

Trends in Etiological Profile of Patients with Massive Pericardial Effusion with Signs of Tamponade Presenting to a Tertiary Care Hospital

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Abstract: *Virtually any disease that can cause pericarditis can cause an effusion. About 20% of large, symptomatic effusions without an obvious etiology following routine evaluation constitute the initial presentation of a cancer. This study is a prospective study including patients presenting with pericardial effusion and features of tamponade to NRI medical college from Nov 2017 to May 2019. The diagnosis of pericardial effusion was established by echocardiography, seen as a echo free space (representing pericardial fluid) surrounding the heart, more than 10 mm. Evaluation for the cause of PE included complete blood count with ESR, blood urea, serum creatinine, tuberculin skin test, chest X-ray, ECG, thyroid profile, ANA, rheumatoid factor, CT chest/MRI and pericardiocentesis. Pericardial fluid was analysed for cells, proteins, LDH, malignant cells, ADA, PCR (for mycobacterium tuberculosis), gram staining, AFB staining and cultures, CT-Chest with contrast. Most common cause for pericardial effusion in our study was tuberculosis (65.1%), followed by malignancy (20.9%), hypothyroidism (9.3%), chronic kidney disease (CKD) (2.3%), pyogenic (2.3%). Out of malignant aetiologies, most common was lung malignancy followed by breast malignancy. Tuberculosis was the most common cause in our study and this differed from western literature where malignancy was leading.*

Keywords: pericardial effusion, Tamponade, pericardiocentesis, tuberculosis, malignancy

1. Introduction

Pericardium normally contains up to 20 ml of serous fluid within its two layers¹. Pericardial effusion (PE) is the presence of an abnormal amount of fluid in the pericardial space. Clinical manifestations of pericardial effusion are highly dependent on the rate of accumulation of fluid in the pericardial sac. Rapid accumulation of pericardial fluid may cause elevated intrapericardial pressures with as little as 80 mL of fluid², while as slowly progressing effusions can accumulate upto 2 liters without symptoms³. Cardiac tamponade is defined as a haemodynamically significant cardiac compression caused by pericardial fluid⁴. The fluid may be blood, pus, effusion (transudate or exudate) or air. Transudative fluids result from obstruction to fluid drainage, which occurs through lymphatic channels. Exudative effusion occurs secondary to inflammatory, infectious, malignant or autoimmune processes within the pericardium. Idiopathic chronic pericardial effusion constitutes 15- 20% and can even lead to large pericardial effusion and cardiac tamponade. It is defined as collection of pericardial fluid that persists for greater than three months with no apparent cause. Its treatment is pericardiocentesis, which also has a relatively high diagnostic performance (around 30%)⁵. Nevertheless, diagnostic pericardiocentesis has a low performance (5%), which is why it is reserved for cases of suspicion of purulent pericarditis or long-standing pericardial effusion without a clear diagnosis.

Among the imaging techniques used for diagnosis, echocardiography remains the cornerstone for its ease of execution and for its ability to assess the hemodynamic aspects of the effusion. Nevertheless, its diagnostic

capability to recognize the underlying aetiology is low⁶. In these patients, chest computed tomography (CT) can offer some advantages: this imaging technique allows assessment of the entire chest and detection of associated abnormalities in the mediastinum, lung, and adjacent structures⁷. The guidelines of the European Society of Cardiology for the diagnosis and management of pericardial diseases consider chest CT as an optional diagnostic tool that is indicated only when previous test results have been inconclusive⁸. The present study was done to evaluate the etiology of pericardial effusions at our centre and its correlation with literature.

2. Materials and Methods

This study is a prospective study including patients presenting with pericardial effusion and features of tamponade to NRI medical college from Nov 2017 to May 2019. Total of 43 patients were included in the study.

Iatrogenic (cardiac surgery, catheterization) and post traumatic cases were excluded. The diagnosis of pericardial effusion was established by echocardiography, seen as a echo free space (representing pericardial fluid) surrounding the heart, more than 10 mm. The size of the Effusion was categorized as moderate-sized when 10 to 20 mm and severe when more than 20 mm. Tamponade was defined as early diastolic right atrial and/or ventricular collapse or more than 25% change in mitral inflow velocities with respiration in presence of tachycardia, hypotension or significant paradox.

Evaluation for the cause of PE included complete blood count with ESR, Blood urea, serum creatinine, tuberculin

skin test, chest X-ray, ECG, thyroid profile, ANA, rheumatoid factor, CT chest/MRI and pericardiocentesis. Pericardial fluid was analysed for cells, proteins, LDH, malignant cells, ADA, PCR (for mycobacterium tuberculosis), gram staining, AFB staining and cultures, CT-Chest with contrast. Final diagnosis was based on clinical history, examination, and specific laboratory investigations for tuberculosis, uraemia, malignancy, collagen vascular disease hypothyroidism etc.

Therapeutic Echo-guided percutaneous pericardiocentesis was performed by placing pigtail catheter in pericardial space through subxiphoid approach in 43 patients presenting with cardiac tamponade.

