CASE REPORT

Klebsiella ozaenae sepsis in a young healthy male

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Abstract

Introduction: K. ozaenae is a weak pathogenic organism known to cause primary atrophic rhinitis or ozena. There are few reports that the bacteria could cause serious invasive infection in debilitated patients. This is first report of K. ozaenae in a young previously healthy adult. Case presentation: A 34-year-old Filipino male with no significant previous medical history presented with severe frontal headache of two days duration with fever and chills. Blood and serum work-up showed leukocytosis, mild thrombocytopenia, hypomagnesemia, hypokalemia, and hypophosphatemia. Liver function test indicated elevated bilirubin and transaminases. CT of the head indicated sinus disease including mucoperiosteal-like thickening of the right maxillary sinus, left mastoid hypoaeration and sclerosis characteristics of chronic inflammation. Blood culture grew gram negative rods identified as Klebsiella ozaenae species. Conclusion: Klebsiella ozaenae sepsis is rarely reported in medical literature. There are about 12 case reports all of which identified with one or more chronic conditions causing decline in patient immunity resulting in invasive infection by the weak pathogen. Our patient is a young physically active adult male with no identifiable risk factors except chronic ozena-like infection that might serve as a source for haematologic seeding.

Keywords: Klebsiella ozaenae, sepsis, ozena

INTRODUCTION

Klebsiella ozaenae is a gram negative aerobic bacillus, a member of a family Enterobacteriaceae. Members of Klebsiella genus typically express lipopolysaccaride (O) and capsular polysaccharide (K) antigens which are the base of their serotype variability and virulence. K. ozaenae is a weakly pathogenic organism known to be a causative agent of the rare disease primary atrophic rhinitis or ozena.1 Patients with ozena have progressive chronic inflammatory disease of the upper respiratory tract with a distinctive feature of fetid endonasal crusting and discharge with mucosal atrophy and bone resorption.2 Patients may present with chronic nasal discharge and malodor, anosmia, epistaxis, nasal obstruction or headache. Mucoperiosteal wall thickening of the maxillary and ethmoid sinus is a characteristic radiological finding in chronic infection with Klebsiella ozaenae.3 There are only few literature reports that this bacterium is associated with serious invasive infection such as meningitis,4 sepsis5 and intracranial abscesses.6 Here we report a case of K. ozaenae sepsis in a patient with asymptomatic sinusoidal and mucosal changes.

CASE REPORT

A 34-year-old Filipino male who is working in a Sushi Bar with no significant previous medical history presented with severe frontal headache of two days duration with fever, chills, loss of appetite, nausea and one episode of vomiting. The patient reports no abdominal pain, diarrhoea, cough, skin rash, recent throat infection, neck stiffness, blurring of vision, nasal discharge, tinnitus or urinary symptoms. The patient denied contact with similarly ill patients, recent travel or head trauma. He stated that he drinks once to twice weekly about 4-6 beers in a session. At admission his axillary temperature was 101.5°F, blood pressure 110/60 mmHg, respiratory rate 18/min, pulse 108 beats/min and SaO2 99% in ambient air. He is a well-built athletic young male with slightly dry buccal and glossal surfaces. The remaining physical examination...
of all body systems was none rewarding except mild tenderness to pressure over maxillary sinus and epigastric tenderness without guarding or rigidity.

Initial blood and serum work up showed leukocytosis [15,300 cells per mm$^3$ with neutrophils of 95% and bands 21%], mild thrombocytopenia (111,000 cells per mm$^3$), hypomagnesemia (1.4 mg/dl), hypokalemia (3.4 meq/l), and hypophosphatemia (1 mg/dl). His random blood glucose level was 180 mg/dl.

Liver function test indicated elevated bilirubin (3.1 mg/dl) and transaminases (AST 64 mu/ml, ALT 79 mu/ml). Chest x-ray showed clear lungs. Urinalysis, renal functional state tests and coagulation profile were normal. CT of the head indicated sinus disease including mucoperiosteal-like thickening and possible air-fluid level in the right maxillary sinus, mild soft tissue density of the left maxillary and ethmoid sinus and left mastoid hypoaeration and sclerosis (Fig.1 and Fig. 2).

FIG. 1: CT scan of the head showing maxillary sinuses mucoperiosteal-like thickening and a possible air-fluid level in the right maxillary sinus.

