*Van Tıp Dergisi: 16 (4):139-142, 2009*

# Coexistence of Purulent Pericarditis and Thoracic Empyema (A case report)

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**Abstract**

**Background: Purulent pericarditis is a rare entity in the developed countries. Coexistence of purulent pericarditis and thoracic empyema is rare. Here we report an adult patient with concomitant purulent pericarditis and thoracic empyema caused by Streptococcus pneumonia as an initial presentation of cardiac tamponade.**

**Case presentation: A 20-year-old male patient was admitted with pleuritic chest pain and shortness of breath. Chest radiograph showed an enlarged cardiac silhouette and pleural effusion. An emergency echo-guided pericardiocentesis was performed and his condition rapidly improved. The day after admission he deteriorated clinically. Repeated echocardiography showed increased effusion with right atrial collapse, features consistent with tamponade. Right thoracotomy was performed and a pericardial window was created to relieve tamponade. The thickened parietal and visceral pleura were decorticated. Streptococcus pneumonia was isolated in the empyema culture. Postoperative recovery was uneventful. Approximately 15 days after discharge, he was hospitalized again due to recurrent chest pain and shortness of breath. Pericardiectomy was performed via median sternotomy. The postoperative recovery was uneventful. He was discharged from the hospital on postoperative day 15.**

**Conclusion: Purulent pericarditis is a rare, life-threatening condition that is most often resulting from the contiguous spread of infection. If its origin is related to thoracic empyema, trapping lung may be developed in conjunction with effusive-constrictive pericarditis and cardiac tamponade, as in this case. The delay in an appropriate surgical procedure can cause complications leading to death.**

***Key words: Purulent Pericarditis, Empyema, Tamponade***

Purulent pericarditis is a rare entity in the developed world. It generally presents with acute cardiovascular decompensation and a sepsis-like appearance (1). The postulated pathophysiology has been that the adjacent pleuropulmonary infection may cause an inflammatory response in the pericardium with migration of neutrophils and eventual deposition of fibrin (2). It has not been clear whether bacteria migrate directly from the lung tissue itself or there is subsequent bacteremia and invasion of the pericardial sac (3). Coexistence of purulent pericarditis and thoracic empyema is rare. Here we report an adult patient with concomitant purulent pericarditis and thoracic empyema caused by Streptococcus pneumonia as an initial presentation of cardiac tamponade.

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## Case presentation

A 20-year-old male patient was presented with pleuritic chest pain and shortness of breath. On admission, the patient was subfebrile (38ºC) and pale with abdominal respiration with tachypnea (32 breaths/min) and tachycardia (130 beats/min). His blood pressure was 95/65 mm Hg. Heart sounds were distant but regular, with no murmurs. Auscultation of the chest revealed decreased breath sounds in the right hemi-thorax. The liver was enlarged 6 cm palpable below the right costal margin. The white blood cell count was 18000 / mm3, with 82% polymorphonuclear neutrophils, 15% lymphocytes, and 3%

Figure 1. Chest radiogram showing increased cardiac silhouette consistent with cardiac tamponade and right lower zone density.

Figure 2. Echocardiogram showing thickened pericardium and large amount of pericardial effusion with echo dense fibrin strands.

monocytes. The erythrocyte sedimentation rate was 48 mm/h. Electrocardiogram revealed sinusal tachycardia with reduction of the QRS complexes' amplitudes. Chest radiograph showed an enlarged cardiac silhouette consistent with cardiac tamponade and right lower zone density (Figure 1). The echocardiogram showed large pericardial effusion with echo dense fibrin strands (Figure 2). Due to his critical condition, an emergency echo-guided pericardiocentesis was performed, releasing 150 ml white, chalky purulent fluid with polymorphonuclear predominance. His condition rapidly improved.

