD)	44.98 ±23.55	40.90 ±7.55	0.200
Triglycerides (mg/dl), mean (SD)	160.56±95.91	139.92±69.01	0.174
Urea (mg/dl), mean (SD)	30.58± 7.54	31.95± 7.68	0.320
Creatinine (mg/dl), mean (SD)	0.72± 0.10	0.87± 0.29	0.000
Fasting plasma glucose (mg/dl), mean (SD)	110.84±36,60	90.90±12.86	0.000
Gamma-glutamyltransferase (U/L), mean (SD)	33.13±31.30	21.16±8.40	0.018
Aspartate transaminase (U/L), mean (SD)	19.44±7.64	19.85±5.92	0.117
Alanine transaminase (U/L), mean (SD)	21.97±13.73	22.95±11.60	0.295
Hemoglobin (g/dl), mean (SD)	12.98±1.38	14.10±1.35	0.000
Platelet (x103), mean (SD)	245.69±61.77	255.44±47.47	0.330
Mean platelet volume (fL), mean (SD)	8.31±1.34	8.88±0.93	0.007
Sedimentation (mm), mean (SD)	27.49±15.89	11.39±9.18	0.000
C-Reactive Protein (mg/dl), mean (SD)	0.73±1.12	0.39±0.47	0.017
Serum Prolidase Activity (U/L), mean (SD)	908.23± 623.92	381.98± 228.50	0.000

Values are express as mean ± SD.

The effects of Pneumoperitoneum on cardiac functions during elective laparoscopic cholecystectomy

Gülçin Ercan[1], Aydın Zilan[2], Ramazan Kuşaslan[2], Asım Enhoş[1], Sinan Varol[1], Kamil Gülşen[1], Rıfat Yıldırım[1], Funda Gümüş[3], Ertuğrul Okuyan[1]
[1]Department of Cardiology, Bagcilar Training and Research Hospital, Istanbul, Turkey sinanvarol@gmail.com
[2]Department of General Surgery, Bagcilar Training and Research Hospital, Istanbul, Turkey
[3]Department of Anesthesiology, Bagcilar Training and Research Hospital, Istanbul, Turkey

BACKGROUND: Several authors described the cardiovascular changes as consequence of the pneumoperitoneum (Pnp) during laparoscopic procedures. Increases in heart rate, mean arterial pressure (MAP), systemic and pulmonary vascular resistances and a decrease in cardiac index have been described, but its effects on the cardiac performance are less known. We aimed to evaluate the cardiac effects of Pnp in a group of otherwise healthy subjects undergoing elective laparoscopic cholecystectomy.

MATERİALS AND METHODS: We included 47 patients with American Society of Anesthesiologists (ASA) physical status I or II; age over 18 years undergoing elective laparoscopic intervention who successfully completed the surgery with no immediate apparent surgical complications. Specifically, the patients with known significant systemic or cardiopulmonary disease were excluded. Echocardiography recordings were carried out at the beginning of anesthesia and after induction of PnP and CO2 evacuation and a 24-h period postoperatively. Transthoracic echocardiography (TTE) examinations were performed with a 3.5-MHz transducer (Philips HD15). All echocardiographic measurements were carried out according to the criteria of the American Society of Ecocardiography.

RESULTS: After the creation of Pnp, we found that MAP increased and stroke volume decreased. At he same time LVEDV significantly diminished (p=0.002). Significant variation was also found regarding the cardiac output (CO), HR and EF. We observed that capnoperitoneum led to a significant reduction of EF (from 62.5±3.5 to 59.5±2.7 %, p < 0.05).

CONCLUSION: Our results suggested that the augmented intraabdominal pressure during Pnp adversely affects left ventricular performance leading to an increase afterload and decrase in cardiac output and left ventricular ejection fraction.
These cardiac consequences appear to be reversible since all the echocardiographic parameters are normalized at the end of surgery. But physicians must be carefull while performing laporoscopic surgery in patients with low baseline EF.

	Body mass index	
	r	p
PD (msc)	0,355	0,004
QTDc (msc)	0,358	0,003

BMI = body mass index; HR = heart rate; ms= milliseconds; QT = QT interval; *QTc = corrected QT; Tp-e = T wave peak-to-end interval; PD=P dispersion; QTD=QT dispersion; QTDc= corrected QT dispersion. Data are presented as mean ± SD, or n (%).*

Is childhood obesity related to atrial and ventricular arrhytmia ?

Metin Karayakalı[1], Samet Özer[2], Arif Arısoy1, Kayıhan Karaman[1], Ataç Çelik[1]
[1]Gaziosmanpaşa University, Department of Cardiology drmk5170@gmail.com
[2]Gaziosmanpaşa University, Department of Pediatrics

OBJECTIVES: The effects of obesity on atrial and ventricular arrhytmia parameters have been studied on children, but there is some conflict in results unlike adults . Atrial arrhytmia parameters especially P-wave dispersion (PD) are associated with atrial fibrilation. QT duration (QT), corrected QT duration (QTc), T wave peak to end interval (Tp-e), Tp-e/QTc and QT dispersion (QTD) as indicatives of depolarization and repolarization abnormalities are associated with ventricular arrhytmias. The aim of our study was to investigate the effects of obesity on atrial and ventricular arrhytmia by using PD, QT,QTc, QTD, QTc dispersion (QTcD), Tp-e, Tp-e/QT and Tp-e/QTc analyses in children.

STUDY DESIGN: Thirty-four obese children and thirty-one normal weight healthy children were included in this study. All subjects electrocardiographic and anthropometric evaluations were done. PD, QT,QTc, Tp-e, Tp-e/QT, Tp-e/QTc, QTD and QTcD parameters were measured from the 12-lead electrocardiogram and compared between two groups.

RESULTS: Body mass index (BMI), as mean ± SD in obese children is 28,7±5,1 and 19±2,8 in control subjects. No statistically significant differences were found in age, sex, HR, QT, QTc, Tp-e, Tp-e/QT and Tp-e/QTc when two groups were compared. PD, QTD and QTcD were significantly increased in obese children compared with the control subjects. The following findings were recorded for the obese and control groups, respectively: PD [25,2±6,9 ms vs. 18,5±6,8 milliseconds (ms), p <0,001], QTD (19,8±6,7 ms vs. 31,5±10,6 ms, p <0,001), QTcD (24,8±8,7 ms vs. 38,9±12,7 ms, p=<0,001). In addition PD, QTD and QTcD were correlated with BMI (r=0,355 p=0,004; r=0,400 p=0,001; r=0,358 p=0,003 respectively)

CONCLUSION: Our study revealed that when compared to the control subjects, PD, QTD and QTcD were significantly increased in overweight children. PD and QTD were also significantly correlated with BMI. However some other ventricular arrhytmia parameters like QT, QTc, Tp-e, Tp-e/QT and Tp-e/QTc were not found statistically significant between two groups. These results suggest that AF and ventricular arrhythmia risks may higher in obese children.

Pearson correlation analysis according to body mass index

	Control (n=31)	Overweight (n=34)	p value
Age (year)	12,6±0,6	12,3±0,5	0,666
Sex (female)	17 (%55)	18 (%53)	0.529
BMI (kg/m2)	19±2,8	28,7±5,1	<0,001
HR (beat/min)	96,4±16,9	92,3±17,6	0,408
PD (ms)	18,5±6,8	25,2±6,9	<0,001
QT (ms)	356,2±29,5	348±23,5	0.214
Tp-e (ms)	94,1±8,7	93,4±10,2	0,790
Tp-e/QTc	0,213±0,025	0,218±0,027	0,393
QTD (ms)	19,8±6,7	31,5±10,6	<0,001
QTcD (ms)	24,8±8,7	38,9±12,7	<0,001

msc: Milliseconds; r; Correlation coefficient; PD: P-wave dispersion; QTD: QT dispersion.

Is there a relationship between mean platelet volume and the severity of coronary ectasia?

Kerem Özbek, Hüseyin Katlandur, Ahmet Keser, Şeref Ulucan, Hüseyin Özdil, Mehmet Sıddık Ülgen
Mevlana University Medicine School
keremozbek@doctor.com

OBJECTIVES: Mean platelet volume (MPV) is an indicator of platelet activation that is elevated in patients with coronary artery ectasia (CAE). This study investigated the relationship between MPV and the severity of coronary ectasia.

MATERIALS-METHODS: The reports of 6,377 patients who underwent elective coronary angiography screening between January 2011 and January 2015 were reviewed. After exclusion, 117 patients with isolated CAE were included in this study. The severity of CAE was divided into four types according to the Markis classification.

RESULTS: Table 1 summarizes the baseline characteristics and laboratory parameters of 117 patients with CAE and 70 age- and sex-matched patients with normal coronary angiograms. The baseline age, sex, diabetes mellitus, hypertension, smoking, hyperlipidemia, and family history were statistically similar in the CAE and normal groups, as were glucose, blood urea nitrogen, creatinine, AST, ALT, white blood cell count, hemoglobin (Hb), hematocrit, red blood cell count, and platelet count. The MPV and red blood cell distribution width (RDW) were significantly higher in the CAE group than the normal coronary artery group (both P<0.001).
After classifying the patients with CAE into four types according to the Markis classification, there were 48 (41%), 39 (33.3%), 6 (5.1%), and 24 (20.55%) patients with types 1 to 4, respectively (Table 2). The CAE most frequently involved the RCA (80 patients, 68.4%), and CAE affected two vessels in 50.4% of patients (Table 3).
The MPV was similar in Markis types 1 and 2 (P=0.089), types 1 and 3 (P=0.09), types 2 and 3 (P=0.195), and types 3 and 4 (P=1.0). The MPV was significantly higher in type 1 than in type 4 and in type 2 than in type 4 (both P<0.001) (Figure 2).
In the multiple logistic regression analysis, MPV (OR=3.555, 95% CI 2.282–5.538, P<0.01) and RDW (OR=2.393, 95% CI 1.573–3.639, P<0.01) were identified as independent predictors of CAE (Table 4). Receiver operating characteristic (ROC) curve analyses were performed for MPV and RDW. The MPV cutoff value was 10.85 fL (AUC=0.864, P<0.001, 95% CI 0.812–0.916, 82.1% sensitivity, 81.8% specificity). The RDW cutoff value was 13.85 (AUC=0.800, P<0.001, 95% CI 0.739–0.861, 69.2% sensitivity, 69.6% specificity) (Figure 3).
There was a strong, significant positive correlation between MPV and RDW (r=0.282, P<0.01).

CONCLUSIONS: MPV and RDW are both increased in CAE. MPV and RDW are positively correlated with each other. An increased MPV is associated with the severity of CAE. MPV values >10.85 fL may indicate the presence of CAE.

