

Case Report

An interesting case of metastatic brain abscess

Chandramouleeswaran V¹, Kannan V², Lakshmi Narasimhan Ranganathan³, Balasubramanian S¹, Jawahar M¹, Nithyanandam A²

From ¹Professor, ²Assistant Professor, ³Director and Professor, Department of Neurology, Institute of Neurology, Madras Medical College, Chennai, Tamil Nadu, India

Correspondence to: Chandramouleeswaran V, Institute of Neurology, Madras Medical College, Park Town, Chennai – 600003, Tamil Nadu, India. E-mail: drvcmpn@gmail.com

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ABSTRACT

Klebsiella pneumoniae is a Gram-negative, non-motile, lactose fermenting, aerobic rod-shaped bacterium with three different subspecies, *K. pneumoniae*, *Klebsiella ozaenae*, and *Klebsiella rhinoscleromatis*. Here, we report the case of a 32-year-old male, chronic alcoholic presented with fever, hemoptysis, and headache of 20 days duration. Over a period of 4 days, the patient worsened with the development of altered sensorium and respiratory distress, connected to a mechanical ventilator. Computed tomography and chest X-ray showed consolidation involving the left lower lobe with an air-fluid level. Magnetic resonance imaging brain showed multiple metastatic brain abscess involving cerebrum and cerebellum and culture reports of sputum and blood showed *K. pneumoniae*. The patient was started on antibiotics along with anti-tubercular drugs. In spite of effective management, the patient developed recurrent episodes of hemoptysis and died of respiratory failure. For the concomitant involvement of both cerebrum and cerebellum for the first time.

Key words: Hemoptysis, *Klebsiella*, Metastatic brain abscess, Pneumonia

Klebsiella pneumoniae is a Gram-negative, non-motile, lactose fermenting, aerobic rod-shaped bacterium with three different subspecies, *K. pneumoniae*, *Klebsiella ozaenae*, and *Klebsiella rhinoscleromatis*. Virulence factors contributing to the pathogenesis are capsular serotype, hypermucoviscosity phenotype, lipopolysaccharide, siderophores, and pili. Community-acquired pneumonia (CAP) due to *Klebsiella* is common among alcoholics, diabetic patients with poor glycemic status, solid organ transplant, malignancy, and chronic obstructive pulmonary disease patients [1].

CAP often produces lobar pneumonia similar to *Streptococcus pneumoniae* with a predilection for the involvement of posterior segment of the right upper lobe. On Gram stain of sputum, *Klebsiella* species appear as short, plump, Gram-negative bacilli surrounded by a capsule that appears as clear space. Even with early initiation of appropriate antibiotic therapy, mortality rates are high due to bacteremia and producing metastatic abscess in multiple sites involving liver, brain, heart valves, spleen, kidney, eye, and skin.

Usually, the patients die of respiratory failure due to the involvement of multiple lobes or due to acute respiratory distress syndrome. The emergence of resistance to broad-spectrum antibiotics is becoming an alarming trend in the treatment of *K. pneumoniae* with the possibility of extended-spectrum beta-lactamases or carbapenemase production to be taken into account before choosing appropriate antibiotic regimen [2].

We report the case of a 32-year-old male, chronic alcoholic patient of metastatic brain abscess. In our case, there was diffuse involvement of both cerebrum and cerebellum.

CASE REPORT

A 32-year-old male, chronic alcoholic for 15 years duration presented with high-grade intermittent fever, associated with chills and rigor for 20 days duration, five episodes of blood-tinged sputum, holocranial headache for 10 days, and weakness of the right upper and lower limb for 3 days. No history of head trauma, seizures, vomiting, loss of consciousness, speech difficulty, and visual disturbances. The patient was not a known diabetic, hypertensive, smoker and had no other comorbid illness.

