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ORIGINAL ARTICLE

Clinicopathology Examining of Pericarditis in Patients who Referred to Afshar Hospital in Yazd Province During the Years 2009-2014

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ABSTRACT

Objective: Pericarditis is an inflammation of the outer layer of the heart. Pericardial effusion is an abnormal accumulation of fluid in the pericardial space. Studies on this disease are mostly related to developed societies and its epidemiological dimensions are not well known in developing countries such as Iran. Therefore, this study was performed to evaluate the clinical pathology of different types of pericarditis referred to Afshar Heart Hospital during the years 2009 to 2014.

Method: In this study, 116 patients were examined using a prepared checklist wich includes age, sex, year of hospitalization, clinical symptoms Clinical examinations, echocardiographic evidence, pathological findings (types of pericarditis) and finally recovery and death. The collected data were entered into SPSS software and analyzed using Chi-Square test, and P-values<0.05 were considered statistically significant.

Results: This study was performed on 116 patients with a mean age of 45.1±23.95, of whom 61 were male (52.6%) and 55 were female (47.4%). The most common type of pericarditis was idiopathic (51.7%). In cancerous pericarditis (81%) and myxedema (33.3%), most patients were female. The most common complaint was 51.7% of patients with dyspnea. The most cardiac auscultation was reduction of heart sounds (56%). Friction rub was heard in auscultation in only 5 patients (3.4%). The most finding in patients' ECG was normal sinus rhythm with or without tachycardia (62.1%) and typical ECG changes were seen in 15.5% of patients. The most common pathology observed in 43 patients (37.1%) was acute inflammation. As a result, 112 patients (96.6%) recovered and 4 patients (3.4%) died.

Conclusion: As in developing countries, idiopathic type was the most common type of acute pericarditis with the difference that its frequency was lower compared to developed countries. Most young patients with idiopathic pericarditis had a history of a recent cold.

Keywords: Pericarditis, Pericardial effusion, Inflammation

INTRODUCTION

The most common disease involving the pericardium is acute pericarditis. Pericarditis accounts for about 5% of emergency room visits with complaints of non-ischemic chest pain. Pericarditis means inflammation of the pericardial layer. In response to a slow increase in pericardial effusion, the pericardial space complies with an increase in volume without pressure on the heart cavities, but a rapid increase in this fluid (tamponade) can be life-threatening. Pericarditis is divided into the following types based on its cause: infectious pericarditis (viral pericarditis, tuberculosis ...), acute myocardial infarction (including two types of premature and delayed, (Dressler syndrome)), pericarditis caused by uremia, some cancers (Lung cancer, malignant melanoma, etc.), familial Mediterranean fever, collagen and vascular diseases (lupus, rheumatoid arthritis, rheumatic fever), migraine, opening of lymph ducts to the pericardial space (trauma ..), radiation, sarcoidosis Injury after heart surgery and medication (hydralazine, isoniazid, procaine amide).[1]

Pericarditis can be divided into three categories based on the duration of the disease: acute pericarditis (duration of disease less than 4-6 weeks), persistent pericarditis (duration of disease more than 4-6 weeks but less than 3 months) and chronic pericarditis (The duration of the disease more than 3 months). Most patients with pericarditis complain of chest pain. Chest pain is pleural pain (worsens with deep breathing) and postural (improves with standing and leaning forward). This pain is more common in acute infectious or autoimmune diseases and is not seen in tuberculous pericarditis and uremia and radiation-induced pericarditis. Friction rub is heard on auscultation in 80% of cases. Although this sound is specific for pericarditis, its absence does not rule out the disease. Although pericardial effusion is often associated with pericarditis, its presence is not necessary to confirm the diagnosis. The European Heart Association in 2015 required the diagnosis of pericarditis with 2 out of 4 criteria, including pericardial chest pain, friction rub, typical ECG changes, and pericardial effusion.[1]

Due to the fact that in pericarditis, a vital organ is involved, which in some cases leads to the death of the patient, and considering that this issue has not been studied before in Yazd province, so in this study, the clinical pathology of pericarditis in patients who referred to Afshar Hospital, which is one of the centers under the control of Shahid Sadoughi Hospital in Yazd, during the years 2009-2014, was examined.

