

ORIGINAL RESEARCH

Study of clinico-etiological profile of patients with cardiac tamponade at a tertiary care center

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ABSTRACT

Background: Accumulation of pericardial fluid (exudate, leaks, or blood) in the pericardial space in a quantity sufficient to cause serious obstruction to the inflow of blood to the ventricles results in cardiac tamponade. Present study was aimed to study clinico-etiological profile of patients with cardiac tamponade at a tertiary care center.

Material and Methods: Present study was single-center, prospective, observational study, conducted in patients with cardiac tamponade diagnosed by clinical and echocardiography criteria and admitted to our hospital.

Results: In present study, total 104 patients were evaluated. Majority of them were from 61-70 years (22.12 %) & from 31-40 years (20.19 %). Male (56.73 %) were outnumbered females (43.27 %). Common symptoms among study subjects noted were dyspnea (92.31 %), fatigue (51.92 %), chest pain (36.54 %) & fever (31.73 %). Clinical signs noted were tachypnea (99.04 %), hypotension (85.58 %), tachycardia (52.88 %), JVP elevated (46.15 %), hypoxia (41.35%). Laboratory findings were anemia (77.88 %) & leukocytosis (33.65 %). Common causes of cardiac Tamponade in present study were malignancy (32.69 %), tuberculosis (25.96 %), idiopathic (10.58 %), post-surgical (7.69 %), hypothyroidism (5.77 %) & post mi (4.81 %), ECG findings noted were sinus tachycardia (55.77 %), low voltage QRS (53.85 %) & electrical alternans (37.50 %). In present study, transthoracic echocardiography findings were RA collapse (81.73 %), IVC plethora (75.96 %), trans mitral flow variation (50 %), swinging heart (46.15 %), RV collapse (41.35 %) & strands in pericardium (29.81 %), On Pericardiocentesis, aspirated fluid quantity among majority cases was 500-1000 ml (58.65 %), followed by <500 ml (20.19 %), 1000-1500 ml (18.27 %) & >1500 ml (2.88 %). **Conclusion:** Malignancy followed by tuberculosis were most common cause of cardiac tamponade.

Keywords: Malignancy, cardiac tamponade, echocardiography, pericardiocentesis

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INTRODUCTION

Accumulation of pericardial fluid (exudate, leaks, or blood) in the pericardial space in a quantity sufficient to cause serious obstruction to the inflow of blood to the ventricles results in cardiac tamponade.¹ Diagnosis of cardiac tamponade is based on demonstrating hemodynamic impairment in the presence of moderate or severe pericardial effusion.

The causes of a cardiac tamponade include an acute accumulation of pericardial fluid from a ruptured myocardium (following myocardial infarction, blunt or penetrating cardiac trauma or cardiac perforation following cardiac catheterisation), proximal dissecting aortic aneurysm, carcinomatous infiltrate of the pericardium and acute pericarditis.² Idiopathic or viral pericarditis, iatrogenic injury (invasive procedure-related, post-CABG), uraemia, collagen vascular disease, tuberculosis and bacterial infection may lead to cardiac tamponade.³

Early diagnosis of cardiac tamponade is essential to prevent hemodynamic impairment and fatal outcome. Various modalities available for tamponade diagnosis include clinical signs and symptoms, chest X-ray, echocardiography (ECHO), ECG and other investigations.⁴ The characteristic feature seen on echocardiography is the invagination of the right ventricular free wall in early diastole with further invagination of the right atrial wall at end diastole as pericardial pressure prevents adequate diastolic filling of the cardiac chambers.⁶ Present study was aimed to study clinico-etiological profile of patients with cardiac tamponade at a tertiary care center.

MATERIAL AND METHODS

Present study was single-center, prospective, observational study, conducted in Department of General Medicine, B.K.L. Walawalkar Rural Medical College, Chiplun, India. Study duration was of 2 years (January 2020 to December 2021). Study approval was obtained from institutional ethical committee.

Inclusion criteria

- Patients with cardiac tamponade diagnosed by clinical and echocardiography criteria and admitted to our hospital, willing to participate in present study

Exclusion criteria

- Vulnerable groups or critically ill with severe comorbidities were excluded from our study.
- Patients not willing to participate or not giving consent for pericardiocentesis.

