

**Original Article****Clinical Characteristics of Patients with Pericardial Effusion****Madhab Bista<sup>1\*</sup>, Rajesh Nepal<sup>1</sup>, Manoj Aryal<sup>1</sup>, Sushant Katwal<sup>1</sup>, Manoj Kumar Thakur<sup>2</sup>**<sup>1</sup>Cardiology Unit, Department of Internal Medicine, Nobel Medical College Teaching Hospital, Biratnagar, Nepal, <sup>2</sup>Department of Medicine, Koshi Zonal Hospital, Biratnagar, NepalArticle Received: 18<sup>th</sup> September, 2020; Accepted: 25<sup>th</sup> February, 2021; Published: 30<sup>th</sup> June, 2021**DOI: <http://dx.doi.org/10.3126/jonmc.v10i1.37832>****Abstract****Background**

Pericardial effusion (PE) is one of the common pericardial diseases in our population with its associated morbidity and mortality. Our study aims to evaluate the clinical characteristics of patients with PE from eastern region of Nepal.

**Materials and Methods**

A descriptive cross-sectional study carried out in tertiary care center in eastern region of Nepal from March 2019 to February 2020. A total of 45 cases of PE were enrolled by convenient sampling method. Diagnosis was made based on clinical history, examination, and relevant laboratory investigations. Data was entered in Microsoft excel 2007 and converted into IBM SPSS data editor, version 20.


**Results**

Forty five patients were included with mean age of  $55.36 \pm 16.38$  years. Twenty seven patients (60%) were male and 18 (40%) were female. Hypertension was present in 12 (26.7%) and diabetes mellitus in 13 (28.9%). Mean serum hemoglobin was  $10.85 \pm 2.09$  gm/dl. Chronic kidney disease (Uremia), tuberculosis and hypothyroidism were the common causes of PE. Common clinical symptoms were dyspnea, fever, and cough and chest pain. Moderate to large pericardial effusion was noted in 21 (46.7%) of patients. Cardiac tamponade was present in 6 (13.3%). Twenty seven patients (60%) patients underwent pericardiocentesis.

**Conclusion**

Chronic kidney disease, tuberculosis and hypothyroidism were the common causes of PE with male predominance. Dyspnea was the most common presenting symptom. Cardiac tamponade was relatively less common.

**Keywords:** *Pericardiocentesis, Pericardial effusion, Study characteristics*

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**Citation**

Bista M, Nepal R, Aryal M, Katwal S, Thakur MK, Clinical Characteristics of Patients with Pericardial Effusion, JoNMC. 10:1 (2021) 16-19.



## Introduction

Pericardial effusion (PE) is defined as the presence of abnormal amount of fluid in the pericardial space. PE can be acute or chronic, is usually secondary to inflammation to the pericardium called pericarditis. It is caused by various systemic or local disorders secondary to infections, malignancy, autoimmune disorders or inflammatory diseases. Clinical pictures of PE are highly dependent on rapidity of accumulation of fluid in the pericardial space. Rapid collection of fluid may cause rise in intrapericardial pressures with as little as 80 mL of fluid, whereas slow collection can accommodate as much as 2 liters without symptoms [1, 2].

Most idiopathic pericarditis and PE are presumed to be of viral etiology based on clinical picture by ruling out other causes [3]. Idiopathic chronic PE constitutes 15- 20% and can even lead to large PE and cardiac tamponade. PE leading to hemodynamic instability is medical emergency and needs immediate pericardiocentesis. There is lack of data about clinical characteristics of patients with PE from our population. Our study aims to evaluate the clinical profile of patients with PE from eastern region of Nepal.

## Materials and Methods

This is a descriptive cross-sectional study carried out in the cardiology unit of Nobel Medical College Teaching Hospital located in eastern region of Nepal over a period of 1 year from March 2019 to February 2020. A total of 45 cases of pericardial effusion of both gender were enrolled by convenient sampling method. The sample size of  $n = 45$  (more than calculated size of 38) was taken. It was done using formula,  $n = Z^2 \times p \times q / e^2$  ( $Z=1.96$ ,  $p=2.5\%$ ,  $q= 1-p$ ,  $e=5\%$ ). Diagnosis of pericardial effusion was made by echocardiography (echo) based on echo free space of pericardial fluid at least 10 mm around right or the left ventricle.

