Clinical Features and Factors Affecting In-Hospital Mortality of Patients Who Underwent Pericardiocentesis Due To Moderate To Severe Pericardial Effusion

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ABSTRACT

Introduction: The aim of this study was to determine the primary etiology of pericardial effusion in patients undergoing percutaneous pericardiocentesis. Possible in-hospital mortality related predictors were also investigated.

Patients and Methods: A retrospective analysis was made of the clinical and laboratory features of 268 patients who underwent pericardiocentesis due to moderate to severe pericardial effusion between January 2009 and March 2020.

Results: The patients comprised 57.5% males and 42.5% females with a mean age of 62.3 ± 15.4 years. Cardiac compression was detected in 220 (82.1%) patients, of which 208 (77.6%) were clinically tamponade and 12 (4.5%) were asymptomatic cardiac compression. The most common symptom was dyspnea (58.6%) and 10.8% of patients were asymptomatic. Pericardial fluid was exudate in 235 (87.7%) patients. The most common causes were malignancy (37.3%) followed by idiopathic (22.1%) and iatrogenic (12.7%) causes. The patients with asymptomatic cardiac compression were more likely to have malignant effusion than those with other etiologies (p= 0.001). In-hospital mortality developed in 37 (13.8%) patients. The independent predictors of in-hospital mortality were determined as follows; etiology other than infectious or idiopathic (OR= 3.447; 95% CI= 1.266, 9.386; p= 0.015), and receiving antithrombotic therapy (OR= 2.306; 95% CI= 1.078, 4.932; p= 0.031).

Conclusion: Malignancy is the most common cause of moderate to severe pericardial effusions. The detection of cardiac compression in asymptomatic patients may be an important indicator of malignancy. Receiving antithrombotic therapy and having a non-idiopathic and non-infectious etiology may be predictors of in-hospital mortality.

Key Words: Malignant effusion; pericardial effusion; pericardiocentesis; tamponade.

Orta-Ciddi Perikardiyal Efüzyon Nedeniyle Perikardiyosentez Yapılan Hastaların Klinik Özellikleri ve Hastane İçi Mortaliteyi Etkileyen Faktörler

ÖZ

Giriş: Bu çalışmanın amacı, perkütan perikardiyosentez yapılan hastalarda perikardiyal efüzyonun birincil etiyolojisini belirlemektir. Ayrıca hastane içi mortaliteyle ilişkili olası öngördürücüler de araştırılmıştır.

Hastalar ve Yöntem: Ocak 2009-Mart 2020 tarihleri arasında orta-şiddetli perikardiyal efüzyon nedeniyle perikardiyosentez yapılan 268 hastanın klinik ve laboratuvar özellikleri geriye dönük analiz edildi.

Bulgular: Hastaların %57.5'i erkek ve %42.5'i kadın olup, ortalama yaş 62.3 ± 15.4 yıldır. Hastaların 220 (%82.1)'sinde kardiyak bası saptanmıştır. Bunlardan 208 (%77.6)'i klinik olarak tamponad, 12 (%4.5)'si asemptomatik kardiyak basıydı. En sık semptom dispneydi (%58.6) ve hastaların %10.8'i asemptomatikti. Hastaların 235 (%87.7)'i perikardiyal sıvı eksüda vasfındaydı. En sık nedenler, malignite (%37.3) ardından idiyopatik (%22.1) ve iyatrojenikti (%12.7). Asemptomatik kardiyak basısı bulunan hastaların malign efüzyon olma olasılığı diğer etiyolojilere göre daha fazlaydı (p= 0.001). Hastaların 37 (%13.8)'sinde hastane içi mortalite gelişmişti. Enfeksiyöz veya idiyopatik dışı etiyoloji (OR= 3.447; %95 GA= 1.266, 9.386; p= 0.015) ve antitrombotik tedavi almak (OR= 2.306; %95 CI= 1.078, 4.932; p= 0.031) hastane içi mortalite için bağımsız öngördürücüler olarak saptanmıştır.

