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E Journal of Cardiovascular Medicine

Feminine heart puzzle in 2015

Nurgül Keser

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Feminine heart puzzle in 2015

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Abstract

In order to decrease the cardiovascular morbidity and mortality special attention should be given to the feminine heart. The first step is to evaluate the major differences in the pathophysiology, symptom onset and clinical outcomes of ischemic heart disease between the genders. Next is to find the best imaging modality that will lead to appropriate treatment.

Keywords: Heart disease, coronary artery, female

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Heart disease has been stated to be number one killer in women^[1] and in 2015 nothing much seems to have changed. It is still the leading killer of women at all ages affecting more women under the ages of 55 years than breast cancer.^[2-5]

In order to solve this global problem, special attention should be given to gender differences in the etiology, pathophysiology, clinical presentation, prognosis and treatment of ischemic heart disease (IHD) which has been accepted as a more inclusive term to define the pathology in women.^[6]

Clinical presentation

The onset of clinical manifestations of coronary artery disease (CAD) in women has been stated to lag behind men by about 10 years.^[1] Following menopause the symptoms become more manifest in women. However instead of typical symptoms, atypical symptoms defined as dyspnea and fatigue may be more prominent in women.^[7] Moreover in almost 60% of women with IHD the initial presentation can be acute myocardial infarction (AMI) or sudden cardiac death^[3,4,8-11] and up to 50% of women presenting with an AMI may not report any prior chest pain symptoms.^[2,12]

This gender difference in clinical presentation carries utmost importance as it may lead to underdiagnosis of IHD in women.

Moreover, even with the clinical diagnosis of angina and traditional risk factors in women there may not be any evidence of CAD at angiography which was first demonstrated by The Coronary Artery Surgery Study (CASS).^[7,13,14]

Almost 50% of women with chest pain suggestive of angina pectoris will have normal or insignificant CAD as compared to 17% of men and 20% of these women will still have evidence for myocardial ischemia.^[15,16]

In such cases coronary microvascular dysfunction involving endothelial and nonendothelial pathways^[7,17] can be identified as reported by Reis et al.^[18]

However ischemia in the setting of vascular dysfunction is not so innocent^[8] and coronary endothelial dysfunction is reported to be associated with adverse

cardiovascular outcomes regardless of CAD severity in the WISE study.^[7,19]

The underlying difference in pathophysiology including smaller arterial size, more prominent positive remodeling and greater role of the microvasculature as demonstrated by various noninvasive imaging modalities has been claimed to carry a greater prognostic weight in women.^[8,20-27]

Risk factors

As stated before, the CASS study was one of the first landmark studies evaluating the cardiac risk factors in women which showed that the use of traditional risk factor assessment was limited in the prediction of CAD in women.^[7,13,14]

The WISE study further revealed that the CV events were independently predicted by coronary vascular endothelial function independent of risk factors and extent of CAD.^[15,19]

This study also showed prominent gender differences in the impact of CV risk factors such as not obesity but metabolic syndrome was reported to be a better predictor for the underlying severity of CAD and event-free survival in women.^[15,28,29]

Moreover waist circumference has been reported to be a stronger risk factor in women^[30] and DAS1 was reported to be strongly correlated with the occurrence of CAD and adverse events.^[31]

Bairey Merz CN et al.^[32] added new insights to risk factor analysis in women and showed that disruption of ovulatory cycling resulting in hypoestrogenemia in premenopausal women appeared to be associated with increased risk of obstructive CAD which claims that hypoestrogenemia might be the underlying reason for obstructive CAD during the postmenopausal years.

Clear differences also exist regarding the impact of lipid parameters such as Manolio et al.^[2,33] reported that HDL cholesterol inversely predicted CAD in younger women and men as well as older (>65 years) women; whereas the relative risks for IHD in women and men as related to total and LDL-cholesterol were found to be similar.^[2-4,10]

As for the triglyceride levels a meta-analysis of 17 studies revealed that hypertriglyceridemia increased the CAD relative risk by 32% in men and 76% in women^[2,34] and diabetes was also reported to be a stronger risk factor for IHD in women.^[2,35]

Smoking also deserves special attention in women. As it is complicated by hormonal variables, it has a larger detrimental impact in female hearts and especially in young women smoking is the most important risk factor for sudden cardiac death.^[36] A recent meta-analysis demonstrated a 25 % higher relative risk of heart disease in women smokers compared to men.^[37]

Specific conditions during pregnancy also need emphasis^[35] such as preeclampsia doubles the risk for subsequent IHD^[38] and gestational diabetes increases the risk of development of diabetes and thereby IHD.^[39]

Prognosis

As mentioned before 50% of women referred for the evaluation of suspected myocardial ischemia were found to have no obstructive CAD and the prognosis of future adverse cardiac events was reported to be intermediate for these women.^[7]

After an acute coronary syndrome(ACS) women and especially younger women with less obstructive CAD will also have a poorer prognosis.^[35,40,41]

It should also be remembered that although the total number of sudden cardiac deaths is higher in men^[42], 52% of women are more likely to die of a cardiac arrest before hospital arrival as compared to 42% for men.^[2,4,42,43]

Sex differences in cardiac catheterization and revascularization use and timing which are associated with poorer outcomes in women after an ACS^[35,44-46] cause a dilemma in treating the feminine heart.

Although stent usage is similar in women and men^[19,47] they tend to be treated less often with platelet glycoprotein IIb/IIIa receptor antagonists, possibly due to the increased incidence of bleeding which also may limit the effectiveness of the therapy.

Coronary artery Bypass Surgery(CABG) is also

troublesome in women. Following CABG the operative mortality is 4.0% for women and 3.2% for men^[48], in part due to excessive rates of congestive heart failure.^[8,48-51]

In addition, women have a higher incidence of bleeding complications^[1,19] and a more difficult recovery after CABG^[8,52] which may prolong the duration of hospital stay.

Diagnostic tests

Due to pathophysiological differences in IHD traditional tests for diagnosis that focus on identifying obstructive CAD work suboptimal in women.^[8]

Thus a need for an alternative strategy that would rely upon the estimation of the “culprit patient” or prognosis instead of culprit” obstructive coronary lesions has been proposed in women.^[8]

In order to choose the best noninvasive imaging modality the American Heart Association (AHA) has proposed to include the pretest risk stratification as low, intermediate and high risk before diagnostic testing referral^[53] which added a valuable insight for diagnosis.

We also agree with Lerman et al.^[7] who emphasize strongly that nonobstructive coronary angiograms in women should not be ignored and till new imaging modalities that will clearly diagnose ischemia due to vascular dysfunction are utilised, careful attention should be paid to the clear evidences of ischemia such as a positive troponin or an abnormal stress perfusion test in the absence of coronary artery obstruction.