Figure 1. Study Flow Diagram

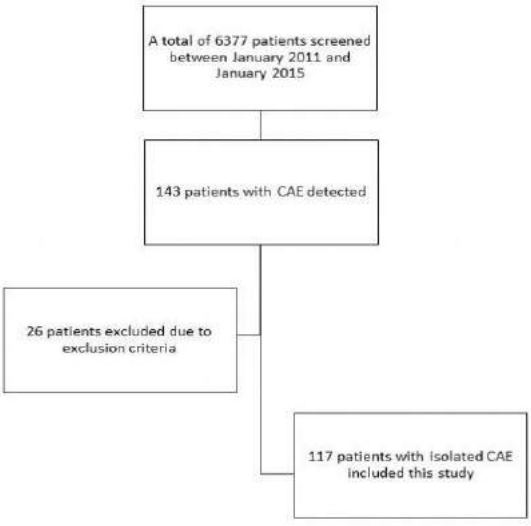
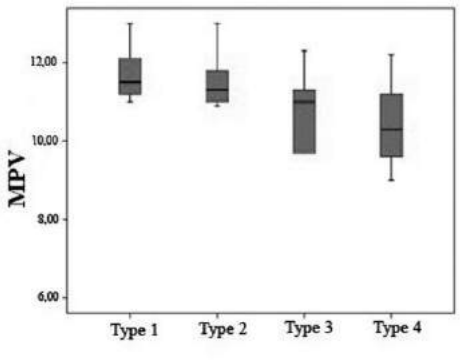
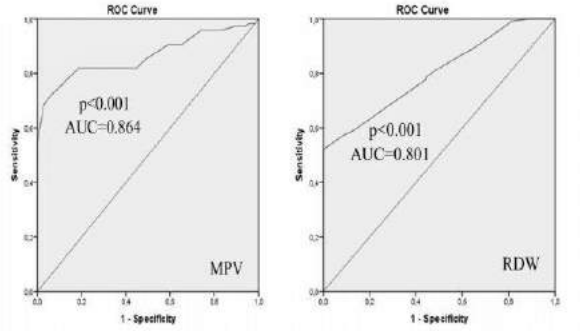


Figure 2. Mean platelet volume (MPV) and severity types of coronary artery ectasia according to the Markis classification



Between types 1&2, P=0.089; types 1&3, P=0.090; types 1&4, P<0.001; types 2&3, P=0.195; types 2&4, P<0.01; and types 3&4, P=1.00.

Figure 3. Receiver operating characteristics (ROC) curve analysis of the mean platelet volume (MPV) and red cell distribution width (RDW)



AUC (area under the curve).

Table 1. Baseline characteristics and laboratory parameters of patients with coronary artery ectasia and normal coronary angiograms

Variables	Ectasia (n=117)	Normal (n=70)	P values
Age	64.32±10.42	65.39±10.46	0.502
Male n (%)	50 (42.7)	31 (44.3)	0.836
Female n (%)	67 (57.3)	39 (55.7)	0.956
Diabetes mellitus n (%)	35 (29.9)	19 (27.1)	0.741
Hypertension n (%)	83 (70.9)	43 (61.4)	0.119
Hyperlipidemia n (%)	42 (35.9)	26 (37.1)	0.410
Smoking n (%)	31 (26.5)	10 (14.3)	0.670
Family History n (%)	37 (31.6)	17 (24.3)	0.320
BMI (kg/m2)	25.8±2.6	25.6±2.5	0.770
Glucose (mg/dl)	117.09±44.53	115.20±41.22	0.773
Urea (mg/dl)	19.18±9.11	19.37±10.86	0.889
Creatinine (mg/dl)	0.83±0.33	0.80±0.38	0.713
AST (U/L)	24.38±29.82	26.98±40.17	0.632
ALT (U/L)	22.11±14.45	23.72±18.22	0.520
WBC (x103)	8.06±2.17	7.91±2.18	0.660
Hemoglobin (g/dl)	14.07±1.58	14.24±1.48	0.479
Hematocrit (%)	42.37±4.31	42.42±3.98	0.937
RBC (x106)	4.88±0.58	4.86±0.51	0.839
Platelet (x103)	233.18±63.91	236.86±66.54	0.709
MPV (fL)	11.14±1.13	9.82±0.90	<0.001
RDW (%)	15.02±1.89	13.41±0.72	<0.001

BMI: body mass index, Family history: for coronary artery disease, AST: aspartate amino transferase ALT: alanine amino transferase WBC: White blood cell, RBC: Red blood cell, MPV: Mean platelet volume, RDW: Red cell distribution width, SD, standard deviation.

Tablo 2. Classification of the severity of coronary ectasia

	Markis classification	n (%)
Type 1	Diffuse ectasia of two or three vessels	48 (41
Type 2	Diffuse ectasia in one vessel and localized disease in another	39 (33.3)
Type 3	Diffuse ectasia in one vessel only	6 (5.1)
Type 4	Localized or segmental involvement	24 (20.5)

Table 3. Number and distribution of coronary vessels with ectasia

Number of ectasic vessels	n	%
1 vessel	30	25.6
2 vessels	59	50.4
3 vessels	28	23.9
Distribution of ectasic vessels	n	%
LMCA	49	41.9
LAD	68	58.1
LCX	51	43.6
RCA	80	68.4

ıMCA: Left main coronary artery, LAD: Left anterior descending artery, LCx: left circumflex artery, RCA right coronary artery

Table 4: Independent predictors of coronary artery ectasia in the multivariate logistic regression analysis

Multivariate Analysis			
Variables	OR	%95 CI	P value
Hypertension	2.577	0.996-6.668	0.51
Smoking	3.584	1.171-10.973	0.24
MPV	3.555	2.282-5.538	<0.01
RDW	2.393	1.573-3.639	<0.01

MPV, Mean platelet volume; RDW, Red blood cell distribution width; OR, odds ration; CI, confidence interval

Prevalence of resting electrocardiography changes in patients with coronary artery ectasia and their relationship with coronary artery disease severity

Ahmet Keser[1], Kerem Özbek[1], Şeref Ulucan[1], Hüseyin Katlandur[1], Mustafa Bilgi[2], Hüseyin Özdil[1], İsmail Ateş[3]
[1]Mevlana University Medicine School, Department of Cardiology
drkeser@hotmail.com
[2]Mevlana University Medicine School, Department of Internal Medicine
[3]Antalya Medical Park Private Hospital, Cardiology Department

OBJECTIVES: Coronary artery ectasia (CAE) is defined as abnormal dilatation of the normal adjacent segment of coronary arteries (≥ 1.5 times). The relationship between the prevalence of abnormalities from routine 12-lead ECG in CAE patients and CAE remains unknown. Therefore, we aimed to examine the relationship between CAE and abnormal 12-lead ECG results, as well as determine the prevalence of CAE in patients with coronary artery disease suspicion who underwent diagnostic CAG.

MATERIALS and METHODS: A total of 6,875 patients were admitted to the cardiology clinic of our hospital due to angina, equivalent symptoms, and/or identified signs of ischemia upon CAG between 2011 and 2015. Of these, 112 (1.63%) patients with CAE, as determined by retrospective scanning, were included in this study. CAG results were evaluated by two experienced cardiologists who were blinded to patient information and who were selected according to the study aims and patient characteristics. The Markis classification was used to determine CAE distribution. ECG findings were classified according to the Minnesota coding system.

RESULTS: Of the 112 patients, 48 (43%) were female and 64 were male (53%), and the mean age was 64 ± 11 years. When the CAG results were evaluated according to the Markis classification [9], 52 patients (46.4%) were classified as type 1, 20 patients (17.9%) were classified as type 2, 16 patients (14.3%) were classified as type 3, and 24 patients (21.4%) were classified as type 4 (Table1). There were no significant differences between the demographic features of all groups (Table 2). The coronary ectasia types grouped according to the Markis classification, and the frequency and types of abnormal findings from the resting 12 derivative ECG were evaluated according to the Minnesota classification. ECG results were normal in almost half of all patients, apart from patients in the type 2 category, and atrial fibrillation and ST-T changes were similar in all groups. Bundle branch block prevalence was similar in type 1 and type 4 patients, with no prevalence in type 3 patients (Table 2). Although the prevalence of bundle branch block differed between groups, the difference was not significant. Left bundle branch block was observed most frequently in type 1 patients (9.6%). The majority of patients with bundle branch block were male, and the majority of patients with ST-T changes and atrial fibrillation (AF) were female; these differences were significant (P = 0.015). The rates of ST depression (35%) and T negativity (25%) were seen mostly in type 2 patients, while ventricular extra beats were observed mostly in type 1 and type 4 patients (5.8% and 4.5%, respectively) (Table 3).

In CONCLUSION: Tthe prevalence of AF, ST-T changes, pathological Q-wave and R amplitude values, and different levels of bundle branch block was higher in CAE patients in our study compared with that of studies on nonselective populations.

Table 1. Description and prevalence of coronary ectasia types according to Markis classification

Markis Classification		n (%)
Type 1	Diffuse ectasia of two or three vessels	52 (46.4)
Type 2	Diffuse ectasia in one vessel and localized disease in another	20 (17.9)
Type 3	Diffuse ectasia in one vessel only	16 (14.3)
Type 4	Localized or segmental involvement	24 (21.4)

Table 2. Comparing the demographical characteristics of the groups that are formed according to the severity of coronary artery ectasia

	Group 1 (n=52) *	Group 2 (n=20) *	Group 3 (n=16) *	Group 4 (n=24) *	P
Age (Years)	63±10	67±9.0	65±13	61±9.0	0.143**
Sex, Female, n (%)	21 (43.8)	13 (27.1)	8 (16.7)	6 (12.5)	0.055
Smoking (n, %)	10 (45.5)	-	6 (27.3)	6 (27.3)	0.036
Hyperlipidemia (n, %)	18 (43.9)	13 (31.7)	4 (9.8)	6 (14.6)	0.024
Hypertension (n, %)	34 (47.2)	5 (20.8)	9 (12.5)	14 (19.4)	0.605
DM (n, %)	14 (58.3)	3 (12.5)	4 (16.7)	3 (12.5)	0.443
Family History (n, %)	20 (62.5)	2 (6.3)	3 (9.4)	7 (21.9)	0.085
SAP (n, %)	15 (46.9)	5 (15.6)	6 (18.8)	6 (18.8)	0.825
USAP (n, %)	36 (46.8)	13 (16.9)	10 (13.0)	18 (23.4)	0.834
ACS	3 (50)	2 (33.3)	1 (16.7)	-	0.522
CRF	4 (66.7)	1 (16.7)	1 (16.7)	-	0.583

*DM: diabetes mellitus, Family history; family history of coronary artery disease, SAP; Stable angina pectoris, USAP; unstable angina pectoris, ACS; Acute coronary syndrome, CRF; Chronic renal failure *Chi-square test, according to MARKIS classification that shows the severity of coronary artery ectasia **One Way ANOVA test*

Table 3. ECG changes at the groups that are formed according to the severity of coronary artery ectasia

ECG (Minnesota)	Type 1 (n=52)	Type 2 (n=20)	Type 3 (n=16)	Type 4 (n=24)	Total=112 (%)
Normal ECG (n, %)	25 (48.1)	2 (10)	10 (62.5)	10 (41.7)	47 (42.0)
(8.3.1) Atrial fibrillation (n, %)	4 (7.7)	2 (10)	1 (6.3)	2 (8.3)	9 (8.0)
(4.2) ST-segment depression (n, %)	4 (7.7)	7 (35.0)	2 (12.5)	4 (16.7)	17 (15.2)
(5.2) T negativity (n, %)	6 (11.5)	5 (25.0)	1 (6.3)	3 (12.5)	15 (13.4)
(1.1) Pathological Q waves (n, %)	-	-	1 (6.3)	2 (8.3)	3 (2.7)
(8.1.2) Ventricular extra-systole (n, %)	3 (5.8)	1 (5)	-	1 (4.2)	5 (4.5)
(9.1) Low QRS voltage (n, %)	2 (3.8)	-	-	-	2 (1.8)
(7.1.1) Complete left bundle branch block (n, %)	-	1 (5)	1 (6.3)	-	2 (1.8)
(7.6) Partial left bundle branch block (n, %)	5 (9.6)	-	-	-	5 (4.5)
(3.1) High amplitude R (n, %)	2 (3.8)	-	-	1 (4.2)	3 (2.7)
(7.2.1) Complete right bundle branch block (n, %)	-	2 (10.0)	-	1 (4.2)	3 (2.7)
(8.8) Sinus bradycardia (n, %)	1 (1.9)	-	-	-	1 (0.9)

Total pulmonary vein Diameter is strong predictor of atrial fibrillation after coronary artery bypass graft surgery

Hüseyin Katlandur[1], Kerem Özbek[1], Hüseyin Özdil[1], Bilal Arık[2], Ahmet Kuzgun[3], Ahmet Keser[1], Şeref Ulucan[1], Mehmet Sıddık Ülgen[1]
[1]Department of Cardiology, Mevlana University, Konya, Turkey
hkatlandur@mevlana.edu.tr
[2]Department of Radiology, Mevlana University, Konya, Turkey
[3]Department of Cardiovascular Surgery, Mevlana University, Konya, Turkey

OBJECTIVE: Recent studies have shown that the pulmonary veins are important in atrial fibrillation (AF). This study evaluated the relationship between total pulmonary vein diameter and postoperative AF in on-pump coronary artery bypass graft (CABG) patients.