Sonuç: Malignite, orta-ciddi perikardiyal efüzyonların en sık nedenidir. Asemptomatik hastalarda kardiyak basının saptanması malignitenin önemli bir göstergesi olabilir. Antitrombotik tedavi almak ve idiyopatik ve enfeksiyöz olmayan bir etiyolojiye sahip olmak hastane içi mortalite için öngördürücüler olabilir.

Anahtar Kelimeler: Malign efüzyon; perikardiyal efüzyon; perikardiyosentez, tamponad.

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INTRODUCTION

Pericardial effusion is common in clinical practice, seen either as an incidental finding or a manifestation of a systemic or cardiac disease.

The major pathology causing pericardial effusion is the imbalance between production and drainage of pericardial fluid. Pericardial effusion is often associated with inflammation of the pericardium (e.g. pericarditis) but it may develop without inflammation (e.g. hydropericardium). This condition is caused by impaired permeability of the inflamed pericardium and excessive release of fluid from the visceral pericardium[1,2].

Pericardial effusion is associated with many underlying medical disorders such as malignancies, infections, and complications of cardiovascular procedures. Moderate and severe pericardial effusions may cause pericardial tamponade depending on the rate of fluid accumulation and etiological cause[3-5]. Pericardiocentesis is the gold standard for clarifying the etiology and is also a lifesaving measure for cardiac tamponade. The diagnosis of primary disease is very important from the evaluation of the clinical and laboratory features in patients undergoing pericardiocentesis. This diagnosis of primary disease can positively affect the prognosis[6-8].

The aim of this study was to determine the specific etiology by examining the clinical and laboratory findings of patients undergoing percutaneous pericardiocentesis.

PATIENTS and METHODS

Study Population and Data Collection

This study was approved by the Non-Interventional Clinical Research Ethics Committee of Katip Celebi University (Decision number: 2021/0088).

A total of 268 patients were identifed who underwent pericardiocentesis due to moderate to severe pericardial effusion in two tertiary level hospitals between January 2009 and March 2020. The study population consisted of patients diagnosed in the outpatient clinic, emergency department, and in consultations of other clinics, and patients who developed pericardial effusion as a complication of cardiac interventions. Patients aged 16 years and older who underwent percutaneous pericardiocentesis due to moderate to severe pericardial effusion of any etiology were included in the study. Patients were excluded from the study if percutaneous pericardiocentesis was unsuccessful and required surgical intervention, but those who developed complications during percutaneous pericardiocentesis and required surgery were included.

The clinical, electrocardiographic (ECG), echocardiographic, and laboratory characteristics, procedural data and in-hospital mortality rates of these patients were retrospectively analyzed. Medical history, hemodynamic status on admission, comorbidities, and drug treatments were recorded. Complications that developed during the pericardiocentesis procedure and treatments for these complications were examined. The patients were classified according to the symptoms such as dyspnea, chest pain, syncope, peripheral edema, vague semptoms, and asymptomatic. Dyspnea was defined as shortness of breath at rest and/or during exertion. Those who had repeated pericardiocentesis were identified and grouped according to the number of procedures.

Echocardiography

The diagnosis of pericardial effusion was made with a transthoracic echocardiography (TTE) in all patients. The suitability of the effusion for percutaneous pericardiocentesis was also evaluated with TTE. Pericardial effusion was defined as moderate (n= 115, 42.9%) and severe (n= 153, 57.1%) according to the amount of fluid. The magnitude of effusion was defined as an echo-free space either in front of the right ventricle or posterior to the left ventricle during diastole, with spaces of 10-20 mm and over 20 mm defined as moderate and severe effusion respectively[1].

Patients were also grouped according to the development of pericardial tamponade. Emergency pericardiocentesis was applied to 220 patients due to tamponade or asymptomatic cardiac compression and elective pericardiocentesis for diagnostic evaluation was applied to 48 patients who did not respond to empirical therapies. Cardiac tamponade was defined as the coexistence of a significant hemodynamic abnormality (elevated systemic venous pressure, tachycardia, dyspnea, and paradoxical arterial pulse) and echocardiographic findings of right cavities compression[9]. Patients with no symptoms despite echocardiographic compression findings were defined as asymptomatic cardiac compression. Echocardiographic compression was defined as the detection of right atrial or ventricular collapse in diastole on 2D or M-Mode echocardiography and/or more than 25% reduction in mitral peak E-wave velocity in inspiration and more than 40% reduction in tricuspid peak E-wave velocity in expiration on Doppler echocardiography[10].

