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NECROTISING PNEUMONIA: A CASE SERIES

Medical Science

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ABSTRACT

Background: Necrotising pneumonia is due to severe complication of bacterial pneumonia, associated with high mortality. Data on its management is not available in literature although its management is difficult.
Objective: To describe clinical features and management of five cases of necrotising pneumonia.
Methods: Details of five cases of necrotising pneumonia admitted to a tertiary care hospital were compiled for this study. Out of these five cases, Klebsiella pneumonae was isolated from sputum in one patient and in three patient's organisms were isolated from bronchoalveolar lavage (two Methicillin Sensitive Staphylococcus Aureus, one Acinetobacter baumanii). In fifth patient sputum and bronchoalveolar lavage (BAL) culture were sterile but Methicillin Sensitive Staphylococcus Aureus (MSSA) was grown in blood culture. All available literature was reviewed regarding surgical and medical management of necrotising pneumonia.
Results: All five patients were started with antibiotics as per culture and sensitivity results. Four of them recovered with medical management only. Fifth patient developed pulmonary gangrene for which surgery was planned as per thoracic surgeon opinion, but patient refused for surgery, so he was continued on medical management and surprisingly he also responded to it.
Conclusions: Although necrotising pneumonia is a severe illness, it can be managed with antibiotics only as demonstrated in our case series of five patients. But physicians should be vigilant to seek surgical opinion if patient deteriorates on antibiotics.

KEYWORDS

INTRODUCTION

Bacterial pneumonias can lead to numerous complications and necrotising pneumonia is one of them. Necrotising pneumonia is rarely seen now a days due to early treatment with antibiotics. It belongs to the same group as lung abscess and pulmonary gangrene (1,2). There is presence of consolidation, necrosis and multiple cavitary lesions. Such severe inflammation can lead to compromised vascular supply and impaired antibiotic delivery leading to further necrosis and devitalisation of lung parenchyma known as pulmonary gangrene. Management of necrotising pneumonia therefore is a challenge on the part of a physician. Usually prolonged duration of antibiotics and supportive therapy is what helps but progression to pulmonary gangrene definitely necessitates surgical intervention.

Organisms which are common culprits include Staph aureus, Streptococcus pneumoniae, Klebsiella pneumoniae. Other organisms like staphylococcus epidermis, Acinetobacter baumani, Hemophilus influenza and Pseudomonas aeruginosa, Aspergillus, Clostridia species and Bacteroides may also be in involved rarely (1,2). Risk factors include diabetes mellitus, alcohol abuse, prolonged steroid therapy. The patients usually present with typical pneumonia symptoms of fever, chest pain, cough and dyspnoea. Purulent sputum may be present. Some patients may also present with severe disease in sepsis with rapid clinical deterioration like shock and respiratory failure.

Necrotising pneumonia usually is seen radiographically as an extensive disease with multilobar involvement. On CT there is presence of multiple cavities less than 1 cm and necrosis. If there is evidence of vascular obstruction to the affected areas on CT it will be concluded that pulmonary gangrene has set in (3).

We present a case series consisting of five necrotizing pneumonia presenting to the Pulmonary medicine department of a tertiary care hospital.

Case:1

72-year-old diabetic, hypertensive male presented to the hospital with high grade fever, right side pleuritic chest pain and cough with scanty expectoration. On admission his temperature was 102 °F, SpO_2 - 93% at room air, pulse rate- 120/ minute, respiratory rate- 30 / min and blood pressure- 100 /60 mm Hg. On auscultation, coarse crepitations all over right chest. Chest X Ray revealed consolidation all zones of the right lung (Figure1.1). CT thorax also revealed consolidation in the all the lobes of right lung with areas of necrosis (Figure1.2).

Bronchoscopy revealed only mucoid secretions in the right main bronchus and all other bronchi. Broncho alveolar fluid culture did not reveal any bacteria, mycobacteria or fungi. The blood culture revealed a methicillin sensitive Staphylococcus aureus. So, he was started on injection linezolid and clindamycin and continued for 2 weeks followed by oral course of same drugs for another week. Glycaemic control was achieved with strict diabetic diet and insulin titration. He improved slowly and discharged after 3 weeks of hospitalisation.

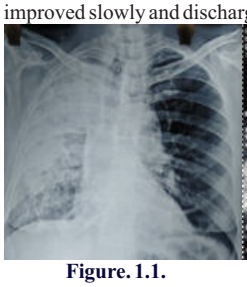

Figure. 1.1.