MATERIAL AND METHODS: Our study enrolled 149 patients undergoing on-pump CABG. The primary endpoint was defined as postoperative new-onset in-hospital AF. All patients underwent preoperative non-contrast tomography to measure pulmonary vein diameter.

RESULTS: The study enrolled 149 patients undergoing CABG requiring CPB for the first times. The average patient age was 63.8 ± 9.4 (range 41–87) years; the average BMI was 28.3 ± 4.4 (range 17–48) kg/m^2. The study population included 35 (23.5%) women. The average duration of ICU follow-up was 2.2 ± 1.7 (range 1–17) days, the average total hospitalization was 9.8 ± 3.3 (range 5–24) days, and the average cross-clamp duration was 55.9 ± 16.8 (range 22–98) minutes. In our study population, AF developed in 35 (23%) patients and the remaining 114 (77%) patients remained in sinus rhythm. Baseline characteristics, operative and radiological variables stratified by the development of AF are summarized in Table I. The patients who developed AF had a significantly greater total pulmonary vein diameter (54.5 ± 6.5 vs. 49.9 ± 5.5 mm, p = 0.0001) and were older (69.2 ± 8.3 vs. 62.1 ± 9.1 years, p = 0.0001) than those who remained in sinus rhythm. Demographic variables such as diabetes and hypertension and procedural factors such as the cross-clamp time, pump time, number of bypass grafts, duration of hospitalization, and ICU stay were similar in both groups. Receiver operator characteristic curve analysis revealed a cutoff of 51.15 mm (95% Confidence Interval 0.627–0.810, area under the curve 0.712, p = 0.0001) of the total pulmonary vein diameter for predicting the development of new-onset AF with 71% sensitivity and 61% specificity (Figure 2). A logistic multivariate regression analysis was performed on tomography variables, including the left atrial volume, left atrial horizontal diameter, and total pulmonary vein horizontal diameter. Only the total pulmonary vein diameter (OR 1.084, 95% CI 1.084–1.003; p = 0.042) was an independent predictor of the development of new-onset AF (Table 2).

CONCLUSION: To our knowledge, this is the first report of an association between total pulmonary vein diameter and the development postoperative AF. The identification of high-risk patients using pulmonary vein diameters should facilitate preventive measures.

Figure 2. ROC curve illustrating sensitivity and specificity rates at all possible cut-off levels to assess the performance of total pulmonary vein diameter to predict postoperative CABG AF.

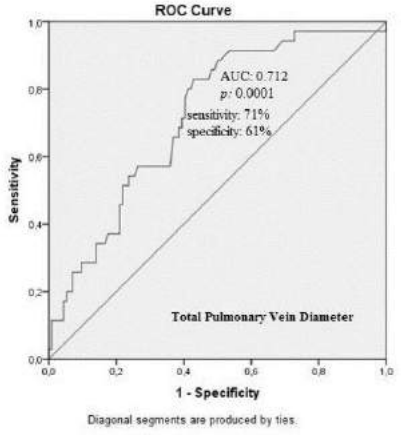


Table 1. Baseline Characteristic's, operative and radiologic variables stratified by development of new onset Atrial Fibrillation

Variables	Atrial Fibrillation (n=35)	Sinus Rhythm (n=114)	P value
Age (years)	69.2 ± 8.3	62.1 ± 9.1	0.001
Age>70 years old	17/42	18/107	
Male / Female	26 / 19	30 / 16	0.46
Body Mass Index (kg/m2)	28.4 ± 0.6	29.6 ±.9	0.46
Operative and postoperative variables			
Cross Clamp Time (minutes)	69.7 ± 37.3	59.3 ± 24.3	0.35
Pump Time (minutes)	94.7 ± 47.4	84.5 ± 32	0.69
Stay in hospital (days)	11 ± 3.9	9.4 ± 3	0.003
Intensive Care Unit period (days)	3.3 ± 2.9	1.9 ± 0.8	<0.001
Number of bypass grafts			
1	7	10	
2	9	34	
3	11	41	
4	6	19	
5	2	10	
Radiologic Parameters			
Total Pulmonary Vein Diameter (mm)	54.5 ± 6.5	49.9 ± 5.5	<0.001
Left Atrial Diameter (mm)	47 ± 8.3	41 ± 6.2	0.001
Left Atrial volume (mm3)	72.9 ±27.2	56.8 ± 15.2	0.003

Bolded data are statistically significant

Table 2. Tomographic variables examined in the multivariate logistic regression analysis

Variables	OR	95% CI	P value
Total Pulmonary vein diameter (mm)	1.084	1.003-1.171	0.042
Left atrium volume (mm3)	1.013	0.984-1.043	0.391
Left Atrium Diameter (mm)	1.061	0.978-1.151	0.153

OR: Odds Ratio, CI: Confidence Interval Bolded data are statistically significant

Arterial Stiffness Parameters in Patients With Vasovagal Syncope

Erkan Alpaslan[1], Ebru Özpelit[1], Emre Özpelit[2], Sedat Taş[3], Abdulla Arslan[1], Reşit Yiğit Yılancıoğlu[1], Neryan Özgül[1], Asım Oktay Ergene[1]

[1]Department of Cardiology, Dokuz Eylül University, İzmir, Turkey
erkan8721@gmail.com

[2]Department of Cardiology, İzmir University, İzmir, Turkey

[3]Department of Cardiology, Soma State Hospital, Manisa; Turkey

INTRODUCTION: Vasovagal syncope (VVS) is by far the most common cause of syncope in people without structural heart disease, but the exact mechanisms for these neural pathways and their variations among individuals remain unclear. Fall in cardiac output and peripheral vascular resistance with coincident vasodilatation occurs in the majority of cases. Whether any hemodynamic or structural background exists is not known exactly. In this study we aimed to evaluate the arterial stiffness parameters in patients with VVS

MATERIALS-METHODS: 42 consecutive patients with recurrent VVS and a positive tilt table test were compared to 41 age- and sex-matched controls with a negative tilt table result and no history of syncope. Central aortic pressure parameters including augmentation index, central pulse pressure and carotid to radial pulse wave velocity as markers of aortic stiffness were generated noninvasively by applanation tonometry.

RESULTS: Peripheral systolic (SBP) and diastolic blood pressures (DBP) were similar in VVS and control groups. Central systolic blood pressures and central augmentation pressures also did not significantly differ between groups. No difference in aortic augmentation index was observed between groups. However, in patients with vasovagal syncope the pulse wave velocity was significantly lower than the healthy controls.

CONCLUSION: The findings of present study indicate the presence of less stiff arteries in patients with VVS compared to healthy controls. Further studies are needed to confirm this finding. Whether this lower arterial stiffness is a cause or consequence in these patients is another concern to be investigated.

Stiffness Parameters and Blood Pressure of Control group and Patients with Vasovagal Syncope

	Patient	Control	P value
Age (years)	34.3±10.0	31,4±5.7	0,115
SBP (mmHg)	125 ±16,6	121,1 ± 14.9	0,318
DBP (mmHg)	79,6±8,9	77,7 ± 9,7	0,379
Central BP (mmHg)	98 (13)	93 (14)	0,105

Augmentation pressure (mmHg)	8,5 ±10,1	6,2 ± 8,6	0,274
Augmentation Index (%)	21 (21,5)	14 (25,5)	0,225
Pulse Wave Velocity (m/s)	5,4 (1,4)	5,9 (1,8)	0,046

An Interesting and Unusual Clinical Scenario; Anomalous Origin of the Left Coronary Artery from the Right Sinus of Valsalva with Interarterial Course, Presented as Acute Myocardial Infarction Caused by the RCA

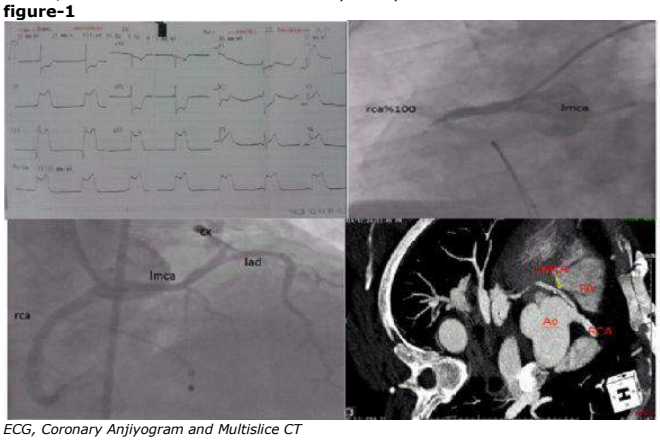
Ersin Çağrı Şimşek[1], Sadık Volkan Emren[2], Mehmet Erdinç Arıkan[3], Emre Özdemir[3], Sedat Altay[3]
[1]Tepecik Education and Research Hospital, Izmir,Turkey
[2]Afyonkarahisar State Hospital, Afyon, Turkey vemren@hotmail.com
[3]Katip Celebi University Ataturk Education and Research Hospital, Izmir,Turkey

INTRODUCTION: Coronary artery anomalies are potentially life-threatening anatomic variants that occur in approximately 1% of patients. Among all the congenital coronary anomalies, an anomalous origin of the left coronary artery (LCA) from the right sinus of Valsalva is extremely rare approximate prevalence, 0.15%).

CASE: A 53-year-old man with a history of smoking was admitted to the emergency department with severe chest pain which lasted for 1 hour. The initial ECG showed acute inferolateral and right myocardial infarction. The patient was referred for primary PCI. At first, temporary pacemaker was inserted from the femoral vein. Then, we tried to perform left coronary angiography, but we could not find the orifice of the left coronary artery(LCA).Right coronary artery was occluded from the proximal, two bare-metal stents (5.0 mm×28 mm, 4.5mm×20 mm) were implanted to the proximal and midportion of the RCA with an excellent result. As LCA could not be engaged with stand technique, a JR-4 right guiding catheter was used to seek the anomalous LCA. As expected LCA took origin from the right and showed a critical stenosis on the proximal LCX. Multislice CT revealed an interarterial course between the pulmonary artery and the aorta. After a consensus with the surgeons, the patient was scheduled for CABG one month later.

DISCUSSION: Anomalous origin of the left coronary artery in the right sinus of Valsalva is an uncommon malformation. The anomalous artery can have various courses; however, the interarterial course between the aorta and pulmonary artery is the one most frequently associated with sudden death, particularly during or immediately after strenuous physical exercise.The outward expansion of the aortic root and pulmonary trunk during exertion in addition to the external compression of the vessel, also increases the angulation at the LMCA ostium can result in acute myocardial infarction or sudden cardiac death. When the anomaly is associated with obstructive coronary lesions, treatment planning in these cases may be complex. Guidelines recommends surgical coronary revascularization in patients with anomalous left coronary artery arising from the right sinus of Valsalva and coursing between the aorta and pulmonary artery. About half of the patients with anomalous LCA arising from the right coronary sinus die before the age of 20 years, and usually during or shortly after vigorous exertion. However, this patient did not have any cardiac symptoms until the age 53 years eventhough there was a significant atherosclerotic change in the LCx. Culprit lesion was RCA and the cause of AMI might be related to coronary artery risk factors such as smoking. Suprisingly, in this case; cause of MI was an atherosclerotic lesion of RCA which had a normal course, instead of the anomalous coronary artery.

figure-1



ECG, Coronary Anjiyogram and Multislice CT

Evaluation of neutrophil to lymphocyte ratio changes between pre- and post-menopausal life for cardiovascular risk prediction

Ahmet Karakurt[1], Cennet Yıldız[2]
[1]Department of Cardiology, Kafkas University, Kars, Turkey
karakurt38@hotmail.com
[2]Department of Cardiology, Tekden Hospital, Istanbul, Turkey

AIM: Neutrophil to lymphocyte ratio (NLR) has demonstrated in various clinical studies to identify the increased atherosclerotic cardiovascular risk. However, the prognostic value of NLR is unknown in healthy postmenopausal women. The aim of this study to evaluate the relationship between and premenopausal and postmenopausal healthy women regarding the NLR.

