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Case Report

Lung abscess with metastatic brain abscess- A case report

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ABSTRACT

Brain abscess can result from spread of infection from contiguous sites or from distant hematogenous spread. Hematogenous spread from a distant site as from the lungs is more common with cyanotic congenital heart disease and in patients with infective endocarditis. We report a case of hematogenous spread of brain abscess from lung in a patient who had no concurrent heart disease. Klebsiella pneumonia was isolated both from brain abscess and from lung abscess.

A fifty years old lady with uncontrolled sugars presented with cough with expectoration and fever. Chest X ray showed cavity with fluid level on the right side and sputum culture showed Klebsiella pneumoniae. She was treated with sensitive antibiotics. During in hospital stay she developed headache and blurring of vision. CT brain showed a right parietal lobe abscess. She underwent decompression procedure and abscess from brain was drained which also revealed growth of Klebsiella pneumoniae. Her echo was normal. She was treated with sensitive antibiotics and had clinical improvement.

While treating a case of lung abscess, clinicians should be aware of the possibility of metastatic spread and a high index of suspicion and a radiological imaging leads to early diagnosis and treatment.

1. Introduction

Brain abscess can result from spread of infection from contiguous sites and structures as in otitis media, dental infection, mastoiditis, sinusitis or secondary to hematogenous spread from a remote site. It can also occur after skull trauma or surgery, and meningitis. Hematogenous spread from a distant site as from the lungs is more common with cyanotic congenital heart disease and in patients with infective endocarditis.[1] We report a case of hematogenous spread of brain abscess from lung in a patient who had no concurrent heart disease. Klebsiella pneumonia was isolated both from brain abscess and from lung abscess.

2. Case Details

A fifty years old home maker presented with complaints of cough with purulent expectoration and high grade fever of ten days duration. Fever was associated with chills. She expectorated half a tea cup of purulent, yellowish and foul smelling sputum. Two days before presenting to our institute she noticed streaks of fresh blood in the sputum. She had no preexisting respiratory disease. She is a known diabetic and was on oral glycemic agents regularly. She had been treated with antipyretics and intravenous drugs elsewhere. Upon presentation patient was febrile, had tachycardia and was mildly dyspneic. She had normal sensorium. Her oxygen saturation and blood pressure were within normal levels. She had few scattered crepts in the right interscapular region. Chest X ray revealed the presence of a cavity with fluid level on the right side (Fig A). A possibility

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of lung abscess was considered and a plain CT chest also confirmed the diagnosis. On presentation patient's blood glucose was elevated. Sputum culture revealed klebsiella pneumonia with fluroquinolone and ceftazidime sensitivity. Blood culture was contaminated. Sensitive antibiotics and antiglycemic measures were started and blood sugars were controlled. Patient initially had good response and remained afebrile for two days. On the fifth day of hospital stay she complained of severe headache and had low grade fever. She also complained of blurred vision. Ophthalmologist opined as papilledema. A CT brain was performed urgently which revealed a right parietal lobe abscess (Fig C). She underwent decompression procedure and 30 ml of pus was drained. Pus from brain abscess revealed klebsiella pneumonia identical to the lung isolate. Patient was given four weeks of sensitive antibiotics. Patient improved clinically and had no neurological deficit (Fig B and Fig D).

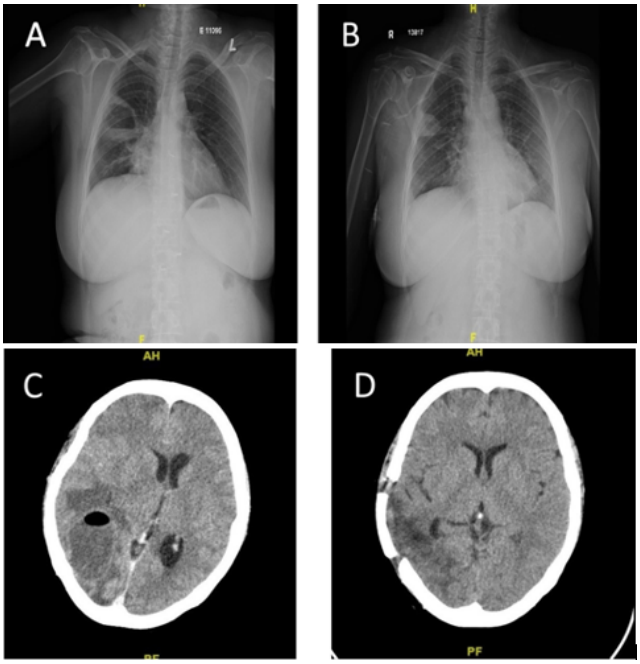

Fig. 1:

3. Discussion

Lung abscess and necrotizing pneumonia are often used interchangeably. Necrosis of the pulmonary parenchyma with resultant formation of cavity secondary to an infectious process is lung abscess. When there are areas of multiple small lung abscess is present, it is termed as necrotizing pneumonia. Hippocrates had described the clinical signs and therapy of lung abscess ages ago. Before the advent of effective antimicrobials, lung abscess had a mortality of about 30%. About 1/3 rd of survivors used to have complications like chronic lung abscess, empyema and bronchiectasis. Currently effective antimicrobial therapy had largely improved patient clinical outcomes.[2]

Lung abscess can be classified as acute or chronic based on the duration and as primary or secondary based on the etiology. Acute lung abscess is when the duration of illness is less than six weeks and chronic when it is more than 6 weeks. Based on the etiology, lung abscess can be primary or secondary. In primary lung abscess, there is no preexisting lung disease and lung abscess occurs as a result of aspiration of oropharyngeal secretions. This can occur in conditions like dental infections, para nasal sinusitis, altered mental status, gastro-esophageal reflux disease and recurrent vomiting. Secondary lung abscesses occurs in patients with preexisting lung disease, spread from extrapulmonary spread(abdominal sepsis, infective endocarditis, infected iv cannula or central venous catheter, septic thromboembolisms) or by direct spread (broncho-oesophageal fistula, sub diaphragmatic abscess).