The day after admission he deteriorated clinically. Repeated echocardiography showed increased effusion with right atrial collapse, features consistent with tamponade. He was transferred to cardiothoracic surgery department for operation. Right thoracotomy was performed. Initially, a pericardial incision was performed to relieve tamponade. The pericardium was remarkably thickened to about 6-8 mm and 700 ml purulent fluid was aspirated. At the same time, the pericardial space was irrigated with saline to remove septations and fibrin clots. A pericardiopleural window was created 4 cm in diameter. Parietal and visceral pleura were inflamed and thickened. There was a posterior located empyema sac over the spine and a significant amount of pus and fibrin ( ~1000 ml) was aspirated. The right lung expanded normally after the decortication of both the parietal and the visceral pleural layers. Prophylactic antibiotic treatment had been commenced with intravenous cefazolin sodium. Streptococcus pneumonia isolated in the empyema culture. Postoperative recovery was uneventful and he was discharged in good condition.

Approximately 15 days after leaving the hospital, he was hospitalized again due to recurrent chest pain and shortness of breath. He was pale with an arterial blood pressure of 85/65 mm Hg, pulse rate 118 beats/min, and respiratory rate 26 breaths/min. A repeat echocardiogram revealed a substantial re-accumulation of pericardial effusion with diastolic collapse of left ventricle lateral wall and pericardial thickening (Figure 3).

Figure 3. Large pericardial effusion and diastolic collapse of left ventricle lateral wall.

He was taken to the operating room where median sternotomy was carried out with CPB stand-by. After drainage of 500 ml purulent fluid mixed with fibrin, the pericardium was decorticated from the diaphragmatic surface and both ventricular surfaces to the bilateral phrenic nerves, which were left on pedicles.

The postoperative chest radiogram was seen normal (Figure 4). Histological examinations of

the resected pericardium revealed fibrotic thickening and acute inflammation superimposed on chronic inflammation, without evidence of granuloma or malignancy. The postoperative recovery was uneventful. He was discharged from the hospital on postoperative day 15. He was doing well 10 months after operation.

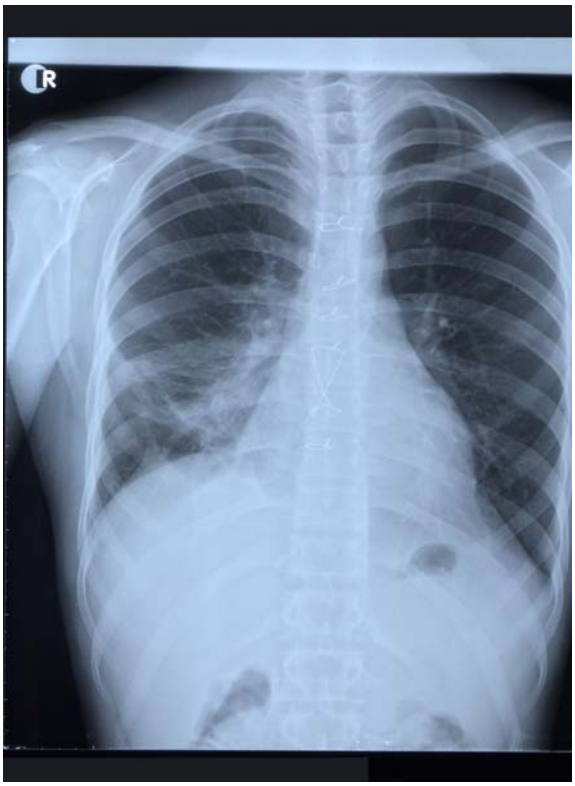

Figure 4. Postoperative chest radiograph was seen normal.

## Discussion

Primary infection of the pericardium is rare and purulent pericarditis most often occurs as a direct extension of an infection from an adjacent pneumonia or empyema, but may also occur in association with sepsis elsewhere in the body, most commonly pneumonia (4,5). In patients treated only with antibiotics without pericardial drainage, the rapid unsuspected development of a large pericardial effusion may result in sudden cardiovascular collapse and death due to cardiac tamponade ( 2).

Pneumococcal pneumonia is the most common clinical presentation of pneumococcal disease among adults. Its complications include empyema, pericarditis, and endobronchial obstruction, with atelectasis and lung abscess formation. If purulent pericarditis develops, pneumococcal pneumonia frequently becomes fulminant (2).

A wide variety of bacteria and fungi have been isolated as causative agents although Streptococci and Staphylococci are most commonly isolated (6,7). Hemophilius influenzae and Neisseria meningitides (8) have been also noted to cause purulent pericarditis (5). Majid and Omar (9) reported that 6 of 12 patients with purulent pericarditis were secondary to Staphylococcus aureus infection, and a respiratory infection was the most common preceding illness.