FIG. 2: CT scan of the head showing pneumatization of left maxillary sinus with sclerosis consistent with chronic infectious process.
Patient was primarily managed with a working diagnosis of Systemic Inflammatory Response Syndrome to rule out meningitis. Patient did not consent for LP. He was started empirically with vancomycin and ceftriaxone. In the mean time blood culture grew gram negative rods identified as *Klebsiella ozaenae* species. The working primary diagnosis was *Klebsiella ozaenae* sepsis. The bacterium was sensitive to ampicillin/sulbactam, ciprofloxacin, cefazolin, piperacillin, imipenem and timentin. The antibiotic treatment was changed to piperacillin.

The ENT team evaluated the patient and took scrapings from the nasal mucosa and turbinates. No bacteria grew from these specimens. Imaging studies of the abdomen and pelvis structures were carried out with sonography. It revealed a 4.6 cm mixed ecogenic mass in the medial aspect of the right lobe of the liver without flow on color Doppler imaging. Further characterization of the mass using IV contrast CT has indicated that the mass is an incidental benign hemangioma. A stool culture grew normal flora. No ova, parasites or WBC were found in the stool. Hepatitis B panel showed no vaccination or previous encounter with the virus. Patient was negative for hepatitis A IgM.

With the continuation of piperacillin therapy, patient’s headache and fever disappeared. Two sets of blood cultures showed no new growth. Patient’s low platelet count and abnormal liver function started trending to normality. Patient became apyrexial for more than 48 hours and is discharged home with oral moxyfl oxacin after 7 days of hospital stay. Subsequent follow-ups at 3 weeks after discharge have revealed no change in the size and architecture of the hepatic mass and sinus findings. He remained symptom free and was well.

**DISCUSSION**

*K. ozaenae* is weakly pathogenic and is part of the normal flora of the upper respiratory passageways. The bacterium is the putative cause of a rare ENT disease; chronic atrophic rhinitis. However, there are few literature reports that it could also cause life threatening serious infections. Tang and Chen reported two cases of *K. ozaenae* meningitis and reviewed other two similar cases of meningitis previously reported in literature. Multiorgan infection and formation of abscesses in brain, lung, prostate and around the kidney was reported by Ng et al. from Malaysia. Case reports of abscess formation at various anatomical sites including brain, lungs, eye, pituitary gland, liver and spleen are also reported sporadically. Most of the unusual invasive presentation of klebsiella infection has been reported from South East Asia. Ko et al. described, of his Taiwan patients who had klebsiella bacteremia, 88% were with liver abscess. In contrast, in the same study, only 12% of cases of *K. pneumoniae* bacteremia are associated with liver abscess in non-South-East Asian patients. The reason for the geographic preponderance of these severe manifestations is not known, likewise the prevalence of ozena in the same subcontinent. In our Filipino patient, abdominal, pelvic, and head CT scan has been done to rule out both primary abscesses as a source of bacteremia and metastatic abscesses as secondary seeding complications.

Septicemia with *K. ozaenae* is similarly rare and highly fatal. Among the seven patients of *K. ozaenae* septicemia reported in the literature, five died. It is reported that all affected patients have one or more underlying diseases and conditions known to compromise body immunity such as alcoholism, diabetes, malignancy, lepromatous leprosy, leucopenia, immune suppressive treatments or advanced age. In a similar study, Ko et al. has also shown that 78% of their patients with Klebsiella bacteremia have underlying predisposing diseases, the most common being diabetes mellitus (40%), liver disease (34%), malignancy (16%) and alcoholism (12%). However, unlike previous reports, the case reported here is a young athletic man in whom no immune compromising chronic diseases could be identified. To our knowledge this is the first report of *Klebsiella ozaenae* in a previously healthy adult with no apparent chronic illness known to debilitate the patient’s immunity. The purpose of this report is to sensitize practitioners that this unusual organism can cause sepsis in immune competent patients. It is important because it is invariably fatal if treatment is delayed.

The source of septicemia could not be definitively established in this case. It is not possible, yet, always to identify the primary site of blood invasion. In a large worldwide collaborative study involving 455 episodes of bacteremia caused by *Klebsiella pneumoniae*, up to 12 % of the studied bacteremia cases have no primary site evident as a source for blood invasion. Nonetheless, the CT findings in our patient are very characteristic for chronic atrophic rhinitis and sinusitis of *K. ozaenae*. Clinically, the patient is asymptomatic for rhinitis or sinusitis and unfortunately the organism could
not be isolated from the nasal mucosal specimen. Those asymptomatic radiological changes of the sinusoids could still be presumed as colonized with K. ozaenae and could be the most likely source for blood infection.

Consent
Written informed consent was obtained from the patient for publication of this case report.

Competing Interests
There are no personal or financial competing interests to declare.

REFERENCES