

Liver abscesses with venous extension - rare complication of a common problem

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ABSTRACT

Considering the high incidence of amoebic and pyogenic liver abscess in the developing world, occurrence of inferior vena cava thrombosis secondary to liver abscess is a rare but life threatening complication. We report 4 such complicated cases of liver abscess(s). The first case involved a large caudate lobe abscess extending across middle hepatic vein into suprahepatic inferior vena cava (IVC). Development of a left hepatic artery pseudoaneurysm following attempted percutaneous aspiration highlights the difficulties encountered in percutaneous interventional management of caudate lobe abscesses. The second case involved multiple liver abscesses with large thrombus in the right ventricular cavity & right ventricular outflow tract. The patient developed cardiorespiratory arrest limiting any aggressive management options for the complex nature of illness. The third case had a large caudate lobe abscess with direct extension into intrahepatic IVC while the fourth showed a segment 4 abscess with thrombosis of adjacent left hepatic vein. These cases highlight the fact that diagnosis of such life threatening complications of liver abscesses as hepatic vein & IVC thrombosis requires high clinical suspicion followed by targeted imaging. Image guided interventional therapy is a useful tool for management in cases of liver abscess. But, abscesses in precarious locations like caudate lobe are associated with higher risk of complications including pseudoaneurysm formation asking for a cautious approach to interventional therapy in such circumstances.

Keywords: Liver Abscess, pseudoaneurysm, inferior vena cava, thrombus

INTRODUCTION

Amoebic and pyogenic liver abscesses are commonly encountered in the Indian subcontinent. Poor sanitary conditions and a lower socioeconomic status are the chief contributory factors (1). Considering the high incidence of amoebic and pyogenic liver abscess, various complications such as abscess perforation into adjacent viscus or cavities (peritoneal, pleural or pericardial) & bleeding from colonic ulcers are routinely encountered. However, the occurrence of inferior vena cava &/ or hepatic vein thrombosis secondary to liver abscess is a rare yet life threatening complication. We report four such complicated cases of liver abscess(s).

CASE PRESENTATIONS

Case 1

55 years male who presented with low grade fever for 15 days, jaundice & pedal edema for 5 days. He was

initially investigated elsewhere and given intravenous piperacillin & tazobactam combination (4.5g) thrice daily and intravenous metronidazole (500mg) thrice daily for 4 days after which fever improved. He was referred to our centre for further management. Clinical examination showed presence of icterus and pedal edema without palpable lymphadenopathy, hepatosplenomegaly or obvious ascites. Transabdominal ultrasound revealed a large hypoechoic lesion likely suggestive of abscess (volume 430cc.) predominantly in caudate lobe. The lesion was seen just extending into the inferior vena cava via the middle hepatic vein. Amoebic serology showed *Entamoeba histolytica* IgG positive by ELISA suggesting amoebic nature of liver abscess.

Percutaneous placement of drainage tube was considered. However, due to precarious location & presence of multiple vessels surrounding the lesion, only single time aspiration of 50ml of pus under ultrasound guid-