The causative organisms of lung abscess are usually poly microbial. Anaerobic bacteria include gram negative organisms like Bacteroides fragilis, Fusobacterium capsulatum and necrophorum. Gram-positive anaerobic include Peptostreptococcus and microearophillic streptococci. Multiple species of aerobic bacteria can cause lung abscess like Staphylococcus aureus [including methicillin resistant staphylococcus aureus (MRSA)], Streptococcus pyogenes, Sreptococcus pneumonia, Klebsiella pneumonia, Pseudomonas aeruginosa, Haemophilus influenza (type B), Acinetobacter spp, Escherichia coli, and Legionella. Less common isolates include Mycobacterium spp, Aspergillus, Cryptococcus, Histoplasma, Blastomyces, Coccidoides, Entamoeba histolytica, Paragominus westermani. Actinomyces and Nocardia asteroids.[2] Though anaerobic bacteria have been the most common causative agent,[3] the incidence of Klebsiella pneumonia causing lung abscess is on the rise.[4] Our patient also had Klebsiella.

The common complications of lung abscess include rupture into the adjoining pleural space causing empyema and bronchopleural fistula, hemoptysis, amyloidosis and metastatic brain abscess.

Metastatic brain abscess secondary to lung abscess usually occur in patients as a result of septic emboli from infective endocarditis and in patients with right to left shunt. Our patient did not have endocarditis or right to left shunt. It is postulated that the spread of infective foci from the lung to the brain could be from an erosion of a pulmonary vein by the pulmonary abscess and consecutive trans cardiac embolization of septic material. It is also possible that an infected embolus from an intercostal thrombophlebitis in the chest wall can enter the spinal veins and thus enter the cerebral circulation. The spinal veins communicate above with the venous sinuses of the skull and below with the intercostal and lumbar veins. Usually the flow from the spinal veins is more to the lumbar veins. There can be an

antigravity flow into the venous sinuses of the skull when the patient coughs or strains during toilet. Also operative interference of lung abscess increases the chances of brain abscess.[5] There is a considerable variation in the interval between the onset of the lung infection and the appearance of neurologic signs due to brain abscess. It can range from a few days to even as long as four years. Our patient had a gap of about 5 days.

There are multiple differentials for lung abscess. These include cavitating lung cancer, cavitating lung infarcts, granulomatosis with polyangiitis, Hiatus hernia, hydatid cyst and infected bulla containing a fluid level.

Being polymicrobial etiology, treatment of lung abscess includes broad spectrum antibiotics such as Clindamycin or combination of ampicilin/sulbactam. Alternatively, piperacilin/tazobactam or meropenem can be administered. For MRSA isolates, vancomycin is effective. With sensitive antibiotics, clinical response can be seen in 3-7 days. The radiographic changes may be present for about two months despite clinical response. Bronchoscopy may be needed if adequate clinical response is not noted.

The duration of antibiotics therapy depends on the clinical and radiographic response of the patient. Antibiotics therapy should be continued till adequate clinical response is obtained. Intravenous antibiotics for three weeks followed by 1-2 weeks of oral antibiotics may be needed. Other supportive treatment includes high calorie diet, adequate hydration and postural drainage. Drainage procedures include percussion and positioning to increase drainage through the airways.

Surgical management may be occasionally needed if the abscess is greater than 6 cm in diameter or if symptoms lasts more than 12 weeks with appropriate therapy. Surgical options include chest tube drainage or surgical resection of lung abscess with surrounding tissue. Bronchoscopic drainage of lung abscess is an alternative to chest tube drainage but has the possibility of spillage into the opposite lung. Per cutaneous trans thoracic tube drainage can be performed under radiological guidance but has risk of spillage of the necrotic debris and infection in pleura with formation of pyopneumothorax, empyema or bronchopleural fistula or bleeding.

Lobectomy is the resection of choice for large or central position of abscess. Mortality rate after surgical resections is about 11-28%. Minimal invasive surgical procedures, such as video assisted thoracoscopy is a method of choice for peripheral localization of lung abscess and without pleural adhesions and fibrothorax.[6,7]

Brain abscess secondary to lung abscess usually requires surgical drainage and appropriate antibiotic therapy.[8]

4. Conclusions

Lung abscess though a benign condition can occasionally cause serious complications like brain abscess. While treating a case of lung abscess, clinicians should be aware of the possibility of metastatic spread and a high index of suspicion and a radiological imaging leads to early diagnosis and treatment.

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5. Conflicts of Interests

None.

6. Source of Funding

None.

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