3. Results

Our study included 43 patients of whom males were 22 (51.16%) and females included 21 (48.84%). Mean age of patients with pericardial effusion was 43.86 +/- 17.52. Patients with age < 65 years were 37 (86%) and with age > 65 years were 6 (14%). The following are clinical characteristics of patients – history of diabetes was present in 8 (18.60%) patients, hypertension was present in 7 (39.5%), CKD in one patient (2.32%), 5 patients (11.62%) were smokers and two (4.65%) patients gave history of regular alcohol consumption.(Table-1)

Table 1: Clinical Characteristics of Study Patients

Characteristics		Number (%)
No of patients		43
Mean Age		43.86 +/- 17.52
Male	No of patients	22 (51.16%)
	Mean age	41.22 +/- 17.32
Female	No of patients	21 (48.84%)
	Mean age	46.61 +/- 17.70
Diabetes		8 (18.60%)
Hypertension		7 (39.5%)
CKD		1 (2.32%)
H/o Smoking		5 (11.62%)
H/o Alcohol intake		2 (4.65%)

Most common cause for Pericardial effusion in our study was Tuberculosis (65.1%), followed by malignancy (20.9%), Hypothyroidism (9.3%), CKD (2.3%), pyogenic (2.3%). Out of malignant aetiologies, most common was lung malignancy followed by breast malignancy (Table-2). Five patients had recurrent pericardial effusion with tamponade requiring repeated pericardiocentesis of which three had tubercular aetiology and two had malignant aetiology. Two patients were started on empirical antituberculosis medications as their evaluation was inconclusive. CT Chest was done in 20 patients and it yielded in diagnosis in 3 patients.

Table 2: Distribution of pericardial effusion patients based on diagnosis

Diagnosis	No of Patients	Percentage
Tuberculosis	28	65.1 %
Malignancy	9	20.9 %
Hypothyroidism	4	9.3 %
CKD	1	2.3 %
Pyogenic	1	2.3 %

4. Discussion

A significant pericardial effusion requires percutaneous drainage to relieve hemodynamic instability and to make a diagnosis, which is crucial for immediate management and long term prognosis. The common causes of pericardial effusion worldwide are malignancy, tuberculosis, and a group of idiopathic, viral, and immunological diseases. In developed countries, malignancy is the most common cause of pericardial effusion, while tuberculosis and bacterial infections have been implicated as the most common pathogenesis in the developing countries.

Our present study demonstrated tuberculosis as the most common aetiology of pericardial effusion, followed by malignancy. Our study suggest that with careful assessment of clinical, serological, biochemical, cytological, echocardiography, computed tomography imaging, etiological diagnosis of pericardial effusion can be made in majority of the patients.

In study done by Tsang et al⁹ and Colombo et al¹⁰ most common aetiology was malignancy, uraemia, idiopathic. This discrepancy in aetiology when compared to our study could be due to change in geographical location, population studied, institutional protocols for diagnosis. Recurrent pericardial effusion was seen in 27% of patients in study done by Tsang et al, where as it was seen in only 9.3 % in our study group. This decrease in recurrence rates could be due to advanced diagnostic tools leading to early diagnosis and initiation of treatment, improved surgical techniques.

Dressler syndrome can cause pleural and pericardial effusions, but cardiac tamponade is an unusual result. Dressler syndrome is generally reported in patients with extensive myocardial infarctions who did not receive thrombolytic therapy. None of our study patients had undergone pericardiocentesis due to dressler syndrome, though a few cases have been reported in previous studies.

None of our study patients died during hospital stay.

5. Conclusion

Tuberculosis was most common aetiology in our study, followed by malignancy, hypothyroidism, CKD. Recurrent rates were less with early diagnosis and initiation of treatment. CT chest is useful in case of inconclusive pericardial fluid results. In hospital mortality rates are very less suggesting that , if done with care, echocardiography guided pericardial catheter placement is a safe procedure.

References

- [1] Shabetai R. The Pericardium Mass, Kluwer; Chapter 1-4. Norwell, MA: Kluwer Academic Publishers;2003:1-166
- [2] LeWinter MM, Hopkins WE. Pericardial disease. Chapter 71. Braunwald's Heart Disease 10th ed. 2014;2:1640-4.
- [3] Willerson JT, Cohn JN. Cardiovascular Medicine. Wellens. 2007;1015-8.

- [4] Spodick DH. Pathophysiology of cardiac tamponade. Chest 1998;113:1372-1378
- [5] Permanyer-Miralda G, Sagristá-Sauleda J, Soler-Soler J. Primary acute pericardial disease: a prospective series of 231 consecutive patients. Am J Cardiol 1985;56:623-30.
- [6] Cosyns B, Plein S, Nihoyanopoulos P, Smiseth O, Achenbach S, Andrade MJ et al. European Association of Cardiovascular Imaging (EACVI) position paper: multimodality imaging in pericardial disease. Eur Heart J Cardiovasc Imaging 2015;16: 12–31
- [7] Verhaert D, Gabriel RS, Johnston D, Lytle BW, Desai MY, Klein AL. The role of multimodality imaging in the management of pericardial disease. Circ Cardiovasc Imaging 2010;3:333–43
- [8] Maisch B, Seferovic PM, Ristic AD, Erbel R, Rienmuller R, Adler Y et al. Guidelines on the diagnosis and management of pericardial diseases executive summary; The Task force on the diagnosis and management of pericardial diseases of the European society of cardiology. Eur Heart J 2004;25: 587–610
- [9] Tsang TS, Enriquez-Sarano M, Freeman WK, Barnes ME, Sinak LJ, et al. (2002) Consecutive 1127 therapeutic echocardiographically pericardiocentesis: clinical profile, practice patterns, and outcomes spanning 21years. Mayo clinic proceedings 77: 429-436.
- [10] Colombo A, Olson HG, Egan J, Gardin JM (1988) Etiology and prognostic implications of a large pericardial effusion in men. Clin Cardiol 11: 389–394.

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