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Received: January, 23 2013

Accepted: April, 10 2013

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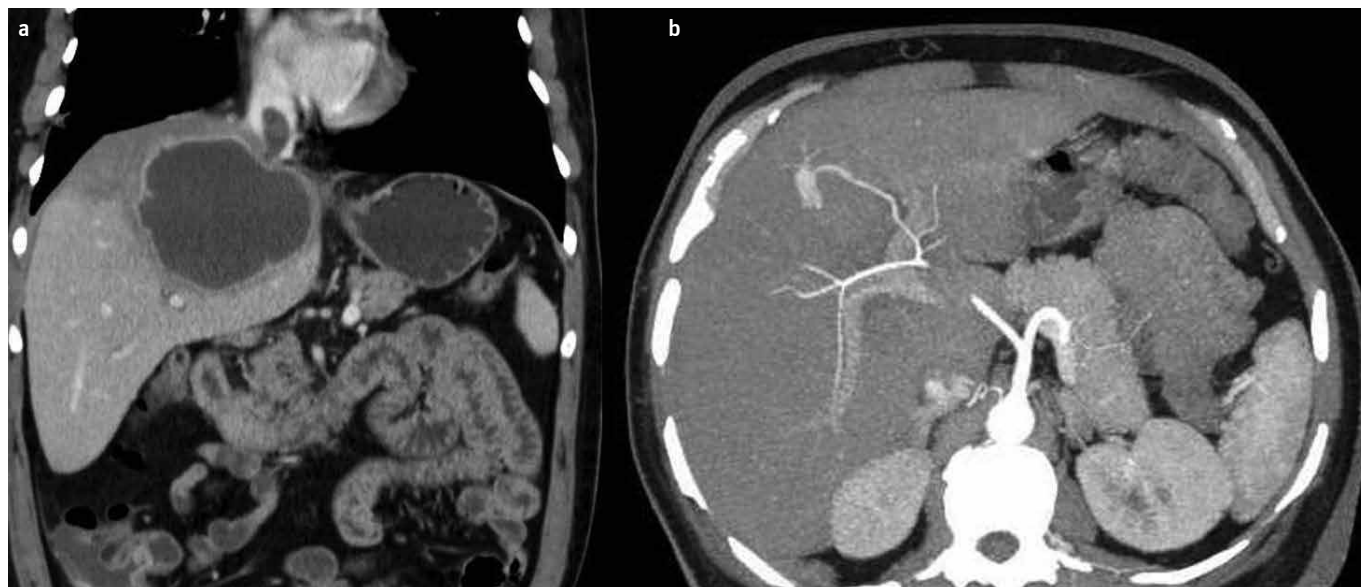


Figure 1. a,b. Abscess in the caudate lobe with perifocal edema & IVC extension seen on CT venography (coronal reconstruction) (a), Pseudoaneurysm in relation to segment 4 branch of left hepatic artery seen on arterial phase of CT angiogram (b).

ance could be performed which allowed confirmation of the diagnosis. Microscopic examination of the aspirate showed only occasional pus cells with no micro-organisms seen. Cultures showed no growth. Further CECT abdomen with CT angiography (Figures 1. a,b) was performed for better localization of abscess and its relationship to critical structures with intent to perform surgical drainage. It showed hepatomegaly with abscess in segments 1,4 & 8 which was extending via middle hepatic vein upto suprahepatic IVC just short of right atrium. Arterial phase images also showed a small 15mm X 8mm X 9mm sized pseudoaneurysm arising from the segment 4 branch of left hepatic artery.

Surgical opinion was in favour of operative intervention only if conservative management failed. Follow up contrast enhanced CT performed after 2 showed absence of abscess extension into IVC with residual liquefied abscess in liver. While there was no significant change in abscess volume, patient was now completely asymptomatic for the same. Left hepatic artery pseudoaneurysm was not seen (likely thrombosed). Due to the asymptomatic nature of patient, he was advised follow up. The patient has remained asymptomatic with near complete resolution of the liver abscess on sonography performed 3 months after discharge.

Case 2

45 year old male who presented with history of abdominal pain & fever for 20 days along with shortness of breath for a week. Abdominal ultrasound revealed presence of multiple liver abscesses for which medical management (injections Metronidazole 500mg & Piperacillin 4.5gm thrice daily via intravenous route) and symptomatic treatment was initiated. While on treatment, patient complained of sudden onset of breathlessness. General examination revealed presence of hypoten-

sion (BP-90/70mmHg), tachycardia (pulse rate -110/minute) with decreased air entry in both lungs. Per abdomen examination revealed tender hepatomegaly. Clinical findings were consistent with multiple liver abscesses with pneumonia. Patient was admitted and underwent placement of 12F malecot catheter into the largest abscess under ultrasound guidance, draining thick pus. Culture was positive for E.Coli. Echocardiography examination revealed a massive thrombus within the right ventricular outflow tract. Injection streptokinase bolus and infusion therapy were given. CECT examination (Figure 2) confirmed the presence of a large intraluminal thrombus in the right ventricular cavity. Patient's condition kept on worsening despite use of inotropes & he developed cardio respiratory arrest & was put on mechanical ventilator. Because of the poor prognosis and complex nature of illness, the patient left against medical advice after 7 days of admission & expired at home soon after discharge.

