International Journal of TROPICAL DISEASE & Health
11(3): 1-5, 2016, Article no.IJTDH.21476
ISSN: 2278–1005, NLM ID: 101632866

SCIENCEDOMAIN *international*
www.sciencedomain.org

Invasive *Klebsiella pneumoniae* Liver Abscess with Multiple Septic Metastatic Complications – Case Report and Review of Literature

Kashif Khan[1*], Elhadi Elouzi[1] and Hiba Rashid[1]

[1]Hamad General Hospital, Qatar.

Authors' contributions

This work was carried out in collaboration between all authors. Author KK did the study design, literature review, data gathering, drafting of manuscript and critical revision. Author EE did the study design, literature review and critical revision. Author HR did study design, literature review, data gathering and critical revision. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/IJTDH/2016/21476
Editor(s):
(1) C. H. Chu, University of Hong Kong, China.
Reviewers:
(1) S. Adewoyin Ademola, University of Benin Teaching Hospital, Benin City, Nigeria.
(2) Patrick Akpaka, The University of the West Indies, West Indies.
Complete Peer review History: http://sciencedomain.org/review-history/11842

Case Study

Received 18th August 2015
Accepted 27th September 2015
Published 16th October 2015

ABSTRACT

Klebsiella pneumoniae is a common bacterial pathogen that is known to cause diverse community acquired and nosocomial infections [1,2]. These infections commonly occur in hospitalized individuals with impaired host defenses [3]. However the proportion of community acquired vs nosocomial infection has markedly increased in recent years [4]. A community acquired syndrome of cryptogenic invasive *Klebsiella pneumoniae* Liver Abscess Syndrome (CIKPLA) has been known to typically affect individuals of Southeast Asian origin, and is complicated by devastating septic spread to other organs [5]. We report a case of community acquired invasive *Klebsiella pneumoniae* infection with multi organ involvement in an individual of non-Asian origin. The aim of this case report is to alert clinicians about increasing prevalence of CIKPLA syndrome, its different clinical presentations and occurrence in different populations suggesting a need for increased vigilance for early diagnosis and prompt management to prevent disastrous sequelae.

**Corresponding author: E-mail: kashifkashif@gmail.com;*

Keywords: Klebsiella pneumonia; liver abscess; septic; CIKPLA; endophthalmitis.

1. CASE REPORT

A 64 year old Sudanese male with a background of hypertension and diabetes mellitus for 13 years presented with history of low grade fever and productive cough of 10 days duration. Two days after the fever, the patient developed pain in the right ankle along with redness and mild pain and swelling in the left calf. He visited a private clinic and received amoxicillin for 5 days without resolution of his symptoms. On the day of admission he developed dull aching, continuous, non- radiating pain on the right side of the abdomen, unrelated to food intake and without alteration in bowel or bladder habits, nausea, vomiting or jaundice along with urinary discomfort. The following day he also developed pain, redness and photophobia along with sticky, mucoid discharge from his right eye.

On physical examination, he had a regular pulse of 80 beats/min, a respiratory rate of 17 breaths/min, temperature of 38.2℃ and a blood pressure of 145/90 mmHg. The other notable physical findings were distention of neck veins. Pitting pedal edema was present bilaterally up to the mid-calf region. There was a red, warm, tender swelling over the right medial malleolus measuring 7 X 5 cm with minimal purulent discharge. Abdominal examination revealed tenderness in the right upper quadrant and a palpable liver edge of 4 cm. Respiratory examination revealed decreased breath sounds and crackles over right basal area. The right eye was chemosed with conjunctival and ciliary injection along with mucoid discharge. The left eye appeared normal. Visual acuity was counting fingers at 1 meter & at 5 meters for right and left eye, respectively. Pupil was sluggishly reactive on the right side and normal on the right. Extra ocular movements were normal bilaterally. Other systems were unremarkable.

His initial laboratory tests showed a platelet count of 132 X 103 U/L with a normal white cell count and hemoglobin. The serum sodium was 125 mmol/L, bicarbonate of 18 mmol/L and blood glucose of 23.42 mmol/L. The remaining electrolytes were within the reference range. Of note was a serum albumin of 26 g/L, ALT of 92 U/L, ALP of 225 with a normal AST, lipase and bilirubin. Chest X-ray revealed evidence of bilateral increased bronchovascular markings with a homogenous opacity on the right side, extending up to the right middle zone with an air-bronchogram suggestive of a parapneumonic effusion (Fig. 1). Blood cultures were positive for *Klebsiella pneumoniae* resistant only to ampicillin. Culture from the urine sample and the leg ulcer also grew the same organism. Ultrasound (Fig. 2) abdomen revealed a liver abscess. A CT guided percutaneous drain yielded 250 cc of purulent fluid, with *Klebsiella pneumoniae* isolated from cultures of the aspirated pus. The patient was initially started on Piperacillin/Tazobactam and urgent ophthalmology consultation was sought. Despite the initial antibiotic treatment, the patient had worsening eye symptoms with tense proptosis and conjunctival chemosis. The patient was diagnosed with endogenous ophthalmitis and total retinal detachment. CT scan showed orbital cellulitis. The antibiotic was changed to Meropenem and IV steroids were added. Unfortunately he developed globe perforation of right eye and underwent evisceration under general anesthesia. The patient's general condition improved after this. He completed the course of antibiotics and was subsequently discharged.