Treatment

The necessity of earlier and aggressive primary prevention in women has been clearly reported.^[1] Prudent treatment directed at improving endothelial function, atherosclerosis and established risk factors in women including lipid-lowering, angiotensin-converting enzyme inhibitors and aspirin is well established.^[7]

However there is still a necessity for the FDA to monitor inclusion of proportional amount of women in all stages of drug research and as offered by Wenger et al.^[1]

further evaluation of the possible sex-based differences in drug metabolism is required before choosing the optimal management strategy for the female heart.

Till the feminine heart puzzle is completely solved

there is a compelling need to drive sustained attention to the female heart and remind the physicians to be more more aware of the basic differences between the 2 genders.

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Long-Term survival in a young adult with total artificial heart: A success story

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Abstract

We presented here the result of a successful surgical treatment of 16 years old male diagnosed as dilated cardiomyopathy with the history of siblings' early sudden death at the age of fifteen. The patient had to undergo total artificial heart implantation (TAH-T), (SynCardia) operation due to rapid biventricular deterioration and intracardiac thrombus formation after his admittance to the ward. Due to lack of donor in the region he had to wait for long time with accurate anticoagulation and no serious complication during this long follow up period. He lived with TAH-T implantation both in the hospital and at home later was transplanted successfully after 32 months. The patient is now actively working at a private company in NYHA Class 0 status. We have published this case due to its rarity in a young adult begins in childhood and longevity of the survival without any complication in TAH-T.

Keywords: Total artificial heart, SynCardia, Heart transplant, Dilated cardiomyopathy.

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Introduction

Ventricular assist devices have been emerged for the pediatric population to mechanical circulatory support since late 1980s' as a bridge to heart transplantation (HTx).^[1] Park and colleagues have demonstrated that the Total Artificial Heart (TAH-T) (SynCardia Systems Inc., Tuscon, AZ) has been approved for compassionate use by the Food and Drug Administration for patients with end-stage biventricular heart failure as a bridge to heart transplantation since 1985 and has had FDA approval since 2004.^[2] In cases where total artificial heart (TAH-T) and ventricular assist devices (VAD) used as a bridge to heart transplantation mostly inhibits patients dying from end-stage bi-ventricular heart failure associated with ischemic or non-ischemic dilated cardiomyopathy. Beyond progressive chronic heart failure, the TAH-T has provided great efficacy in patients with acute irreversible heart failure. Although common use of TAH-T in patients with heart failure since 80's, usage in young adults and childhood age are rare. We present our experience with a young patient who had lived with a SynCardia TAH-T during 32 months for bridge to heart transplantation.

Case Report

16 years old- male had been admitted to our clinic with dilated cardiomyopathy. His background revealed that his elder brother had been diagnosed with same disease and died. He was suffering from exhaustion, exertional dyspnea and angina. His physical examination findings were fine crackles with lung auscultation and pretibial oedema +++/++++, based on these findings intravenous diuretic treatment was administered. In addition levosimendan treatment was initiated.

His echocardiogram resulted as left ventricle ejection fraction was 10-15%, dilated cardiomyopathy, mild-severe mitral regurgitation (accompanied with coaptation deficiency), mild-severe tricuspid regurgitation (accompanied with coaptation deficiency),

interventricular septum diameter: 0.8, left ventricle diastolic diameter: 7.7, left ventricle systolic diameter: 7.4, left ventricle posterior wall diastolic diameter: 0.7, right atrium: 7.5x6.5 cm, left atrium: 7.5x7 cm and thrombus formation was imaged in left atrial appendix.

Severe right ventricular failure has shown with low EF and high pulmonary arterial pressure (PAP) measured as 65 mmHg and tricuspid annular plane systolic excursion (TAPSE) was scored >18mm.

Cardiology- cardiovascular surgery multidisciplinary heart team decided on artificial heart implantation and immediate heart transplant for this particular patient. In 10.2012 the case underwent SynCardia total artificial heart implantation operation. He was extubated postop 1. day with no complications, the treatment carried on at cardiovascular surgery service unit. Acetylsalicylic acid 1x100 mg and warfarine dosage that arranged due to INR level were medicated daily. On account of prevention a possible thrombosis, the INR range was kept above 3. Following 32 months were complication-free. In the third year of our search for the donor heart we found a compatible one, unfortunately due to the short CPR story of the donor, we returned from the harvest empty-handed.

Finally in 06.2015 a suitable donor heart was found. Donor was a 23 year old male whom brain death had been occurred, there was no story of CPR, with 2.5 mcg/kg/min. dobutamine support, echocardiogram showed no contraction fault in his heart, 55% left ventricle ejection fraction. After median sternotomy, we evaluated the donor heart. Neither contusion sign nor contraction fault were mentioned. The heart was harvested and transferred to our clinic in accurate storage conditions. Before the operation, prednolone and antibiotics administered to the patient. Patients were taken to the operation simultaneously, SynCardia total artificial heart was taken out. Transplant operation carried out with heterotopic heart implantation procedure.

In postop follow-up we detected over 100 cc/h bleeding from drainage tubes, because these findings indicated a possible hemorrhage, we immediately initiated revision surgery. The bleeding source was founded in the left atrium anastomose, and it had been controlled with resutures. After bleeding control completed, layers were closed in anatomical plan and patient was taken to the intensive care unit (ICU) again. 5 mcg/kg/min dobutamine and 3 mcg/kg/min dopamine infusions were administered. Blood gas values were controlled hourly and values were around normal range. Due to patients neurological evaluation and awakens, patient was

extubated. Inotrope support was decreased and eventually stopped. Anti Tymoocyte Globulin (ATG), prednole, tacrolimus and micofenolate mofetile treatments were initiated. White blood cell levels had dropped therefore ATG treatment was stopped and prednole dosage was decreased. Due to lack of C-reactive protein (CRP) increase, prednole treatment was stopped. Tacrolimus and micofenolate mofetile were administered at maintenance dosage. While admission he was suffered by fever and diarrhea. After consulting the infectious disease department, we started variconazole, linezolid, cholistine, tigecycline combination as antibiotherapy. After the serologic tests resulted CMV antigenemia and high level of viral DNA load detected. The complications were considered to CMV infection thus valganciclovir therapy has started at dosage of 1000 mg/day PO after induction therapy and revised due to viral load in follow-up.

Blood cultures, tracheal aspiration cultures, catheter cultures was examined in follow up regularly. Due to having no fever and diarrhea anymore, we stopped antibiotherapy after 15 days in addition there were no organism growth in any cultures and serologic tests. Later on patient had swelling and pain in his left leg, lower limb venous doppler ultrasound revealed subacute deep vein thrombosis in left leg, as treatment rivaroxaban was administered. In following days there were no other complications so patient was discharged.