Case 3

60 year old male who presented with high grade fever & anorexia for 15 days. Patient was a known case of type 2 diabetes mellitus on oral hypoglycemic drugs. On examination, there was minimal pedal edema. Liver was palpable 3 cm below the costal margin & soft, non tender. Sonography done elsewhere 1 week before showed a focal hypoechoic lesion in caudate lobe. He was initially admitted elsewhere & intravenous antibiotics (Metronidazole 500mg thrice daily & Ceftriaxone 2gm. twice daily) were administered. Patient was referred to our centre for further management & contrast enhanced CT abdomen was performed just after admission. It showed enlargement of caudate lobe with a hypodense lesion of size 95x80x53 mm with irregular peripheral wall enhancement suggestive of abscess formation. The abscess was closely abutting intrahepatic inferior vena cava (IVC) & focally infiltrating the anterior wall of

IVC with direct intraluminal extension at that level (Figure 3. a,b). Image guided percutaneous drainage of the abscess was contemplated. But due to the deep seated location of abscess & presence of multiple surrounding vessels, percutaneous drainage was not performed. While diagnostic aspiration could not be accomplished, serology was positive for *E. histolytica* suggesting the possibility of amoebic liver abscess. Due to challenging surgical approach, surgical drainage was not offered upfront and reserved in case the ongoing conservative management failed. Patient was maintained on Injection Metronidazole 500mg thrice & Injection Ceftriaxone 2g daily via intravenous route along with injection insulin for control of hyperglycemia. He became fully asymptomatic after one week of

conservative treatment following which he was discharged on oral antibiotics. Follow up sonography after 2 weeks showed mild reduction in the size of the abscess with no obvious thrombus in intrahepatic IVC. Hence, patient was advised to remain on close follow up with maintenance of good glycemic control with oral hypoglycemic agents.

Case 4

56 years old male, known case of type 2 diabetes mellitus who presented with epigastric pain & non bilious non projectile vomiting. On examination, patient was afebrile with no evidence of jaundice or organomegaly. Abdominal sonography showed hypoechoic lesions in segments 4 & 6. CECT abdomen (Figure 4. a,b) confirmed the presence of hypodense lesions in segments 4 & 6 (close to the left hepatic vein & right posterior branch of portal vein respectively) with presence of a discrete thrombus projecting into the lumen of left hepatic vein. Microscopic examination of ultrasound guided aspirate revealed few pus cells with no microorganism seen. Entamoeba histolytica IgG is positive by ELISA suggesting stronger possibility of amoebic liver abscess. Patient was started on Inj. Metronidazole (500mg thrice daily) & Injection ciprofloxacin (400mg thrice daily). He was discharged on resolution of symptoms after one week. Follow up sonography after 2 weeks showed further regression in the size of liver lesions and resolution of the venous thrombus with complete absence of constitutional or abdominal symptoms.

DISCUSSION

Thrombosis of IVC is not common. Inferior vena cava thrombosis (IVCT) usually results from deep vein thrombosis. However, isolated IVCT may occur secondary to complication of malignancy (renal cell carcinoma, other genitourinary tumors

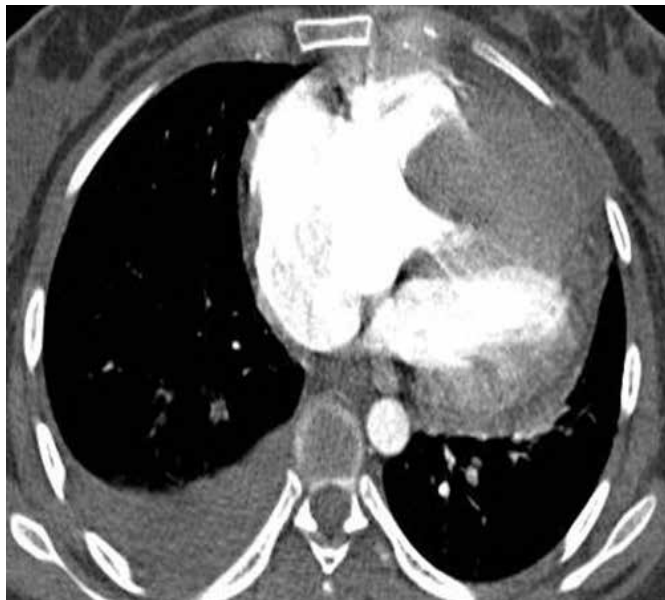


Figure 2. CECT showing presence of intraluminal thrombus in right ventricular cavity with right pleural effusion