2. DISCUSSION

Klebsiella pneumoniae is an encapsulated Gram-negative bacillus which belongs to the family of Enterobacteriaciae. It is known to cause diverse community-acquired and nosocomial infections [1] and presents with distinct clinical and epidemiological features throughout the world. It is also known to be associated with gastrointestinal infections [6].

Klebsiella pneumoniae has emerged as a major cause of primary or cryptogenic liver abscess, along with an increasingly recognized condition known as Cryptogenic Invasive *Klebsiella pneumoniae* Liver Abscess Syndrome (CIKPLA). It is commonly found in persons with Diabetes mellitus – possibly due to their impaired phagocytosis mechanism of encapsulated organisms [7,8]. Other than diabetes, invasive *Klebsiella pneumoniae* infections have been also found in individuals with impaired host defenses (such as chronic alcoholism, malignancy, hepatobiliary disease, chronic obstructive pulmonary disease, glucocorticoid therapy, and renal failure) [4,9-14], suggesting intrinsic virulence factors enabling the organism to escape host immunity [4]. K1 and K2 capsular strains, coded by the *rmpA* genes have been attributed to the invasive and virulent potential of

Klebsiella pneumoniae [15,16], with K1 strains being significantly associated with pyogenic liver abscess and endogenous endophthalmitis [17,18]. However, to date, its exact pathological mechanisms remain unclear [2]. Although the *Klebsiella pneumoniae* organism was not serotyped for the presence of magA gene and K1 capsular type in our patient, he demonstrated poor prognostic features suggesting a virulent form of strain.

CIKPLA syndrome is frequently associated with one or more complications such as meningitis, endophthalmitis, lung abscess, or fasciitis and has been commonly reported in Taiwanese population [19], with a few reports emerging in United States (of Asian descent) [20]. This syndrome has never been reported in Middle Eastern or Sudanese population.

A few studies have analyzed poor prognostic features associated with CIKPLA syndrome. These include a Glassgow coma scale < 7 - prior to initiation of treatment [21], thrombocytopenia, raised white cell counts and reduced CSF glucose levels [16,22]. Treatment of choice for CIKPLA syndrome includes third generation Cephalosporin, preferably Ceftriaxone.

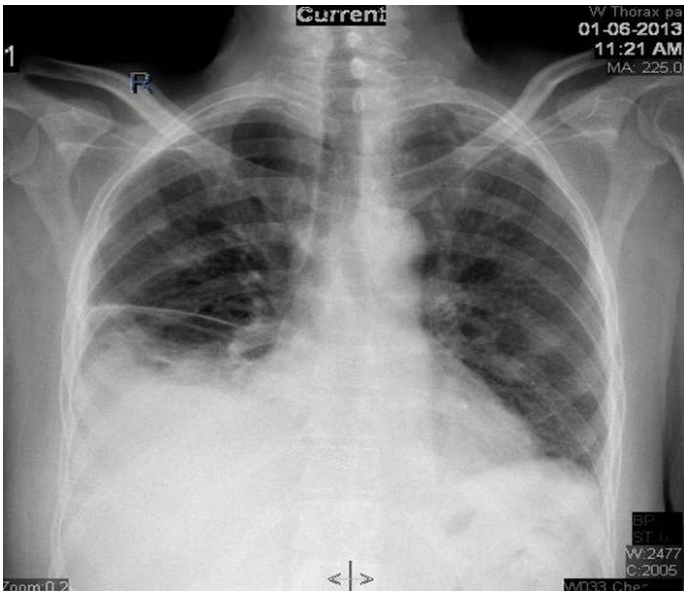

Fig. 1. Chest X-ray showing a heterogeneous opacity involving the mid and lower zone on the right side along with obliteration of the right costophrenic angle and an airbronchogram, suggestive of a parapneumonic effusion