Procedure

Percutaneous pericardiocentesis was performed with a subxiphoid approach in all patients. A 6Fr introducer was entered into the pericardial space then a pigtail catheter was advanced over a 0.035 guidewire through the pericardial space. The procedure was performed in 221 patients (82.5%) under the guidance of echocardiography and in 47 patients (17.5%) under fluoroscopy guidance.

Pericardial Fluid

Pericardial fluid was grouped according to macroscopic appearance as hemorrhagic or serous. These samples were analyzed in respect of cytological examination, microbiological

culture, biochemical tests [glucose, protein, albumin, cholesterol, and lactate dehydrogenase (LDH)], and specific tests for mycobacterium tuberculosis [polymerase chain reaction (PCR) and adenosine deaminase activity (ADA)]. Simultaneous blood biochemical tests, hemogram, sedimentation, C-reactive protein (CRP), tumor markers, autoimmune tests, and thyroid function tests results were evaluated. The results of the fluid and blood biochemistry tests were evaluated together, then grouped as transudates or exudates according to Light's criteria and the serum-pericardial fluid albumin gradient.

Under the guidance of all these analyses, the patients were classified according to their primary etiology, and those with no etiological cause were classified as idiopathic. After exluding bacterial pericarditis, the diagnosis of viral pericarditis was made based on inflammatory signs such as typical pericarditic chest pain, fever, pericardial friction rub, leukocytosis and high CRP level in the blood sample, and typical ECG findings. Viral specification was not applied. Death for any reason after hospitalization of these patients was recorded as in-hospital mortality.

Statistical Analysis

All statistical analyses were performed using SPSS for Windows vn.15.0 software (SPSS Inc., Chicago, IL, USA). Normal distribution of data was assessed with the Kolmogorov-Smirnov test. Continuous variables were reported as mean ± standard deviation (SD) and median values, and categorical variables as number (n) and percentage (%). The groups were compared using the Independent Student's t-test or the Mann-Whitney U test for continuous variables according to the normality distribution and the Chi-squared test was applied to categorical variables. To determine independent predictors for in-hospital mortality, first the clinical parameters were evaluated with univariate regression analysis and the variables with a value of $p< 0.1$ in that analysis were evaluated with multivariate logistic regression analysis. A value of $p< 0.05$ was accepted as statistically significant.

RESULTS

Demographic Data and Clinical Characteristics

Evaluation was made of a total of 268 patients, comprising 154 (57.5%) were males and 114 (42.5%) females with a mean age of 62.3 ± 15.4 years (median 62 years). Of these patients, 149 (55.6%) had hypertension and 68 (25.4%) had diabetes mellitus. Of the 268 patients, 37 (13.8%) underwent recurrent pericardiocentesis, for the second time in 33 (12.3%), the third time in 3 (1.1%), and for the fourth time in 1 (0.4%). Cardiac compression was detected in 220 (82.1%) patients, of which 208 (77.6%) were clinically tamponade and 12 (4.5%) were asymptomatic cardiac compression. On admission, 239 (89.1%) patients were symptomatic. The most common symptom was dyspnea (58.6%) and 29 (10.8%) patients were asymptomatic. Atrial fibrillation or flutter was observed on the ECG of 17 (6.3%) patients, and there were signs of acute pericarditis on the ECG of 13 (4.8%) patients. The mean left ventricular ejection fraction of the patients was 57.2% ± 6.9%. Of these patients, 115 (42.9%) had moderate and 153 (57.1%) had severe pericardial effusion. At the time of pericardiocentesis, 69 (25.7%) patients were taking at least one antithrombotic therapy. The demographic, clinical, electrocardiographic, echocardiographic and drug characteristics of the patients are presented in Table 1.

