

# Necrotising pneumonia: A pneumonia that may need surgical intervention

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## SUMMARY

Pneumonia is primarily a disease that is usually managed medically with antibiotics. However, in rare cases it may progress to necrotising pneumonia, which is an uncommon but severe complication of bacterial pneumonia. This case illustrates a typical case of necrotising pneumonia complicated with parenchymal and pleural complication such as empyema, pneumothorax with possible bronchopleural fistula. Early consultation with thoracic surgeon can be life-saving.

## INTRODUCTION

Necrotising pneumonia is a rare and severe form of pneumonia associated with the formation of abscess, cavitation within the lung parenchyma.

Managing patients with necrotising pneumonia is challenging because there is no firm guidelines outlining management of necrotising pneumonia. The mainstay of treatment is supportive care with appropriate antibiotics. Surgical intervention may play a role when medical therapy fails.

## CASE REPORT

A 47-year-old man, who is a chronic active smoker with medical history of diabetes mellitus, defaulted follow up and medication for past one year. He presented with poor oral intake and generalised weakness for one week duration, three days history of chesty cough and shortness of breath. He denied recent hospitalization, history of fever and contact with patient of pulmonary tuberculosis.

On arrival to emergency department, he was hypotensive and hypoxic, with low-grade fever. His blood sugar was uncontrolled at 19.2mmol/l. Clinical examination revealed a tachypnoeic, drowsy patient with lung findings of bilateral lower zone crepitation. Fluid resuscitation and inotrope was promptly started. He was intubated for respiratory failure and subsequently admitted to intensive care unit. Blood investigations were in keeping with sepsis, which showed neutrophil predominant leucocytosis with thrombocytopenia, acute kidney injury, deranged liver function test and deranged coagulation profile.

Chest radiograph (Figure 1) revealed consolidation and effusion in the right lower zone and patchy infiltrates over

left middle zone with area of lucency in the right lower lobe, suspicious of abscess formation.

IV Piperacillin-Tazobactam and IV Azithromycin were empirically started with the diagnosis of severe community acquired pneumonia with septic shock and subsequently upgraded to IV Meropenem to treat for possible severe pulmonary melioidosis.

Beside ultrasound thorax revealed pleural effusion of right lung. CECT thorax done on day three of admission, showing bilateral lung consolidation complicated with right lower lobe necrotising pneumonia and right tension hydropneumothorax which was not evident on the chest x-ray before this. Chest tube was inserted promptly and 50cc frank pus was drained with persistent bubbling.

Final blood culture, tracheal aspirate culture and pleural fluid culture all grew klebsiella pneumonia, which was sensitive to amoxicillin/clavulanic acid, ampicillin/sulbactam and most of the cephalosporin group antibiotics. Patient's condition deteriorated despite on IV antibiotic, complicated with disseminated intravascular coagulopathy. He required high dose inotropic support and high ventilation support. He was referred to cardiothoracic surgeon and planned for surgical intervention once condition stable. Unfortunately, his condition worsens progressively and he succumbed to the illness on day nine of admission.

## DISCUSSION

Necrotising Pneumonia is a rare but severe complication of bacterial lung infection that is almost always complicated with para-pneumonic effusion, empyema or bronchopleural fistula.<sup>3</sup> It is characterised by necrosis and liquefaction of lung parenchyma, which is thought to be secondary to ischaemia caused by thrombosis of intrapulmonary vessels and can culminate in pulmonary gangrene.