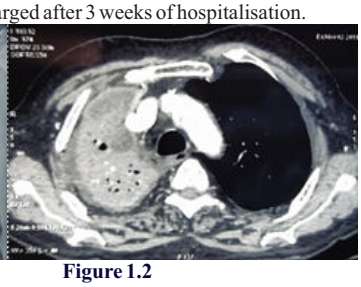

Figure 1.2

Case:2

56 year old male without any comorbidities presented with high grade intermittent fever, cough with mucoid expectoration, shortness of breath and loose stools for 1 week .On admission, vitals were: temperature- 101 °F, blood pressure- 90/60 mm Hg, pulse rate- 110 /minute, SpO_2 -94% , respiratory rate- 40 / minute. Bilateral coarse crepitations were heard over chest.

Routine laboratory investigation revealed neutrophilic leucocytosis. Chest X-ray showed bilateral patchy consolidations (figure 2.1). Contrast enhanced CT of thorax revealed patchy consolidation with areas of necrosis (figure 2.2 and 2.3). Sputum culture revealed Klebsiella pneumoniae sensitive to Meropenem, Tigecycline, Colistin and Amikacin.

He was started on Meropenem and Amikacin. After for 10 days, as patient showed significant clinical improvement injectables were stopped and he was put on oral Faropenem for 1 week more. He was discharged in a stable clinical condition.

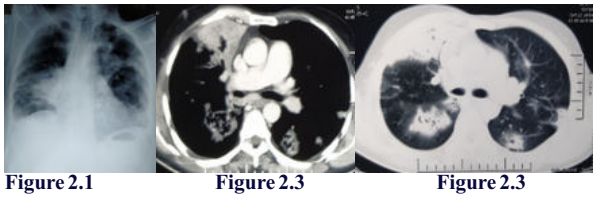

Figure 2.1 Figure 2.3 Figure 2.3

Case:3

57-year-old diabetic male presented with high grade fever, cough without expectoration for 5 day and swelling over right gluteal area since last 7 days.

On examination vitals were temperature- 103 °F, blood pressure- 110/ 70 mm Hg, pulse rate- 120 /minute, respiratory rate 32/ minute, Spo2- 92% on room air. A large fluctuant tender swelling was found over his right gluteal region suggestive of abscess. Chest X ray and CECT thorax revealed bilateral consolidation with necrosis (figure 3). Bronchoalveolar lavage culture yielded a Methicillin Sensitive Staphylococcus aureus (MSSA). He was started on injection cloxacillin and clindamycin for 2 weeks followed by oral drugs for 1 more week. He responded favourably to the treatment and discharged.

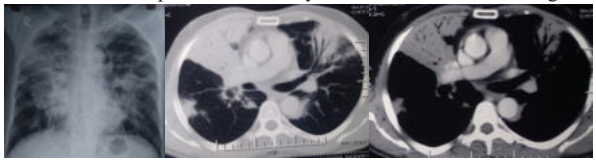

Figure 3.1 Figure 3.2 Figure 3.3

Case:4

40-year-old female without comorbidities presented with high grade intermittent fever, cough with foul smelling expectoration, left pleuritic chest pain and shortness of breath in the last 15 days. She also had a right knee swelling for 20 days.

On examination vitals were blood pressure- 100/ 60 mm Hg, pulse rate- 100/ minute, respiratory rate- 24/ minute, SpO2- 97%, temperature - 100 °. Chest X ray and CT thorax revealed a left lower zone consolidation (figure 4). Bronchoscopy revealed a thick mucus plug in the left main bronchus. Broncho alveolar lavage culture revealed Methicillin resistant Staphylococcus aureus (MRSA) following which injection linezolid was started along with piperacillin and tazobactam. During the course of admission, she had multiple episode of moderate haemoptysis and started expectorating retained necrotic lung tissue. CTVS consultation was sought in view of impending pulmonary gangrene. However, the patient did not give consent for lobectomy. So medical management was continued. In due course the haemoptysis subsided and patient clinically improved.