METHOD: The study population included 295 premenopausal (median age 37 years, range 33-42 years) and 153 postmenopausal (median age 56 years, range 52-62 years) healthy women who have admitted cardiology clinic between March-2013 and May-2014. The complete blood count was obtained from all patients. Total leukocytes were counted and differential count obtained for neutrophil, lymphocyte and NLR were evaluated.

RESULTS: There were no significant differences between premenopausal and postmenopausal healthy women regarding NLR [median: 1.77, (interquartile range (IQR): 1.38 - 2.25) and 1.68 (IQR: 1.24 - 2.07), p=0.240, respectively]. Similarly, there were no significant differences between two groups in terms of neutrophil and lymphocyte counts [median: 3,7x103/mm3 (IQR: 3.04 - 4.50) vs. 3.63x103/mm3 (IQR: 2.79 - 4.33), p=0.393 and 2.12 x103/mm3 (IQR: 1.79-2.52) vs. 2.10 x103/mm3 (IQR: 1.70-2.60), p=0.624, respectively].

CONCLUSION: This study demonstrated that there is no difference regarding NLR between the premenopausal and healthy postmenopausal women. These findings have also revealed that the NLR, neutrophil and lymphocyte counts do not change in menopausal life, and thus can not be used as a marker for atherosclerosis in these groups.

Table 1. Neutrophil to lymphocyte ratio and other circulatory blood cells count of two groups are given.

Parameters	Premenopausal (n=295)	Postmenopausal (n=153)	p
WBC (103/mm3)	6.58 (5.63-7.84)	6.23 (5.47-7.51)	0.075
Nc (103/mm3)	3.70 (3.04-4.50)	3.63 (2.79-4.33)	0.393
Lc (103/mm3)	2.12 (1.79-2.52)	2.10 (1.70-2.60)	0.624
NLR	1.77 (1.38-2.25)	1.68 (1.24-2.07)	0.240
Pc (103/mm3)	261 (220-306.75)	257 (225.50-288)	0.508
MPV (µm3)	10.36 ± 1.20	10.39 ± 0.92	0.781
RDW (%)	14.02 ± 2.08	13.80 ± 1.78	0.284

WBC: White blood cell count; Nc: Neutrophil count; Lc: Lymphocyte count; NLR: Neutrophil to lymphocyte ratio; Pc, Platelets count; MPV: Main platelet volume. RDW: Erythrocyte distribution width; Data are expressed as mean ± SD or median [interquartile range (IQR) (25th-75th)]. P value is significant less than at the 0.05 level in the between groups.

Table 2. A linear relationship between neutrophil to lymphocyte ratio and the other continuous variables.

Parameters	r	p
FBG (mg/dL)	-0.114	0.016
Hb (g/dL)	-0.100	0.035
MCHC (g/dL)	-0.120	0.011
RDW (%)	-0.094	0.021
TC (mg/dL)	-0.109	0.021
LDL(mg/dL)	-0.093	0.049
TG (mg/dL)	-0.109	0.021
LDL/HDL	-0.105	0.026
TC/HDL	-0.122	0.010

FBG: Fasting blood glucose; Hb: Hemoglobin; MCHC: Mean corpuscular hemoglobin concentration; RDW: Erythrocyte distribution width; TC: Total cholesterol; LDL: Low-density lipoprotein; TG: Triglyceride; HDL: High density lipoprotein.

Acute pulmoner embolism mimicking acute coronary syndrome can misdirect the diagnostic approach

Fulya Avcı Demir[1], Yunus Okudan[2], Ahmet Altınbaş[2]
[1]Isparta Devlet Hastanesi, Isparta
fulyaavcidemir@gmail.com
[2]Süleyman Demirel Üniversitesi, Kardiyoloji Anabilim Dalı, Isparta

INTRODUCTION: Clinical and electocardiographic (ECG) features in pulmonary embolism (PE) lack of specificity and may mimic an acute coronary syndrom (ACS). We here report a case of a 56-year-old woman presenting with chest pain secondary to pulmonary artery embolism which was initially diagnosed as ACS due to electrocardiographic changes and raised troponin.

CASE: A 56-year-old diabetic, hypertensive, obese woman with a history of smoking was admitted to the emergency service with chest pain and nausea. She did not have any other relevant symptoms. Clinically, she was oriented; her cardiovascular and chest examination was unremarkable. Her pulse was regular at 93 beats/minute, blood pressure was 142/89 mmHg and respiratory rate was 18 breaths/minute. The room air oxygen saturation was 99%.In her blood investigations everything was normal except troponin I which was 0.98 ng/ml (normal < 0.06 ng/ml). On her 12-lead ECG, the rhythm was sinus.There was ST segment depression in leads V3-V6 and T wave inversion in anterior and inferior leads and minimal ST segment elevation in AVR.(Figure 1) She was diagnosed as Non-ST elevation myocardial infarction and referred for invasive coronary evaluation. The coronary angiography revealed normal. Transthorasic echocardiography demonstrated good left ventricular systolic function but a dilated right ventricle (RV). There was mild tricuspid regurgitation with calculated RV systolic pressure of 45 mmHg. So thoracic computed tomographic angiogram planned and it showed extensive PE of both right and left main pulmonary arteries extending distally into lobar, segmental and sub segmental branches.(Figure 2)A Doppler scan of the legs revealed no deep vein thrombosis. Her thrombophilia profile was normal. The patient was treated with low molecular weight heparin (LMWH) along with overlap warfarin.

CONCLUSION: PE presenting with negative T-wave inversion can mimic ACS and misdirect the diagnostic approach. Simultaneous T-wave inversions in anterior and inferior leads are important clues suggesting PE. Most common ECG findings in PE are anteroseptal T-wave inversion/ST-elevation or depression along with complete or incomplete right bundle branch block, sinus tachycardia, low QRS-complex voltage, an S1Q3T3 pattern, and right axis deviation. The reasons for the ECG changes that seem like ischemia are sudden RV strain, hypoxemia and the release of catecholamines. So we have to be aware that PE can present as acute coronary syndrome with ECG changes preoccupy ischemia. Otherwise, the diagnosis of PE can be easily missed and patients may not receive appropriate treatment resulting in increased mortality.

Figure 1. 12- Lead electrocardiogram on admission

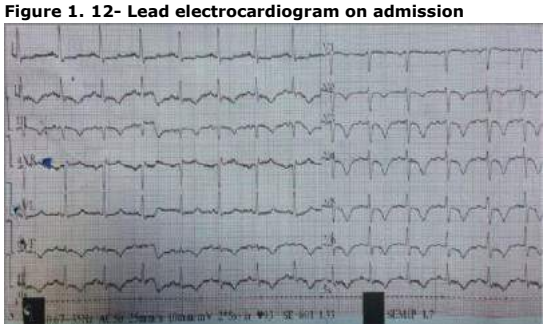
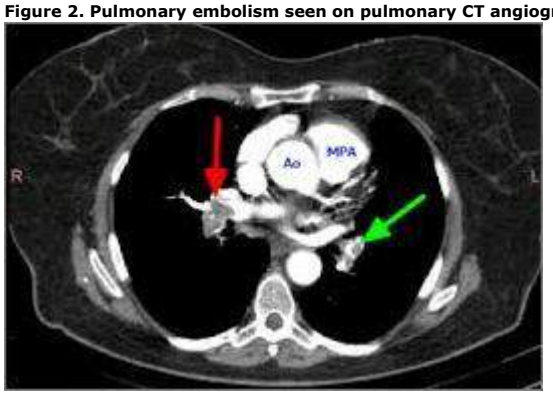


Figure 2. Pulmonary embolism seen on pulmonary CT angiogram



Evaluation of Tp-e interval and Tp-e/QT ratio in patient with polycystic ovary syndrome

Arif Süner[1], Mustafa Kaplanoğlu[2]

[1]Department of Cardiology, Adiyaman University, Adiyaman, Turkey
arifsuner@gmail.com
[2]Department of Gynecology and Obstetrics, Adiyaman Univercity, Adiyaman, Turkey

OBJECTIVE: Cardiovascular events have increased in polycyctic ovary syndrome (PCOS), including atrial and ventriculer tachyarryhthmias. Previous studies have showed the prolonged P wave dispersion (Pd) and QT dispersion (QTd) in patients with PCOS. The Tp-e interval, Tp-e/QT ratio new ventriculer arrhythmias indexes. We purposed to evelation this indexes in patients with PCOS.

METHODS: Our study included 42 patients (mean age: 28 years) with PCOS and 40 healthy (mean age: 24 years) volunteers. Diagnosis of PCOS was established wiht the Rotterdam criteria in the presence of at least two of the following three features: oligo or anovulation, hyperandrogenism, and polycystic ovaries. The Tp-e interval, Tp-e/QT ratio were measured from the 12-lead electrocardiogram. These parameters were compared between groups.

RESULTS: The Tp-e interval and Tp-e/QT ratio were significantly higher in the PCOS patients with than those in the control subjects (Tp-e interval: 91 ± 11 milliseconds [ms] vs 78 ± 5 ms, P < 0.001, Tp-e/QT: 0.24 ± 0.02 vs 0.20 ± 0.01, P < 0.001). Multivariate analysis indicated that the prolonged Tp-e interval, Tp-e/QT ratio were independent predictor factors for PCOS.

CONCLUSION: Our study showed that the Tp-e interval and Tp-e/QT ratio may be used to assessment of cardiovascular arrhythmias events for PCOS patients.