Pericardial Fluid

In the macroscopic examination of the drained fluid, 180 (67.2%) had hemorrhagic appearance. Pericardial fluid was exudate in 235 (87.7%) patients. The mean serum-pericardial fluid albumin gradient was 0.79 ± 0.4 g/dL (range, 0.1 to 2.6 g/dL). Cytological analysis was available for 182 (67.9%) pericardial effusions. Pericardial fluid cytology was positive for malignant cells in 28 (15.4%) patients, of which 20 were new diagnoses and 8 had a history of malignancy. The ADA level was examined in 72 (26.8%) patients and 21 were positive (> 40 IU/dL). For the diagnosis of Mycobacterium tuberculosis, 132 (49.2%) patients were examined with PCR-ELISA test and 9 were positive.

Pericardial Effusion Etiology

The etiological data are presented in the Table 2. Malignant pericardial effusion was the most common cause of pericardial effusions (37.3%, n= 100). Of the patients with cancer-related effusion, carcinoma of the lung was the most common underlying malignancy (71/100) (Figure 1). Of these 100 patients, 24 were newly diagnosed with cancer.

The second most common cause of pericardial effusions was idiopathic effusions (22.1%, n= 59), followed by iatrogenic causes (12.7%, n= 34). Of these 34 pericardial effusions, 20 occurred during percutaneous coronary angioplasty, 10 during pacemaker implantation, 3 during percutaneous atrial septal defect closure, and 1 during mitral balloon valvuloplasty.

Post-myocardial infarction (MI) conditions included the following; free wall rupture due to myocardial infarction during fibrinolytic therapy (n= 2), post-MI early pericarditis (n= 1), and post-MI late pericarditis (dressler syndrome) (n= 2).

In patients with asymptomatic cardiac compression, the probability of malignant effusion was significantly higher than for those with other etiological causes ($p= 0.001$). Moderate pericardial effusions caused tamponade more frequently in the iatrogenic group than in the other groups ($p= 0.003$).

Procedural Complications

Major complications due to the pericardiocentesis procedure developed in 23 (8.5%) patients. The distribution of complications is shown in Table 3. Of the patients who developed cardiac damage, 6 recovered with a new pericardiocentesis without surgical intervention. The other

Table 1. Demographic, clinical, and medication features and procedural data of the patients

Variables	Surviving patients (n= 231)	In-hospital deaths (n= 37)	All patients (n= 268)
Male gender, n (%)	128 (55.4)	26 (70.3)	154 (57.5)
Age, years (mean ± SD)	61.9 ± 15.3	64.8 ± 16.5	62.3 ± 15.4
Hypertension, n (%)	130 (56.3)	19 (51.4)	149 (55.6)
Diabetes mellitus, n (%)	63 (27.3)	5 (13.5)	68 (25.4)
Chronic renal failure, n (%)	26 (11.2)	6 (16.2)	32 (11.9)
Chronic heart failure, n (%)	19 (8.2)	5 (13.5)	24 (8.9)
Pericardiocentesis history, n (%)	34 (14.7)	3 (8.1)	37 (13.8)
Tamponade, n (%)	175 (75.7)	33 (89.2)	208 (77.6)
Asymptomatic cardiac compression, n (%)	10 (4.3)	2 (5.4)	12 (4.5)
Admission symptoms, n (%)			
Dyspnea	133 (57.6)	24 (64.9)	157 (58.6)
Chest pain	57 (24.7)	5 (13.5)	62 (23.1)
Syncope	6 (2.6)	2 (5.4)	8 (3)
Peripheral edema	3 (1.3)	2 (5.4)	5 (1.9)
Vague symptoms	6 (2.6)	1 (2.7)	7 (2.6)
Asymptomatic	26 (11.3)	3 (8.1)	29 (10.8)
AF or AFL on ECG, n (%)	13 (5.6)	4 (10.8)	17 (6.3)
Heart rate, bpm (mean ± SD)	83.8 ± 15.6	87.2 ± 20.6	84.2 ± 16.1
Acute pericarditis signs on ECG, n(%)	12 (5.2)	1 (2.7)	13 (4.8)
LVEF (%), (mean ± SD)	57.4 ± 6.3	56.3 ± 9.3	57.2 ± 6.9
Amount of effusion, n (%)			
Moderate	99 (42.9)	16 (43.2)	115 (42.9)
Severe	132 (57.1)	21 (56.8)	153 (57.1)
Received antithrombotics, n (%)			
ASA	12 (5.2)	3 (8.1)	15 (5.6)
P2Y12 inhibitor	4 (1.7)	1 (2.7)	5 (1.9)
UFH	1 (0.4)	3 (8.1)	4 (1.5)
LMWH	5 (2.2)	2 (5.4)	7 (2.6)
OAC	9 (3.9)	0	9 (3.4)
ASA + P2Y12 inhibitor	5 (2.2)	1 (2.7)	6 (2.2)
UFH + ASA	2 (0.9)	2 (5.4)	4 (1.5)
UFH + ASA + P2Y12 inhibitor	14 (6.1)	3 (8.1)	17 (6.3)
Warfarin + ASA	2 (0.9)	0	2 (0.7)
Procedural guidance, n (%)			
Echocardiography	192 (83.1)	29 (78.4)	221 (82.5)
Fluoroscopy	39 (16.9)	8 (21.6)	47 (17.5)