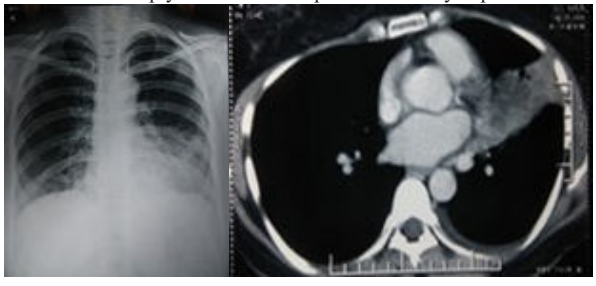

Figure 4.1 Figure 4.2

Case:5

50-year-old male without any comorbidities presented to the Emergency Room with high grade continuous fever, cough with scanty expectoration and shortness of breath for 5 days. On examination he had a blood pressure of 80/60 mm Hg which responded to bolus intravenous fluid and did not require vasopressor support. His other vitals were pulse rate- 101 / minute, respiratory rate-34 / minute, SpO2- 93 % with 3 litres of oxygen. He had bronchial breath sound in the right interscapular areas and crepitations in all areas of right hemithorax and infrascapular area on the left. Chest X ray revealed consolidation right upper and mid zones. Contrast enhanced CT thorax showed confluent necrotising consolidation right upper and middle lobes (figure 5.2). Sputum was negative for mycobacteria or fungi or other bacteria but Bronchoalveolar lavage culture revealed Acinetobacter baumannii sensitive to only Meropenem, Tigecycline, Colistin. He was started on injection Meropenem and Tigecycline for a period of 2 weeks followed by oral faropenem for 2 more weeks. He improved clinically and radiologically on subsequent follow ups.

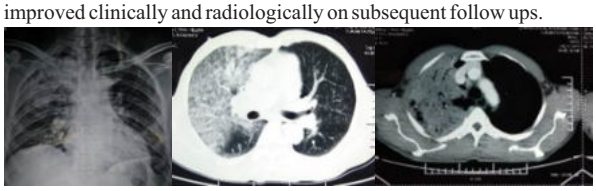

Figure 5.1 Figure 5.2 Figure 5.3

RESULTS:

Table 1. Routine Blood Investigations

Serial no	Hb	TLC	Sodium	potassium	urea	creatinine	LFT	Procal	FBS	PPBS
1	12	17,250(N-84%)	120	4.1	12	0.86	N	1.1	201	350
2	10.5	23,500(N-90%)	140	3.9	34	1.55	N	0.9	88	110
3	13.5	16,150(N-80%)	133	4.3	23	1	N	1	190	211
4	12.4	20,350(N-87%)	135	3.8	25	0.5	N	1.3	92	120
5	11.4	18,340(N-89%)	138	3.5	24	1.2	N	1.2	82	124

(Hb- hemoglobin, TLC- total leucocyte count, LFT- liver function tests, Procal- procalcitonin, FBS- fasting blood sugar, PPBS- post prandial blood sugar)

Table 2. Radiological Profile Of Patients

Serial no	Chest X ray	Contrast CT thorax
1	Consolidation all zones of right lung	Consolidation involving all lobes of right lung with areas of necrosis
2	Consolidation in the right mid zone ,lower zone, all zones in the left	Patchy consolidation with internal cavity and necrosis with surrounding GGO
3	Non homogeneous opacities mid and lower zones bilaterally	Multiple large confluent areas of consolidation right upper and middles lobes and left lingula
4	Consolidation left mid and lower zones	Consolidation in inferior segment of lingula with necrosis
5	Consolidation right upper zone	Confluent necrotic consolidation in the right upper lobe

Table 3: Microbiological Profile Of Patients

Ser no	Sputum Culture	Sputum AFB	Sputum CBNAAT	Blood culture	Bronchoscopy	BAL culture	BAL CBNAAT	BAL AFB
1	neg	neg	neg	MSSA	Mucoid secretions right main bronchus	No organism	neg	neg
2	Klesiella pneumoniae	neg	neg	neg	Could not be done	-	-	-
3	neg	neg	neg	neg	Mucoid secretions in all lobes bilaterally	MSSA	neg	neg
4	neg	neg	neg	neg	Thick mucus plug in the left main bronchus	MSSA	neg	neg

5	neg	neg	neg	neg	Mucoid secretions in the right main bronchus bronchi	Acinetobacter baumanii	neg	neg

(*Neg – negative, implies no organism isolated, BAL- Bronchalvelar lavage, MSSA- methicillin sensitive staphylococcus aureus)

DISCUSSION:

Clinical Presentation And Diagnosis Of Necrotising Pneumonia:

Necrotising lung infections presentation range from simple lung abscess to necrotising pneumonia to pulmonary gangrene (5). Patients usually presents initially with sign and symptoms of pneumonia that fails to resolve with standard antibiotic therapy.

Most cases of lung abscess usually respond to a long course of antibiotics and surgical intervention is required in those in which medical therapy fails.

Necrotising pneumonia and pulmonary gangrene usually have a rapid clinical course. In necrotising pneumonia, extensive consolidation with multi lobar involvement is common. CT might show small cavities and necrosis. Necrosis is identified by lack of perfusion and presence of micro abscesses in CT thorax (5). Most patients with necrotising pneumonia are sick on presentation with shock, sepsis, respiratory failure requiring ICU care owing to rapid deterioration. Necrotising pneumonia can't be treated along the lines of community acquired pneumonia due to its high mortality, morbidity and ICU admission rates (4).