At 04.2016, patient complained about left side pain and shortness of breath at 300m walk. Lung x-ray showed thickened fissure, so we admitted the patient with pre-diagnosis of fissurite. Myocardial biopsy was performed to exclude rejection of donor. Biopsy results revealed no sign of rejection. Given the fact that he has a deep vein thrombosis story, thorax bt angiography was performed to see if there is a clue of pulmonary embolism. Screening results showed no sign of thromboembolism. In follow-up symptoms regressed and patient was discharged.

Discussion

This case is rare because a 16 years old patient had waited with SynCardia total artificial heart implantation among 32 long months for a heart transplant and bridge to transplantation (BTT) was successful.

Heart failure is as one of the top diagnoses for inpatients. The hospital admission mortality rates for heart failure are high with over 10% and over 20% mortal within 1 year of discharge. With limited numbers of solid organ donors for heart transplantation, one choice for this population is to use mechanical circulatory support devices.

Ventricular assist devices are widely accepted as a therapeutic option for bridge to transplant operation. El-Banayosi and colleagues have demonstrated that there are still limitations to the patient collective eligible for VAD placement, who might therefore benefit from the implantation of a total artificial heart.^[1] The SynCardia TAH-T is the only FDA-approved TAH-T in the world.^[2] The TAH-T is indicated for use as a BTT in patients at imminent risk of death from non-reversible bi-ventricular failure.^[2] The SynCardia is the only device that eliminates the symptoms.^[2-5] SynCardia TAH-T is the most effective and safe therapeutic system, providing a high cardiac output (~10 L/min) [6]. Nishimura et al.^[7] reported the importance of effective flow for the recovery of end-organ dysfunction those who have non-reversible bi-ventricular failure with multi-system failure and also emphasized the necessity for a minimum cardiac index of 3.0 L/min/m² for the recovery of pre-operative end-organ dysfunction.

The TAH-T implantation is occurring at an ever increasing rate in the recent years. Slepian recommend that looking to the future a major unmet need remains in providing total heart support for children and small adults.^[2] The length of the blood-flow path is shorter and the inflow and outflow valves are larger than in any other bridge-to-transplant device, resulting in greater blood flow at smaller pre-load.^[3-4] Such a device should be optimal for bridging transplant candidates who have biventricular failure and for whom all other therapies have failed.^[4]

Dilated cardiomyopathy is the primary indication with an estimated 1.000 to 1.500 new pediatric cases diagnosed each year in the United States.^[5] The disease accounts for 65 percent of heart transplants in children

11 to 17 years old.^[6-8] This group of patients is subject to the longest waiting-list mortality in Turkey.

Herein, the cardiology- cardiovascular surgery multidisciplinary team determined the SynCardia Heart was the only available choice for the patient because of exclusive conditions. The patient waited for an appropriate donor for cardiac transplantation nearly for 32 months at hospital. 16 years old- male was supported, rehabilitated and subsequently transplanted.

During device support, most mortality outcomes were related to pre-implant problems. Infection and stroke are rare events.^[4] Following the implantation, the patient experienced progressive subacute deep vein

thrombosis in left leg. During post-implant period, in case of a thrombosis, the INR range was kept above 3.

In this article, we aimed to present our experience with a young patient who had waited with SynCardia total artificial heart implantation over years for a heart transplant and bridge to transplantation. Unfortunately, these patients on the waiting list can suffer from worsening of the clinical status or even die while waiting for the transplantation, and this occurs despite close follow-up and intensive medical therapy.

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Ivemark syndrome with cor triatriatum, primum ASD, cleft mitrale and pulmonary stenosis

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Abstract

Ivemark syndrome is a rare anomaly with a reported incidence of 1 in 10000 – 20000 live births. It is characterized by agenesis of spleen, a dextroposed, hypoplastic or lobulated spleen or multiple spleens in association with complex cardiac anomalies. These malformations are usually associated with trilobulated or bilobulated lungs and abnormalities of other abdominal organs. Here we report a case of Ivemark syndrome, accompanied by polysplenia, accessory gall bladder, dilatation of the intrahepatic ducts, cor triatriatum, primum ASD, pulmonary stenosis, dysmorphic face and mild mental retardation.

Keywords: Ivemark syndrome, cor triatriatum, primum ASD, cleft mitrale, pulmonary stenosis

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Introduction

Ivemark syndrome is a rare anomaly with a reported incidence of 1 in 10000 – 20000 live births. It is characterized by agenesis of spleen, a dextroposed, hypoplastic or lobulated spleen or multiple spleens in association with complex cardiac anomalies^[1,2] These malformations are usually associated with trilobulated or bilobulated lungs and abnormalities of other abdominal organs. Some other anomalies like Howell-Jolly and Heinz bodies in peripheral blood, agenesis of corpus callosum and facial abnormalities were also noted^[3,4]

Here we report a case of Ivemark syndrome, accompanied by polysplenia, accessory gall bladder, dilatation of the intrahepatic ducts, cor triatriatum, primum ASD, pulmonary stenosis, dysmorphic face and mild mental retardation.

Case Report

A 20-year-old woman was admitted to Dr. Sami Ulus Research and training Hospital because of dyspnea and palpitation. Family history was unremarkable. At the time of admission her height was 164 cm and

body weight was 49 kg. Physical examination revealed that she had mild cyanosis with facial anomalies including prominent nasal bridge, malformed ears, simple philtrum, narrow forehead, hypotelorism and mild mental retardation. **(Figure 1)**

Auscultation revealed augmentation of the S1 sound, and a 20/60 systolic murmur was heard at the left side of the sternum. The heart rate was 72 / min and systolic blood pressure was 90 mm.Hg. The liver was enlarged to 2-3 cm below costal margin.

Telecardiogram showed an enlarged heart with a cardiothoracic ratio of 0.6. Transthoracic echocardiography revealed mild pulmonary stenosis with a 45 mm Hg gradient, primum ASD, a membrane in the right atrium and mitral insufficiency. **(Figure 2)**

Abdominal ultrasonography indicated polysplenia, accessory gallbladder and dilatation of intrahepatic ducts. Cranial tomography was normal. **(Figure 3)**

She underwent an operation. Cardiopulmonary bypass with bicaval cannulation was directly established from the superior and inferior vena cava. Standart cardiopulmonary bypass with systemic hypothermia at

Figure 1. Her appearance including prominent nasal bridge, malformed ears, simple philtrum, narrow forehead, and hypotelorism.



