



Study of etiological profile of large pericardial effusion and outcome of post pericardiocentesis in a tertiary care hospital in central part of Nepal.

Keshav Budhathoki¹, Sudhir Regmi², Shyam raj Regmi², Bishnu Mani Dhital², Ananda GC³, Sabeena Sedhai³, Shahid Murtuza⁴, Puran Gurung⁴, Amir Khan⁴

Department of Cardiology, Chitwan Medical College and Teaching Hospital, Bharatpur, Chitwan, Nepal

Corresponding Author: Keshav Budhathoki
Department of Cardiology
Chitwan Medical College and Teaching Hospital, Chitwan, Nepal
Email Address: keshavbudhathoki@gmail.com
Cell Number: +9779841277228

Abstract

Background: Pericardial tamponade is a life threatening condition caused by the accumulation of fluids in the pericardial space. It is associated with increased risk of cardio respiratory failure and death. Mortality and morbidity can be minimized with the early diagnosis and treatment with pericardiocentesis. The etiology of pericardial effusion varies in different parts of the world and is related to the relative prevalence of different diseases.

Methods: This is a single center prospective observational study where patient diagnosed with large pericardial effusion with or without tamponade were included. 24 cases diagnosed to have large pericardial effusion were established with echocardiography. Evaluation to find out the cause of large pericardial effusion were performed with various investigations.

Results: Our patient age ranged from 16 to 76 years with mean age of 55.12 ± 2.97 . Most common etiology of pericardial effusion was tuberculosis 37.5% followed by malignancy 25% then idiopathic 20.8% then hypothyroidism 8.33% followed by least being CKD and Viral infection (HBV) (4.16%). Majority of patients had tamponade or impending tamponade (70.8%). Four patients had reaccumulation of pericardial fluid where in one case needed pericardiocentesis twice. During pericardiocentesis, three patients developed non-fatal arrhythmias that is 2 patients had PVC's and 1 had APC's.

Conclusion: By this study, we have observed various causes of pericardial effusion, tuberculosis being the most common cause. So, pericardiocentesis is the safe procedure

in saving life when patient presented with tamponade or impending tamponade and helps in ascertaining the cause of it.

Keywords: etiology, large pericardial effusion, outcome, pericardiocentesis.

Introduction:

Normally, Pericardium contains 25-50 ml of serous fluid within its two layer, parietal and visceral. 1 The normal pericardium exerts a restraining force and prevent sudden dilatation of cardiac chambers especially the right atrium and right ventricle during exercise with hypervolemia.2 Pericardial effusion is the presence of abnormal and excessive amount of fluid in the pericardial space. It is caused by variety of local and systemic disorders or may be idiopathic. Transudative fluid results from obstruction to fluid drainage which happens via lymphatics whereas exudative effusion occurs secondary to inflammation, infection, malignant or autoimmune processes within the pericardium. Rapid accumulation of pericardial fluid may cause elevated intrapericardial pressure with as little as 80ml while slowly accumulating effusion can accommodate upto 2 litres of pericardial fluid without any symptoms.3.4

Most idiopathic cause is assumed to be viral in etiology but testing for specific viruses is not routinely done because of the cost involved and negligible impact on management.5-7 Clear lung fields with cardiomegaly should raise the suspicion of pericardial effusion and echocardiography plays a vital role in verifying the presence of pericardial fluid, size of pericardial effusion and also an evaluation of hemodynamics. Echo free space of more than 20mm during diastole is considered large pericardial effusion. The most common cause of pericardial effusion in developed countries are neoplastic, idiopathic and uremia whereas in developing country tuberculosis is the most common cause.10.11 Computed tomography is a reliable method which can precisely identify the nature of the echocardiographic findings.12

Methods:

This is a prospective observational hospital based study carried out in the department of cardiology at Chitwan Medical College, Bharatpur, Chitwan from November 2018 to October 2020 after approval from institutional ethical committee. Informed consent was taken from each participated patient with large pericardial effusion who were admitted at this center. Altogether 24 cases diagnosed with large pericardial effusion with or without tamponade by echocardiography were taken into consideration. Evaluation for the case of pericardial effusion included Complete blood count with ESR, CRP, Blood urea, serum creatinine, chest X-ray, ECG, thyroid profile, ANA, Rheumatoid factor, and pericardiocentesis Pericardial fluid was analysed for cells, proteins, LDH, ADA, cytology, Gram staining, AFB staining and cultures. Final diagnosis was made on the basis of clinical history, examination and specific laboratory investigations for tuberculosis, uraemia, malignancy, collagen vascular disease, hypothyroidism etc. The diagnosis of acute idiopathic was presumptive and was based on the clinical scenerio and negative screening tests for other etiologies. Therapeutic echo and fluoroscopy guided percutaneous pericardiocentesis was performed by placing femoral sheath and pigtail catheter in some cases in the pericardial space through subxiphoid approach. Statistical analysis was conducted using SPSS 17 software. Continuous variable were presented as mean and standard deviation whereas categorical variables were presented as number and percentage.

Results:

This study included 24 cases with age ranging from 16 to 76 years with a mean age of 55.12± 2.97. Table 1 showed 11 patients (45.8%) were male and 13 patients (54.2%) were female. Table 2 showed the most common etiology of pericardial effusion was tuberculosis 37.5% followed by malignancy 25% followed by idiopathic 20.8%. The least common etiology of pericardial effusion was viral hepatitis (HBV) and chronic kidney disease 4.16%. 70.8% (17 Patients) presented in tamponade or impending tamponade whereas 29.2 % (7 patients) with only large pericardial effusion. Appearance of pericardiocentesis fluid was haemorrhagic in 9 cases (37.5%) while serous in 8 cases (33.33%) and serosanguinous in 7 patients (29.17%). Pericardial fluid analysis showed high ADA in 14 cases (58.3%) and none showed malignant cells and acid fast bacilli in pericardial fluid analysis. Reaccumulation happened in 4 cases with twice in one cases and re-pericardiocentesis performed in that case. During procedure, none has life threatening complication besides two had VPCs and one had APCs. During in-hospital, one patient got expired few days after pericardiocentesis due to the sequel of carcinoma of esophagus.

Table 1: Demographics and chronic diseases of large pericardial effusion patients

Variable	Frequency
Mean age +_ SD (Median)	55.12+_ 2.97
Gender	
Male	11(45.8%)
Female	13 (54.2)
Chronic diseases	
Diabetes Mellitus	1 (4.2%)
Hypertension	2 (8.3%)
Chronic kidney disease	1 (4.2%)
Dyslipidaemia	0
Heart Failure	1 (4.2%)
Lung Cancer	3 (12.5%)
Breast cancer	1 (4.2%)
Lymphoma (Non-Hodgkin)	1 (4.2%)
Oesophageal Cancer	1 (4.2%)
Connective tissue disease	0
Prostate cancer	0

Metastasis	0
Multiple Myeloma	0
Autoimmune disease	0
Post Myocardial Infarction	0
Radiation	0

Table 2: Etiology of large pericardial effusion:

Etiology	No. of patients
Malignancy	6 (25%)
Viral infection (HBV)	1 (4.2%)
Heart Failure	1 (4.2%)
Tuberculosis	9 (37.5%)
Hypothyroidism	2 (8.3%)
Idiopathic	5 (20.8%)
Autoimmune	0
Uremia	0
Post MI	0
Connective tissue disease	0
HIV	0