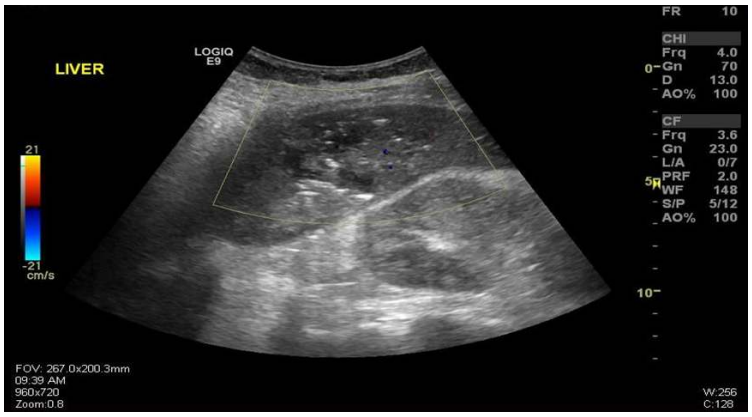

Fig. 2. Ultrasound scan of abdomen showing hepatomegaly (17cm) with multiple echogenic foci likely representing aerobilia probably as a result of gas forming microorganism with abscess, without any obvious fluid

Endogenous endophthalmitis, caused by *Klebsiella pneumoniae* liver abscess is often a devastating septic metastatic infection. Considered to be rare previously, it accounts for about 2 – 8% of all endophthalmitis cases [16]. It has mostly been described in association with primary liver abscess in patients from East Asia, particularly Taiwan [8,23-27], and to a much lesser extent in other parts of the world. After diagnosis pyogenic liver abscess, occurrence of ocular symptoms within 48-72 hours suggests the possibility of septic endophthalmitis via hematogenous spread from the liver abscess [24]. Vigorous search for an intraocular infection should be considered in patients presenting with *Klebsiella pneumoniae* liver abscess.

3. CONCLUSION

We highlight a case of Sudanese male with CIKPLA syndrome demonstrating liver abscess, pneumonia, urosepsis, cellulitis and endo-phthalmitis with total retinal detachment. The risk factors in our patient included poorly controlled diabetes and chronic heavy alcohol consumption. Despite intensive therapy by an ophthalmologist, visual outcome was poor in our patient. The aim of this case report is to alert clinicians about increasing prevalence of CIKPLA syndrome, its different clinical presentations and occurrence in different populations. We suggest a need for increased vigilance while managing such cases and regularly performing eye examinations at the time of diagnosis so as prevent serious debilitating disease complications.

CONSENT

All authors declare that written informed consent was obtained from the patient (or other approved parties) for publication of this case report and accompanying images.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Lin YT, Liu CJ, Yeh YC, Chen TJ, Fung CP. Ampicillin and amoxicillinuse and the risk of *Klebsiella pneumoniae* liver abscess in Taiwan. J Infect Dis. 2013;208(2):211-217.
2. Fang CT, Chuang YP, Shun CT, Chang SC, Wang JT. A novel virulence gene in *Klebsiella pneumoniae* strains causing primary liver abscess and septic metastatic complications. J Exp Med. 2004;199(5): 697–705.
   DOI: 10.1084/jem.20030857.
3. Tsay RW, Siu LK, Fung CP, Chang FY. Characteristics of bacteremia between community-acquired and nosocomial *Klebsiella pneumoniae* infection: Risk factor for mortality and the impact of capsular serotypes as a herald for community-acquired infection. Arch Intern Med. 2002;162(9):1021.
4. Ko WC, Paterson DL, Sagnimeni AJ, Hansen DS, Von Gottberg A, Mohapatra S, Casellas JM, Goossens H, Mulazimoglu L, Trenholme G, Klugman KP, McCormack JG, Yu VL. Community-acquired *Klebsiella pneumoniae* bacteremia: Global differences in clinical patterns. Emerg Infect Dis. 2002;8(2):160-6.
5. Chew LC. Septic monoarthritis and osteomyelitis in an elderly man following *Klebsiella pneumoniae* genitourinary infection: Case report. Ann Acad Med Singapore. 2006;35(2):100-3.
6. Braiteh F, Golden M. Cryptogenic invasive *Klebsiella pneumoniae* liver abscess syndrome. J Infect Dis. 2007;11:16-22.
7. Hui JY, Yang MK, Cho DH, Li A, Loke TK, Chan JC, Woo PC. Pyogenic liver abscesses caused by *Klebsiella pneumoniae*: US appearance and aspiration findings. 2007;242(3):769-76.
8. Cheng DL, Liu YC, Yen MY, Liu CY, Wang RS. Septic metastatic lesions of pyogenic liver abscess. Their association with *Klebsiella pneumoniae* bacteremia in diabetic patients. Arch Intern Med. 1991; 151(8):1557.
9. Tsay RW, Siu LK, Fung CP, Chang FY. Characteristics of bacteremia between community-acquired and nosocomial *Klebsiella pneumoniae* infection: Risk factor for mortality and the impact of capsular serotypes as a herald for community-acquired infection. Arch Intern Med. 2002;162(9):1021.
10. Kang CI, Kim SH, Bang JW, Kim HB, Kim NJ, Kim EC, Oh MD, Choe KW Community-acquired versus nosocomial *Klebsiella pneumoniae* bacteremia: Clinical features, treatment outcomes, and clinical

implication of antimicrobial resistance. J Korean Med Sci. 2006;21(5):816.