MATERIAL AND METHODS

In this retrospective descriptive cross-sectional study, our study population was all patients who were admitted with a diagnosis of pericarditis during 2009 to 2014, and finally 116 people were studied. The sampling method was census, which was approved by the University Ethics Committee in order to preserve patient information with the ethics code IR.SSU.MEDICINE.REC.1394.520. The required information was collected using a prepared checklist that included variables of age, sex, year of hospitalization, clinical symptoms, clinical examinations, echocardiographic evidence, pathological findings (types of pericarditis), and ultimately the outcome of patients in terms of recovery and death.

The age of the patient was calculated in years and the age range of the patients was from 8 months to 87 years. The age groups were categorized as 20-year ranges. Clinical symptoms included chest pain, shortness of breath. On physical examination only (cardiac auscultation), normal heart sounds, reduction of heart sounds, friction rub and souffle were examined. Echocardiographic results were divided based on the information in the files on the presence or absence of pericardial effusion (mild, moderate, severe), aortic vegetation and calcification. Cardiac ECG results were divided based on normality, tachycardia, low voltage, arrhythmia, and pericarditis manifestations. The results of the samples sent to the pathology laboratory were divided into chronic inflammation, granuloma acute inflammation, malignancy, calcification and no pathology. Of the underlying diseases, compressive tamponade and pericarditis were examined. Clinical outcomes including recovery and death were evaluated.

Data analysis method: The collected data were analyzed using SPSS software version 21 (US New York, IBM Inc). Chi-Square test was used to compare the amount and number of variables in patients, and P-values less than 0.05 were considered statistically significant.

RESULTS

In this disease, 116 patients were studied, of which 61 (52.6%) were male and 55 (47.4%) were female. The mean age of patients was 45.01 + 23.95. Patients were divided into five age groups: 0-20 years, 18 people (15.5%), 20-40 years, 35 people (30.2%), 40-60 years, 31 people (26.7%), 60-80 years, 22 people (19%) and 10 people (8.6%) over 80 years old. As can be seen, the age group of 20-40 years had the highest frequency.

Table 1: Relation between clinical symptoms and sex with types of pericarditis.

Types of pericarditis	Clinical symptoms				Sex	
	Nonspecific symptoms	Chest pain	Shortness of breath	Both	Male	Female
Infectious pericarditis	(%0)0	(%44.4)8	(%50)9	(%5.6)1	(%66.7)12	(%33.3)6
Acute myocardial infarction	(%0)0	(%0)0	(%100)1	(%0)0	(%100)1	(%0)0
Pericarditis caused by uremia	(%25)1	(%0)0	(%75)3	(%0)0	(%50)2	(%50)2
Some cancers	(%9.5)2	(%0)0	(%71.4)15	(%19)4	(%19)4	(%81)17
Vascular collagen diseases	(%50)2	(%25)1	(%0)0	(%25)1	(%50)2	(%50)2
Myxedema	(%0)0	(%50)1	(%50)1	(%0)0	(%0)0	(%100)2
Injury after heart surgery	(%0)0	(%33.3)2	(%66.7)4	(%0)0	(%66.7)4	(%33.3)2
Idiopathic	(%3.3)2	(%30)18	(%45)27	(%21.7)13	(%60)36	(%40)24
Total	%6	%25.9	%51.7	%16.4	(%52.6)61	(%47)55
p-value	**0.001>**				0.01	

According to the table above, there was a significant difference between gender and the frequency distribution of pericarditis causes (p-value = 0.01) and in all types of pericarditis except pericarditis caused by cancer and myxedema, most patients were male.