The most common pathogens associated are *Staphylococcus aureus*, *Streptococcus pneumoniae*, and *Klebsiella pneumoniae*.<sup>1,2</sup> Patients who develop necrotising pneumonia usually have concomitant medical disease like diabetes mellitus and alcohol abuse.<sup>2</sup>

Necrotising lung infections constitute a spectrum of disease severity ranging from lung abscess to necrotising pneumonia and pulmonary gangrene. Although the pathogenesis of

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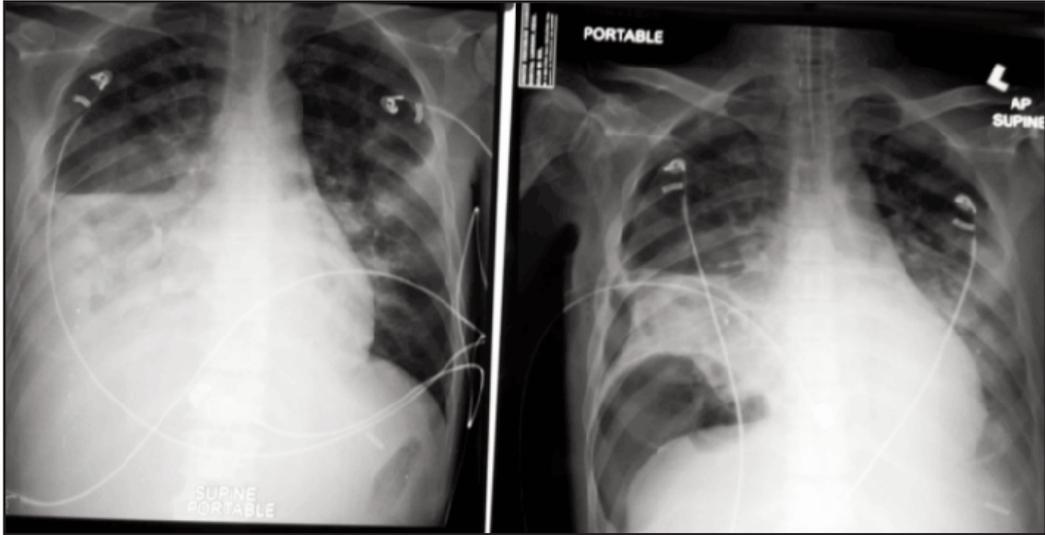


Fig. 1: 1A-Left) Chest-x ray on admission.  
1B-right) Chest X ray post chest tube insertion