280 C were used. Cold potassium crystalloid cardioplegia and topical hypothermia were used for myocardial protection.

Then right atriotomy was performed. On exploration it was observed that the right atrium was divided into two portions by a membrane. The membrane was fully resected. The mitral cleft was repaired with 5-0 prolene suture and the primum ASD was closed with a pericardial patch. Pulmonary valvular stenosis was treated by commissurotomy. The post-operative course was uneventful and she was discharged at 6th postoperative day.

Comment

Ivemark syndrome is a very rare congenital disorder that includes complex cardiac malformations, splenic agenesis and abnormalities of other abdominal organs. Most of the cases are sporadic, but familial occurrence

also has been described, suggesting autosomal recessive inheritance. The etiology of the syndrome has not been clearly defined, but the teratogenic effect seems to occur between the 30th – 40th days of intrauterine life. A study by Britz-Cunningham indicated that a mutation of the connexin 43 (CX43) gene might also be responsible for Ivemark syndrome^[4]

Ivemark syndrome is a multiple organ syndrome and symmetric liver, malrotation or dilatation of the bowel, duplication of uterus and vagina were observed^[5,6] In our case, in addition to polysplenia, accessory gallbladder, multiple facial anomalies and mild mental retardation were observed. But Ivemark Syndrome's lung or hematologic signs were absent.

Ivemark syndrome accounts for 1-3 % of all congenital heart defects. The most frequent cardiac mal-

Figure 2. Echocardiographic findings

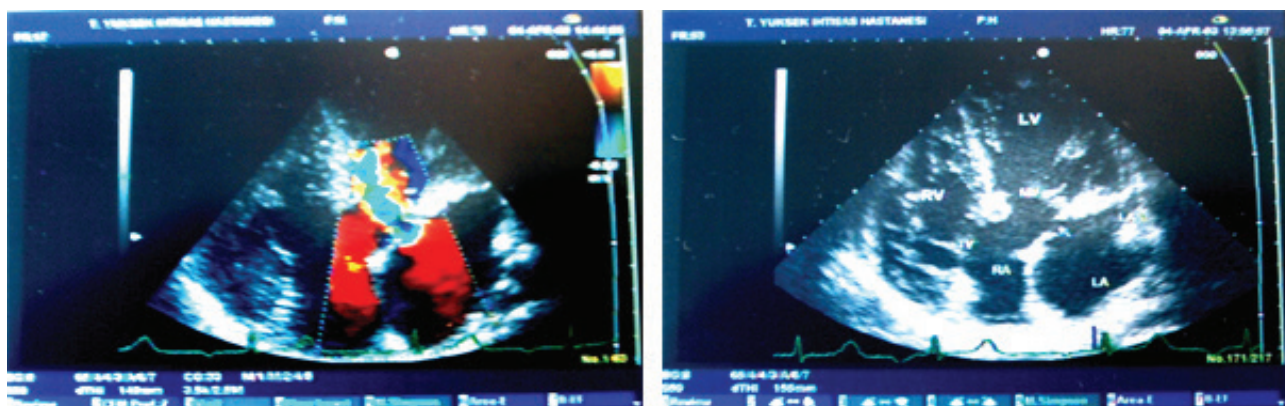
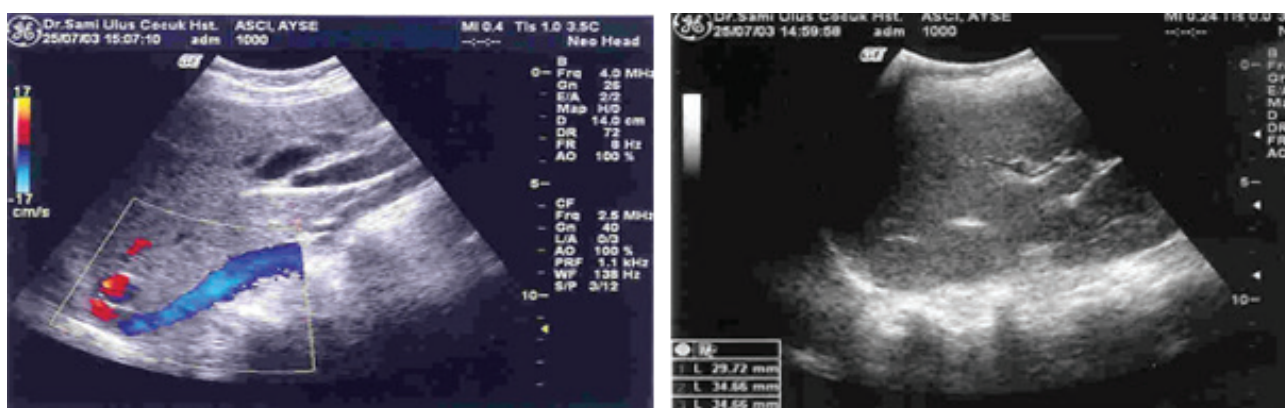


Figure 3. Ultrasonography revealed the dilatation of the bile ducts



formations are as follows: Persistent atrioventricular canal, patency of ductus arteriosus, atrial septal defect, ventricular septal defect, truncus arteriosus and dextrocardia^[7] The cardiac anomalies can increase the mortal-

ity risk and prognosis depends mainly on the degree of malformation of the heart^[8] Due to our knowledge the association of cor triatriatum with Ivemark syndrome has not been reported previously.

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Recurrent large pericardial effusion after cardiac surgery presenting with reversible hyponatremia

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Summary

Abstract: Pericardial effusion is a common complication of open heart surgery and more frequently occurs after coronary artery by-pass grafting. There are classical symptoms such as chest pain, dyspnea and orthopnea. However, hyponatremia is an unusual finding on presentation, and reported only three times in the literature. In this paper, a case in which recurrent pericardial effusion developed after coronary artery by-pass grafting presented with reversible hyponatremia was described. Hyponatremia was resolved rapidly, only after removal of large pericardial effusion by a successful pericardiocentesis. The possible mechanisms of reversible hyponatremia, relationship with pericardial effusion, and discrepancies about diagnosis were discussed, briefly.

Keywords: Cardiac surgery, hyponatremia; pericardial effusion.

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Introduction

Pericardial effusion is not a rare complication of cardiac surgery and more common in patients undergoing coronary artery by-pass grafting (CABG).⁽¹⁻³⁾ Patients may present with various symptoms like chest pain, dyspnea, and orthopnea.⁽⁴⁾ But presentation with hyponatremia is extremely rare. Here, we described a case with recurrent pericardial effusion after CABG and its first attack presented with reversible hyponatremia.

Case

A 55 year old woman was admitted to emergency department with dyspnea on mild exertion, fatigue, abdominal pain, and vertigo. She has undergone CABG operation, two months ago. Past medical history was including hypertension. Her medications were silazapril, acetylsalicylic acid and famotidin.

