



## Inferior Vena Cava Syndrome: A Rare Presentation of Liver Abscess

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### Abstract

Inferior Vena Cava (IVC) syndrome is caused by compression of IVC in the abdominal cavity. It is characterized by abrupt onset of ascites, hepatomegaly, splenomegaly, and fluid retention below the diaphragm with edema of the lower extremity. In clinical practice, it is encountered much less frequently than superior vena cava syndrome. Amoebic liver abscess has been reported as a cause of IVC syndrome but that is very rare. We hereby present a case of pyogenic liver abscess presenting as IVC syndrome, which is the first reported case to the best of our knowledge. A 3 year old male child with fever and pain abdomen for 15 days was referred to our institute with outside ultrasound (USG) abdomen suggestive of liver abscess. USG abdomen done in our institute confirmed the findings. Child was admitted and started on empirical IV antibiotics. On day 3 of admission, child developed swelling of bilateral lower limbs, scrotum and abdominal distension, findings consistent with inferior vena cava syndrome. CECT abdomen was done to rule out malignancy. It showed significant IVC compression. The pus culture sent from ultrasound guided tap showed Methicillin resistant *Staphylococcus aureus* and *Klebsiella pneumoniae* grew in the subsequent attempt to relieve compression. IV antibiotics were adjusted according to sensitivity but there was no relief of symptoms. Surgical drainage of abscess through posterior thoracotomy was done which led to resolution of symptoms in the next 48 hours. Although a rare occurrence, IVC syndrome can be a distressing and difficult to treat condition when accompanied with mass effect. In such circumstances, surgical drainage might be the only option and must be sought once USG guided drainage fails.

**Keywords:** Pyogenic liver abscess, Inferior vena cava syndrome

### Introduction

Liver abscess is a commonly encountered entity in developing countries in both adult and pediatric patients. 1 out of 140 admissions belonging to pediatric population are contributed by liver abscess [1]. The predisposing factors vary widely ranging from parasitic infections

to genetic disorders. The most commonly implication organism is *Staphylococcus aureus*. Classically liver abscess presents with signs and symptoms of fever, pain abdomen and tender hepatomegaly. However rarely, as in this case report, it can present with compressive symptoms like Inferior Vena Cava (IVC) syndrome.

As opposed to superior vena cava syndrome [2] inferior vena cava syndrome is a rarely observed as a presenting complaint. Resulting from compression of IVC in the abdominal cavity, IVC syndrome is characterized by abrupt onset of ascites, hepatomegaly, splenomegaly, and fluid retention below the diaphragm with edema of the lower extremity. There has been one case series reported by Sarda et al of amoebic liver abscess presenting with IVC syndrome in adult patients [3]. Most cases of amoebic liver abscess that reported produced IVC syndrome secondary to thrombosis of hepatic veins [4]. This is to our knowledge, the first case report of a pyogenic liver abscess producing symptoms of IVC syndrome due to external compression in pediatric age group.

### Case Report

We report a 3 year old male child who presented to emergency with complaints of fever off and on for month, high grade from last 3 days, swelling over hands and feet and progressive abdominal distension for last 3 days. There was no associated vomiting, diarrhoea or bleed from any site. There was not antecedent history of travel, contact with animals or intake of contaminated food and water. Child was taken to a local hospital where USG abdomen was done suggestive of right lobe liver abscess 80 × 66 × 7.2 mm. At admission, child was irritable. Pallor and icterus were present. Child had pitting edema in periorbital region and bilateral feet. Abdomen was grossly distended with visible veins per abdomen, shifting dullness was positive. Liver was palpable, firm consistency, span of 11 cm. Complete blood count, liver function test, renal function test and ultrasound guided pigtail drainage was planned for the child. Investigations showed microcytic hypochromic anemia with hyperbilirubinemia and transaminitis along with acute kidney injury. HIV serology was negative. Amoebic serology was negative. USG showed an abscess that was not liquefied.

Child was put on Acute Renal Failure (ARF) regime. MRI abdomen was done to better appreciate the morphology of the lesion as contrast could not be given in the setting of ARF, a liver abscess with no liquefaction involving segments 5, 6, 7 and 8 of liver was visualized. Acute kidney injury resolved over next 48 hours so CECT was ordered which confirmed the findings and showed nearly complete occlusion of IVC. Ascitic tap showed transudative fluid with no malignant cells. Small amount of fluid drained from the abscess area was predominantly neutrophilic. Alpha-feto protein and amoebic serology came to be negative. The tests for viral markers (Hepatitis A, E, B and C were negative)

Pigtail catheter was placed to decompress the IVC. Culture from perilesional fluid was suggestive of MRSA so antibiotics were changed accordingly and Teicolplanin and clindamycin were added. Blood cultures were sterile. A review ultrasound after 3 days of changing antibiotics suggestion some liquefaction but the IVC compression persisted. Surgical consult was taken and surgical drainage of abscess was planned. A posterior thoracotomy approach was followed considering the location of the abscess. 200-300 cc of fluid was drained during surgery. Drain was kept in situ for 10 days. The anasarca and abdominal distension were relieved around 48 hours

after the surgery. Nutritional rehabilitation has been initiated for the child. Work up for chronic granulomatous disease is underway for the cause of the abscess. Child received IV antibiotics for 6 weeks. Child was discharged on oral antibiotics and is currently healthy.

