

## Multifocal hepatic abscess with community acquired *Citrobacter koseri* infection causing liver failure in an immune competent child

Liver abscess is one of the deep seated abscess and serious infection requiring hospitalization in children. Pyogenic abscesses are more common than amebic abscesses. Various gram positive, negative and anaerobic organisms are implicated, but *Citrobacter koseri* as the causative agent of community acquired multifocal liver abscesses in immunocompetent child is virtually unknown. We report a case of acute liver failure in a multifocal liver abscess with *Citrobacter koseri* immune competent child with.

### Case Report

A 4-year-old male child presented with four day history of high grade intermittent fever and right upper abdominal pain. There were no other gastrointestinal or system complaints. On examination, child was febrile; however, he was hemodynamically stable, except of irritability and poor cooperation for the examination having grade I encephalopathy. Weight and height were 14.95 kg and 97.5 cm respectively. There was excessive tenderness in the right upper quadrant, with hepatomegaly measuring 14 cm in total span. On investigating, hemoglobin was 10 g/dL, total leucocyte count of 32,200 [70% polymorphs] and platelet count of 331,000/ $\mu$ L. liver function tests showed total bilirubin 0.7 mg/dL, SGOT was 57 U/L, SGPT 43 U/L, total protein of 5.1 mg/dL, with albumin of 1.8 mg/dL and globulin: 3.3 mg/dL. His CRP was 172.5 mg/dL with deranged coagulogram (PT: 28 seconds, PTI: 50%, aPTT:31 seconds, INR:2.01) not corrected with 2 doses of vitamin K injection. Ultrasonography abdomen revealed multiple heteroechoic collections with anechoic center with maximum diameter of 5.6x5.8 cm involving segment VII and VIII, smaller collections in the junction of segment

VI and VII and small subcapsular collections in the right and left lobe. Child was started on ceftriaxone, cloxacillin and metronidazole at weight-appropriate doses. The aspirate from the liver abscess grew, *Citrobacter koseri*. The organism was sensitive to cefotaxime, ceftazidime, cefepime, piperacillin and tazobactam, amikacin and imipenem. Cefotaxime and amikacin were continued after the availability of sensitivity pattern. Amikacin was stopped after 14 days and oral cefixime was continued for 6 weeks. Child continued to be febrile for 10 more days after initiation of the antibiotics. His irritability and liver functions improved. The tests for predisposing causes for liver abscess like primary and acquired immunodeficiency were negative. Typhoid serology and blood cultures were negative. Child was discharged after 15 days of hospitalization. At follow-up visit, he is asymptomatic, without any complication. The liver size normalised and is seen without residual cavity after 6 months.

### Discussion

Various organisms are implicated in the causation of pyogenic liver abscesses, however in children the gram positive microbes are more common as compared to adults where *Klebsiella pneumonia* and *E. coli* are the commonest organisms.<sup>1</sup> *Citrobacter* species belong to family of enterobacteriaceae, ubiquitous in both living and the non-living host. They are typically infectious in hospitalized, immune compromised and malnourished host with multiple co-morbidities and would seldom cause an infectious in normal host. *Citrobacter Koseri* is mainly associated with neonatal meningitis and fatal cerebral abscess in premature neonates. However, there are few reports in adult literature where *C. koseri* being causative of liver abscess in adults.<sup>2</sup>

According to pediatric acute liver failure group, ALF in children is rapidly progressive clinical syndrome with profound defects in hepatic synthetic function ending in severe coagulopathy and/or encephalopathy with various infectious and non-infectious agents being implicated in causation.<sup>3</sup> Even though various bacterial agents are associated with liver failure in children, this is the first case of *C. koseri* as an agent of ALF in an

immunocompetent child and with normal outcome after appropriate antibiotics and minimally invasive aspiration. Various risk factors such as poor nutritional status and hygiene, lack of access to primary medical care, immune deficiency, and injectable drug abuse are associated increase chance of developing deep seated abscess. But it is perplexing to see a rare gram negative organism causing a multifocal abscess in liver in an otherwise normal child, which would indicate a change in epidemiology of these infectious agents. The management of these lesions would not greatly defer from the stand protocols, where empirical broad spectrum antibiotics followed by specific agents based on the sensitivity pattern of the cultured organism and continuous catheter drainage to evacuate the pus.<sup>4</sup> In *C. koseri* infection, aminoglycosides, fluoroquinolones, third or second generation cephalosporins and carbapenems are considered effective for the duration of 4 to 6 weeks, however there are reports of antibiotics resistance.<sup>4</sup> Monotherapy is better avoided in case of deep seated serious infections such as liver abscess as it would lead to inadequate clearance and development of resistance.

KP SRIKANTH  
JAGADEESH MENON V  
SUBHAMOY DAS  
SADHNA B LAL  
PALLAB RAY  
BR THAPA

*Division of Pediatric Gastroenterology, Department of  
Gastroenterology, Department of Medical Microbiology,  
PGIMER, Chandigarh.*

*Correspondence: KP Srikanth  
Email: [kpkantha@gmail.com](mailto:kpkantha@gmail.com)*

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