Case Report

Pyopericardium progresses to cardiac tamponade in patient of hypothyroidism due to *Staphylococcus aureus*

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ABSTRACT

Pyopericardium is a rare condition with a high mortality rate, in which, infection propagates into pericardial space, leading to pus-filled pericardial effusion and cardiac tamponade which can lead to cardiogenic shock and death, if there is any delay in diagnosis and treatment with antibiotics and pericardial drainage. We report the case of a 28-year-old female, a known case of hypothyroidism from the last 6 years who presented with 2 months of fever and recent onset shortness of breath diagnosed as pyopericardium due to *Staphylococcus aureus*, and having clinical features of cardiac tamponade. She was a known case of hypothyroidism non-compliant with treatment. Pyopericardium conformed with transthoracic 2D echocardiography-guided aspiration of pericardial fluid. After pericardial pus drainage, the patient symptomatically improved initially but remained in shock due to ongoing sepsis and died due to septic shock and multi-organ failure.

Key words: Pyopericardium, Sepsis, Uncontrolled hypothyroidism

Pyopericardium is a rare condition with a high mortality rate of 40% and 100% in treated and untreated patients, respectively, therefore, it is important not to miss the early diagnosis [1,2]. The treatment must be initiated immediately after diagnosis with antibiotics and pericardial pus drainage. Hypothyroidism is a prevalent endocrinal disorder with a wide range of symptoms and multi-organ involvement [3]. Among numerous complications, pericardial effusion is a notable complication [4]. Pericardial effusion can occur in severe or long-standing hypothyroidism although it is uncommon in mild cases and can rarely present even as the primary presentation of hypothyroidism [5]. If this long-standing pericardial effusion resulting in cardiac tamponade is often due to malignancy, tuberculosis, or acute pyogenic infection, the most common cause is *Staphylococcus aureus* [6], as in our case.

Herein, we report the case of a 28-year-old female, a known case of hypothyroidism from the last 6 years who presented with 2 months of fever and recent onset shortness of breath diagnosed as pyopericardium due to *S. aureus*, and having clinical feature cardiac tamponade. She was a known case of hypothyroidism non-compliant with treatment. Pyopericardium conformed with transthoracic 2D echocardiography-guided aspiration of pericardial fluid. After pericardial pus drainage, the patient symptomatically improved initially but remained in shock due to ongoing sepsis and died due to septic shock and multi-organ failure.

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CASE REPORT

A 28-year-old female was referred to the Department of Medicine, KGMU, Lucknow, with complaints of shortness of breath at rest in shock (systolic blood pressure [SBP] 70 mmHg) on inotropic support of noradrenaline and dobutamine. She had a history of fever for the past 2 months, for which, she was taking treatment at the local hospital.

She was conscious and oriented at the time of examination. On examination, pulse rate was 124/min regular, feeble, with raised jugular venous pressure. Bilateral vesicular sound present, no added sound heard, and muffled s1 s2.

Chest X-ray showed a bilateral clear lung field. Ultrasound abdomen was not suggestive of any collection or any source of infection. Urine routine examination was normal and the urine culture was sterile. An electrocardiogram was done which was suggestive of a low voltage complex in all leads and sinus

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tachycardia. Transthoracic 2D echocardiography was performed showing large pericardial effusion (2.2 cm collection on the right ventricular [RV]) free wall and 2.3 cm on the left ventricular posterior wall (Fig. 1). Other 2D echocardiograpic findings are normal left ventricular ejection fraction of 60%, mild mitral regurgitation, moderate tricuspid regurgitation, right ventricular wall collapse during diastole, dilated Inferior vena cava and hepatic vein.

The patient was moved to the medical intensive care unit. The pericardial drain was placed through the subxiphoid route using 16 F leader catheter needle under 2D echocardiographic guidance and 250 mL of pus was extracted and 16 F leader catheter was placed in pericardial space (Fig. 2). The patient was started on intravenous (IV) antibiotics (meropenum 1 g 3 times a day and vancomycin 1 g twice a day), IV fluids, and 40% oxygen. After the removal of pus from the pericardial space, the patient's hemodynamics transiently improved having a blood pressure of 90/50 mmHg and heart rate of 106/min. Dyspnea also got improved. Post pericardiocentesis 2D echocardiography shows thin rim of pericardial effusion of 3 mm with no feature of cardiac temponade.