There was a significant difference between the frequency distribution of pericarditis causes and clinical symptoms according to p-value <0.001. The most patient complaints were shortness of breath with 51.7% frequency. There were no complaints of typical chest pain in uremic pericarditis, cancer, and acute myocardial infarction.

Table 2: Result of cardiac auscultation in patients with pericarditis.

Cardiac auscultation	Frequency	Percentage of frequency
Normal	37	9.%31
Reduction of heart sounds	65	%56
Friction rub	5	3.%4
Souffle	9	8.%7
Total	116	%100

Table 3: Result of ECG in patients with pericarditis.

ECG result	Frequency	Percentage of frequency
Normal or tachycardia	72	62.1%
Low voltage	23	19.8%
Typical sample	18	15.5%
Arrhythmia	3	2.6%
Total	116	100%

Table 4: Relation between pericardial effusion in patients with pericarditis.

Types of pericarditis	Pericardial effusion rate		
	None	Mild to moderate	Severe
Infectious pericarditis	(%27.8)5	(%55.6)10	(%16.7)3
Acute myocardial infarction	(%0)0	(%0)0	(%100)1
Pericarditis caused by uremia	(%0)0	(%50)2	(%50)2
Some cancers	(%0)0	(%38.1)8	(%61.9)13
Vascular collagen diseases	(%50)2	(%50)2	(%0)0
Myxedema	(%0)0	(%50)1	(%50)1
Injury after heart surgery	(%16.7)1	(%66.7)4	(%16.7)1
Idiopathic	21.7)13 (%	(%44.8)25	(%36.7)22
Total	%18.1	%44.8	%37.1
p-value	0.047		

The most cardiac auscultation was reduction of heart sounds (frequency 56%). Friction rub was heard in only 3.4% (5 patients). There was no significant difference between the frequency distribution of pericarditis causes and cardiac auscultation despite p-value = 0.403.

The most common finding in patients' ECG was normal sinus rhythm with or without tachycardia (frequency 62.1%) and typical ECG changes were seen in 15.5% of patients.

81% of patients had pericardial effusion and most patients (44.8%) had mild to moderate pericardial effusion. According to p-value = 0.047, there was a significant difference between the frequency distribution of pericarditis and pericardial effusion.

Table 5: Pathology findings in patients with pericarditis.

Types of pathology	Frequency	Percentage of frequency
No pathology	10	8.6%
Normal	21	18.1%
Acute inflammation	43	37.1%
Granuloma	6	5.2%
Chronic inflammation	10	8.6%
Malignancy	21	18.1%
Calcification	5	4.3%
Total	116	%100

According to the table above, the highest pathology in patients with pericarditis was acute inflammation with a frequency of 37.1% (n = 43) and the lowest was related to calcification with a frequency of 4.3% (n = 5).

Table 6: Relation between underlying disease and pericarditis.

Types of pericarditis	Tamponade	Compressive pericarditis
Infectious pericarditis	)422.2%(	)00%(
Acute myocardial infarction	)00%(	)00%(
Pericarditis caused by uremia	)375%(	)00%(
Some cancers	)1571.4%(	)00%(
Vascular collagen diseases	)00%(	)00%(
Myxedema	)2100%(	)00%(
Injury after heart surgery	)233.3%(	)00%(
Idiopathic	)2745%(	)58.3%(
Total	45.7%	4.3%

In terms of underlying disease, 45.7% (n = 53) had tamponade and 4.3% (n = 5) had compressive pericarditis. All patients with myxedema pericarditis had tamponade. There was a significant difference between the frequency distribution of pericarditis causes and complications of pericarditis with p-value = 0.028.

Finally, 112 patients (96.6%) recovered and 4 patients (3.4%) died. There was no significant difference between the

frequency distribution of pericarditis causes and clinical outcome according to p-value = 1.