Pulmonary gangrene lies at the end of the spectrum of necrotising lung infections. A contrast CT will show obstruction of pulmonary arterial supply to a necrotic segment, lobe with multiple cavities. Presence of central necrosis with lack of perfusion involving more than 50 % of the affected lobe indicates pulmonary gangrene (5,6). Microscopically organisms may be seen in the perivascular region in necrotising pneumonia but are absent in pulmonary gangrene. The pulmonary arterial vessels are thrombosed extensively in gangrene.

Most common causes of necrotising pneumonia are Staphylococcus aureus, Streptococcus pneumoniae and Klebsiella pneumoniae (5,7, 8). But pulmonary gangrene is usually caused by gram negative organisms like Klebsiella pneumoniae and Pseudomonas aeruginosa (5, 9)

Lack of definitive guidelines for such cases makes the decision making quite difficult since surgery is also a part of the management (6). Broad spectrum antibiotics are started initially. Source of infection control is done by draining parapneumonic effusion or pus if any. Distinguishing necrotising pneumonia from pulmonary gangrene is not possible always. CT thorax will help in diagnosis and therefore decision making regarding surgical intervention as well. Coexisting structural lung disease and co morbidities influence the feasibility of surgical resection.

Surgical Intervention

Includes management of pleural disease like empyema and BPF and management of parenchymal infection. Massive haemoptysis, pulmonary gangrene as well as no response to conservative management need surgical resection (3,4,8). Optimal timing of surgery as well indications are unclear. Many factors make surgery quite risky in such cases like hemodynamic instability, hypoxemia, acute lung injury. Risk benefit assessment as a result is also very difficult in such a setting.

If at all surgery is being planned the goals are to control the sepsis, drain empyema, resect or debride necrotic tissue, re expand the lung and protect the opposite lung from spillage and avoiding major complications (5).

This case series throws light on varied manifestations and optimal management of necrotising pneumonia cases. Out of these five cases, Klebsiella pneumonae was isolated from sputum in one patient and in three patient's organisms were isolated from bronchoalveolar lavage (two Methicillin Sensitive Staphylococcus Aureus, one Acinetobacter baumanii). In fifth patient sputum and bronchoalveolar lavage (BAL) culture were sterile but Methicillin Sensitive Staphylococcus Aureus (MSSA) was grown in blood culture.

All five patients were started with antibiotics as per culture and sensitivity results. Four of them recovered with medical management only. Fifth patient developed pulmonary gangrene for surgery was planned as per thoracic surgeon opinion, but patient refused for surgery, so he was continued on medical management and surprisingly he also responded to it.

CONCLUSION:

Conservative management with appropriate antibiotics for optimal duration is the mainstay of treatment of necrotising pneumonia. Surgical intervention may be necessary in some cases. CT thorax is an important tool to know the extent of the disease. The outcome is usually dependent upon complex interplay of host, microbe as well other factors. There is definitely need of further studies on necrotising pneumonia so that clear guidelines regarding management of the same can be laid down.

REFERENCES

1. Chatha N, Fortin D, Bosma KJ. Management of necrotizing pneumonia and pulmonary gangrene: A case series and review of the literature. Can Respir J 2014; 21(4): 239-45.
2. Tsai YF, Ku YH. Necrotizing pneumonia: a rare complication of pneumonia requiring special consideration. Curr Opin Pulm Med 2012; 18: 246-52.
3. Curry CA, Fish aEK, Buckley JA. Pulmonary gangrene: Radiological and pathologic correlation. South Med J 1998;91:957-60.
4. Mandell LA, Marrie TJ, Grossman RF, Chow AW, Hyland RH. Canadian guidelines for the initial management of community acquired pneumonia: An evidence-based update by the Canadian Infectious Diseases Society and the Canadian Thoracic Society. The Canadian Community-Acquired Pneumonia Working Group. Clin Infect Dis 2000;31:383-421.
5. Reimel BA, Krishnadasen B, Cuschieri J, Klein MB, Gross J, Karmy-Jones R. Surgical management of acute necrotizing lung infections. Can Respir J 2006; 13:369-73.
6. Penner C, Maycher B, Long R. Pulmonary gangrene. A complication of bacterial pneumonia. Chest 1994; 105:567-73.
7. Tsai YF, Tsai YT, Ku YH. Surgical treatment of 26 patients with necrotising pneumonia. Eur Surg Res 2011; 47:13-18.
8. Krishnadasan B, Sherbin VL, Vallieres E, Karmy-Jones R. Surgical management of lung gangrene. Can Respir J 2000; 7:401-4.
9. Curry CA, Fish aEK, Buckley JA. Pulmonary gangrene: Radiological and pathologica correlation. South Med J 1998; 91:957-60.