Case Report

# A Disastrous Omen – Candidal Pyo pneumopericardium

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## Abstract

Pyo-pneumopericardium or purulent pericarditis is a rare medical entity associated with high mortality. We hereby report a rare case of a 25-years old lady with pyo-pneumopericardium, aspirated pus culture from the pericardial cavity of which grew yeast (Candida species) like organism. This patient underwent a pericardiocentesis and was initiated on generic antibiotic treatment. However, despite the best possible medical management, she succumbed to her illness. This is a rare case report from India and an addition to the already available literature.

**Keywords:** Pericardiectomy, purulent pericarditis, pyo-pneumopericardium, pyopericardium, pneumopericardium

## Introduction

Pyo-pneumopericardium is a rare medical condition in which infection cultivates in the pericardial space leading to pericardial effusion (pus-filled) and air-causing cardiac tamponade. In the present antibiotic era, pyo-pneumopericardium is uncommon however, fatal as can cause death due to cardiac tamponade and cardiogenic shock.[1,2] Several etiological agents like *Staphylococcus aureus*, Streptococcus spp., Hemophilus influenzae, Pseudomonas spp., coliforms, and anaerobic bacteria have been implicated.[3,4] The growth of yeast (Candida sp.) is extremely rare and reports are scant. Symptoms can mimic that of pericarditis and hence in a patient with atypical chest pain, fever, and cardiogenic shock pyo-pneumopericardium or pyopericardium should also be considered as an important differential.[5,6]

## Case Report

A 25-year-old lady presented to the Emergency Department (ED) with chief complains of epigastric pain and intermittent low-grade fever for more than 2 months requiring multiple hospitalizations. Epigastric pain was moderate to severe in nature, diffusely scattered that was aggravated by food intake and relieved by analgesics. She also had associated complains of multiple-episode of postprandial vomiting (nonbilious, nonprojectile, and nonblood stained) with breathing difficulty on exertion, orthopnoea, loss of appetite and weight. However, she had no complaints of typical chest pain, night sweats, limb edema, jaundice, or decreased urine output. At presentation to our ED, she was in severe shock (qSOFA ≥2) – tachycardia (heart rate – 122 b/min), tachypnoea (respiratory rate – 30/min) and her blood pressure was not recordable. On palpation, there was tenderness over the epigastric region and auscultation revealed left infrascapular crepts with decreased breath sounds on the same side. Other general and systemic examinations were within normal limits. Her laboratory investigations and serial arterial blood gas analysis are given in Table 1. Fluid resuscitation was initiated immediately, to which she did not respond and had to be started on inotropes in the ED. Intravenous (IV) antibiotics (Azithromycin and Piperacillin/Tazobactam) were administered after taking a blood culture in view of shock following which she was shifted to the medical intensive care unit. Portable chest radiograph (CXR) [Figure 1] showed features of pneumopericardium and two-dimensional echocardiography (2D-Echo) revealed a cardiac tamponade with echogenic materials in the pericardial space. Immediate pericardiocentesis was performed under ultrasound guidance which drained frank pus. Pyo-pneumopericardium was diagnosed at this stage based on the clinical findings, laboratory investigations, radiological imaging and the

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**Table 1: Baseline investigations and serial arterial blood gas**

| Variables | Laboratory values |
|---|---|
| Hemoglobin, total WBC (N, L, E, B) | 12.6; 29600 (92, 5, 0, 0) |
| Platelet count | 405000 |
| Total bilirubin, direct bilirubin, total protein, albumin | 0.75; 0.49; 6.6; 2.0 |
| SGOT, SGPT, alkaline phosphatase | 39; 48; 217 |
| Creatinine, urea | 1.36; 68 |
| Sodium, Potassium, Bicarbonate | 136; 2.6; 10 |
| Lipase, Amylase | 117; 95 |
| Malarial parasite | Nil. |
| Procalcitonin | 8.39 |
| Prothrombin time with INR (normal range: 11.7-16.1), ½ patient + ½ control, INR | 42.7; 17.1; 3.17 |
| APTT (normal range: 27.8-40.4), ½ patient + ½ control, APTT | 48.1; 31.1; 42.4 |
| Viral markers (HIV, HbAg, HCV) | Negative |
| XPERT TB PCR test (pus) -reported after patient's death | Not detected. |
| AFB smear - reported after patient's death | Not detected. |
| Culture fungus | Many yeasts like organism-Candida Glabrata, Candida Tropicalis. |
| Culture- aspirated pus from pericardial cavity | Many pus cells, occasional epithelial cell, many Gram-negative and positive bacilli, few Gram-positive cocci in groups and pairs and many yeasts like organisms.<br>Escherichia coli-susceptible to gentamycin, chloramphenicol. |

| Serial arterial blood gas | At presentation in ED | 7th h MICU | 10.5th h MICU | 13th h MICU |
|---|---|---|---|---|
| PH | 7.12 | 7.00 | 6.94 | 6.94 |
| $PCo_2$ | 39 | 31 | 69 | 48 |
| $PO_2$ | 24 | 53 | 74 | 64 |
| Sodium | 146 | 148 | 159 | 161 |
| Potassium | 2.1 | 2.8 | 2.4 | 3.3 |
| Lactate | 7.0 | 15.7 | 19.3 | 20 |
| Bicarbonate | 10.8 | 7.6 | 14.8 | 10.3 |
| Chloride | 115 | 114 | 115 | 117 |
| Glucose | 138 | 320 | 199 | 76 |
| BEecf | −16.6 | −23.7 | −17.5 | −22.0 |
| $FIO_2$ | 21.0 | 40.0 | 100.0 | 100.0 |