AF: Atrial fibrillation, AFL: Atrial flutter, ASA: Acetylsalicylic acid, LMWH: Low molecular weight heparin, OAC: Oral anticoagulant, LVEF: Left ventricular ejection fraction, UFH: Unfractionated heparin.

seven patients recovered with emergent surgery, five patients died before they could reach surgery, and one patient died in the postoperative period. After the procedure, 3 (1.1%) patients developed pneumopericardium, which may be a minor complication. Two of these patients recovered spontaneously and the other patient required surgical intervention.

In-hospital Mortality

In-hospital mortality developed in 37 (13.8%) patients for any reason after hospitalization for pericardiocentesis. Of these 37 patients, 6 (16.2%) died during or immediately after the procedure due to the devastating effect of the primary

Table 2. Etiologies of pericardial effusion according to gender

Etiology	Gender		Total (n= 268)
	Male (n= 154)	Female (n= 114)	
Malignancy, n (%)	68 (44.1)	32 (28.1)	100 (37.3)
Idiopathic, n (%)	29 (18.8)	30 (26.3)	59 (22.1)
Iatrogenic, n (%)	18 (11.6)	16 (14.1)	34 (12.7)
Infectious, n (%)			
Viral	13 (8.4)	9 (7.9)	
Tuberculosis	3 (1.9)	6 (5.2)	33 (12.3)
Bacterial	1 (0.6)	1 (0.9)	
Uremia, n (%)	11 (7.1)	10 (8.7)	21 (7.8)
Others, n (%)			
Thyroid diseases	1 (0.6)	4 (3.5)	
Post-MI conditions	2 (1.3)	3 (2.6)	
Post-cardiac surgery	3 (1.9)	1 (0.9)	21 (7.8)
Heart failure	2 (1.3)	1 (0.9)	
CNTD	2 (1.3)	1 (0.9)	
Post-traumatic	1 (0.6)	0	

CNTD: Connective tissue disease, MI: Myocardial infarction.

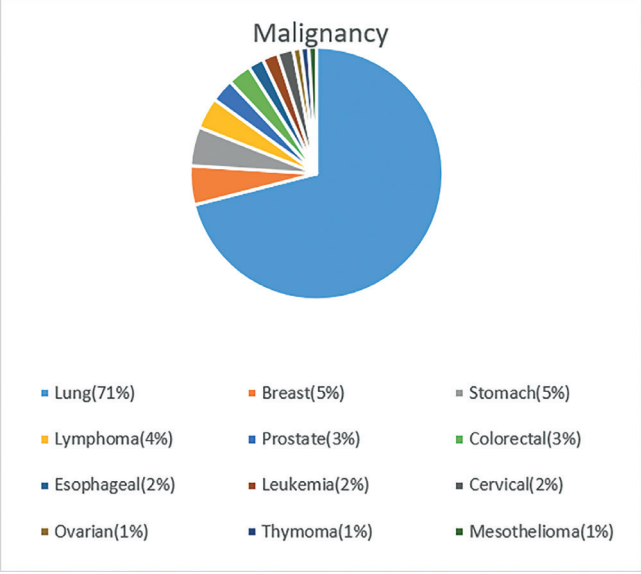

Figure 1. Types of cancer that cause malignant effusion..

