

## ABERRANT FORM OF KLEBSIELLA PNEUMONIAE IN FULMINANT EMPHYSEMATOUS HEPATITIS WITH POLYMICROBIAL INFECTION

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### ABSTRACT

*Klebsiella pneumoniae* is a gram negative, rod shaped and non-motile bacterium of the family Enterobacteriaceae. It is encapsulated, facultative anaerobic bacteria. Bacterial morphology can be altered by various factors, including antibiotics. Unusually shaped, large, swollen organisms were observed in the liver abscess obtained from a patient with Fulminant emphysematous hepatitis with polymicrobial infection in blood. The organism was identified as *Klebsiella pneumoniae* by the Vitek-2 compact system.

**KEYWORD:** Fulminant emphysematous, Aberrant form, *Klebsiella pneumoniae*, Hepatitis, Liver Abscess

### INTRODUCTION

Emphysematous pyogenic liver abscess is a rare manifestation. Gas forming pyogenic liver abscess, which accounts for 7 to 24% of pyogenic liver abscess, has a high fatality rate in spite of aggressive management. (1) *Klebsiella pneumoniae* had surpassed *E.coli* as the predominant isolate from patients with pyogenic liver abscess in Asian countries, the United States, Europe and tended to spread globally. (2) Usually fulminant in nature and rapidly progress to multi organ failure and deaths.(3)

**Case History:** A 53 yr old lady with a background history of Diabetes mellitus was brought as an emergency with progressive breathlessness, diarrhoea and pain in abdomen for past 3 days. On examination she was found to be septic with tachycardia, tachypnoea, blood pressure on lower side, drowsy and had diffuse tenderness over the abdomen. She required mechanical ventilation and resuscitation. She was started on broad spectrum antibiotic (IV Carbapenem in view of shock) after sending samples for all cultures. Investigations showed leucocytosis with 48620 cell/cumm, thrombocytopenia with platelet count – 23,000cell/cumm, deranged LFT with total bilirubin-3.88mg/dl, SGOT-551 IU, SGPT – 276 IU, ALP – 911IU/L, Albumin – 2.5g/dl, deranged renal function with urea – 68.3mg/dl and creatinine – 2.8mg/dl. Cardiac evaluation was found to be normal.

She rapidly progressed to shock requiring multiple inotropes and renal failure requiring initiation of acute peritoneal dialysis. CT abdomen showed a large abscess in the right lobe of liver with air pockets. [Fig 1b] CT chest showed patchy areas of consolidation in the lower lobes of both lungs. Multiple nodular lesions with

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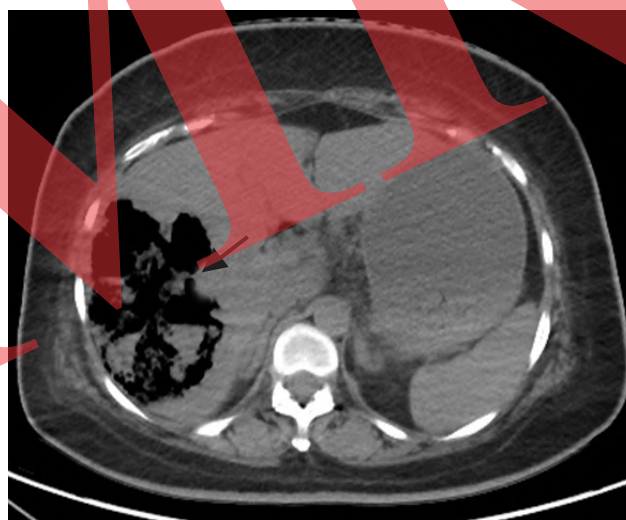
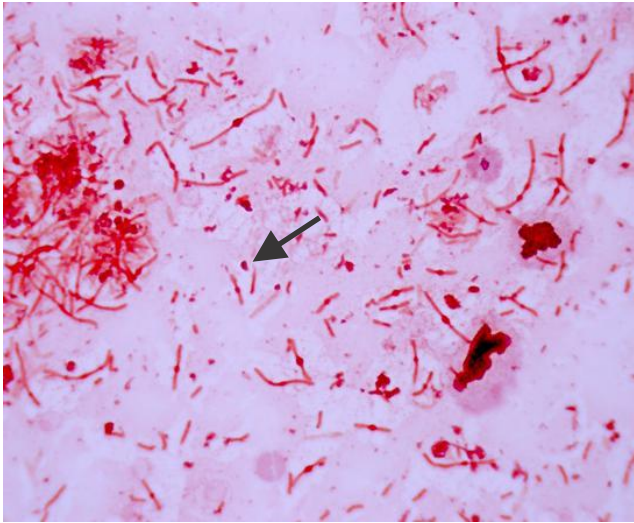


Fig1.b) CT abdomen shows Emphysematous liver abscess

central cavitation -? Septic emboli. Diagnosed as fulminant emphysematous hepatitis.