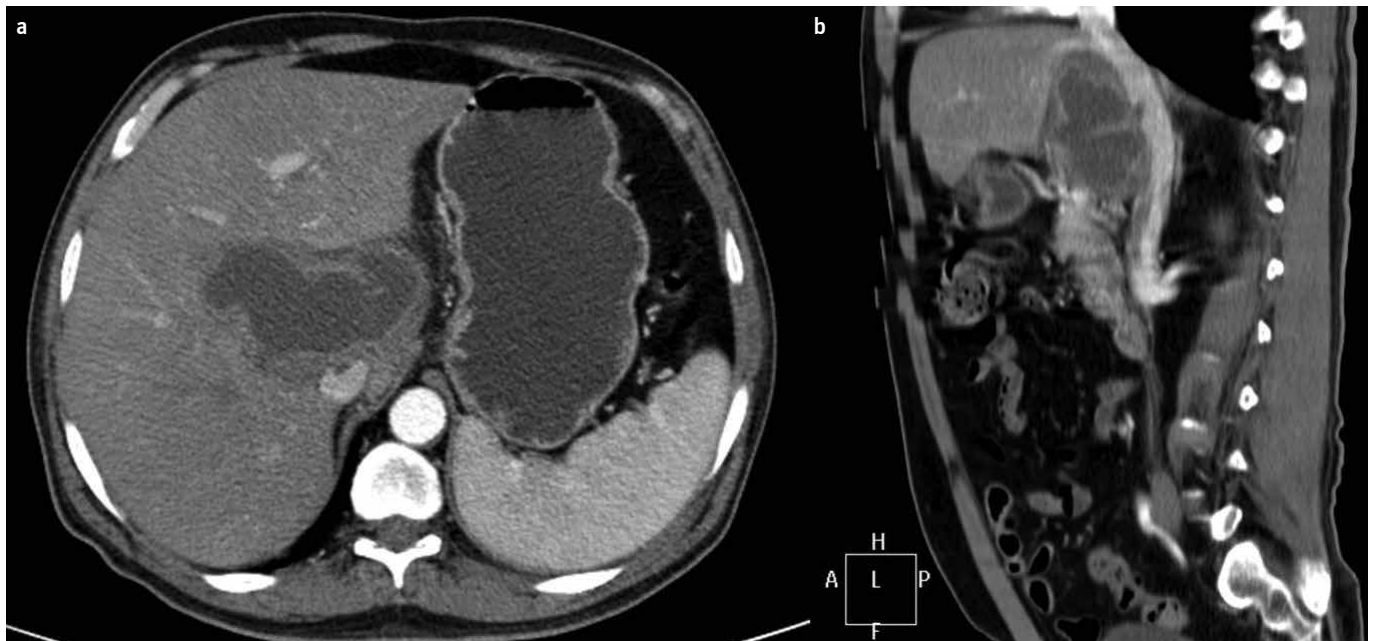


Figure 3. a,b. Axial image (a) showing abscess in caudate lobe with direct extension into intrahepatic IVC, also seen on parasagittal image (b).