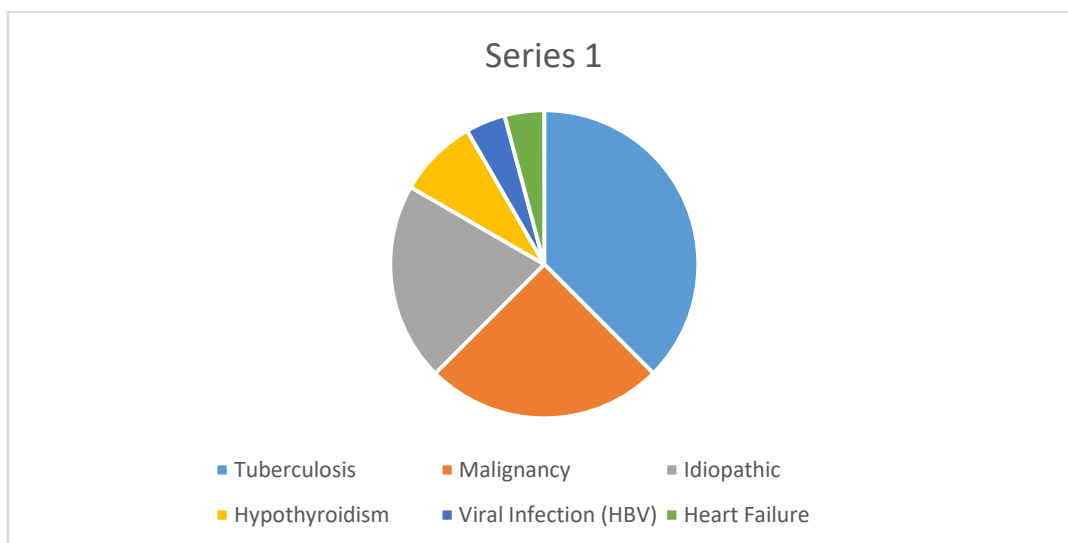


Figure 1: Pie Chart for the causes of large pericardial effusion.

Table 3: Pericardial effusion severity for patients who underwent pericardiocentesis

Severity	No. of patients
Mild	0
Moderate	0
Large	24 (100%)
Cardiac Tamponade or Impending tamponade	
Yes	17 (70.8%)
NO	7 (29.2%)

Table 4: Pericardial fluid analysis

Apperance	No. of patients
Serous	8 (33.3%)
Serosanguinous	7 (29.2%)
Hemorrhagic	9 (37.5%)
Cytology	
Malignant	0
Normal	24 (100%)
ADA Level	
High	14 (58.3%)
Normal	10 (41.7%)
AFB	
Detected	0