On physical examination, blood pressure was 100/60 mm Hg, heart rate was 84 beats/min, respiratory rate was 18 breaths/min. Heart sounds were distant and deep on cardiac auscultation. There was distension on abdominal examination. Mental status was normal.

Laboratory studies were as follows: Serum sodium, 124 mmol/L; potassium, 4.3 mmol/L; chloride, 90 mmol/L; blood urea nitrogen, 54 mg/dl; and serum creatinine 1.6 mg/dl. An electrocardiogram showed low voltage on chest leads (**Figure 1**).

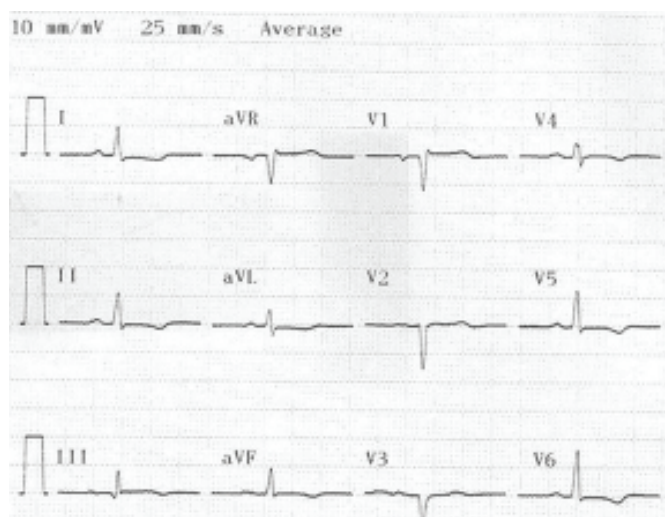


Figure 1. (Legend) The 12-lead electro-cardiogram showing low voltage on chest leads.

Chest radiograph showed cardiomegaly. Transthoracic echocardiogram demonstrated large, diffuse pericardial effusion with evidence of right atrial collapse (**Figure 2**). Valvular and left ventricular systolic functions were normal.

Because of the progressive symptoms and size of the pericardial effusion pericardiocentesis was performed via subxiphoid route and approximately 1500 ml serous pericardial fluid was removed. A pigtail catheter was leaved in pericardial cavity and during the following 24 hours 1700 ml blood-tinged fluid removed, subsequently. Control laboratory studies were; serum sodium, 134 mmol/L; blood urea nitrogen, 36 mg/dl; serum creatinine, 1.1 mg/dl. Surprisingly, serum sodium was normalized after pericardiocentesis without any specific therapy. In control echocardiography only minimal residual pericardial fluid was detected and patient was discharged with colchicine 0.5 mg 2x1 and ibuprofen 800 mg 2x1 therapy.

10 days later, patient presented with dyspnea at rest and orthopnea. Echocardiography showed recurrence of large, diffuse pericardial effusion with evidence of right atrial collapse. Serum sodium levels were normal. Pericardiocentesis was performed again, approximately 2500 ml serous pericardial fluid removed and a pigtail catheter was leaved in pericardial cavity. Pericardial

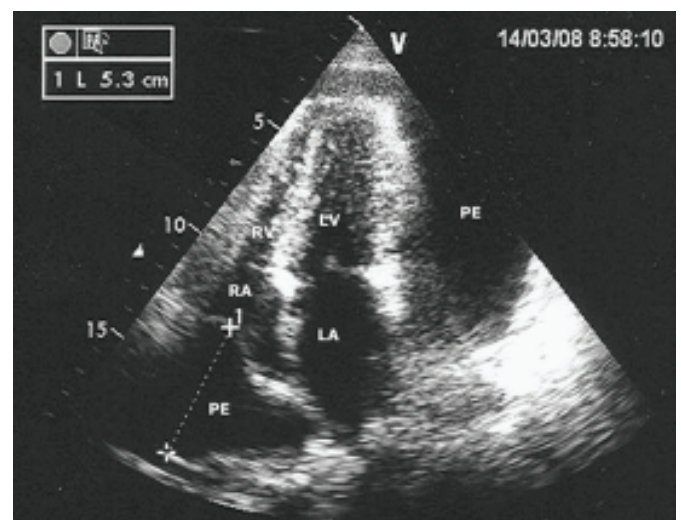


Figure 2. Transthoracic echocardiography from apical 4-chamber view demonstrating large pericardial effusion and right atrial collapse (LA: left atrium, LV: left ventricle, RA: right atrium, RV: right ventricle, PE: pericardial effusion).

fluid studies were negative for evidence of infectious, neoplastic, or rheumatologic causes.

Pericardial fluid adenosine deaminase level was in normal ranges. During the following 72 hours 2000 ml pericardial fluid removed, subsequently. Two days later, control echocardiography demonstrated recurrence of large, diffuse pericardial effusion again. Owing to the frequent recurrences of large pericardial effusion and risk of tamponade, patient was referred for pericardiopleural fenestration. After a successful operation, she is following up uneventfully for 2 months.

Discussion

Following cardiac surgery the incidence of pericardial effusion is high (range, 50 to 85%) and CABG accounts for more than half of the cases.⁽¹⁻³⁾ Patients may be asymptomatic or present with various symptoms including chest pain, dyspnea, orthopnea, cough, fatigue and palpitations.⁽⁴⁾

Presentation of a pericardial effusion with hyponatremia is extremely rare. In previous reports, inappropriate secretion of antidiuretic hormone as a response to diminished cardiac output in pericardial tamponade was accepted as most plausible mechanism for hyponatremia.⁽⁵⁻⁷⁾ This response is mediated by baroreceptors in the carotid sinus, which sense a reduction in pressure or stretch, and can overcome the inhibitory effect of hyponatremia on ADH secretion.⁽⁸⁾

Reversibility of hyponatremia and rapid correction after pericardiocentesis without any specific treatment for low serum sodium levels support this hypothesis. After removing the large, diffuse pericardial effusion leading low cardiac output, the cause for secretion of antidiuretic hormone disappeared and serum sodium levels normalized by losing extra volume.

However, in this case, pericardial effusion was recurrent, resistant to pericardiocentesis and hyponatremia was only detected at the first attack of pericardial fluid accumulation. Serum sodium levels were normal at subsequent episodes of pericardial effusion. Therefore, inappropriate secretion of antidiuretic hormone is not an enough explanation for hyponatremia in this case. Yet, we don't fully know why there was an imbalance between previously mentioned mechanisms in first attack of pericardial effusion and led to hyponatremia, and why there was not for subsequent episodes.