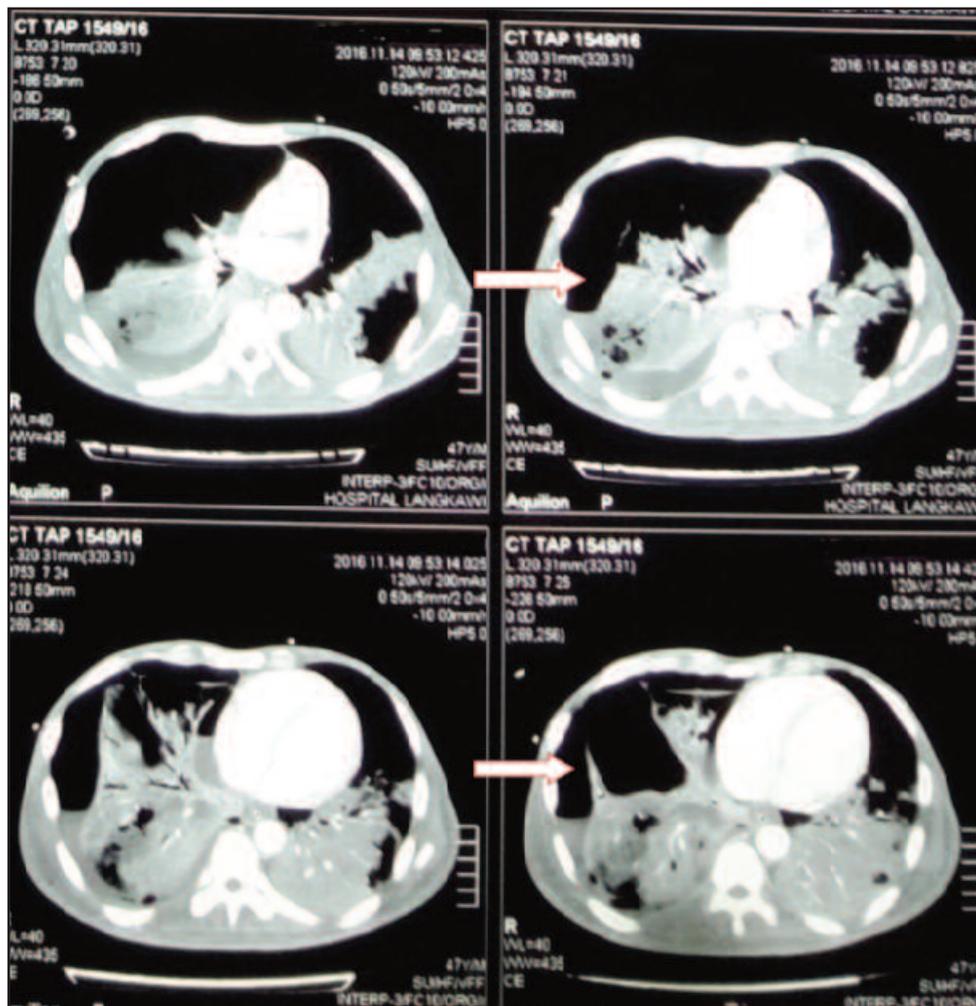


Fig. 2: Arrows show area of parenchymal hypo-densities with irregular margin in the right lower posterior lobe suggestive of necrotic area and multiple air pockets within are suggestive of cavitations.

necrotizing pneumonia is not clearly defined, most studies suggest that it is a result of inflammatory response due to the toxins produced by the pathogen; or the associated vasculitis and venous thrombosis.<sup>4</sup>

Serial radiographic evaluation is essential to detect the presence of necrotising pneumonia.<sup>1</sup> Contrast enhanced computed tomography (CT) Thorax is usually needed to demonstrate the character of necrotising pneumonia in which multiple air or fluid filled cavity may replace the normal lung parenchyma. CT thorax is also helpful to evaluate parenchymal complications that are not appreciated on chest radiographs.<sup>2</sup> Common findings of necrotising pneumonia include necrosis of bronchioles and alveoli<sup>4</sup> followed by air filled cavities. A bronchopleural fistula may be formed leading to pneumothorax or hydro-pneumothorax if necrosis occurs adjacent to the pleura.<sup>4</sup>

General initial management is similar to non-complicated pneumonia using empirical broad-spectrum antibiotic according to local antibiotic susceptibility pattern. Other measures include supplemental oxygen if hypoxic and supportive care with adequate hydration.

Pulmonary gangrene represents the most severe spectrum of parenchymal destruction occurring in necrotising pneumonia. Antibiotic is generally regarded as ineffective once the presence of pulmonary gangrene sets in. Inadequate perfusion may render the antibiotic ineffective. Thus, it would be necessary to discuss with cardiothoracic surgeon in regards of surgical intervention. To date, there is no guideline to direct the care of patients with necrotizing pneumonia, and determine the timing of surgical intervention.

Operative interventions fall into two broad categories: management of pleural disease including empyema or bronchopleural fistula, and management of progressive parenchymal necrotizing infection.<sup>1</sup>

We hope this case will help to create awareness among clinicians about this clinical entity. Necrotising pneumonia should be considered when patient's condition not improving despite appropriate antibiotic. Early contrasted CT scan will aid in further assessment and diagnosis. A prompt discussion with thoracic surgeon for any role of surgical intervention may be lifesaving. Surgical resection for necrotising lung infection is a reasonable option in patients with persistent sepsis who failed to respond to medical therapy. When resection is not feasible or is associated with an excessively high risk, non-resective surgery is generally performed in a multimodality management setting to maximize possibility of success in severely ill patients. Surgical methods like open window thoracostomy, thoracoplasty can be an effective tool in the management of severe infectious pleuro-pulmonary disease.<sup>5</sup>

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