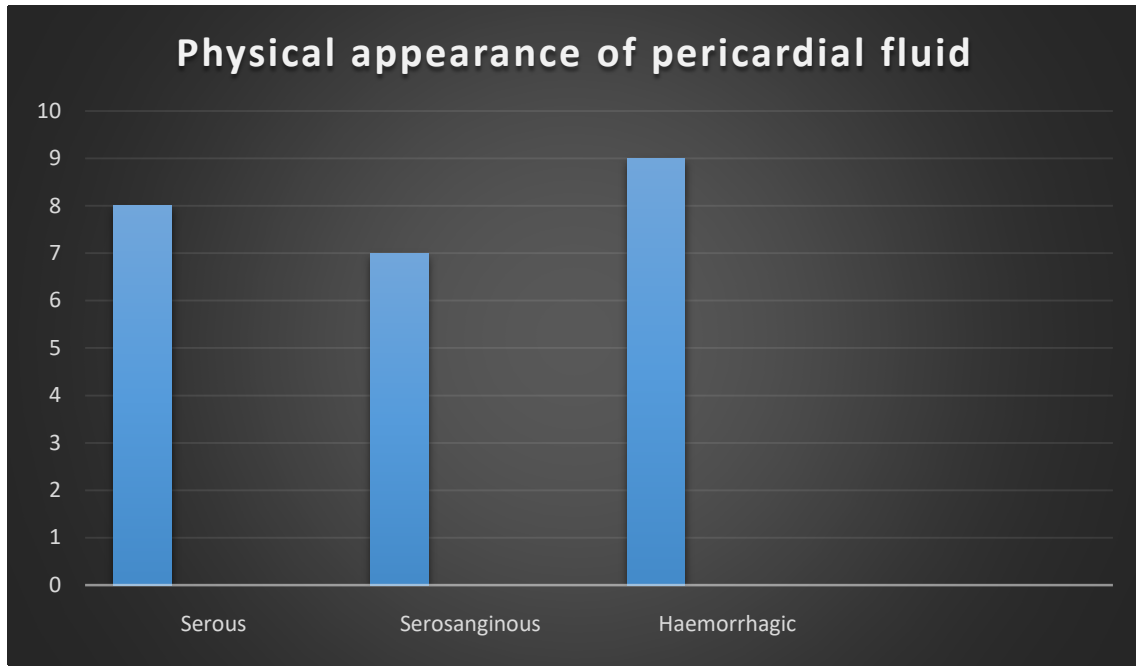


Table 5: Outcome after pericardiocentesis

Outcome	No. of patients
Reaccumulation	4 (16.7%)
Repeated pericardiocentesis	5 (20.8%)
Arrhythmia	3 (12.5%)
APC's	1 (4.2%)
PVC's	2 (8.3%)
Haematoma	0
Arrest	0
Hypotension	0
Death (Mortality)	1 (Ca Oesophagus) (4.2%)

Discussion:

Pericardial effusion is a relatively common findings in our daily clinical practice. Pericardial effusion is the presence of abnormal and excessive amount of fluid in the pericardial space. It is caused by variety of local and systemic disorders or may be idiopathic. Pericardial effusion can be acute or chronic. Pericardial effusion can occur at any age but age specific etiologies may be different. The cause of abnormal and excessive fluid production depends on the underlying etiology. Commonly etiology of

pericardial effusion are infectious/ idiopathic pericarditis, malignancy, renal failure and collagen vascular disease. Pericardial effusion resulting from acute pericarditis with less than 1 to 2 weeks of duration is considered as idiopathic. Mild pericardial effusion is considered when echo free space is less than 10mm during diastole by M-mode echocardiography while moderate pericardial effusion is labelled when echo free space of anterior plus posterior pericardial space is 10-20mm during diastole whereas echo free space of more than 20mm is considered large pericardial effusion.

In our study, out of 24 cases of pericardial effusion, the average age of the patient is 55.12 ± 2.97 years. The most common etiology of pericardial effusion was tuberculosis (37.5%), malignancy (25%), idiopathic (20.8%), Hypothyroidism (8.33%) and 4.16% being CCF. 70.8% (17 Patients) presented in tamponade or impending tamponade whereas 29.2 % (7 patients) presented with only large pericardial effusion. Appearance of pericardiocentesis fluid was haemorrhagic in 9 cases (37.5%) while serous in 8 cases (33.33%) and serosanguinous in 7 patients (29.17%). Pericardial fluid analysis showed high ADA in 14 cases (58.3%) and none showed malignant cells and acid fast bacilli in pericardial fluid analysis. Reaccumulation happened in 4 cases with twice in one cases and re-pericardiocentesis performed in that case. During procedure, none has life threatening complication besides two had VPCs and one had APCs. During in-hospital, one got expired due to sequel of carcinoma of esophagus. The findings of this study is consistent with the findings of developing countries but differ from western studies due to low prevalence of infectious disease and high prevalence of neoplastic disease.

The study by Sagrista- Sauleda et al 10 included 322 patients, 132 with moderate and 190 with severe pericardial effusion. In this series, the most common diagnosis was idiopathic-20%, neoplastic-13%, post MI-8%, Uraemia-6%, Collagen Vascular disease-5%, tuberculosis-2%.

The study by Corey et al 12 investigated the etiology of pericardial effusion in 57 patients. An etiologic diagnosis was made in 53 patients (93%). The most common diagnosis were Malignancy (23%), viral infection (14%), radiation induced inflammation (14%), collagen vascular disease (12%) and uraemia (12%).

Colombo et al. described 20 patients with pericardial effusion, 44% have presented with cardiac tamponade. Neoplastic 44%, idiopathic 32% and uraemia 20% were found to be min reason that cause cardiac tamponade.13

Turak et al. described 104 patients with established moderate to severe pericardial effusion, idiopathic conditions were found to be the leading cause of pericardial effusion.14 They also showed that malignancy, congestive heart failure and tuberculosis were other primary etiologies that might lead to pericardial effusion.