Table 1. Clinical Characteristics, Laboratory and Echocardiographic Findings of the Study Population

Variables	PCOS group (n=42)	Healthy group (n=40)	P value
Age, years	28.7±4.2	23.7±3.7	0.261
BMI, kg/m2	29.1±3.8	27.1±3.2	0.016
SBP, mm Hg	127.6±7.2	126.5±5.2	0.566
DBP, mm Hg	83.2±10.2	79.5±6.0	0.061
Fasting glucose, mg/dL	97.0±13.2	92.6±5.2	0.055
Total cholesterol, mg/dL	178.2±25.6	172.3±22.1	0.850
LDL cholesterol, mg/dL	116.4±41.2	116.6±27.6	0.977
HDL cholesterol, mg/dL	38.6±10.2	44.2±9.5	0.013
Triglyceride, mg/dL	179.4±71.5	146.2±42.1	0.012
WBC, 103/mL	7.03±1.1	7.4±1.2	0.093
Hemoglobin, g/dL	12.9±1.0	12.7±1.0	0.235
LVEDD, mm	47.1±2.1	46.9±2.6	0.720
LVESD, mm	32.8±2.1	32.4±2.6	0.477
PW, cm	8.0±1.0	8.0±1.3	0.388
IVS, cm	10.7±0.8	10.5±0.7	0.216
LVEF, %	60.9±2.9	61±3.6	0.214

Table 2. Electrocardiographic Findings of the Study Groups

Variables	PCOS group (n=42)	Healty group (n=40)	P value
Heart rate, beat/min	81.0±8.3	76.1±6.0	0.013
Pd, ms	24.6±6.9	19.9±5.1	0.001
QTd, ms	27.6±8.0	22.5±6.5	0.002
cQTd, ms	29.6±9.4	24.8±6.6	0.010
Tp-e, ms	90.9±11.3	78.2±5.2	<0.001
Tp-e/QT, ms	0.24±0.02	0.20±0.01	<0.001

Table 3. Multivariate Logistic Regression Analyses of Independent Variables for Polycyctic Ovary Syndrome

Variables	OR	%95 CI or OR Lower	%95 CI or OR Upper	P value
Fasting glucose, mg/dL	0.99	0.91	1.07	0.683
BMI	0.92	0.74	1.10	0.464
Heart rate, beat/min	0.92	0.85	1.11	0.092
HDL cholesterol, mg/dL	1.08	0.91	1.02	0.945
Triglyceride, mg/dL	0.99	0.97	1.00	0.124
Pd	0.89	0.79	1.03	0.185
QTd	0.92	0.80	1.05	0.221
Tp-e	0.88	0.80	0.91	0.032
Tp-e/QT	1.08	1.02	1.14	0.027

Prosthetic Mitral Valve Endocarditis Presenting as Complete Heart Block

Özlem Arıcan Özlük[1], Mustafa Yîlmaz[1], Tezcan Peker[1], Faruk Toktas[2], Bedrettin Boyraz[1]
[1]Department of Cardiology, Bursa Yuksek Ihtisas Training And Research Hospital oarican@yahoo.com
[2]Department of Cardiovascular Surgery, Bursa Yuksek Ihtisas Training And Research Hospital

INTRODUCTION: Infective endocarditis is associated with a broad array of complications. We are reporting a case of infective endocarditis of prosthetic mitral valve presented with complete atrioventricular block.

CASE: A 53-year-old man presented to our hospital's cardiology clinic with dizziness. In his past medical history, he had mitral valve replacement surgery for mitral valve insufficiency at an outside center 8 months ago. His physical examination revealed dysrhythmic, metallic prosthetic valve sounds. Arterial blood pressure was 160 / 80 mmHg. His electrocardiogram showed complete AV block with narrow QRS complexes at a rate of 48 bpm (fig 1). At the time of admission his body temperature was 38.20 C. Laboratory findings were as follows: erythrocyte sedimentation rate 48/hour, C- reactive protein 124 mg/l, white blood cell count 12100 /mm3, hemoglobin 10.4 g/ dl, platelet count 215000/mm3, creatinine 0.6 mg/dl, and INR 2.4. On transesophageal echocardiography, a 2.5x1.8 cm irregular, mobile mass lesion compatible with a vegetation on the mitral prosthesis with peak /mean transmitral gradients of 20 / 11 mmHg (Fig 2). Our patient had no abscess formation in the perivalvular tissue. Methicillin resistant S.Aureus was shown in all blood culture samples. Considered to have prosthetic valve endocarditis (PVE) complicated by complete AV block, the patient was scheduled for early surgery. However, he refused to undergo surgery, and thus triple antibiotherapy consisting of vancomycin, gentamycin, and rifampin was continued. At the third week, he accepted to undergo the operation. His valve replacement operation had a successful course and his postoperative rhythm converted from complete AV block to atrial fibrilloflutter, eliminating the need for a pacemaker.. Patient was discharged with medical therapy.

DISCUSSION: PVE is a serious infection with potentially fatal complications. Microorganisms directly can reach the perivalvular tissue and the prosthesis-annulus interface along the non-epithelized suture line. Development of conduction defects during disease course may reflect that infection has spread out of valvular leaflets to surrounding myocardial tissue. A majority of cases with perivalvular extension and complete AV block have aortic valve endocarditis. There are only a few literature reports on complete AV block secondary to native mitral valve endocarditis. There is yet no case of a complete AV block secondary to prosthetic mitral valve endocarditis, and our patient is the first to be reported in the literature. The clinical course of endocarditis may not be as prominent as in our patient. Electrocardiograms should be carefully reviewed and newly developed conduction defects should made physicians think of the possibility of endocarditis and reevaluate patients.

Figure 1. 12 lead Electrocardiogram of the patient taken in cardiology department showing complete heart block with with narrow QRS complexes

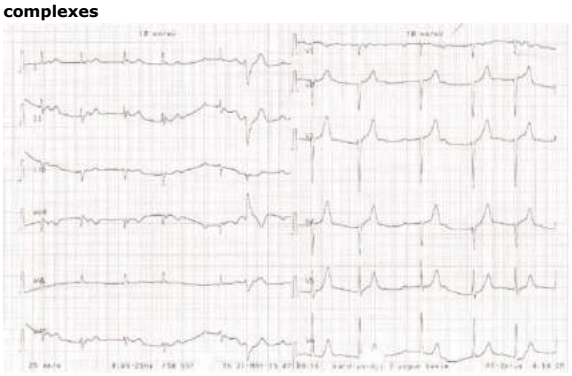
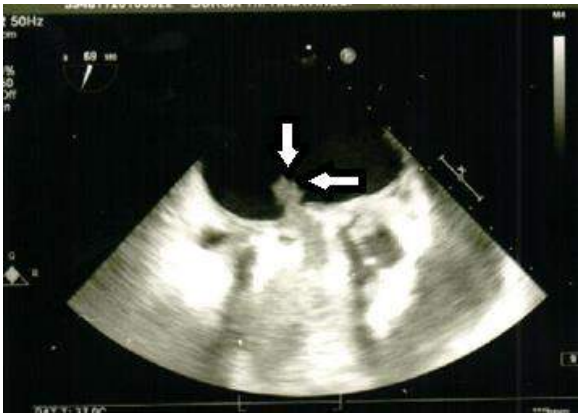


Figure 2. Transesophageal echocardiogram (TEE) reveals a vegetation on the prosthetic valve



Comparison of heart rate variability of the nurses working in coronary care unit during working and resting time

Taner Şen, Mehmet Ali Astarcıoğlu, Celal Kilit
Dumlupinar University Kutahya Evliya Celebi Education and Research Hospital medicineman_tr@hotmail.com

BACKGROUNDS: Heart rate variability (HRV) is a noninvasive measure of autonomic modulation of the heart. Medical personnels working in emergency care have high mental and physical work related stress. In this study, we investigated HRV of nurses working in coronary care unit to examine whether or not the circadian rhythm and HRV variables differ between working and nonworking days.

METHODS: 19 nurses working in coronary care unit were included into the study. The study was performed when the subjects were on 24-hour weekend shift. Subjects were underwent 24 hours 3 channel ambulatory rhythm Holter from 08:00-08:00 o'clock twice, once during their 24 hours shift and once during normal nonworking day. HRV analysis was performed by using same Holter software system.

RESULTS: Only mean values of SDNN and SDANN of the entire day were statistically different between working and nonworking days. The 24 hour trend of mean NN intervals indicated very similar pattern in working and nonworking days. VLF, HF, and HFnu which reflect mainly parasympathetic activity of the heart were significantly lower in the period while LFnu and LF/HF ratio which shows sympathetic activity and sympathovagal balance respectively were significantly higher in the day period than in the night period in the working day group. HFnu parameter during working day showed sudden decrease whereas LFnu parameter exhibited slight increase during 03:00-05:00 o'clock.

CONCLUSION: First of all, HRV parameters generally shows circadian pattern irrespective of the working status of the participants. Second, in the working day group, sympathetic activity was significantly higher in the day period than the night period but there was no difference within nonworking group. Third, sympathetic system activity was slightly increased and parasympathetic activity was markedly decreased during 03 to 05 o'clock in working day group.

HFnu	25,41 ± 10,44	33,74 ± 10,50	0,001	33,58 ± 14,38	36,70 ± 12,94	0,363
LF/HF	4,38 ± 2,21	3,46 ± 2,01	0,003	3,77 ± 3,19	2,64 ± 1,65	0,053

NN; RR interval, SDNN;Standard deviation of NN, SDANN; Standard deviation of the average NN intervals for all of the five-minute intervals,RMSSD; Root mean square of differences between successive NN intervals, pNN50; Percent NN intervals >50, TP; total power, VLF; very low frequency power, LF; low frequency power, HF; high frequency power, LFnu;normalized low frequency, HFnu; normalized high frequency,LF/HF;the ratio of low frequency (LF)/high frequency (HF) component The significance level is 0.05

Functional capacity is associated with socioeconomic and medico-social status

Hakkı Kaya, Hasan Yücel, Mehmet Birhan Yılmaz, On Behalf Of Treat Hf Investigators
Department of Cardiology, Cumhuriyet University, Sivas, Turkey
drhakkikaya84@gmail.com
BACKGROUND: New York Heart Association (NYHA) classification has been utilized to identify functional status of patients with heart failure (HF) for several years, and parameters that influence NYHA functional status might potentially be important for prognostic evaluation. In this study we aimed to investigate whether the socioeconomic and medico-social status of Turkish patients with HFrEF influence NYHA functional status.

METHODS: Turkish Research Team-HF (TREAT-HF), is a questionnaire-based prospective cohort study with 52 questions which aim to investigate various aspects of HF patients. 2013-2014-2015 (not fully recorded) cohorts of TREAT-HF included consecutive 1001 stable HFrEF patients out of 18 different centers from Turkey. Patients were classified into two as those with mild symptoms with NYHA functional class I-II (Group 1) and those with NYHA functional class III-IV symptoms (Group 2) and two groups were compared with regard to socio-economic and medico-social characteristics.

RESULTS: Mean age was 59±14 with 28% females and 72% male patients. Distribution of NYHA functional class in the whole group was 13%- 49%- 34%-4% for NYHA Class I-II-III-IV respectively. Clinical, socio-economic and medico-social characteristics of males, females and all patients according to NYHA classes were presented in Table 1.

CONCLUSION: Good functional class in HFrEF outpatients has several domains and associates. Hence, keeping in mind that good functional status means good prognosis has to be considered in the context of these domains

Baseline, socio-economic and medico-social charecteristics of males, females and all patients according to NYHA classes

	All patients n=1001			Male n=703			Female n=298		
Characteristics	NYHA I-II n=571	NYHA III-IV n=431	p	NYHA I-II n=419	NYHA III-IV n=284	p	NYHA I-II n=151	NYHA III-IV n=147	p
Age (years)	61+/-13	65+/-13	<0.001	61+/-13	64+/-13	0.001	58+/-15	65+/-14	0.006
EF(%)	32+/-8	29+/-8	<0.001	38+/-8	39+/-8	<0.001	33+/-8	31+/-10	0.072
Graduation from high school or university	19%	17%	0.376	22%	20%	0.705	12%	10%	0.631
Married	90%	74%	0.015	85%	79%	0.049	71%	67%	0.435
Patients with monthly income level <1000TL	49%	40%	0.007	50%	42%	0.032	47%	38%	0.135
Providing family income himself/herself	65%	54%	0.002	79%	69%	0.008	24%	28%	0.413
Having regular doctor controls	70%	59%	0.001	69%	60%	0.016	71%	58%	0.015
Making regular weight control	53%	38%	<0.001	53%	42%	0.016	53%	29%	<0.001
Regular exercise	26%	17%	0.003	59%	21%	0.005	16%	14%	0.576
Complying with doctors' salt dietary advices	55%	46%	0.001	56%	49%	0.017	55%	42%	0.042
Using medications regularly	81%	73%	0.002	81%	75%	0.079	83%	69%	0.006

Usefulness of Eosinophil-Lymphocyte Ratio to Predict Stent Restenosis

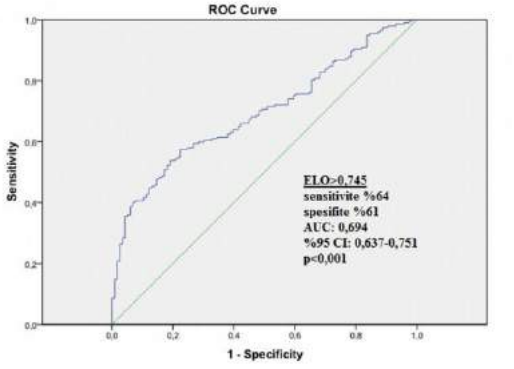
Mehmet Zihni Bilik, Mehmet Ata Akil, Halit Acet, Murat Yüksel, Mustafa Oylumlu, Nihat Polat, Adem Aktan, Sait Alan
Department of Cardiology,Dicle University, Diyarbakır, Turkey
mzbilik@mynet.com
OBJECTIVE: Stent restenosis (SR) is an important complication of percutaneous coronary intervention. There are
many studies explored the relation of eosinophils with SR, however, there is no data about relationship between eosinophil-lymphocyte ratio (ELR) and SR. In this study we aimed to investigate the relationship between the value of ELR on admission and SR.