Laboratory evaluation for the etiology of PE included complete blood count, serum urea and creatinine, chest X-ray, Electrocardiogram, thyroid profile and pericardial fluid analysis. Pericardial fluid was analyzed for cells, proteins, malignant cells and ADA. Final diagnosis was made based on clinical history, examination, and relevant laboratory investigations. The diagnosis of acute idiopathic or viral etiology was presumptive and was based on the clinical history, and ruling out of other etiologies. Echocardiography guided diagnostic or therapeutic pericardiocentesis through apical or sub-xiphoid approach was performed for moderate to large PE or tamponade physiology by placing pigtail catheter

in pericardial space. Data was entered in Microsoft excel 2007 and converted into IBM SPSS data editor, version 20. Continuous variables were expressed as mean and standard deviation (SD). Categorical variables were expressed as frequencies and percentages.

## Results

Forty five patients were included with mean age of  $55.36 \pm 16.38$  years. Twenty seven patients (60%) were male and 18 (40%) were female. **Table 1** shows the baseline clinical characteristics of patients with PE. Hypertension was present in 12 (26.7%) and diabetes mellitus 13 (28.9%). Mean serum hemoglobin was  $10.85 \pm 2.09$  gm/dl.

Common etiologies of pericardial effusion were uremia (chronic kidney disease) ( $n=10$ , 60%) followed by tuberculosis ( $n=8$ , 17.8%) and hypothyroidism ( $N=8$ , 17.8 %) then post viral illness ( $n=7$ , 15.6%), Malignancy ( $n=4$ , 8.9%), post myocardial infarction ( $n=3$ , 6.7%), post pericardiotomy ( $n=3$ , 6.7%) and unknown etiology ( $n=2$ , 4.4%) as shown in **Figure 1**. Common clinical symptoms were dyspnea (60%), fever and cough (13.3%) each, chest pain (11.1%).

**Table 1: Baseline characteristics of patients with pericardial effusion (n=45)**

Variables	N=45	Percent
<b>Gender</b>		
Male	27	60%
Female	18	40%
<b>Age in years, (Mean± SD)</b>		
Total	55.36 ± 16.38	
Male	56.52 ± 15.57	
Female	53.61 ± 17.85	
<b>Chief complaints</b>		
Dyspnea	27	60%
Fever	6	13.3%
Cough	6	13.3%
Chest pain	5	11.1%
Leg edema	1	2.2%
<b>Etiology</b>		
Chronic kidney disease	10	22.2%
Tuberculosis	8	17.8%
Hypothyroidism	8	17.8%
Post viral illness	7	15.6%
Malignancy	4	8.9%
Post MI	3	6.7%
Post pericardiotomy	3	6.7%
Other	2	4.4%
Hypertension	12	26.7%
Type 2 Diabetes Mellitus	13	28.9%
Serum hemoglobin, gm/dl	10.85 ± 2.09	
Serum TLC	11366 ± 8758	
Sinus rhythm	37	82.2%
Atrial fibrillation	8	17.8%



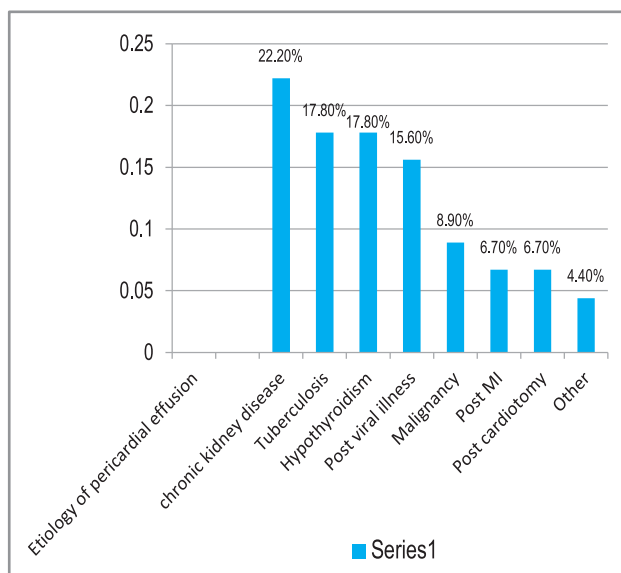


Figure 1: Etiologies of pericardial effusion

Table 2: Severity of pericardial effusion (n=45)