Since the pericardial space is only rarely the initial site of infection, identification of the primary focus is mandatory. In some cases, the primary site of infection may be unknown (5). In our case the presence of trapping lung and pleural empyema makes the right lung the most likely site of entry.

Despite aggressive treatment of purulent pericarditis (pericardiocentesis, drainage of the infected pericardial fluid, and prolonged intravenous antibiotic therapy), constrictive pericarditis often complicates the patient's condition (10). Variable degrees of pericardial thickening and loculations tend to occur early. Furthermore, the infection spreads downward to the diaphragm and the peritoneum (11). Therefore, prophylactic pericardiectomy should be suggested in patients with purulent pericarditis to prevent eventual pericardial constriction (9). In contrast, Cakır et al. (12) do not suggest pericardiectomy as primary choice of treatment in purulent pericarditis. They reported that only 2 of 12 patients with purulent pericarditis treated with subxiphoid drainage were required pericardiectomy in the early period due to pericardial constriction. In our case, right thoracotomy was preferred to improve both the cardiac tamponade and the trapping lung. However, we had to perform subsequent pericardiectomy via median sternotomy due to constriction and localized massive purulent effusion.

## Conclusion

Purulent pericarditis is a rare, life-threatening condition that is most often resulting from the contiguous spread of infection (often as a complication of pneumonia and concomitant empyema). It is often diagnosed late in its course (10). If its origin is related to thoracic empyema, trapping lung may be developed in conjunction with effusive-constrictive pericarditis and cardiac tamponade, as in this case. Pleural decortication and pericardiectomy should be performed in the management of concomitant purulent pericarditis

and thoracic empyema leading to tamponade and trapping lung. The delay in an appropriate surgical procedure can cause complications leading to death.

## Pürülan Perikardit ve Torasik Ampiyemin Birlikte Bulunması Olgu Sunumu

***Özet***

***Giriş: Gelişmiş ülkelerde pürülan perikardit ender rastlanır. Pürülan perikarditin ve torasik ampiyemin birlikte bulunması daha da enderdir. streptococcus pneumonia'nın neden olduğu ve ilk bulgusu kardiyak tamponad olan, pürülan perikardit ile torasik ampiyemin birlikte olduğu bir yetişkin olguyu sunuyoruz.***

***Olgu sunumu: Yirmi yaşında bir erkek hasta plöritik göğüs ağrısı ve nefes darlığı yakınmalarıyla kabul edildi. Göğüs radyografisinde plevral effüzyon vardı ve kalp gölgesi genişlemişti. Acilen ekokardiyografi eşliğinde perikardiyosentez uygulandı ve hemen düzeldi. Kabul edildiğinin ertesi günü klinik durumu kötüleşti. Tekrarlanan ekokardiyografi artmış perikardiyal effüzyon ve atriyal kollaps gibi tamponadla uyumlu bulgular gösterdi. Sağ torakotomi uygulanarak ve perikardiyal pencere açılarak tamponad giderildi. Kalınlaşan paryetal ve visseral plevra dekortike edildi. Kültürde Streptococcus pneumonia üredi. Postoperatif dönem olaysız geçti. Taburcu edildikten yaklaşık 15 gün sonra tekrarlayan göğüs ağrısı ve dispne nedeniyle tekrar hastaneye yatırıldı. Medyan sternotomi yapılarak perikardiyektomi yapıldı. Postoperatif dönem olaysız geçti. Operasyondan 15 gün sonra taburcu edildi.***

***Sonuç: Pürülan perikardit ender rastlanan ve yaşamı tehdit eden bir durum olup, sıklık komşuluk yoluyla yayılan enfeksiyondan kaynaklanır. Eğer torasik ampiyemden kaynaklanıyorsa, olgumuzda olduğu gibi effüsiv-konstriktif perikardit ve kardiyak tamponad ile birlikte küskün akciğer gelişebilir. Uygun bir cerrahi girişimde gecikme öldürücü komplikasyonlara yol açabilir.***

***Anahtar kelimeler: Pürülan Perikardit, Ampiyem, Tamponad***

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