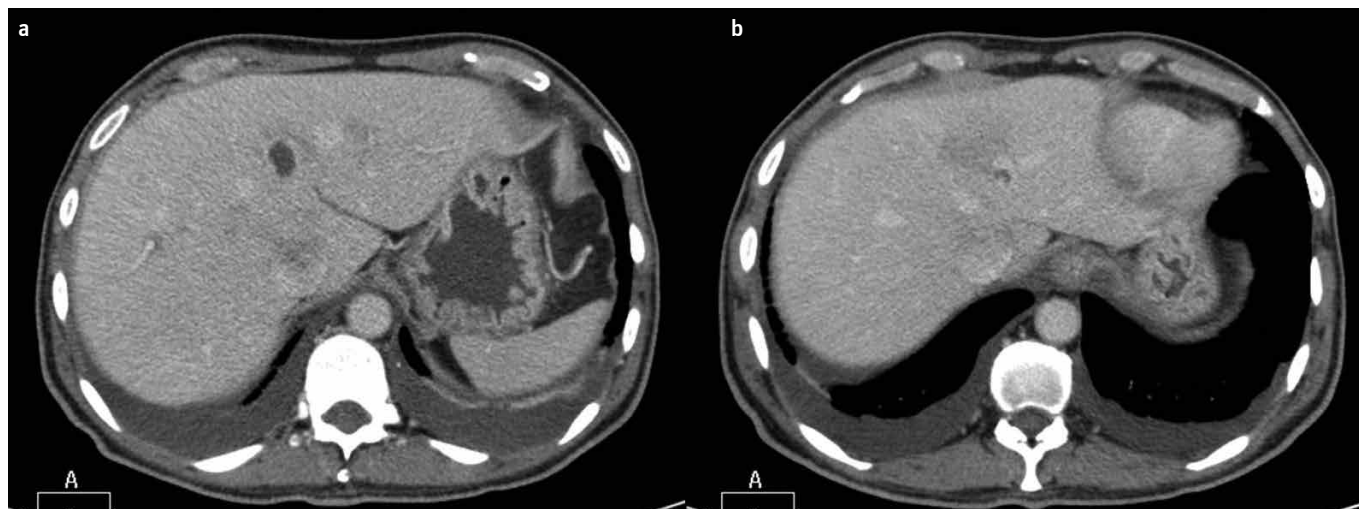


Figure 4. a,b. Small abscess in segment 4a with perifocal edema (a) & thrombus in adjacent left hepatic vein (b) (not in direct continuity with central liquefied part of abscess)

or hepatoma), extrinsic compression in cases of post-traumatic hematoma etc., coagulopathy, iatrogenic causes, pregnancy or use of oral contraceptives (2). Its association with liver abscess is rare.

The initial site of thrombus formation was the IVC in 2 cases from literature. Right hepatic vein was the initial site in the third case with thrombosis extending into IVC. In 2 cases (1 and 3) communication between the abscess and IVC, indicating that rupture of the abscess had occurred, was established at necropsy (3).

When an amoebic liver abscess ruptures into a vascular channel such as the IVC, there is likelihood of localized luminal thrombosis which may act as source of pulmonary emboli. Septicemia and septic emboli to lung & brain may follow.

Similarly, Gordin (4) reported a case of amoebic liver abscess with thrombosis of IVC. Thrombosis of portal & hepatic veins was described by Hare and Ritchey (5). An autopsy study by Aikat et al. (6) on 75 cases of fatal hepatic amoebiasis showed that 27.5% of portal veins, 29.5% of hepatic veins, and 4% of inferior vena cava were thrombosed. Obstruction of hepatic vein(s) contributes substantially towards the enlargement of liver.

Sarda et al. (7) reported a series of three cases of amoebic liver abscess causing IVC obstruction. Two of the abscesses were compressing the IVC while the third was mentioned as causing IVC thrombosis. One case resolved with conservative management while the other two cases had to be subjected additionally to single time aspiration and catheter drainage of liver abscesses respectively to achieve resolution.

England et al. (8) have also published cases of external compression of IVC from a giant, benign, hepatic cyst & pelviureteric junction obstruction respectively.

Vascular complications of hepatic amoebiasis should be routinely investigated in patients with fever, tender liver or signs of portal hypertension appearing or persisting despite a 5–7 day anti-amebic treatment. Cases 3 & 4 in the present series were suffering from uncontrolled type 2 diabetes mellitus which is a known modifiable risk factor associated with complications from liver abscess (9). Patients with diabetes & other conditions predisposing to complicated liver abscess should be actively investigated for complications such as venous thrombosis.

In our patients, the pathophysiology of hepatic vein thrombosis could be explained by extension of the abscess and vein compression (10).