Study was explained to patients in local language & written consent was taken for participation & study. Patient underwent history taking, clinical examination, (to evaluate Etiology, clinical features), ECG, and ECHO and other relevant laboratory parameters. An echocardiography guided pericardiocentesis was performed in patients with cardiac tamponade. Pericardiocentesis was done by subxiphoid approach. Pericardial fluid was drained and submitted for culture, cytological and biochemical analysis.

All patients were followed up at 1 month after discharge and thereafter at every three months intervals. Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Statistical analysis was done using descriptive statistics.

RESULTS

In present study, total 104 patients were evaluated. Majority of them were from 61-70 years (22.12 %) & from 31-40 years (20.19 %). Male (56.73 %) were outnumbered females (43.27 %).

Table 1: General characteristics

Variables	No. of patients	Percentage
Age group (in years)		
< 20	13	12.50%
21-30	11	10.58%
31-40	21	20.19%
41-50	15	14.42%
51-60	13	12.50%
61-70	23	22.12%
71-80	7	6.73%
>80	1	0.96%
Gender		
Male	59	56.73%
Female	45	43.27%

Common symptoms among study subjects noted were dyspnea (92.31 %), fatigue (51.92 %), chest pain (36.54 %) & fever (31.73 %). Clinical signs noted were tachypnea (99.04 %), hypotension (85.58 %), tachycardia (52.88 %), JVP elevated (46.15 %), hypoxia (41.35%). Laboratory findings were anemia (77.88 %) & leukocytosis (33.65 %).

Table 2: Clinical Parameters of study subjects.

Parameter	No. of patients	Percentage
Clinical presentation		
Dyspnea	96	92.31%
Fatigue	54	51.92%
Chest Pain	38	36.54%
Fever	33	31.73%
Signs		
Tachypnea	103	99.04%
Hypotension (SBP < 100 mm of Hg)	89	85.58%
Tachycardia (HR >100 bpm)	55	52.88%
JVP Elevated	48	46.15%
Hypoxia (SpO ₂)	43	41.35%
Laboratory		
Anemia	81	77.88%
Leukocytosis	35	33.65%

Common causes of cardiac Tamponade in present study were malignancy (32.69 %), tuberculosis (25.96 %), idiopathic (10.58 %), post-surgical (7.69 %), hypothyroidism (5.77 %) & post mi (4.81 %).

Table 3: Underlying Causes of cardiac Tamponade

Diagnosis	No. of patients	Percentage
Malignancy	34	32.69%
Tuberculosis	27	25.96%
Idiopathic	11	10.58%
Post-surgical	8	7.69%

Hypothyroidism	6	5.77%
Post MI	5	4.81%
Post procedural	4	3.85%
Chronic kidney disease	4	3.85%
Pyopericardium	3	2.88%
Connective tissue disorder	2	1.92%

ECG findings noted were sinus tachycardia (55.77 %), low voltage QRS (53.85 %) & electrical alternans (37.50 %).

Table 4: ECG findings

ECG parameters	No. of patients	Percentage
Sinus tachycardia	58	55.77%
Low voltage QRS	56	53.85%
Electrical alternans	39	37.50%

In present study, transthoracic echocardiography findings were RA collapse (81.73 %), IVC plethora (75.96 %), trans mitral flow variation (50 %), swinging heart (46.15 %), RV collapse (41.35 %) & strands in pericardium (29.81 %),

Table 5: Transthoracic Echo findings

Parameters	No. of patients	Percentage (%)
RA collapse	85	81.73%
IVC plethora	79	75.96%
Trans mitral flow variation	52	50.00%
Swinging heart	48	46.15%
RV collapse	43	41.35%
Strands in pericardium	31	29.81%

On Pericardiocentesis, aspirated fluid quantity among majority cases was 500-1000 ml (58.65 %), followed by <500 ml (20.19 %), 1000-1500 ml (18.27 %) & >1500 ml (2.88 %).