In conclusion, patients with pericardial effusion developed after CABG may present with hyponatremia. Currently, the most reasonable cause of hyponatremia seems to the imbalance between the antinatriuretic and antidiuretic responses to pericardial effusion leading to low cardiac output. Hyponatremia resolves, only when the effusion removed without any specific therapy. Further investigations are needed to understand all factors contributing hyponatremia in patients with pericardial effusion.

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E-Journal of Cardiovascular Medicine welcomes scientific contributions in the field of cardiovascular and thoracic surgery - all aspects of surgery of the heart, vessels and the chest in various article types: new ideas, brief communications, work in progress, follow-up studies, original articles, best evidence topics, case reports, reports on unexpected results etc. All manuscripts shall be reviewed by the Editor-in-Chief, Associate Editors, Invited Referees and a Statistician when appropriate. If accepted, articles will be posted online and opened up for discussion. Acceptance criteria are based on the originality, significance, and validity of the material presented.

All material to be considered for publication in E-Journal of Cardiovascular Medicine should be submitted in electronic form via the journal's online submission system. (<http://my.ejmanager.com/ejcm/>)

A cover letter should be enclosed to all new manuscripts (to be filled in online), specifying the name of the journal and the type of paper, and including the following statements:

- The manuscript should not be previously published in print or electronic form and is not under consideration by another publication.
- All authors should contribute to the content of the article.
- All authors should read and approve the submission of the manuscript to ICVTS.
- Subject to acceptance, authors will sign an exclusive license to publish.
- No ethical problem or conflict of interest should exist.

If your first language is not English, we recommend that you consult an English language editing service to ensure that the academic content of your paper is fully understood by journal editors and reviewers. Language editing does not guarantee that your manuscript will be accepted for publication.

Manuscripts should be prepared using a word-processing package (save in .doc, .docx or .rtf format). The font type and font size should preferably be Arial or Times New Roman 11 points. The manuscript should be double-spaced and should include line and page numbers. The lines of the reference list do not need to be numbered; include a section break before.

Manuscripts should be organized as follows:

(a) Title page; (b) Abstract and Key words; (c) Text with the following sections (not applicable for article types with unstructured abstracts): Introduction, Materials and Methods, Results, Discussion, Acknowledgement (optional), Funding statement, Conflict of interest statement, (d) Figure (and Video) legends; (e) Tables; (f) References.

Title page (1st page): Title: should be brief and descriptive (100 characters) - no abbreviations are allowed, even if well known.

Authors: list all authors by full first name, initial of or full middle name and family name. Qualifications are not required. Ensure the author names correspond (in spelling and order of appearance) with the metadata of the system

Institution(s): include the name of all institutions with the location

(department, institution, city, country) to which the work should be attributed (in English). Use superscript numbers to connect authors and their department or institution.

Corresponding author: The full name, full postal address, telephone/fax numbers and the e-mail address should be typed at the bottom of the title page.

Meeting presentation: If the manuscript was (or will be) presented at a meeting, include the meeting name, venue, and the date on which it was (or will be) read; also indicate if you have submitted an Abstract of this manuscript for the EACTS or ESTS annual meeting and whether it has been accepted (if known).

Word count: The total number of words of the whole article (including title page, abstract, main text, legends, tables and references) must be specified on the title page.

Abstract (2nd page): An abstract should be a concise summary of the manuscript. Reference citations are not allowed. The abstract should be factual and free of abbreviations, except for SI units of measurement.

Keywords: Following the abstract, 3-6 keywords should be given for subject indexing.

Introduction: Should state the purpose of the investigation and give a short review of pertinent literature.

Materials and methods: Should be described in detail with appropriate information about patients or experimental animals. Use of abbreviations renders the text difficult to read; abbreviations should be limited to SI units of measurement and to those most commonly used, e.g. VSD, ASD, CABG (abbreviations should not be included in headings and extensions should be included at first mention).

Results: Results should be reported concisely and regarded as an important part of the manuscript. They should be presented either in tables and figures, and briefly commented on in the text, or in the text alone. Repetition of results should be avoided!

Discussion: The discussion is an interpretation of the results and their significance with reference to pertinent work by other authors. It should be clear and concise.

Acknowledgement: Acknowledgements and details of non-financial support must be included at the end of the text before the references. Personal acknowledgements should precede those of institutions or agencies.

Tables: All tables must be included in the manuscript file, should start on separate pages and be accompanied by a title, and footnotes where necessary. The tables should be numbered consecutively using Arabic numerals. Units in which results are expressed should be given in parentheses at the top of each column and not repeated in each line of the table.

References: Authors are responsible for checking the accuracy of all references. If you use EndNote or Reference Manager to facilitate referencing citations (not required for submission), this journal's style is available for use. References should be numbered in order of appearance in the text (in Arabic numerals in parentheses) and must be listed numerically in the reference list. Journal titles and author initials should be properly abbreviated and punctuated.

GENERAL RULES

Files should be prepared as a Word document using font size 12 Times New Roman characters, double-spaced and with 2.5 cm margins on each side, top and bottom. Only standard abbreviations should be used; other shortened phrases should be indicated in parentheses as used in the text. Generic or chemical names of drugs should be used instead of trade names.

ETHICAL ISSUES

Publishing responsibilities of authors and Ethics

The publication of an article in a peer-reviewed journal is an essential building block in the development of a coherent and respected network of knowledge. It is a direct reflection of the quality of work of the author and the institutions that support them. Peer-reviewed articles support and embody the scientific method. It is therefore important to agree upon standards of expected ethical behavior.

Reporting standards

Authors of reports of original research should present an accurate account of the work performed as well as an objective discussion of its significance. Underlying data should be represented accurately in the paper. A paper should contain sufficient detail and references to permit others to replicate the work. Fraudulent or knowingly inaccurate statements constitute unethical behavior and are unacceptable. Review and professional publication articles should also be accurate and objective, and editorial 'opinion' works should be identified as such.

Hazards and human or animal subjects

If the work involves chemicals, procedures or equipment that have any unusual hazards inherent in their use, the author must clearly identify these in the manuscript. If the work involves the use of animal or human subjects, the author should ensure that the manuscript contains a statement that all procedures were performed in compliance with relevant laws and institutional guidelines and that the appropriate institutional committee(s) has approved them. Authors should include a statement in the manuscript that informed consent was obtained for experimentation with human subjects. The privacy rights of human subjects must always be observed.

Use of patient images or case details

Studies on patients or volunteers require ethics committee approval and informed consent, which should be documented in the paper. Appropriate consents, permissions and releases must be obtained where an author wishes to include case details or other personal information or images of patients and any other individuals in publication. Written consents must be retained by the author and copies of the consents or evidence that such consents have been obtained must be provided to us on request. Particular care should be taken with obtaining consent where children are concerned (in particular where a child has special needs or learning disabilities), where an individual's head or face appears, or where reference is made to an individual's name or other personal details.