Contrast enhanced computed tomography (CECT) is an ideal method for diagnosing hepatic abscess with a sensitivity as high as 97%. This technique enables visualization of impending perforation, ruptured liver abscess and ascites. IVC, hepatic and portal venous obstruction can be better demonstrated on multiphasic CT angiography. Whenever a liver abscess is seen in the caudate lobe or elsewhere but close to a vascular channel, the radiologist should actively look for vascular complications including abscess extension & partial/complete thrombosis of the venous channel. Such venous involvement may be found even in the asymptomatic patient. A posteriorly placed amoebic liver abscess is more likely to lead to thrombosis of IVC.

Traditionally, invasive venography has been considered the gold standard in venous assessment. However it can have limitations, particularly in the assessment of the proximal veins. Sonography and CT angiography (CTA) are now the major imaging tools for detection and characterization of venous extension. Both modalities can accurately depict the cephalad extent of thrombus and also allow further assessment of the cause of IVC flow interruption- whether intraluminal or external compression. Ultrasound is the most accessible means of fol-

low-up. When transluminal interventional therapy such as filter insertion or venoplasty is considered, venography remains essential (8).

During the past 20 years, many non-surgical therapies have been developed for the management of extra-hepatic vascular pathology. These therapies include thrombolysis, angioplasty, stent graft, intrahepatic portosystemic anastomosis, and transjugular intrahepatic portosystemic shunt.

However, interventional management of amoebic liver abscess-related Budd-Chiari syndrome has not been reported in the literature as per our knowledge. The first case in this series showed early resolution of intracaval extension of liver abscess and patient was asymptomatic precluding any attempt at interventional management for IVC thrombosis. The massive nature of right ventricular thrombus left little scope for endovascular approach to the problem in the second case.

Medical management includes the treatment of the thrombosis and its cause. Anticoagulation therapy was not initiated in three of our patients as thrombosis was considered to be mainly secondary to infective pathology. Resolution of abscess component extending into IVC and improvement in patient symptoms vindicates the use of conservative management. One patient received intravenous thrombolytic (streptokinase) for the right ventricular thrombus. Similarly, resolution of symptoms with conservative management & regression in the size of abscess(s) justifies our decision to avoid hasty percutaneous intervention in case 3, given the higher likelihood of iatrogenic complications arising from abscess in such precarious location.

The first case also outlines the possibility of vascular injury arising in the course of percutaneous hepatic interventions. Liver abscesses in precarious locations may not be easily amenable to successful drainage. Arterial pseudoaneurysms are a known but uncommon complication of percutaneous interventional procedures including percutaneous biliary drainage (11) and radiofrequency ablation (12). The liver abscesses in caudate lobe are particularly associated with higher risk of complications associated with drainage by percutaneous route. This necessitates exploring alternative routes for drainage such as endoscopic ultrasound guided transgastric drainage (13). The iatrogenic hepatic artery pseudoaneurysm would have warranted endovascular management such as embolisation if the patient had been symptomatic for it or its size had increased on follow up imaging. The cases outline the fact that percutaneous drainage be performed only when the benefit from such drainage outweighs the likelihood of complications including vascular injury arising due to such drainage.

In three out of four cases, presence of positive serology for *E.histolytica* together with presence of the liver abscess sug-

gested the amoebic nature of liver abscess. Lack of visualization of amoebic trophozoites on microscopy and negative pus cultures for entamoeba in case of amoebic liver abscesses are commonly encountered findings as also shown in literature (14,15).

Surgical management was offered as an alternative to conservative and interventional management in the first three cases if these noninvasive/less invasive management options failed. While the 1st and 3rd case improved, comorbidities and complexity of the disease in the 2nd case made the surgical option extremely challenging.

CONCLUSION

Diagnosis of life threatening complications of liver abscesses like hepatic vein & IVC thrombosis requires high clinical suspicion followed by targeted imaging. This would facilitate timely initiation of appropriate treatment approaches including image guided interventional procedures. Abscesses in precarious locations like caudate lobe are associated with higher risk of complications including pseudoaneurysm formation as a fall out of routine percutaneous drainage procedures.

Conflict of Interest: No conflict of interest was declared by the authors.

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