METHODS: The study was included 314 patients who had been applied a coronary stent implantation and they were
admitted to cardiology clinic with stabile angina and underwent repeat coronary angiography. The data obtained from patients were analyzed retrospectively. The patient group was consisted of 197 patients who were diagnosed as SR, and the control group was consisted of 117 patients whose stents were patent angiographically.

RESULTS: The groups were similar in terms of age, gender, hypertension, diabetes mellitus, LDL-C, HDL-C, platelet
count, platelet-lymphocyte ratio (PLR), hemoglobin and left ventricle ejection fraction (LVEF). White blood cell (WBC), neutrophil, eosinophil, C-reactive protein (CRP), ELR and neutrophil-lymphocyte ratio (NLR) on admission were higher in the SR group compared to the controls. All patients were categorized into two groups according to ELR values and SR was more frequent in the high ELR group compared to low ELR group. An ELR value of ≥0.745 predicted SR with 64% sensitivity and 61% specifity.

CONCLUSION: In this study ELR was found statistically higher in SR patients compared to the controls. According to our data ELR as an inexpensive and easy method, may contribute to determination of high risk patients and increased ELR can be used as a predictor of SR.

ROC curve analysis for ELR (eosinophil-lymphocyte ratio)



AUC, area under curve; CI, confidence interval

Clinical, demographic and laboratory characteristics of study groups

	SR group (n=197)	Control group (n=117)	p
Age, years	63±11	64±12	0.661
Male, n(%)	131 (66)	73 (62)	0.466
Hypertension, n(%)	82 (41)	43 (33)	0.287
Diabetes mellitus, n(%)	53 (27)	29 (25)	0.405
Smoking, n(%)	74 (38)	38 (32)	0.216
Fasting blood glucose, mg/dl	138±70	156±106	0.108
Urea, mg/dl	39±20	41±25	0.427
Creatinine, mg/dl	0.89±0.23	0.95±0.27	0.077
Triglycerides, mg/dl	185±124	180±85	0.721
Total cholesterol, mg/dl	172±43	176±38	0.527
LDL-cholesterol, mg/dl	101±36	101±30	0.925
HDL-cholesterol, mg/dl	36±9	38±12	0.145
CRP, mg/dl	2.6±1.5	1.1±0.6	<0.001
Hemoglobin, g/dl	13.3±2.1	13.1±2.2	0.352
WBC, x1000/µl	9.1±2.1	8.1±1.7	<0.001
Neutrophil, x1000/µl	6.1±2.0	4.9±1.6	<0.001
Lymphocyte, x1000/µl	2.1±0.7	2.4±0.9	<0.001
Platelets, x1000/µl	256±67	252±84	0.657
ELR	0.146±0.14	0.067±0.04	<0.001
NLR	3.61±2.84	2.89±2.32	0.045

PLR	148±141	131±118	0.279
LVEF, %	51.2±11.2	51.7±11.4	0.664

CRP, C-reaktive protein; ELR, eozinophil-lyphocyte ratio; HDL, high-density lipoprotein; LDL, low-density lipoprotein; NLR, neutrophil-lympocyte ratio; PLR, platelet-lympocyte ratio; SR, stent restenosis; LVEF, left ventricle ejection fraction; WBC, white blood count

The incidence of SR in low and high ELR groups

	Low ELR group n=135	High ELR group n=179	p
No stent restenosis, n (%)	63 (47)	54 (30)	0.002
Stent restenosis, n (%)	72 (53)	125 (70)	0.002

ELR; eosinophil-lymphocyte ratio, SR; stent restenosis

Septic coronary artery embolism treated surgically

Mustafa Kurşun[1], İnan Mutlu[2], Cüneyt Türkoğlu[2]
[1]Department of Cardiology, Tepecik Training and Research Hospital, İzmir, Turkey mustafakursun35@gmail.com
[2]Department of Cardiology, Ege University Faculty of Medicine, İzmir, Turkey

CASE: A 55-year old male patient was admitted to our cardiology clinic with acute dyspnea. The echocardiogram showed severe mitral regurgitation and normal ejection fraction, and no vegetation was detected. The inflammatory biomarkers were normal and the body temperature was normal. The patient was consulted with cardiovascular surgery clinic and mitral valve surgery was planned. Before the surgery, coronary angiography was performed and showed no stenosis in coronary arteries.(Image 1-2) Diuretic treatment was started prior to surgery for symptom relief. However, under diuretic therapy, the patient complained of chest pain and temporary loss of consciousness. The electrocardiogram showed ST segment elevation in anterior derivations and cranial computerised tomography showed acute infarction in multiple cerebral regions. Coronary angiogram and bedside echocardiogram were reporformed and showed total occlusion of left anterior descending artery(Image 3) and low ejection fraction of 30% with akinetic myocardial segments. Mitral valve replacement with coronary artery bypass grafting surgery was planned and performed after neurological stabilization. Pathological evaluation of mitral valve material showed calcification and endocarditis, and Candida albicans and Corynebacterium urealyticum were detected in blood as causative agents of endocarditis. Thus, patient was diagnosed as septic coronary and cerebral embolism originated from mitral valve endocarditis. Despite medical and surgical therapies, the patient expired one month after surgery due to heart failure and arrhythmia.

DISCUSSION: Septic coronary artery embolism is a rare cause of acute myocardial infarction and there are various treatment strategies to treat this condition. These strategies include primary percutaneous coronary intervention, aspiration of septic material and coronary artery bypass grafting surgery

CONCLUSION: We present a septic coronary artery embolism originating from mitral valve endocarditis case presenting with acute myocardial infarction and treated with valve replacement and coronary artery bypass grafting surgery. This case report highlights the feasibility of coronary artery bypass grafting surgery and valve replacement as a treatment option for septic coronary artery embolism.

Image 1. Angiogram of Right Coronary Artery prior to embolism

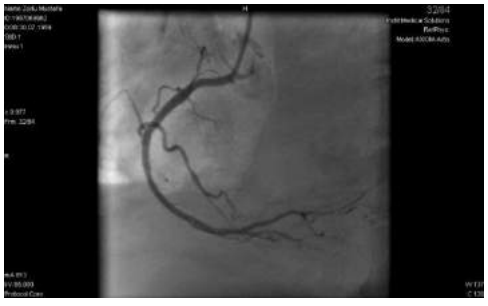


Image 2. Angiogram of Left Coronary System prior to embolism

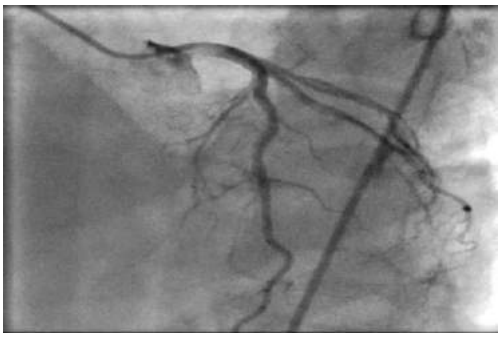


Image 3. Angiogram of Left Coronary System after embolism



Drug Adherence to New Oral Anticoagulant Agents in Patients with Venous thromboembolism: NOAC-TR Subgroup Study

Sadık Volkan Emren[1], Osman Beton[2], Oktay Şenöz[3], Yüksel Dereli[4], Uğur Taşkın[5], Hakan Çakır[6], Çağlar Özmen[7], Gönül Açıksarı[8], Abdulla Aslan[9], Barış Çelebi[10], Özkan Karaca[11], Mehdi Zoghi[12]
[1]Deparment of Cardiology, Afyonkarahisar State Hospital, Afyonkarahisar, Turkey vemren@hotmail.com
[2]Deparment of Cardiology, Cumhuriyet University Faculty of Medicine, Sivas, Turkey
[3]Deparment of Cardiology, Artvin State Hospital, Artvin, Turkey
[4]Deparment of Cardiovascular Surgery, Necmettin Erbakan University, Konya, Turkey
[5]Deparment of Cardiology, Akşehir State Hospital, Konya, Turkey
[6]Deparment of Cardiology, Darıca Farabi State Hospital, Kocaeli, Turkey
[7]Deparment of Cardiology,Pazarcık State Hospital, Kahramanmaraş Turkey
[8]Deparment of Cardiology,Istinye State Hospital, Istanbul, Turkey
[9]Deparment of Cardiology, Dokuz Eylül University Faculty of Medicine, Izmir, Turkey
[10]Deparment of Cardiology, Silifke State Hospital, Mersin, Turkey
[11]Deparment of Cardiology, Fırat University Faculty of Medicine, Elazığ, Turkey
[12]Deparment of Cardiology, Ege University Faculty of Medicine, Izmir, Turkey

BACKGROUND: Novel oral anticoagulant (NOAC) drugs are used for treatment of venous and arterial thromboembolic diseases. Although NOACs have shorter half-life and do not need laboratory monitoring compared to vitamin-K antagonists (VKAs), adequate adherence to NOACs is very important. Reported NOAC adherence is unclear in real world data. We assessed self-reported patient adherence to medication of patients (pts) who used the NOACs, factors influencing adherence as conveyed by the pts with venous thromboembolism.

Patients/METHODS: Cross-sectional study, drug adherence of pts with venous thromboembolism using NOACs. We retrospectively studied 134 pts over 18 year old (median age: 62 range 23-90, 58% female) with venous thromboembolism who had taken any NOAC, with >60 days of supply and ≥180 days of continuous. We used the 8-item Morisky Medication Adherence Scale and analyzed it in relation to age, sex, levels of education, socioeconomic status, patient knowledge, NOAC dosing regimen (once or twice daily), number of using drugs and comorbid conditions.

RESULTS: Of patients 104 (78%) had deep vein thrombosis, 67 (50%) pulmonary embolism, 37 (28%) have both deep vein thrombosis and pulmonary embolism. 52 (39%) of also have concomitant atrial fibrillation. A total of 45.6% Dabigatran, 38.7% Rivaroxaban and 15.7% Apixaban users were identified. 40% of pts had poor adherence to medications (Morisky score >3). The predictors of poor adherence were forgetfulness (Odds ratio(OR):3,26 95% Confidence Interval (CI): 1,16-9,10 p=0,024), depression (OR: 4,54 95%CI: 1,33-15,48 p=0,016), heart failure (OR:6,78 95%CI 1,14-40,35 p=0,035)

CONCLUSION: Twice-daily using NOACs and number of additional oral medications were not affected the patient adherence. The poor adherence was associated with clinical, psychological and socio-economic factors. Therefore patient based factors should be evaluated before starting NOAC treatment in elder patients

Cyst hydatid as annoying neighbour

Özgen Şafak
Department of Cardiology, Burdur State Hospital, Burdur Turkey
ozgen_safak@yahoo.com

INTRODUCTION: Hydatid disease is a human infection caused by the larval stage of Echinococcocus granulosus, which is still endemic in many cattle-raising areas. Infection involves cyst formation in many sites of the body. Clinical signs and symptoms vary according to the number, size, site and effect of the cysts.