DISCUSSION

The mean age of patients in this study was 45.01 + 23.95. In the study by Marcio[2], it was 20-50 years, in the 8-year study by Biuatti[3] 38 + 18 years, in the 5-year study by Massimo[4] 17.1 + 51.3 years and in the study by Niraj[5] 41-60 years, which is consistent with the findings of the present study. The mean age in the present study is lower than in previous studies, which may be due to the increased prevalence of the viral type.

In terms of gender distribution in all studies, including Massimo[4], Martin.M[6], Marcio[2], Niraj[5], preference was given to male gender, which was consistent with the present study. Although, in the study by Niraj[5], the cause of this superiority is unknown, but he cited previous articles as suggesting that testosterone may increase the risk of acute pericarditis.

The study by Niraj[5] listed idiopathic / viral pericarditis as the most common type in developed countries and tuberculosis in developing countries. On the other hand, uremic pericarditis is 8-12%, pericarditis following acute myocardial infarction is 5-8% and pericarditis due to radiation therapy is 2.5% of all acute pericarditis. The study by G.Ralph[7], which was performed on 57 patients with acute pericarditis over a 20-month period, reported 23% cases caused by cancer, 14% viral, 14% radiation, 12% collagen and vascular, 12% uremic, and 7% idiopathic.

The study by Martin.M[6] reported that 80-90% of cases of acute pericarditis in developed countries were idiopathic and another 10-20% were due to cancer, post-operative heart injury, collagen and vascular disease. In the study by Marcio[2], the main cause of pericarditis in developing countries was idiopathic / viral type with a frequency of 80-90%, followed by 33% purulent pericarditis, 20% tuberculous pericarditis, 4% cancer-induced pericarditis and 2.8% collagen and vascular disease. In the study by Ricardo[8] on 100 patients with acute pericarditis from 1991 to 1993, 22% of patients had a specific cause, including: 7% cancer, 4% tuberculosis, 3% other infections, 4% hypothyroidism, and 1% aortic dissection. In the study by Massimio[4], 80% of patients had idiopathic and 20% had other known causes.

In the present study, the causes of acute pericarditis were: idiopathic with a prevalence of 51.7%, cancer 18.1%, infectious disease 15.5% (0.9% AIDS, 5.2% tuberculosis), 5.2% postoperative injury, 3.4% uremia, 3.4%, respectively. Vascular collagen, 1.7% hypothyroidism, 0.9% pericarditis were followed by acute myocardial infarction.

In the study by Biuatti[3], of 62 patients with acute pericarditis who were examined over an 8-year period, 95% had chest pain, 58% had shortness of breath and fever. In the study by Qurashi[9], 44 patients with pericardial effusion had 89% shortness of breath and 36% fever. In the study by Gibbs[10], shortness of breath was present in 90% of patients, chest pain in 74%, cough in 70%, unexplained fever in 28%, and abdominal pain (possibly due to liver congestion) in 61% of patients. In the study by Aazami[11] on 49 patients with pericardial effusion in Ardabil, 44.9% shortness of breath, 40.8% heart palpitations, 24.5% chest pain and 16.3% chest pain with shortness of breath and 1.6% had non-specific complaints. In a 5-year study by Massimo[4] on 300 patients with acute pericarditis, 98.3% had chest pain.

In the present study, 25.9% of patients had chest pain, 51.7% had shortness of breath, 16.4% had both symptoms and 6% had nonspecific symptoms. Of these, 1.7% of patients were discovered accidentally without any complaints. Based on the findings of this study and previous studies, the most common complaints of patients with pericardial involvement are shortness of breath and chest pain.

In terms of clinical examination, 35% of patients in the study by Massimo[4], 24% of patients in Biuatti's[3], 85% of patients in Matthew's[12] and 85% of patients in Marcio's[2] had pericardial rubbing. In the present study, 56% had reduction of heart sounds, 4.3% had pericardial effusion, 7.8% had souffle, and 31.9% had normal auscultation. The reason for the difference between the level of pericardial effusion in this study and the existing studies is probably due to the inclusion of more types of pericardial diseases in this study (including all pericardial effusions).