Originality and plagiarism

The authors should ensure that they have written entirely original works, and if the authors have used the work and/or words of

others, that this has been appropriately cited or quoted. Plagiarism takes many forms, from 'passing off' another's paper as the author's own paper, to copying or paraphrasing substantial parts of another's paper (without attribution), to claiming results from research conducted by others. Plagiarism in all its forms constitutes unethical publishing behavior and is unacceptable.

Data access and retention

Authors may be asked to provide the raw data in connection with a paper for editorial review, and should be prepared to provide public access to such data (consistent with the ALPSP-STM Statement on Data and Databases), if practicable, and should in any event be prepared to retain such data for a reasonable time after publication.

Multiple, redundant or concurrent publication

An author should not in general publish manuscripts describing essentially the same research in more than one journal or primary publication. Submitting the same manuscript to more than one journal concurrently constitutes unethical publishing behavior and is unacceptable. In general, an author should not submit for consideration in another journal a previously published paper. Publication of some kinds of articles (e.g. clinical guidelines, translations) in more than one journal is sometimes justifiable, provided certain conditions are met. The authors and editors of the journals concerned must agree to the secondary publication, which must reflect the same data and interpretation of the primary document. The primary reference must be cited in the secondary publication.

Acknowledgement of sources

Proper acknowledgment of the work of others must always be given. Authors should cite publications that have been influential in determining the nature of the reported work. Information obtained privately, as in conversation, correspondence, or discussion with third parties, must not be used or reported without explicit, written permission from the source. Information obtained in the course of confidential services, such as refereeing manuscripts or grant applications, must not be used without the explicit written permission of the author of the work involved in those services.

Fundamental errors in published works

When an author discovers a significant error or inaccuracy in his/her own published work, it is the author's obligation to promptly notify the journal editor or publisher and cooperate with the editor to retract or correct the paper. If the editor or the publisher learns from a third party that a published work contains a significant error, it is the obligation of the author to promptly retract or correct the paper or provide evidence to the editor of the correctness of the original paper.

Authorship of the paper

Authorship should be limited to those who have made a significant contribution to the conception, design, execution, or interpretation of the reported study. All those who have made significant

contributions should be listed as co-authors. Where there are others who have participated in certain substantive aspects of the research project, they should be acknowledged or listed as contributors. The corresponding author should ensure that all appropriate co-authors and no inappropriate co-authors are included on the paper, and that all co-authors have seen and approved the final version of the paper and have agreed to its submission for publication.

Changes to authorship

This policy concerns the addition, deletion, or rearrangement of author names in the authorship of accepted manuscripts. Before the accepted manuscript is published in an online issue:

Requests to add or remove an author, or to rearrange the author names, must be sent to the Journal Manager by the corresponding author of the accepted manuscript, and must include:

The reason the name should be added or removed, or the author names rearranged

Written confirmation (e-mail, fax, letter) from all authors that they agree with the addition, removal or rearrangement. In the case of addition or removal of authors, this includes confirmation from the author being added or removed

Requests that are not sent by the corresponding author will be forwarded by the Journal Manager to the corresponding author, who must follow the procedure described above.

Note that:

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- After the accepted manuscript has been published in an online issue:

Any requests to add, delete or rearrange author names in an article published in an online issue will follow the same policies as noted above and may result in a corrigendum.

TYPES OF PAPERS

Original Articles

Original articles should consist of sections titled as “Abstract, Introduction, Materials and Methods, Results, Discussion and Conclusion”. For information about the abstract, refer to ‘Manuscript Formatting’ section.

The Introduction section of the manuscript should clearly state the purpose of the manuscript and include a brief summary of the most relevant national and international literature stating the main purposes and research question of the study. Contradictory aspects of the research, if present, should be mentioned. The expected contribution of this study to family medicine and practice should be highlighted.

The Materials and Methods section should describe the study population and the study design, with adequate information on the

techniques, materials and methods used. The section should include information of the study type, population, sample, sample size and selection of the sample. Validity and reliability of scales and questionnaires used also should be referred to. A clear description of the statistical methods should also be given.

The Results section should include a detailed report on the findings of the study. All figures, tables and illustrations should be used in this section. Results should be presented either as text or figures and/or tables and not be replicated.

The Discussion section of the study should emphasize the importance of the results and compare them with the results of other authors with relevant citations from the most recent literature. Study limitations and strengths should be specified. Suggestions for further studies in this area should be added.

The Conclusion should include the main conclusions based on the results of the research, emphasize the contributions of the study to family practice and propose original suggestions. A brief revision of all the results and the discussion should be avoided.

Original articles excluding case reports and systematic reviews should not exceed 3000 words excluding the abstract, references and tables. Case reports should not exceed 1000 words excluding the abstract, references and tables. There are no restrictions for systematic reviews.

Short Reports

Short Reports are accepted when the research topic, aim and results of the study are limited in scope and in cases that do not require writing a full original article. Short Reports can be described as a summarized version that have been prepared according to the structure of research articles. Publishing an article as a short report does not reflect a lower quality. The same rules as relevant to original articles apply to preparing a short report, but structured abstracts are not mandatory references and tables should not exceed 6 and 2 in number, respectively. Abstracts should not exceed 100 words and the text should be restricted to a maximum of 1000 words.

Reviews

Reviews are evidence-based articles about a specific topic using relevant citations from the most recent literature with the authors’ conclusions on this subject. The author is expected to have conducted research on the subject and to have experience in order to discuss and analyze the subject. There is no obligation to follow a particular format and may contain subtitles depending on the subject. The text should not exceed 4000 words excluding the title, abstracts, references and tables. E Journal of Cardiovascular Medicine, only publishes review articles solicited by the editors.

Letters to Editor and Comments

Letters to the editor or comments can be sent to provide commentary and analysis concerning an article published in the journal, to give information about ongoing research, to provide informa

tion in cardiology and cardiovascular-vascular-endovascular surgery, cardio-metabolic and vascular sciences. Letters to the editor or comments may include an optional title, tables and references. These articles should not exceed 1000 words.

What Would You Do?

These are brief articles discussing cases and situations encountered in cardiology and cardiovascular surgery with a biopsychosocial approach. If necessary, photographs (with permission from the patient/owner) may be added. Sections should consist of a title, case report, discussion, questions and answers. Brief comments can be sent to provide commentary on previous articles and case reports written by other authors. Comments should include the number of the journal the article was published in. The text should not exceed 1000 words.