Liver abscess was drained ~60ml of sanguinous fluid was aspirated. Liver abscess cytology was reported as suggestive of abscess. Liver fluid aspirate grew a gram negative aberrant encapsulated, unusual shaped large, swollen organism. They were long bacilli filamentous form with bulge were also seen. A few normal sized bacilli were also mixed in the smear. (Fig 1a) The organism was identified as *Klebsiella pneumoniae* by Vitek 2, which was a sensitive strain. Her blood culture came positive for two organism which was identified as *Shewanella putrefaciens* and *Pseudomonas aeruginosa* in two separate cultures. Both were sensitive strains. The tracheal culture grew *Klebsiella pneumoniae*,



**Fig: 1 a) Aberrant form of *Klebsiella pneumoniae* showing unusual shaped large filamentous form with bulge in the middle.**

which was also detected by microarray technique with Respiratory panel.

Work up for other infective causes like dengue serology, Scrub typhus, Weil felix, *Leptospira* antibody, H1N1 came negative. She was treated with IV carbapenem. She gradually stabilized with multi-organ support and IV carbapenem.

On 13<sup>th</sup> day subsequent blood culture had *K.pneumoniae* and previous organism *Shewanella putrifaciens* and *Pseudomonas aeruginosa* had cleared. The liver abscess fluid had no growth. On 15<sup>th</sup> day she developed pneumothorax from a cavitating nodule probably *Klebsiella* related and subsequently had a bronchopleural fistula. At 20 days she had a new onset shock, persisting bronchopleural fistula with worsening multiorgan failure and she passed away by 21<sup>st</sup> day.

#### DISCUSSION

Fulminant emphysematous hepatitis is rare fatal rapid progressive fulminant infection in spite best of care. In liver, emphysematous condition can be seen in pyogenic liver abscesses by gas forming abscess or after invasive procedures. In few cases of gas forming pyogenic liver abscess, air bubbles or an air-fluid level can be revealed with localization in the involved area. In our case a large abscess in the right lobe of the liver with air pockets was showed in the CT abdomen.

*Klebsiella pneumoniae* causing liver abscesses has been commonly reported. (4,5) The liver abscess of our patient grew *Klebsiella pneumoniae* and similar strain was obtained from the tracheal culture. However her blood culture grew different two organisms. The subsequent blood culture on day 13 also grew *Klebsiella*. This primary infection was concluded to be the *Klebsiella pneumoniae* liver abscess. In our case

the *Klebsiella pneumoniae* was shown as an aberrant form with long filamentous form elongated bacilli with the bulge seen. The reasons for the unusual shaped bacilli can be of any of the following like i) Effect of antibiotics which affect the cell wall synthesis can produce abnormal forms of gram negative bacilli, ii) probable co-infection with other bacteria.

The clinical significance of aberrant morphology remains unclear. Spheroplasts and protoplasts have been implicated in occult chronic infectious processes or recrudescence of overt infection when antibiotic therapy is discontinued. The clinical significance of filamentous forms is even less clear. It has been suggested that filaments may be precursors to spheroplast and protoplast formation, and there is some evidence for a diminished bactericidal effect of serum or blood on filaments. (6) Our patient had persisting *Klebsiella* on day 13 inspite of being on IV antibiotics.

Polymicrobial bloodstream infection (BSI) is uncommon but a critical condition and has been increasingly reported. Polymicrobial BSIs are known to be associated with hospital acquired infection in several studies. (7) Intra-abdominal infection is also a well-known cause of polymicrobial bacteremia. However polymicrobial infection community acquired in the presence of fulminant hepatitis has not been reported.

#### CONCLUSION

In conclusion, Fulminant emphysematous hepatitis is a rare fatal condition. It can be caused by *Klebsiella pneumoniae* and can be associated with polymicrobial infection. The clinical implications of filamentous gram negative bacilli remain to be clarified, but microbiology laboratories must be made aware of the potential appearance of such bacilli in clinical specimens to avoid confusion with fungi and other naturally filamentous organisms.

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