11. Lee KH, Hui KP, Tan WC, Lim TK Klebsiella bacteremia: A report of 101 cases from National University Hospital, Singapore. J Hosp Infect. 1994;27(4):299.
12. Feldman C, Smith C, Levy H, Ginsburg P, Miller SD, Koornhof HJ. *Klebsiella pneumoniae* bacteraemia at an urban general hospital. J Infect. 1990;20(1):21.
13. Lu CH, Chang WN, Wu HS. *Klebsiella pneumoniae* meningitis: Analysis on clinical features of thirty-two adult patients. Zhonghua Yi Xue Za Zhi (Taipei). 1997;60(6):296.
14. Watanakunakorn C, Jura J, Klebsiella bacteremia: A review of 196 episodes during a decade (1980-1989). Scand J Infect Dis. 1991;23(4):399.
15. Fang CT, Chuang YP, Shun CT, Chang SC, Wang JT. A novel virulence gene in *Klebsiella pneumoniae* strains causing primary liver abscess and septic metastatic complications. J Exp Med. 2004;199(5): 697–705.
DOI: 10.1084/jem.20030857.
16. Gordon DM, Feldman C. CIKPLA: Cryptogenic invasive *Klebsiella pneumoniae* liver Abscess (and meningitis) – An emerging disease in South Africa? Southern African Journal of Epidemiology and Infection. 2010;25(2):28 – 29.
17. Sawada A, Komori S, Udo K, Suemori S, Mochizuki K, Yasuda M, et al. Case of endogenous endophthalmitis caused by *Klebsiella pneumoniae* with magA and rmpA genes in an immunocompetent patient. J Infect Chemother. 2013;19(2): 326-329.
18. Chuang YP, Fang CT, Lai SY, Chang SC, Wang JT. Genetic determinants of capsular serotype K1 of *Klebsiella pneumoniae* causing primary pyogenic liver abscess. J Infect Dis. 2006;193(5): 645-654.
19. Lau YJ, Hu BS, Wu WL, Lin YH, Chang HY, Shi ZY. Identification of a major cluster of *Klebsiella pneumoniae* isolates from patients with liver abscess in Taiwan. J Clin Microbiol. 2000;38(1):412-4.
20. Fadi Braiteh Marjorie P. Golden. Cryptogenic invasive *Klebsiella pneumonia* liver abscess syndrome. International Journal of Infectious Diseases. 2005; 11(1):16-22.
DOI: 10.1016/J.IJID.2005.10.006.
21. Fang CT, Chen YC, Chang SC, Sau WY, Luh KT. *Klebsiella pneumoniae* meningitis: Timing of antimicrobial therapy and prognosis. QJM. 1993;1:45.
22. Huang CR, Lu CH, Chang HW, Lee PY, Lin MW, Chang WN. Community acquired spontaneous bacterial meningitis in adult diabetic patients: An analysis of clinical characteristics and prognostic factors. Infection. 2002;30:346-50.
23. Wang JH, Liu YC, Lee SS, Yen MY, Chen YS, Wang JH, Wann SR, Lin HH. Primary liver abscess due to *Klebsiella pneumoniae* in Taiwan. Clin Infect Dis. 1998;26(6):1434.
24. Fung CP, Chang FY, Lee SC, Hu BS, Kuo BI, Liu CY, Ho M, Siu LK. A global emerging disease of *Klebsiella pneumoniae* liver abscess: Is serotype K1 an important factor for complicated endophthalmitis? Gut. 2002;50(3):420.
25. Chen YJ, Kuo HK, Wu PC, Kuo ML, Tsai HH, Liu CC, Chen CH. A 10-year comparison of endogenous endophthalmitis outcomes: An east Asian experience with *Klebsiella pneumoniae* infection. Retina. 2004;24(3):383.
26. Tan YM, Chee SP, Soo KC, Chow P. Ocular manifestations and complications of pyogenic liver abscess. World J Surg. 2004;28(1):38.
27. Wong JS, Chan TK, Lee HM, Chee SP. Endogenous bacterial endophthalmitis: An East Asian experience and a reappraisal of a severe ocular affliction. Ophthalmology. 2000;107(8):1483.

Peer-review history:
The peer review history for this paper can be accessed here:
http://sciencedomain.org/review-history/11842