Table 3. Distribution of complications during percutaneous pericardiocentesis

Procedural complications	Patients (n= 268)
Myocardial injury, n (%)	19 (7.1)
Pneumothorax, n (%)	3 (1.1)
Hepatic vein injury, n (%)	1 (0.4)
Pneumopericardium, n (%)	3 (1.1)
Total	26 (9.7)

disease despite the successful procedure, 6 (16.2%) died due to cardiac damage as a complication of the procedure, and the other 25 (67.6%) patients died during follow-up in the post-pericardiocentesis period.

Univariate and multivariate logistic regression analyses were performed to determine in-hospital mortality predictors (Table 4). The independent predictors of in-hospital mortality were determined to be etiology other than infectious or idiopathic (OR= 3.447; 95% CI= 1.266, 9.386; p= 0.015), and receiving antithrombotic therapy (OR= 2.306; 95% CI= 1.078, 4.932; p= 0.031).

Table 4. Effects of variables on the in-hospital mortality in univariate and multivariate logistic regression analysis

Variables	Univariate logistic regression		Multivariate logistic regression	
	OR (95% CI)	p	OR (95% CI)	p
Age	1.013 (0.989-1037)	0.294		
Gender (male)	1.902 (0.897-4.031)	0.093	1.657 (0.756-3.631)	0.207
Diabetes mellitus	0.417 (0.155-1.117)	0.082	2.509 (0.900-6.990)	0.079
Hypertension	0.820 (0.409-1.643)	0.576		
Serum-to-fluid albumin gradient	0.708 (0.283-1.770)	0.460		
Exudate fluid	0.684 (0.261-1.789)	0.439		
Hemorrhagic appearance	1.617 (0.727-3.594)	0.238		
Echocardiography guidance	0.736 (0.313-1.732)	0.483		
Recurrent effusion	0.511 (0.149-1.758)	0.287		
Etiology other than infectious or idiopathic	3.867 (1.452-10.296)	0.007	3.447 (1.266-9.386)	0.015
Tamponade	4.351 (1.009-18.757)	0.049	3.464 (0.784-15.317)	0.101
Receiving antithrombotic therapy	2.235 (1.084-4.608)	0.029	2.306 (1.078-4.932)	0.031

CI: Confidence interval, OR: Odds ratio.

DISCUSSION

The main findings of the current study are: 1) Malignancies are the most common cause of effusions, 2) Asymptomatic cardiac compression is more common in malignant effusions, 3) In-hospital mortality is higher in non-infectious and non-idiopathic etiologies.

The clinical presentation of pericardial effusion varies according to the collection rate and the amount of fluid. The most common symptoms in the current study were dyspnea and chest pain. Moreover, 11% of the patients had no symptoms and pericardial effusion was detected incidentally. Levine et al. similarly found that dyspnea and chest pain were the most common symptoms, while Merce et al. reported that 34% of patients with compression findings on echocardiography were asymptomatic[11,12]. In various studies, relapsed effusion requiring recurrent pericardiocentesis has been reported at the rate of 15%[13,14]. In the current study, 14% of the patients underwent recurrent pericardiocentesis. In addition to reducing pericardial compression, another important purpose of pericardiocentesis is the etiological diagnosis. Pericardial effusion may be the first sign of significant diseases such as malignancy[15]. In the current study, 24 patients were newly diagnosed with malignancy.