## Discussion

Inferior vena cava syndrome is an infrequently encountered clinical presentation. It has mostly been seen in adult patients. The syndrome presents clinically with lower limb and groin edema along with gross ascites. There have been case reports of amoebic liver abscess presenting as IVC syndrome. The cause has been attributed either to IVC thrombosis or external compression by the mass. The thrombosis secondary to hypercomplementemia is hypothesized to be implicated. Tumors like gastric adenocarcinoma have also been shown to present with IVC syndrome [3-5].

Liver abscess presents most commonly with features of fever, abdominal pain localized to right upper quadrant and tender hepatomegaly; associated nausea, vomiting, anorexia, cough and difficulty breathing might be present. Presentation as fulminant sepsis or acute abdomen is not uncommon. In both pyogenic and amoebic liver abscesses, the site of localization is mostly confined to right lobe of liver and in majority cases, they are solitary. In children, amoebic liver abscess comprise only 21-30% of all the cases. Majority are pyogenic in nature, with *Staphylococcus aureus* being the most common etiology. Anaerobes are seen in 30% of cases. Other organisms commonly isolated include, microaerophilic streptococci, gram negative cocci like *E. coli* and *Klebsiella*. Rarely fungal microabscess and tubercular abscesses are known to occur. USG is the imaging of choice for cases with suspected liver abscess. It is a cost effective, safe and easily available investigation to diagnose liver abscess and determine its size. However, with a higher sensitivity, CECT has the ability to pick up small abscesses anywhere in the liver. MRI is equal in efficacy when compared to CECT in detection of liver abscesses. For follow up and confirmation of resolution, ultrasound remains the standard. The clinical resolution precedes resolution of abscess cavity by months so follow up imaging is usually not necessary.

Treatment of liver abscess varies from case to case basis. At presentation, maintaining adequate hydration and supportive management remains the cornerstone. Once the diagnosis of liver abscess is established, a combination of an anti staphylococcal, an anti amoebic and anti anaerobic drug is given until the microbiological diagnosis is ascertained. Most of the studies have shown that 80-90% of the pyogenic liver abscesses require some form of drainage in contrast to amoebic liver abscess where 95% of the cases do well on medical therapy alone. Ultrasound guided aspiration is a safe and effective means of providing a definitive microbiological diagnosis. With availability of radiological support, percutaneous drainage is being increasingly done in all patients. However the indications of doing a percutaneous drainage include, large volume abscess with risk of rupture (Especially left lobe), in ruptured liver abscess for drainage of extraneous contents, lack of response to medical therapy with

persistence of clinical sepsis and liver failure. Surgical drainage of liver abscess is reserved for patients with failed percutaneous drainage, patients on steroids, with multiple macroscopic abscess or those with ascites.

In this case of pyogenic liver abscess, the abscess produced a mass effect causing critical compression of IVC. This caused the compressive symptoms to develop. Being an uncommon presentation of liver abscess, management of this complication required a multidisciplinary approach. The relief of compression depended upon the liquefaction of the abscess which was achieved by use of appropriate IV antibiotics. Unsuccessful percutaneous drainage and persistence of symptoms called for surgical management in this case and the child could successfully be treated. Pyogenic liver abscess must be considered in the differential diagnosis of patients presenting with IVC syndrome, that is, ascites, swelling of bilateral lower limbs and scrotum, and, occasionally hematuria. It is important to recognize this entity and take measures for early treatment before progression to decompensation.

## Conclusion

Clinicians should be watchful when faced with complicated liver abscesses, especially with uncommon presentations like IVC syndrome. The diagnosis of liver abscess was established in the beginning but the compressive symptoms called for further intervention in this child. With the use of appropriate antibiotics and timely surgical intervention the disease could be treated without causing much damage. What is Known? Pyogenic liver abscess presents as fever, pain abdomen and vomiting and responds to specific intravenous antibiotics and percutaneous drainage. What we add? IVC syndrome can be a rare presentation of liver abscess and might require opens surgical intervention for resolution of symptoms.

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