On general examination, the patient was conscious, oriented, febrile (104°F), tachypneic with stable vitals. Cranial nerves were normal. Spinomotor system examination showed hypotonia of all four limbs with a weakness of the right upper and lower limb and diminished deep tendon reflexes. Sensory, cerebellum, and extrapyramidal system examination were normal. Neck rigidity and Kernig's sign were positive. Auscultation revealed the left basal crackles. Cerebrovascular system and abdomen examination were normal.

X-ray chest showed the left lower zone haziness, cavity with an air-fluid level (Fig. 1). The patient was clinically diagnosed as having left basal pneumonia with meningitis. A computed tomography scan chest showed segmental consolidation, cavity with an air-fluid level in the superior segment of the left lower lobe with mediastinal lymphadenopathy (Fig. 2). Complete blood count showed elevated white blood cells (WBCs) count with predominant neutrophils (91%) and raised erythrocyte sedimentation rate (70 mm/h). Baseline renal and liver function test (RFT and LFT)

were normal. Cerebrospinal fluid (CSF) examination showed elevated protein, normal sugar with cytology showing moderately cellular smear with neutrophilic leukocytosis negativity for gram stain & culture, acid-fast bacillus, and gene expert.

Based on the above-mentioned clinical signs and symptoms, CSF, and chest X-ray findings, the patient was provisionally



Figure 1: Chest X-ray showing lower zone haziness and cavity with an air-fluid level

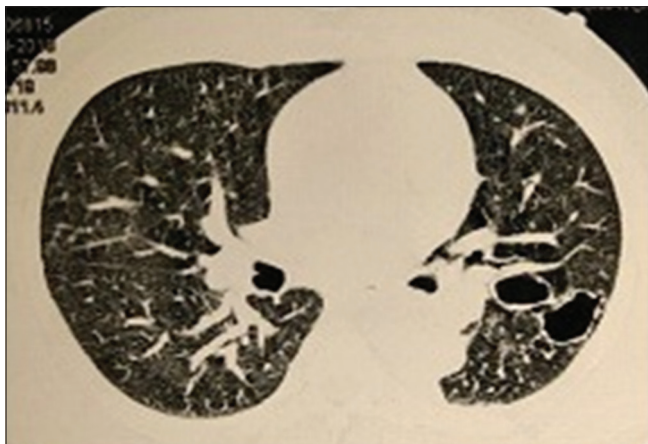


Figure 2: Computed tomography chest showing consolidation in the left lower lobe and cavity with an air-fluid level

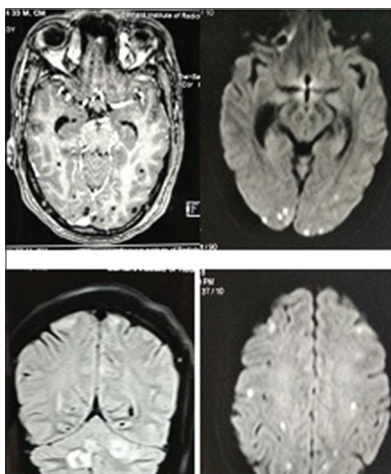


Figure 3: Magnetic resonance imaging brain showing multiple metastatic abscess in the cerebrum and cerebellum

diagnosed to have pneumonia with bacterial meningitis. The patient was started on a prophylactic meningitic dose of antibiotic with steroids. Magnetic resonance imaging brain showed multiple T2 hyperintense lesion of bilateral cerebral cortex and cerebellum with diffusion restriction and peripheral rim enhancement with contrast suggestive of multiple septic embolic or tuberculoma (Fig. 3). Sputum culture and blood culture were positive for *K. pneumonia* with sensitivity to amikacin and piperacillin-tazobactam.