CASE: A 19 year-old boy was admitted to our hospital with complaint of palpitation. Before admitted to our hospital he examined by a cardiologist of another state hospital and they said his echocardiography and EKG were normal. But when we put the proper of Echo to his chest wall, we saw an annoying neighbor that was the spleen with a large cyst. Patient had an ECG with four monomorphic right ventricular originated extra systole. We detected that they were frequent (≥60/min) when we examined his 24 hour holter ECG. His abdominal USG revealed large septated cyst and CT affirmed it (Figure-1). We referred him to a surgeon, and treated with medically and surgically. After that his complaints never exist.

DISCUSSION: Echinococcocus granulosus is stil an important parasitic health problem of undeveloped and developing countries. Ususally sheep is intermediate, dog is definitive host for this tapeworm, but man is a common accidental host. Adult helminths mature in the intestinal mucosa of the final host, who ate the uncooked, cyst-containing meat from the intermediate host. Hydatid disease primarily affects the liver and typically demonstrates well-known, characteristic imaging findings. However, there are many potential local complications, and secondary involvement due to hematogenous dissemination may be seen in almost any anatomic location, such as spleen. All neighbours of the heart can irritate and can cause arrhythmias as seen in our patient. A splenectomy remains the treatment of choice.

Unvisible Heart In Transthoracic Echocardiography

Ahmet Oğuz Baktïr, Bahadır Şarlı, Hüseyin Odabaş
Department of Cardiology, Kayseri Education and Research Hospital, Kayseri, Turkey
aobaktir@gmail.com

Introduction: Transthorasic echocardiography (TTE) is the primary noninvasive imaging method for the evaluation of heart. It provides detailed anatomic and functional information of cardiac disease. Altough the use of new imaging modalities and echocardiographic platforms have improved two dimensional imaging, some TTE images may be suboptimal. Present case report represents a patient without any echocardiographic window because of constrictive pericarditis due to heavy viseral and parietal pericardial calcification.

CASE: A 38-year-old refugee male was admitted to coronary care unit with supraventricular tachycardia and high troponin level after fracturing of radius (Figure 1). Patient history revealed endstage renal disease on hemodialysis and recurrent ascites. In the physical examination, decreased heart sounds, jugular venous distention and ascites were seen. Laboratory evaluations showed creatinine 11,3 mg/dL, PTH >3482 pg/mL, phosphor 10,5 mg/dL, troponin 3,1 ng/mL. There was no visible acoustic view in apical, parasternal and subcostal windows in transthoracic echocardiography. Computed tomography (CT) performed to assess pulmonary vascular and heart structure. CT scan showed pericardial thickening and extreme calcification of parietal and visceral pericardium (Figure 2). Dissociation of two pericardial layers were prominent which was suggestive of pericardial effusion due to renal disease and markedly calcification of pericardial layers in time. Patient refused any further diagnostic and treatment modality such as transesophageal echocardiography and pericardiectomy and discharged at own request.

CONCLUSION: Constrictive pericarditis is the result of scarring and consequent loss of the normal elasticity of the pericardial sac. Usually, the symptoms are similar to those associated with right-side congestive heart failure. The initial diagnostic tool is TTE in these patients. Loss of visible acoustic view due to whole calcification of pericardial layers is very rare. CT scan can guide the diagnose.

Figure 1. 1A Sinus ritm, low voltage although left ventricular hypertrophy. 1B Initial supraventricular tachycardia.

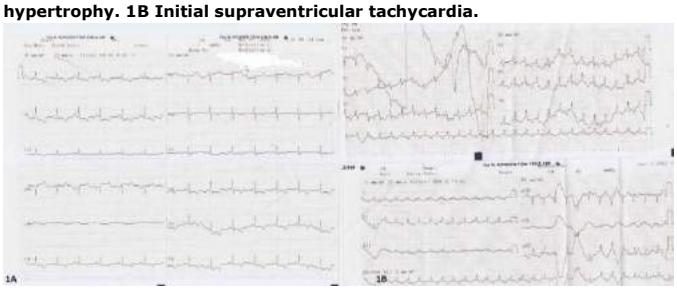
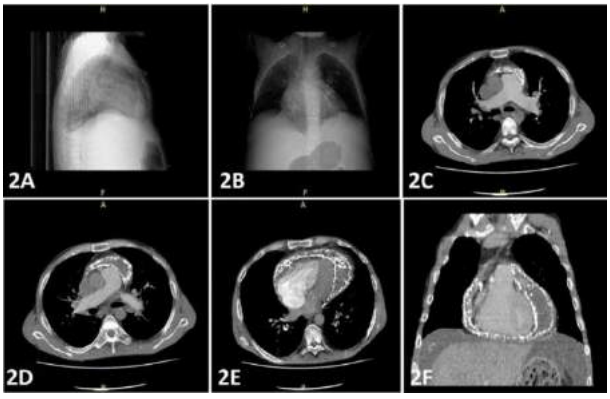


Figure 2. 2A lateral graphic, pericardial calcification. 2B antero-posterior graphic, pericardial calcification. 2C, D, E Transvers CT sections of heart from aorta and pulmonary arteries to right and left ventricle. 2F Coronal CT section of heart.



Cardiac Fibroelastoma Case Presenting with Ischemic Cerebrovascular Accident

Semih Sürmen [1], Murat Uğurlucan [2], Berrin Umman [1], Hasan Kudat [1]
[1]istanbul University İstanbul Medical Faculty Cardiology Department
pasamet@gmail.com
[2]istanbul University İstanbul Medical Faculty Cardiovascular Surgery Department

BACKGROUND: Papillary fibroelastoma is rarely seen, endocardium located, benign tumor. İt is the most common cardiac tumor after mixoma (2). Most of these tumors are reported as a consequence of the development of cardiac imaging. Cardiac fibroelastomas are tend to affect the aortic valve, left ventricle outflox tract and anterior mitral leaflet. They can develop as single or multipl lesions.

CASE: 70 years old female patient, hypertension, rheumatoid artritis, osteoporosis, asthma and thalassemia minör diagnoses were present. A year ago, she referred to neurology department with headache and numbness at her face. At the cranial MRI, there were small ischemic lesions in the lateral ventricle anterior and posterior horns bilaterally. No significant pyshical examination sign was present. 24 hour Holter monitoring showed no atrial fibrillation or atrial flutter. Echocardiography showed normal left ventricle systolic function, left ventricle hypertrophy and 1.1 x 1.3 cm diameter mass which was hold on apicalseptum wall, homogeneous and consistent with thrombus. Transoesophageal echocardiography was performed. Same findings with transthoracic echocardiography were present. We thought that reason of this cerebrovascular accident was cardiac thrombus and started warfarin treatment. INR levels were between 2.0 and 3.0. Serial echocardiographic evaluation was made but we found no difference at diameter of mass since first warfarin treatment was started. Hematology consultation was made. Anticardiolipin antibodies, factor V leiden gene mutation, homocyctein, prothrombin gene mutation were negative. Cardiac MRI was made. İt was reported as "mass at the apicalseptum consisting with the thrombus and image

finding consisting with the myocarditis sequel at the left ventricle lateral wall". While the patient was taking warfarin, she complaint about stomache. Abdominal ultrasound was performed. A 11 x 10 cm diameter hematoma was found in spleen. General surgery department followed the patient and decided not to operate her. Another echocardiographic examination showed no difference in diameter. For this reason, surgical excision was planned. Before that, coronary angiography was performed. There were no significant plaques in coronary arteries. At the surgery, cardiac mass removed and was sent to pathology department. Pathology report showed that surgical mass is cardiac fibroelastoma. Patient's anticoagulation therapy was stopped. Acetylsalicylic acid 100 mg was added to her therapy. At the office visits, hematoma in her spleen was gone and serial echocardiographic evaluation showed no mass in left ventricle.

DISCUSSION: Although papillary fibroelastomas are histologically benign tumors, they may cause stroke, acute valve dysfunction, embolism, ventricular fibrillation and sudden death. Papillary fibroelastomas are attached to mural or valvular endocardium but their increased mobilities are the reason of deattachment of fragments and the embolization to systemic circulation. Most papillary fibroelastomas are located in the left heart cavities. This also increases the risk of embolization. Embolization of cerebral and retinal arteries is common. The management of papillary fibroelastoma depends upon its clinical presentation. Patients who are experiencing embolic events that are cardiovascular or neurologic in origin should undergo surgical resection. Small (diameter, < 1 cm) and sessile tumors may be present in asymptomatic patients. These patients require periodic follow-up with serial imaging studies. Surgical excision should be offered if the tumor is mobile or pedunculated, increases in size, or begins to cause symptoms.

Although thrombi have been reported on the surface of fibroelastomas, there are no guidelines for evaluating the efficacy of anticoagulation or antiplatelet therapy in affected patients. Once the diagnosis of papillary fibroelastoma is established, prophylactic anticoagulation therapy should be initiated, to guard against thrombi until surgical resection is accomplished (6).

Tricuspid Prosthetic Valve Thrombosis of a Patient with a History of Ebstein Anomaly

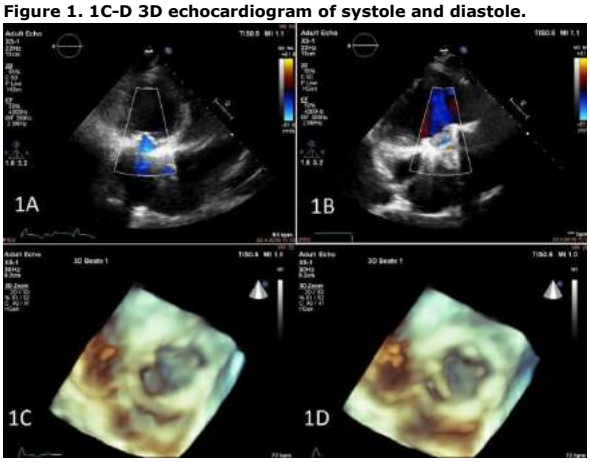
Ahmet Oğuz Baktir, Bahadır Şarlı, Hüseyin Odabaş, Eyüp Özkan
Department of Cardiology, Kayseri Education and Research Hospital, Kayseri, Turkey
aligokhanozyildiz@gmail.com

CASE: A 37 year old woman was consulted at outpatient clinic for abdominal distention and pain of several weeks duration. This refugee woman had undergone tricuspid valve surgery and permanent epicardial pacemaker placement in her country. Anamnesis pointed inappropriate international normalized ratio (INR) levels for several months, although INR value was high at admission.

FINDINGS: History revealed right upper quadrant abdominal discomfort and minimal fatigue but she was not dyspneic. On physical examination, prosthetic heart sounds were absent and there were diastolic murmur low in frequency heard at the lower left sternal border increasing with inspiration. There were no peripheral edema and ascites. Her INR was 5.8, but previous INR records of last two months were 1.5 and 1.5. Transthoracic echocardiogram (TTE) revealed normal left ventricular function, a severely dilated right ventricle, mean tricuspid valvular gradient 9-10 mmHg and the mechanical valve leaflets appeared thickened and immobile (Figure 1). Cinefluorography showed immobile valve leaflets (Figure 2). The diagnosis was either thrombus or pannus formation. Treatment options were surgery or thrombolytic treatment for mechanical tricuspid valve obstruction. Discussion with cardiac surgens and patient resulted in the decision to use thrombolytic. 6-h infusion of 25 mg recombinant tissue plasminogen activator (rTPA) without a bolus, repeat once 24 h later up to 6 times if needed was the infusion protocol. Three times of 25 mg/day 6 hours infusion of rTPA administered to patient. After first infusion headache occured but norologic examination and computed cranial tomography were normal, therefore second and third infusions administered in the following days. After third infusion one leaflet recovered its function and mean tricuspid gradient falled to 3 mmhg on TTE and cinefluorography (Figure 3) Hepatic vein congestion diminished and right upper quadrant abdominal discomfort recovered (Figure 4) Warfarin therapy started bridging with unfractionated heparin. Discharge INR value was 3.5. Follow up INR values are appropriate and patient is without compliant.