Severity	N (%)
Mild	24 (53.3%)
Moderate	14 (31.1%)
Large	7 (15.6%)
Tamponade	6 (13.3%)

Moderate to large pericardial effusion was noted in 21 (46.7%) of patients as shown in **Table 2**. Tamponade physiology was present in 6 (13.3%) based on clinical and echocardiography findings. Diagnostic pericardiocentesis was performed in 14 (31.1%) and therapeutic pericardiocentesis was performed in 13 (28.9%). Diagnostic pericardiocentesis was performed in left lateral position at the site of cardiac apex under echocardiography guidance and therapeutic procedure was done from subxiphoid approach by insertion of 6F pigtail drainage catheter. No peri-procedural complications like cardiac perforation, ventricular fibrillation, or pneumothorax were observed. The macroscopic appearance of the drained fluid was serous in 10 patients, haemorrhagic in 9 patients, straw coloured in 8 patients. Findings of biochemical analysis of specimens are shown in **Table 3**.

Table 3: Laboratory analysis of pericardial fluid (n=27)

Parameters	Mean $\pm$ SD
TLC	547.89 $\pm$ 539.08
Neutrophils	31.73 $\pm$ 35.34
Lymphocytes	17.07 $\pm$ 21.20
Sugar	32.33 $\pm$ 38.09
Protein	1.96 $\pm$ 2.22
ADA	11.76 $\pm$ 16.38
ADA in TB patients	24.37 $\pm$ 29.69

## Discussion

PE results from accumulation of fluid in pericardial space due to various etiologies. The clinical picture of PE depends on the underlying etiology and the speed with which fluid accumulates. Inflammation of the pericardium with an associated PE can occur as an isolated clinical condition or as a part of systemic illness [4]. Similar to a study done by Khanal RR et al [5] in Kathmandu, our study showed male predominance (60%) and the most common symptom was dyspnea. Tuberculosis remains the most common cause of PE in developing countries and malignancy is the commonest cause in industrialized world [6]. Some studies have shown that idiopathic conditions were found to be the leading cause of moderate to severe PE [7, 8]. In the contrary, the leading cause of pericardial effusion in our study was uremia secondary to chronic kidney disease followed tuberculosis and hypothyroidism. This could be due to the predominance of CKD patients attending for hemodialysis in our center.

Cardiac tamponade results when fluid accumulates under pressure surrounding the heart to the point cardiac filling is impaired leading to elevated venous pressures and reduced cardiac output resulting into shock. This may be fatal if left untreated [9]. In our study, six patients presented with clinical picture of cardiac tamponade and underwent therapeutic pericardiocentesis with no procedure related complications.

It must be recognized that pericardiocentesis may not yield an exact diagnosis in most patients, and therefore, the reason for draining large PE is to avoid potential progression to cardiac tamponade. In our study, 60% of the patients underwent pericardiocentesis and laboratory analysis of the fluid. Majority did not yield the suggestive findings pointing to the particular diagnosis and diagnosis was made based on the history, presence of underlying systemic illness and some clue from the fluid analysis.

## Limitations

This is a single-center, small sized cross-sectional study. Higher percentage of patients with CKD was included likely due to the presence of large dialysis unit in this center. Our patients may not be representative of the general population due to selection bias.

## Conclusion

CKD, tuberculosis and hypothyroidism were the common causes of PE with male predominance. Presentation with tamponade physiology was relatively less common with dyspnea being the



most common presenting symptom. Larger multi-center studies are required to assess the characteristics relevant to the general population.

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