The patient was started on piperacillin-tazobactam (4.5 g tds), vancomycin (500 mg tds), and metronidazole (500 mg tds). On day 4 of admission, the patient developed altered sensorium, respiratory distress, and maculopapular rash with multiple microabscess in the thigh with altered renal and liver parameters (Fig. 4). The patient was intubated and connected to a mechanical ventilator. The patient was started on antituberculosis drugs - streptomycin, ethambutol, and ofloxacin regime and one unit of blood transfusion. In spite of effective management, the patient continued to have a fever with elevated WBC count with normalization of RFT and LFT values. Repeat blood culture on day 10 showed ESBL-producing *Klebsiella* sensitive to imipenem. The patient was started on meropenem (500 mg tds) and Category I antituberculosis drugs and regained consciousness with persistence of fever. On day 18, the patient developed



Figure 4: Maculopapular rash with multiple microabscess in the thigh

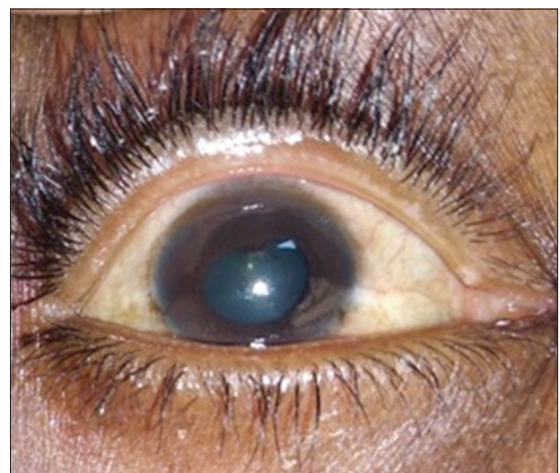


Figure 5: Panuveitis with hypopyon in the right eye

panuveitis in the right eye (Fig. 5) and started on moxifloxacin with atropine eye drops. On day 25, the patient had sudden explosive cough followed by bleeding from the tracheostomy site, and the patient died of aspiration and respiratory failure.

DISCUSSION

Klebsiella spp. account for a majority of infections involving urinary tract, hepatobiliary tract, and lung infections. Studies in Taiwan showed that *Klebsiella* has been the common causative agent resulting in a pyogenic liver abscess, bacteremia, pneumonia, endophthalmitis, and meningitis. They have been recognized as an uncommon cause of the brain abscess in adults, but the incidence is increasing in the modern era due to newer strains and the emergence of drug resistance [3].

Liliang *et al.* [4] reported 15 patients of *Klebsiella* brain abscess with relatively high mortality of 28% and debilitating abscesses were common in *Klebsiella* infection. Zeidman *et al.* [5] noted 85% mortality with *Klebsiella* brain abscess. Takeshita *et al.* [6] reported 37% mortality with intraventricular empyema due to *Klebsiella*.

Brain abscesses usually affect adults with a peak incidence in the second and third decades of life. The underlying diseases commonly included diabetes and alcoholism for *K. pneumoniae* infections. Hyperglycemia enhances capsule formation with a resultant increase in the virulence of *Klebsiella* bacilli. Clinical features include headache due to raised intracranial pressure, fever with chills and rigor, focal deficit in the form of hemiparesis, and altered sensorium due to concomitant meningitis. The location of a brain abscess is frequently related to predisposing factors. Differential diagnosis includes multiple tuberculoma, glioma, fungal granuloma, and neurocysticercosis. *Klebsiella* brain abscess has a fulminant clinical course in the form of multiple septic emboli involving eye, skin, liver, heart, and poor response to therapy. Our patient had multiple brain abscess with the involvement of eye in the form of panuveitis and skin involvement with multiple microabscess.

Metastatic abscesses are commonly located in the parietal, frontal, or temporal lobes, and multiple brain abscesses are

usually the result of metastatic spread from the remote primary foci. Treatment of brain abscesses requires a combination of antimicrobials, surgical intervention, and eradication of the primary infected foci. In spite of modern neurosurgical techniques, new antimicrobial agents, and modern imaging techniques, the treatment of metastatic *Klebsiella* brain abscess in adults remains unsatisfactory, and the mortality rate is high [3].

CONCLUSION

Compared to the previous case reports of metastatic brain abscess with predominant involvement of cerebrum with poor prognosis, our patient also had multiple metastatic brain abscess involving gray matter, corticomedullary junction, cerebrum, and cerebellum due to lung abscess with poor response to antibiotic therapy.

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