International Reprints

Translations of important documents, declarations and guidelines prepared by international organizations in the field of cardiology and cardiovascular surgery, may be published in the journal. Presubmission Inquiry to the Editorial Board of the Journal before submitting the article is recommended. It is the translator's responsibility to obtain permission from the owner of the original manuscript for publication and translation.

News

These articles focus on advances and innovations in clinical topics relevant to cardiology and cardiovascular surgery. There is no obligation to follow a particular format. The text should be limited to 1000 words.

Editorials

Editorials usually provide information about the editorial policy of E Journal of Cardiovascular Medicine, give commentary and feedback on articles published in the journal, draw attention to topics of current interest and give information related to and discuss the development of cardiology and cardiovascular surgery in the world. They are mainly written by the members of the Editorial Board. Editorials are limited to 2000 words with some exceptions and may include a title and references when necessary.

MANUSCRIPT FORMATTING

Manuscripts should be designed in the following order:

Title page

Abstract

Main text

References

Tables, figures and illustrations

Title Page

The title page of the manuscript should include: The title, first

and last names of each author. Complete affiliation and title for each author, with the name of department (s) and institution (s) to which the work should be attributed.

The corresponding author should be clearly identified with name, address, telephone- facsimile number and email address for correspondence about the manuscript. Authors should clearly indicate if the article has previously been presented at a congress or scientific meeting. The title should be concise and informative without abbreviations and not exceed 10 words.

Abstract

Abstracts should be exact in English, with a minimum of 150 and maximum of 350 words. Abstracts of original research articles should be structured under subheadings as follows: objectives, methods, results and conclusion. A maximum of 3 key words should be added to English abstracts.

Text

The text contains the rest of the manuscript. It is structured differently according to the type of manuscript (original research article, review, etc.). For example, original research articles should consist of aim and objectives, methods, results, discussion and conclusion.

References

References should be cited in consecutive numerical order as first mentioned in the text and designated by the reference number in parentheses. If the number of authors for the reference is more than 6 authors, list the first three authors and add "et al".

Journal names should be abbreviated as used in Index Medicus. References should be cited in the Vancouver style. For detailed information please visit the relevant link

Examples:

For research articles follow the example below:

– Verschuren WM, Jacobs DR, Bloemberg BP, et al. Serum total cholesterol and long-term coronary heart disease mortality. JAMA 1995; 274(2): 131–6.

For book chapters follow the example below:

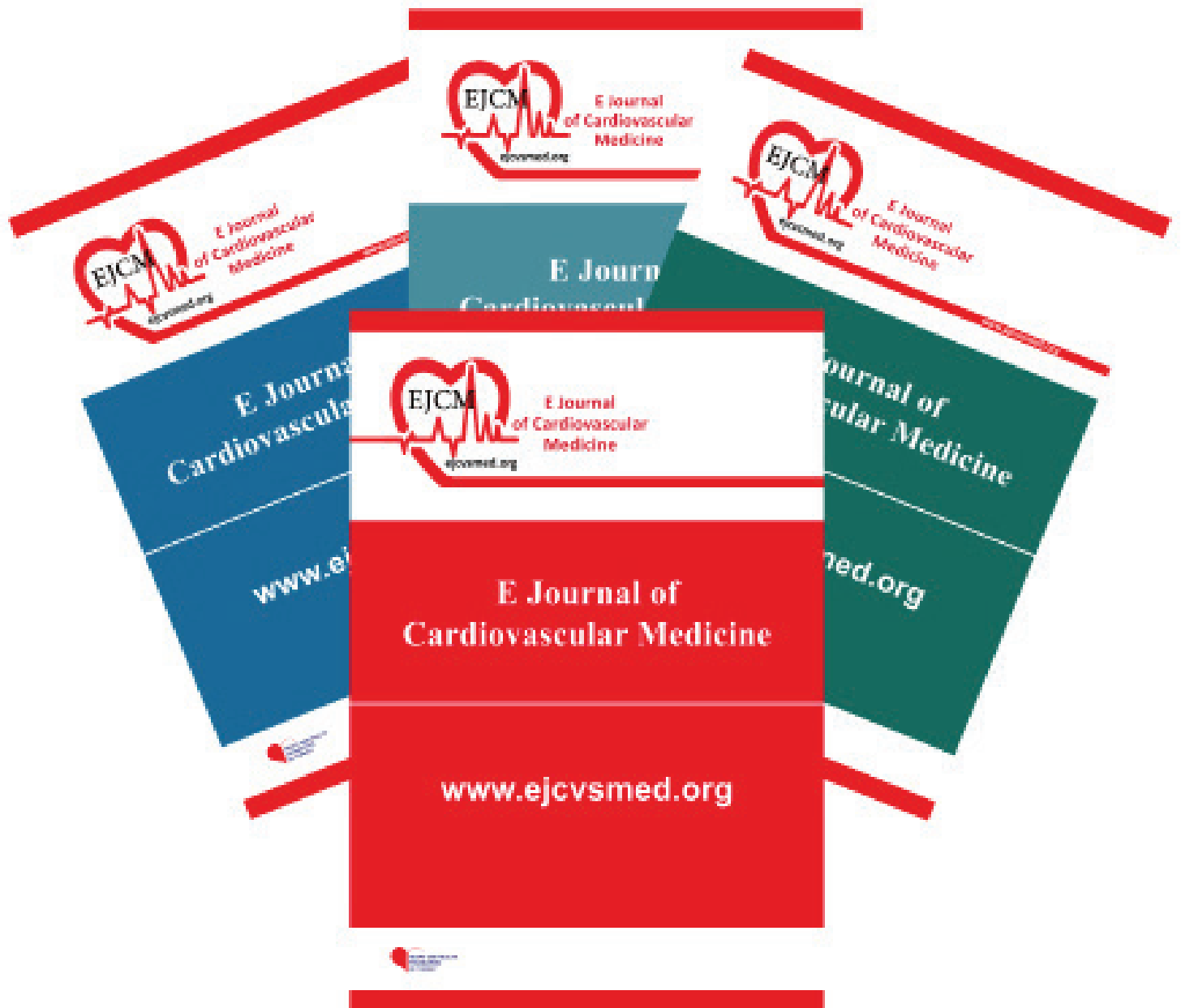
– Rakel RE. The family physician. In: Rakel RE, editor. Textbook of family practice. 5th ed. Philadelphia: W.B. Saunders; 1995. p. 3-19.

For web pages follow the example below:

– Guidance for clinicians. An International Benchmarking Study. <http://www.who.int/topics/surgery/> accessed: 29/09/2002.

Tables and Figures

Legends should take place on the top of the page for tables, and bottom of the page for figures and placed on separate pages. Explain all nonstandard abbreviations in footnotes.



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- arrhythmia,
- cardiovascular surgery,
- vascular & endovascular surgery,
- vascular biology