Malignancy has been found to be the most common cause of massive effusion in many different studies conducted in tertiary centers similar to that of the current study[12,16,17]. Patients with malignancies may develop pericardial disease through 4 mechanisms: direct extension or metastatic spread, chemotherapeutic toxicity, radiation toxicity, and opportunistic infections in the setting of immunosuppressive therapy[18]. Pericardial effusions may also arise because of obstruction to the lymphatic drainage[19]. In autopsy series, the prevalence of pericardial involvement varies from 4% in general autopsies to 15%-30% in autopsies of cancer patients. Autopsy series have shown that pericardial metastases are found particularly in lung (35%) and breast (25%) cancer[20-22]. In the current study, a significant relationship was found between asymptomatic cardiac compression and malignant effusion. The main reason for this condition is the slow accumulation of malignant effusions over a long time. In this way, the distensibility of the pericardium increases and the appearance of clinical findings is delayed. Some previous studies have reported that most malignant effusions are asymptomatic[15,23]. Iatrogenic effusions can occur during percutaneous coronary interventions, pacemaker implantation, and other cardiac interventions. The frequency of iatrogenic effusion is closely related to the percutaneous cardiac intervention density of the study center. Similar to the current study, the rate of iatrogenic effusions was high in the study by Sagrista et al[1]. Iatrogenic effusions can cause tamponade even with a small amount of fluid. In the current study, moderate pericardial effusions were found to cause tamponade more frequently in the iatrogenic group than in the other groups. The frequency of tuberculous pericarditis has been shown to be closely related to the socioeconomic development of countries. While the incidence of tuberculous pericarditis is around 4% in European countries, it can rise up to 69% in African countries. The presence of HIV infection has been found to be an important predisposing factor for tuberculous pericarditis[24,25]. In the current study, either PCR positivity or culture positivity in the fluid sample was required for the diagnosis of tuberculous pericarditis. One of the reasons for the low incidence of tuberculosis in this study may be underestimation in patients who did not meet these conditions.

In-hospital mortality of patients with moderate and severe pericardial effusion depends on many parameters such as hemodynamic status, presence of tamponade and etiological cause. In the literature, the incidence of major complications has been reported to be between 1.3% and 3% and procedural mortality < 1% during pericardiocentesis[26-28]. Although all procedures were performed under the guidance of echocardiography or fluoroscopy in this study, the rates of major complications (8.5%) and procedural mortality (2.2%) were much higher than expected. This could be attributed to the high rate of iatrogenic etiology, which requires urgent pericardiocentesis and operator experience. Iatrogenic tamponades are naturally more likely to be fatal and the pericardiocentesis procedure is more difficult than for other groups. In this study, factors increasing in-hospital mortality were determined to be receiving antithrombotic agents and having an etiology other than idiopathic or infectious pericarditis. The use of antithrombotic agents contributes to pericardial effusion formation by increasing bleeding due to pericardial damage[29-33]. The use of anticoagulants in particular increases the formation of massive pericardial effusion and tamponade[34]. This situation is thought to be a cause that increases mortality. Effusions due to idiopathic and viral pericarditis are usually benign and often do not even require pericardiocentesis. As in the current study, mortality rates have been found to be higher in iatrogenic and malignant effusions in many studies[14,35,36]. The main reason for this is thought to be the devastating effects of primary diseases.

There were some limitations to this study, primarily the retrospective and non-randomized design. The data were obtained from two different centers with high percutaneous cardiac intervention density. The frequency of tuberculous pericarditis was found to be below the country average. Procedural complications were determined at a higher rate than reported in the literature.

CONCLUSION

Malignancy is the most common cause of moderate to severe pericardial effusions. Pericardiocentesis is important not only to relieve patient symptoms but also to diagnose underlying pathology. The detection of cardiac compression in asymptomatic patients may be an important indicator of malignancy. Receiving antithrombotic therapy and having a non-idiopathic and non-infectious etiology may be predictors of in-hospital mortality.

Ethics Committee Approval: This study was approved by the Non-Interventional Clinical Research Ethics Committee of Katip Celebi University (Decision number: 2021/0088).

Informed Consent: Informed consent was obtained.

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