Pus routine microscopy shows a large number of pus cells and few Gram-positive cocci. Total cells in the fluid were 228,000/mm^3 all pus cells, the protein was 4.1 g%, sugar was 15 mg/dL, and ADA was 89.4 U/L. Pus culture shows the growth of methicillin-resistant *S. aureus* sensitive to vancomycin. Furthermore, blood culture was suggestive of the growth of *S. aureus.* Routine investigation showed hemoglobin of 8.2, total leukocyte count (TLC) of 34,500, neutrophil of 87%, and platelets of 3.6 lakh/mm^3. After 24 h, hemoglobin reduced to 7.5, TLC increased significantly to 99,000/mm^3, neutrophil to 85.4%, platelets to 1.83 lakh/mm^3, and thyroid-stimulating hormone to 32 mU/L.

On day 2nd, the patient's dyspnea was resolved but the patient's blood pressure further started to fall due to ongoing sepsis and multi-organ failure, so the noradrenaline dose was increased to 0.3 mcg/kg/min, adrenaline at 0.2 mcg/kg/min, dopamine infusion 10 mcg/kg/min, and calcium infusion was added. She also had persistent high-grade fever (103 F). Due to persistent low blood pressure (SBP 60 mmHg), the patient develops acute kidney injury and a decrease in urine output. Furthermore, the patient's Glasgow Coma Scale (GCS) became 8, in view of the decreased GCS, the patient was prophylactically intubated. On Day 3, the patient's blood pressure was not recordable, and there was acute kidney injury with persistent hyperkalemia with nil urine output which was managed as per protocol. Continuous renal replacement therapy was planned. The patient had cardiac arrest due to persistent septic shock and multi-organ dysfunction with severe metabolic acidosis, cardiopulmonary resuscitation was done as per protocol but the patient could not revive.

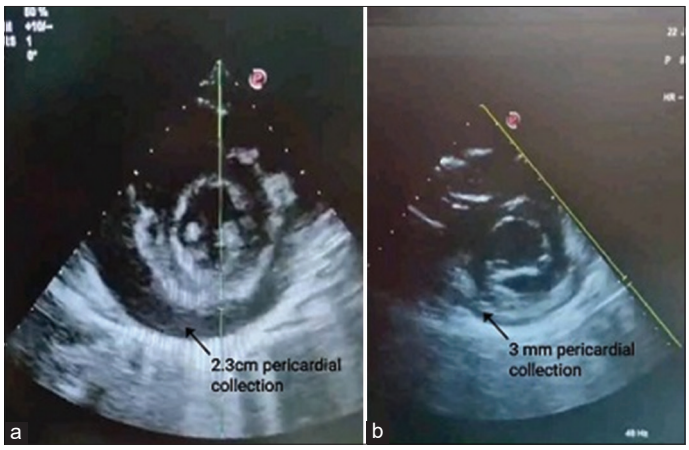

Figure 1: Parasternal short axis view showing (a) pre paracardiocentasis; (b) post pericardiocentasis

Figure 2: Frank pus after pericardiocentasis

DISCUSSION

Purulent pericarditis is diagnosed when pus is drained from the pericardial space or bacteria are cultured from pericardial fluid [7]. Pyopericardium is a rare and fatal condition. About 90% of acute pericarditis are idiopathic or viral. Bacterial pyopericardium is usually not a primary infection but occurs as a complication of an underlying infection such as immunosuppression, pneumonia, retropharyngeal abscess, trauma surgical wound, and endocarditis [8-11]. This rare disease is often diagnosed late when there is a severe hemodynamic compromise due to cardiac tamponade. If this long-standing pericardial effusion resulting in cardiac tamponade is often due to malignancy, tuberculosis, or acute pyogenic infection, the most commonly cause is *S. aureus* [6], as in our case.

Pericardial fluid bacterial infection without any other focal source of infection is very rare but our patient had no other focal source of infection. Our patient symptomatically improved after removing pericardial pus but remained in septic shock. With persistent metabolic acidosis and hyperkalemia, the patient died due to multiple organ dysfunction. Therefore, early suspicion and diagnosis of pyopericardium must be done in patients with uncontrolled hypothyroidism those who have a persistent high-grade fever with no other focal cause or source of sepsis.

Early pericardiocentesis and IV antibiotic therapy are mandatory for a patient suspected to be pyopericardium [12].

CONCLUSION

Early suspicion, diagnosis, and treatment of pyopericardium must be done in patients with uncontrolled hypothyroidism which is a

known cause of long-standing pericardial effusion having a high risk for developing cardiac tamponade due to pyopericardium due to *S. aureus* infection, especially in those patients those who have a persistent high-grade fever with no other focal cause or source of sepsis is defined must to reduce mortality.

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