In the study by Marcio[2], a pericarditis ECG was present in 80% of patients with acute pericarditis. The study by Niraj[5] reported that the ECG did not appear in uremic pericarditis until the myocardium was involved. On the other hand, he stated that these changes are seen in 80% of patients with acute pericarditis. In the study by Aazami[11] conducted in Ardabil, 83.7% of ECGs had low voltage and 40.8% had classic changes. In the present study, 19.8% had low voltage and 15.5% had classic changes (changes specific to pericarditis). Since in the course of acute pericarditis, changes in the ECG disappear after a while, late referral or lack of timely diagnosis can cause this significant difference between classic ECGs in Iran and developing countries.

In the study by Aazami[11], 24.5% of patients had atrial fibrillation rhythm and 53.1% had normal sinus rhythm. In the study by David.H[13], of 100 patients with pericarditis, 7 had arrhythmias (all of which were atrial). In the present study, 2.6% had arrhythmias (all atrial).

In terms of echocardiography, 60% of patients in the study by Massimo[4] had pericardial effusion (79.4% mild, 10% moderate effusion, 10.6% extensive effusion). In the study by Marcio[2], about 3% of patients had extensive effusion. In the study by Niraj[5], 60% of patients had mild to moderate effusion and 15% of patients had extensive effusion. In the present study, 81.9% of patients had pericardial effusion (44.8% mild to moderate and 37.1% extensive effusion). All patients with pericarditis followed by uremia, cancer, and acute myocardial infarction had effusion. On the other hand, all patients with pericarditis had severe effusion after acute myocardial infarction and the majority of cases of pericarditis had severe effusion. In other cases, there was mild to moderate pericardial effusion. This difference in pericardial effusion rate may be due to whether or not the patient is symptomatic. In patients with less typical chest pain (such as pericarditis following acute myocardial infarction, uremia, cancer) the disease is more advanced and the patient refers with a wider pericardial effusion.

Pathologically, in the study by Massimo[14], of 450 patients with acute pericarditis, 7.3% had a neoplastic cause, which was new in 4%. In this study, 18.1% of patients had pericarditis due to cancer, 37.1% had acute inflammation, 8.6% chronic inflammation, 5.2% had granuloma and 4.3% had calcification, and about 8.6% of patients had no pathology.

In the study by Marcio[2], the rate of compressive pericarditis was reported to be 0.5% in idiopathic cases of acute pericarditis. In this study, among those with acute pericarditis, 45.7% had tamponade and 4.3% had compressive pericarditis. The above report of cases of compressive pericarditis as a complication of acute pericarditis in our country can be due to late referral or irregular follow-up of these patients.

In the study by Martin.M[6], the mortality rate in hospitalized patients was 1.1%. In the present study, the mortality rate in hospitalized patients was 3.4%. This significant difference can be due to the progression of the disease in developing countries due to late patient referrals.

CONCLUSION

In this study, idiopathic type was the most common type of acute pericarditis as in developing countries, with the difference that its frequency was lower compared to developed countries. In other words, cases with a specific cause in this study was more than developed countries. This discrepancy may be due to the fact that in their studies, outpatients were also included in the study, while in this study only the records of hospitalized patients were studied. However, it should be taken into account that in recent years, no similar study has been done and the new papers are all reviews based on past findings. In all papers, the prevalence of pericarditis was higher in men than women. However, no paper was found that

examined the causes of this prevalence. In this study, the prevalence of pericarditis was higher in men among all causes except cancerous pericarditis. This finding can be attributed to the high prevalence of Brest cancer in the development of acute pericarditis. In terms of specific symptoms (shortness of breath and typical chest pain), the most common complaint was shortness of breath. It should be noted that in pericarditis caused by uremia following acute myocardial infarction, there were no complaints of typical chest pain.

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Conflict of Interest: The authors declare that there is no conflict of interest.

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