Table 6: Aspirated Fluid quantity

Aspirated Fluid quantity (ml)	No. of patients	Percentage
<500	21	20.19%
500-1000	61	58.65%
1000-1500	19	18.27%
>1500	3	2.88%

DISCUSSION

Cardiac tamponade (CT) is a clinical syndrome characterized by hemodynamic abnormalities resulting from an increase in pericardial pressure due to accumulation of contents such as serous fluid, blood, and pus.⁶ Echocardiography is considered the primary imaging modality for the evaluation of pericardial effusion because of its high sensitivity and specificity, lack of ionizing radiation, and low cost. Computerized tomography and magnetic resonance imaging are indicated when findings at echocardiography are inconclusive.⁷

Pericardial effusion can be caused by common primary malignancies that metastasize to the pericardium, such as lung cancer, lymphoma, breast cancer, and leukemia. Malignant pericardial effusion typically develops slowly and can spontaneously regress or remain stable. Some cases, however, may progress to cardiac tamponade.⁸ Cardiac tamponade due to pericardial effusion too may cause syncope by compromising cardiac output. These patients

generally have tachycardia, distended neck veins, muffled heart sounds, and pulsus paradoxus.⁹

Nataraj Setty HS et al.,¹⁰ studied 246 patients admitted with cardiac tamponade, tuberculosis was the commonest cause, while post procedural and post-surgical causes are insignificant in numbers. Overall mortality rate in our study is 6%. Procedure related cardiac tamponade mortality rate was 6%.

In study by Patel NK et al.,¹¹ most common symptom was dyspnoea (88%), clinical signs were tachypnoea (96%), raised jugular venous pulse (64%), tachycardia (84%), pulsus paradoxus (60%). Classical Beck's triad was seen in 42% cases. X-ray showed cardiomegaly (94%) & pleural effusion (64%). Common ECG findings were sinus tachycardia (84%), low voltage QRS (68%) and electrical alternans (44%). Echocardiography showed 80% and 68% of patients had right atrium collapse and right ventricle collapse respectively. 96% had normal left ventricle function. 80% had large effusion. Pericardiocentesis yield was mostly in between 500-1000ml (mean 908 ml) with 72% with haemorrhagic aspirate. All malignancy cases and 76% tubercular cases had haemorrhagic effusion. Most common etiology was tubercular (50%), followed by malignancy (28%).

In study by Singh A et al.,¹² mean age of the patients was 46.87±14.40 years. The most commonly observed signs/symptoms of patients diagnosed with pericardial effusion was raised jugular venous pulse (55.7%), breathlessness (51.4%) and tachypnea and tachycardia (47.1%) patients each. An etiology of tubercular effusion was common 32 (44.4%) patients. On analyzing data according to the underlying etiology, the most frequent sign/symptom was raised jugular venous pulse in 20 (62.5%) patients diagnosed with tubercular effusion, tachypnea in 10 (52.6%) patients diagnosed with hypothyroidism and tachycardia in 12 (63.2%) patients with a diagnosis other than pericardial effusion or hypothyroidism.

Hasan Ali et al.,¹³ studied 100 patients with cardiac tamponade, echo-guided pericardiocentesis was performed in 38 (38%) patients (Group A), primary surgical treatment was performed in 36 (36%) patients (Group B), and surgical treatment following pericardiocentesis was performed in 26 (26%) patients (Group C). Idiopathic and malignant diseases were primary cause of tamponade (28% and 28%, resp.), followed by tuberculosis (14%). Total complication rates, 30-day mortality, and total mortality rates were highest in Group C. Recurrence of tamponade before 90 days was highest in Group A.

Pericardial disease and effusion is a major cause of morbidity in India. Despite developments in the healthcare facilities, tuberculosis was the most common etiology for PE. Additionally, the raised number of hypothyroid and malignant PE cases demonstrates the changing etiological trends, similar to western countries.¹⁴

The treatment of cardiac tamponade is based on clinical presentation and may involve pericardial content removal by percutaneous pericardiocentesis, balloon pericardiotomy, or surgical drainage.¹⁵ More recently, echocardiographic guided pericardiocentesis has been demonstrated to be a safe and effective procedure that can be performed at the bedside.¹⁶

Thus, minimal invasive procedure echo-guided pericardiocentesis should be the first choice because of lower complication and mortality rates especially in idiopathic cases and in patients with hemodynamic instability. Surgical approach might be performed for traumatic cases, purulent, recurrent, or malignant effusions with higher complication and mortality rates.

CONCLUSION

Malignancy followed by tuberculosis were most common cause of cardiac tamponade. Echocardiography guided percutaneous pericardiocentesis is the safe procedure in saving life when patient presented with tamponade or impending tamponade and helps in ascertaining the cause of it.

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