Conclusion:

From this study, we have observed the important disease factor for the occurrence of pericardial effusion such as tuberculosis, malignancy, idiopathic, hypothyroidism, heart failure etc. This study would help in early diagnosis and prompt management of patients with large pericardial effusion especially in remote areas which remains a challenging for identification, diagnosis, pericardiocentesis and management of the cause in developing country like Nepal where technology and trained manpower were lacking. More detailed epidemiologic studies are required to improve understanding of the

burden of large pericardial effusion, identification of the cause and outcome of pericardiocentesis.

Limitation:

1. Limited to single center with small sample size.
2. Focused only on immediate impact of pericardiocentesis.
3. The Long term outcomes were not evaluated.

Reference:

1. Shabetai R. The Pericardium Mass, Kluwer; Chapter 1-4. Norwell, MA: Kluwer Academic Publishers; 2003:1-166. (Link)
2. Braunwald E. Pericardial Diseases. Chapter 288. Harrison Principles of Internal Medicine. 19th ed. 2015; 2:1571. (Link)
3. Nataraj Setty HS, Yeriswamy MC, Jadav S, Patra S, Swamy K, et al. Clinico-Etiological Profile of Cardiac Tamponade in a Tertiary Care Centre. J Cardiovasc Med Cardiol. 2016, 3(1): 041-044. (DOI).
4. Jamal Uddin MD et al. Study of etiological and clinical profile of pericardial effusion in a tertiary care hospital in Kosi region of Bihar, Int J Adv Med. 2016 Aug; 3(3):514-518. (DOI).
5. Fanne RA, Banai S, Chorin U, Rogowski O, Keren G, Roth A. Diagnostic yield of extensive infectious panel testing in acute pericarditis. Cardiology. 2011; 119:134. (DOI).
6. Sagristà-Sauleda J, Sarrias Mercé A, Soler-Soler J. Diagnosis and management of pericardial effusion. World J Cardiol. 2011; 3(5):135-43. (DOI)
7. Golland S, Caspi A, Malnick SD. Idiopathic chronic pericardial effusion. N Engl J Med. 2011; 342(19):1449-50. (DOI)
8. Yaqoob I, Khan KA, Beig JR, Bhat IA, Trambo NA, Hafeez I, Lone AA, Samreen S. Etiological Profile of Pericardial effusion in Kashmir: A Study from Northern India. Int. Inv. J. Med. Med. 2016, 3(1): Sci. Vol. 3(1): 1-5. (DOI)
9. Restrepo CS, Lemos DF, Lemos JA, Velasquez E, Diethelm L, Ovella TA, Martinez S, Carrillo J, Moncada R, Klein JS. Imaging findings in cardiac tamponade with emphasis on CT. Radiographics. 2007; 27: 1595-610. (Link)
10. Colombo A, Olson HG, Egan J, Gardin JM. Etiology and prognostic implications of a large pericardial effusion in men. Clin Cardiol. 1988; 11:389-94 (Link)
11. Sagristà-Sauleda J, Mercé J, Permanyer-Miralda G, Soler- Soler J. Clinical clues to the causes of large pericardial effusions. Am J Med. 2000; 109:95-101. (DOI)
12. Porte HL, Janecki-Delebecq TJ, Finzi L, Métois DG, Millaire A, Wurtz AJ. Pericardoscopy for primary management of pericardial effusion in cancer patients. Eur J Cardiothorac Surg. 1999; 16:287-291. (DOI)

13. Albugami S, Al-Husayni F, Almalki A, et al. (January 11, 2020) Etiology of Pericardial Effusion and Outcomes Post Pericardiocentesis in the Western Region of Saudi Arabia: A Single-center Experience. *Cureus*. 2020 12(1): e6627. (DOI)
14. Colombo A, Olson HG, Egan J, Gardin JM. Etiology and prognostic implications of a large pericardial effusion in men. *Clin Cardiol*. 1988; 11: 389–394. (DOI)
15. Turak O , Gürel Ö , Çağlı K , Özcan F , Ekizler A , Cebeci M , İşleyen A , Akpınar İ , Gırboviç E , Yalçınkaya A , Başar N . Pericardial effusion: etiology, diagnosis and management. *Duzce Medical Journal*. 2012; 14(2): 23-27. (DOI)