CONCLUSION: The use of thrombolysis has been mainly described on mitral or aortic prosthetic valves. Prosthetic valve thrombosis (PVT) is a life threating complication and prevalans is as high as 20% in mechanical tricuspid valves. Because tricuspid valve replacement counts less than 2% of all mechanical valve implantations, signs of tricuspid valve obstruction can be subtle and as in this case INR values may be normal or high. Low-dose slow infusion of rTPA repeated as needed without a bolus provides effective and safe thrombolysis in patients with PVT.

Figure 1. 1C-D 3D echocardiogram of systole and diastole.



Mechanical valve leaflets appeared thickened and immobile. 1A-B transthoracic echocardiogram.

Figure 2. Cinefluorography of immobile valve leaflets in systole and diastole.

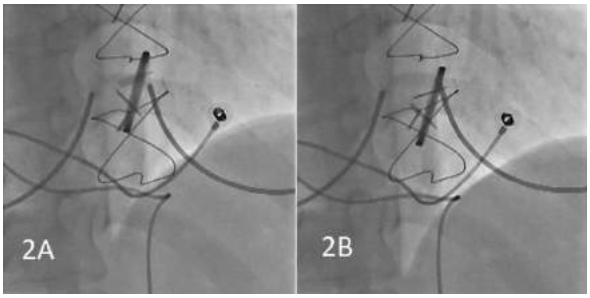


Figure 3. One leaflet recovered its function on 3D transthoracic echocardiogram and cinefluorography. 3A-B 3D transthoracic echocardiogram diastole and systole. 3C-D cinefluorography systole and diastole

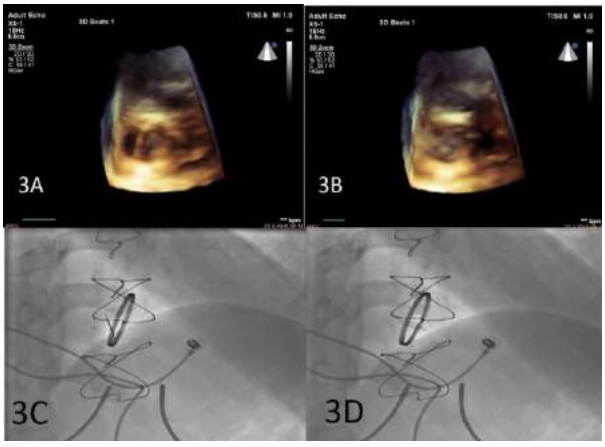
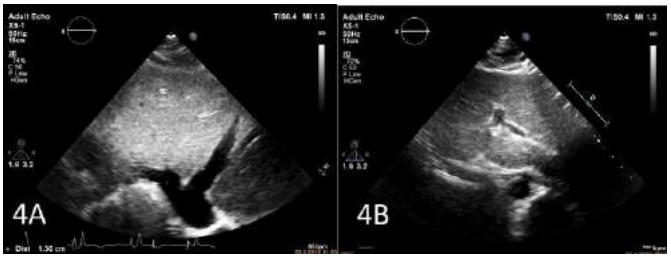


Figure 4. Hepatic vein congestion diminished. 4A-Before rTPA. 4B-After rTPA



Rare Cooccurence of Left Atrial Mixoma and Menengioma

Zafer Yalîm[1], Ersel Onrat[1], Önder Akci[1], Sümeyra Alan Yalım[2], Mustafa Aldemir[3]

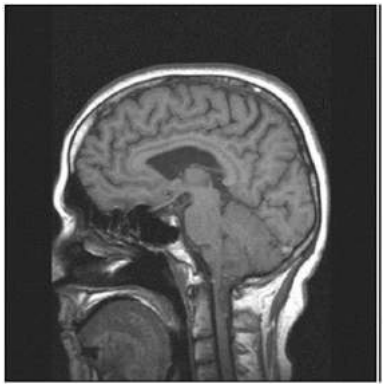
[1]Afyon Kocatepe University Faculty of Medicine, Department of Cardiology, Afyonkarahısar zaferyalm@yahoo.com.tr

[2]Afyon Kocatepe University Faculty of Medicine, Department of Internal Medicine, Afyonkarahısar

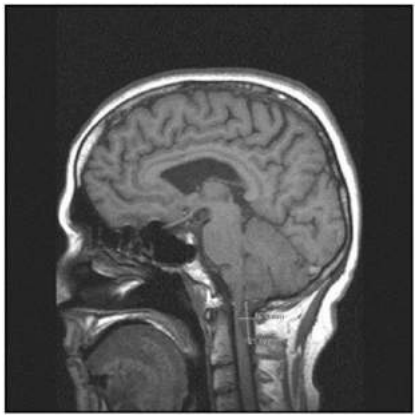
[3]Afyon Kocatepe University Faculty of Medicine, Department of Cardiovascular Surgery, Afyonkarahısar

% 70 of the tumors originated primarly from heart are benign and half of those are mixoma. Primary heart tumors are observed %0,03-0,1 in general population. Cardiac mixomas are usually situated in left atrium(%75) and interatrial septum. They are seen in almost all age groups but mostly in 3rd and 6th decade of life. Clinical symptoms are related to intracardiac obstruction due to tumor and systemic embolism; and the related syptoms are platypnea and dispnea. Our case is 49 year old woman complaining of shortness of breath and syncope. Echocardiographic assesment revealed a 30*60 mm left atrial tumor with a echogenic trombus that is compressing mitral anterior leaflet during diastole. The tumor surgically excised and pathologic examination revealed a mixoma. After the persistence of the neurological symptoms of the patient a brain MR is planned. A calcified menengioma in the close proximity of foramen magnum is observed. The tumor surgically excised and pathologic examination confirmed the diagnosis of menengioma (psammamatose type). Menengiomas are most common primary brain tumors. Their incidence is 1-6/100.000. They are mostly seen in woman and 5th or 6th decade of life. Both menengiomas and mixomas are rare and their co-occurence has never been reported. Our case is first reported one, that has cooccurence of left atrial mixoma and menengioma.

Foramen magnum at the level of the spinal cord posterior C2 vertebra corpus levels ranging from 25-30 mm in length 13x8 mm TR cord lesion sizes that properly contoured to compress posteriorl



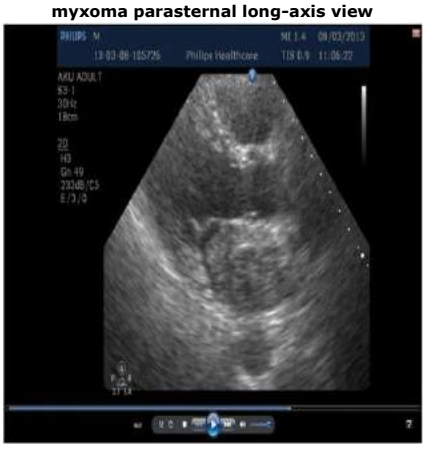
Foramen magnum at the level of the spinal cord posterior C2 vertebra corpus levels ranging from 25-30 mm in length 13x8 mm TR cord lesion sizes that properly contoured to compress posteriorly, figure 2



Giant left atrial myxoma of the left atrial septum interatrial 30x60 mm, apical four-chamber view



Left atrial interatrial septum caused of the 30 x 60 mm giant left atrial myxoma parasternal long-axis view



Prolapsed into the left ventricle during systole giant left atrial myxoma apical four-chamber view



A large periotic abscess in a patient with metallic aortic and mitral valve

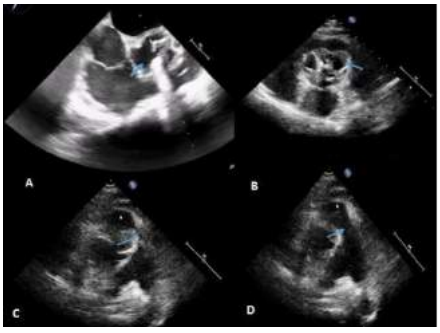
Kamil Gülşen, Gökmen Kum, Sinan Varol, Ertuğrul Okuyan
Bagcilar Research and Education Hospital, Department of Cardiology
kamilgulsen2000@yahoo.com

CASE: We introduce a case of metallic valve endocarditis which complicated with a large abscess.

FINDINGS: A 36 year old female patient admitted to our clinic cause recurrent fever. She had a history of metallic aortic and mitral valve replacement operation in 2002. Her transthoracic echocardiography showed some small masses considering vegetation on both aortic and mitral valve. Upon taking sample for blood culture, empirical antibiotherapy was immediately started. Following day a transesophageal echocardiography (TEE) was preceded. TEE showed a large periaortic abscess which extended and also compressed to right ventricular outflow truck. The patient was referred to cardiovascular surgery for operation. She underwent a successful redo aortic and mitral valve replacement and abscess drainage operation

DISCUSSION: Aortic valve endocarditis should meticulously be studied for occurrence of abscess formation. In that case, misdiagnosis could end with fatal results.

Figure 1. A and B. Large aortic abscess shown by blue arrow, C and D right ventricular outflow truck in systole and diastole



Late Skin Erosion Due to Implantable Cardioverter Defibrillator Generator and Migration Out of the Skin

Cemil Zencir
Department of Cardiology, Medical Faculty, Adanan Menderes University, Aydın, Turkey drczencir@hotmail.com

A 50 years old man with ischemic cardiomyopathy was admitted to cardiology outpatient department with the complaints of protruded ICD generator. On physical examination, there was no fever, pain. Only, local erythema was seen around the wound (Figure 1). In the previous history, coronary by-pass grafting was performed 4 years ago. A VVI-R ICD was implanted due to documented non-sustained ventricular tachycardia 2 years ago.
Since the last 4 months, patient noticed a little erythematous area on the skin and by the time almost half of the battery was protruded over the skin. Fever was never seen during 4 months. White blood cell count, sedimentation and high sensitive C-reactive protein were in normal range on laboratory analysis. ICD generator and lead extraction and a new VVI-R ICD implantation to the contralateral pectoral region were planned. Percutaneous extraction of implantable cardioverter defibrillator and electrode with mechanical dilator sheath was performed successfully (Figure 2).
Erosion and exposure of the implantable devices are dire and relatively rare complications. Generally, extraction of the whole system is required. Consequently the Heart Rhythm Society (HRS) included the pocket infection or erosion as a class I indication for pacemaker lead extraction (1). Raising awareness of patients for potential complications is also important in such patients. With the growing awareness on this issue the incidence of erosion and exposure of the device systems decreases. Therefore, early diagnoses and treatment facilities may be possible before development of the life threatening complications.

Figure 1. Close up examination of implantable cardioverter defibrillator generator eroding through the skin



Figure 2. Successfully extracted electrode



CONTACT US

President : Prof. Dr. Oktay Ergene
Department of Cardiology, Dokuz Eylül University Faculty of Medicine
Mithatpaşa cad. No: 1606 İnciraltı Yerleşkesi
35340 Balçova / İzmir / Turkey
Phone: +90 232 - 2595959 - 3713

General Secretary: Prof. Dr. Mehdi Zoghi
Department of Cardiology, Ege University Faculty of Medicine
35100 Bornova / İzmir / Turkey
Phone: +90 232 - 3904001-5458

Administrative Members: Aslı Giritli, Ufuk Evren
Güngör Mahallesi 350 Sokak No:62 K:1 D:1
35260 Konak / İzmir / Turkey
Phone: +90 232 - 4411990
Fax: +90 232 - 4419889
E-mail: kardiyovaskulerakademi@yahoo.com

TURKISH CARDIOVASCULAR ACADEMY SOCIETY