ED: Emergency department, MICU: Medical intensive care unit (division of critical care), WBC: White blood cell, SGPT: Serum glutamic-pyruvic transaminase, SGOT: Glutamic-oxalacetic transaminase, INR: International normalized ratio, APTT: Activated partial thrombin time, HCV: Hepatitis C virus, PCR: Polymerase chain reaction, TB: Tuberculosis, AFB: Acid-fast bacilli, $PCO_2$: Partial pressure of carbon dioxide, $PO_2$: Partial pressure of oxygen

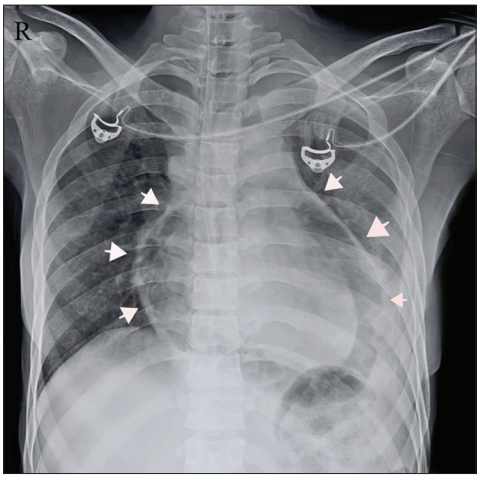


**Figure 1:** Chest radiograph – anterior– posterior view (white arrows) showing cardiac silhouette is partially surrounded by a rim or air-density suggestive of a pneumopericardium

aspirated purulent pus. Culture of this aspirated pus grew yeast (Candida species) like organism with pseudo hyphae. She was started on IV Fluconazole and the antibiotics (Azithromycin and Piperacillin/Tazobactam) were continued. She remained clinically unstable, requiring high ionotropic support, serial arterial blood gas showed worsening metabolic acidosis for which she had to be intubated and mechanically ventilated [Table 1]. Her clinical condition gradually deteriorated and she succumbed to her illness within 24 h of admission.

## Discussion

The pericardial sac is made up of visceral and parietal layers that are separated by a potential space known as the pericardial cavity. In healthy individuals, the pericardial cavity contains 15–50 ml of ultrafiltrate of plasma. Pyo-pneumopericardium is a rare medical condition where an infection propagates in the pericardial sac, leading to a pus-filled pericardial effusion and

cardiac tamponade, that can cause cardiogenic shock and even death.[1-3] It is diagnosed when pus is drained directly from the pericardial space or when bacteria or fungi are cultured from the pericardial fluid. The majority of the reported cases are due to direct spread from pneumonia or empyema, however thoracic surgery, direct hematogenous spread and trauma can also cause the same.[6,7] Pyo-pneumopericardium is associated with high mortality of 40% in treated patients and 100% in untreated patients.[8] This condition usually presents with fever, chest or epigastric pain, congestive cardiac failure and later with sepsis or cardiogenic shock. An electrocardiogram may show features of pericarditis (widespread concave ST elevation), but confirmed diagnosis is mostly made after a 2D-Echo followed by aspiration of pus from the pericardial space.

Computed tomography (CT) or magnetic resonant imaging (MRI) may aid the diagnosis as they can simultaneously show anatomical abnormalities of lung and mediastinal structures with better soft-tissue contrast and larger field of vision than a 2D-Echo.[1,9,10] Literature review demonstrated that Hemophilus influenza, *Staphylococcus aureus*, Viridans streptococci, Streptococcus pneumoniae and anaerobic bacteria to be the most common causative agent. However, few reports showed that gram-negative bacteria and fungi to be more frequent in immunocompromised hosts while others showed gram-positive coccis as the most commonly isolated organisms.[3,4,9,10] This pus filled pericardial space increases the intrapericardial pressure causing the compression of all cardiac chambers thereby limiting cardiac inflow leading to a marked fall in cardiac output and resulting in a cardiac tamponade. Hence early pericardiocentesis, initiation of early antibiotics therapy, 2D Echo guided placement of pericardium catheter reduces complications such as pneumothorax and cardiac or coronary laceration in these patients. Some of these patients may develop constrictive pericarditis, in whom pericardiectomy is the only remaining option.[8,9]

The prognosis depends largely on the timeliness of the diagnosis and initiation of appropriate treatment. Although this patient demonstrated signs of a cardiogenic shock, the clinical feature was initially clouded by suspicion of sepsis. However, esophageal or gastric pericardial fistula could not be ruled out. The differentials considered in the ED were refractory shock both septic and cardiogenic secondary to a pericardial effusion-probable infective/tuberculosis/malignancy, pancreatitis, cholecystitis, haematological malignancies like lymphoma, and gastrointestinal malabsorption syndrome. CXR/2D-Echo followed by draining of frank pus established the diagnosis of a pyo-pneumopericardium. CT/MRI imaging could not be performed due to the hemodynamic instability of the patient. Early pericardiocentesis was performed and pus culture grew Candida species, however, the past history of immune deficiency of this patient was not known. 2D-echo showed features of an impending cardiac tamponade, though early pericardiocentesis was performed, proved futile in this case.

To conclude, pyo-pneumopericardium is a rare medical disorder with a high mortality rate. Prognosis mainly depends on early diagnosis and prompt treatment. 2D-Echo is helpful in early diagnosis and draining of pus followed by placement of a pericardial catheter to drain pus continuously. Pericardiectomy may be required in patients with constrictive pericarditis.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

## Research quality and ethics statement

The authors followed applicable EQUATOR Network ("http://www.equator-network.org/) guidelines, notably the CARE guideline, during the conduct of this report.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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