

# MULTIPLE HEPATIC ABSCESES FROM A RUPTURED GALLBLADDER EMPYEMA – A CASE REPORT AND REVIEW OF THE LITERATURE

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## ABSTRACT

An unusual complication of gallbladder empyema is its rupture into the liver forming a pyogenic abscess. This condition is rapidly fatal in diabetic and Immuno-compromised patients.

We present a 79-year-old african american woman with diabetes mellitus who presented at the ED with constitutional symptoms and abdominal pain of a week duration. She was tender in the upper right quadrant, had a positive murphy's sign on clinical examination, tachycardia and a low-grade fever and laboratory findings of leukocytosis, and metabolic acidosis, lactic acidemia and elevated ketones with moderately deranged hepatic function tests and negative tumor markers. Management consisted of broad spectrum antibiotics, an open cholecystectomy and drainage of two multi-loculated hepatic abscesses. A repeat ultrasonogram showed a remnant collection that was drained by interventional radiology and drains left in-situ. She was discharged after four weeks of parenteral antibiotics with repeat sonogram showing complete resolution of hepatic abscess.

Appropriate antibiotic management, laparoscopic or open cholecystectomy or radiology guided cholecystostomy and drainage of hepatic abscesses is the hallmark of management.

**KEYWORDS** Hepatic; Gallbladder; Pyogenic, Cholecystohepatic; Abscess; Empyema

## Introduction

We presented a rare case of simultaneous presentation of multiple hepatic abscesses secondarily to a cholecystohepatic communication from a perforated gallbladder empyema in a 79-year-old woman with diabetes mellitus. The patient was managed successfully by open cholecystectomy and open drainage of the hepatic abscesses. Conservative management by initial percuta-

neous drainage may be indicated for clinically unstable patients with subsequent cholecystectomy when stable.

## Case Report

79-year-old african american woman with diabetes and hypertension, who was brought to the Emergency Room by daughter with complaints of malaise, right upper abdominal pain, anorexia and multiple episodes of vomiting of a week duration. No recent travels. Initial vitals was 118/82 mmHg Pulse of 130/min Temp of 101.2 F and blood sugar of 550 mg/dl. On clinical revealed an elderly lady, anicteric, the abdominal examination showed right upper quadrant tenderness, positive murphy sign, normal chest examination. Leukocytosis-21.3 thousand, neutrophil percentage of 88.7 percent, hemoglobin of 13, Human Immunodeficiency Virus-negative, Hepatic function showed moderately elevated liver enzymes with an Aspartate transaminase-232, alanine transaminase-99, alkaline phosphatase-251, a total bilirubin of 1.3, direct bilirubin of 0.1,

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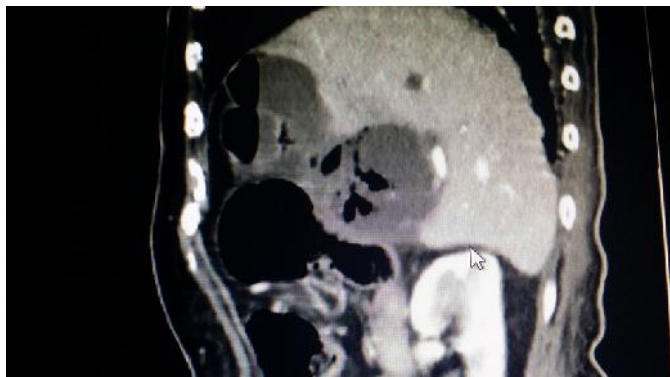
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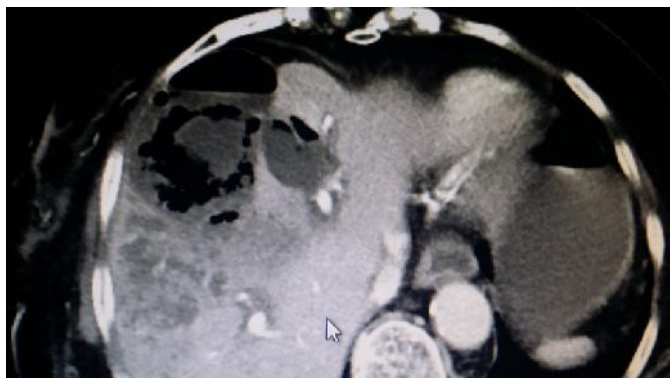
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**Fig 1:** Sagittal CT scan is showing two large hepatic abscesses and enlarged fluid filled gallbladder.



**Fig 2:** Axial CT slice is showing two hepatic abscesses and enlarged gallbladder with air-fluid levels.

hypoalbuminemia of 1.8 mg/dl, normal amylase and lipase levels. Serum electrolytes- Sodium of 127, potassium was 3.8, chloride was 99, serum lactate on admission was 4.8 and serum bicarbonate was 14mg/dl. Tumor markers -alpha-fetoprotein, Carcinoembryonic antigen and Ca -125 were normal.

Abdominal Computed tomographic (CT) scan (Fig 1 and Fig 2) showed multiloculated complex fluid collections with multiple internal septations and air-fluid levels within the right lobe of the liver measuring 4.9 x 6.6 x 8.8 cm and 6.1 x 3.3cm- highly suggestive of hepatic pyogenic abscesses and a markedly enlarged gallbladder with intraluminal air-fluid levels. There was no free air or evidence of diverticular or metastatic disease. Broad spectrum antibiotics - Ppiperacillin and tazobactam, vancomycin, and metronidazole administered within the first hour of admission, and she admitted to the Surgical Intensive care unit for crystalloid resuscitation, glycemic control. She was taken urgently to surgery for open cholecystectomy with open drainage of the gallbladder and the liver abscesses. 100 milliliters of purulent material was drained multiple gallbladder stones retrieved. Drains left in place.

A repeat sonographic evaluation 24 hours following surgery revealed a persistent abscess collection that was drained by radiology - guided aspiration and drains left in-situ. The significant radiographic resolution noted on repeat imaging (Fig 3). Positive blood cultures and gallbladder cultures grew *klebsiella pneumonia*, and she was continued antibiotic-specific therapy until repeat cultures were negative. The patient remained on admission for 27 days; respiratory failure complicated her hospital course, a tracheostomy placed and she eventually weaned from the ventilator. Significant resolution of the abscess collection confirmed



**Fig 3:** Axial CT slice 72 hours following surgery showing near normal liver parenchyma and drain in situ.



**Fig 4:** Repeat ultrasound after three weeks showing complete resolution of hepatic collections.

on ultrasonography (Fig 4), and she successfully discharged to a nursing home for continued rehabilitation.

## Discussion

Development of multiple pyogenic hepatic abscesses from a perforated gallbladder empyema in an immunocompetent patient is very unusual with very few documented case reports and case series in the literature. Untreated gallbladder disease may progress to gallbladder empyema, gangrene with subsequent rupture and development of a paracholecystic or a cholecystohepatic abscess. The overall incidence of pyogenic hepatic abscesses is an estimated 10 - 20 cases per 100,000 persons in the United States with a male- to - female ratio of 2:1 and age range of 40 to 60 years [1-3].

Hepatic abscesses may be primary or secondary in origin. They may arise primarily from blunt or penetrating hepatic trauma or hepatic tumor necrosis or secondarily from biliary perforation or contiguous spread from a perforated appendicular, diverticular or inflammatory bowel disease. Septic hepatic abscesses rarely may complicate biliary strictures, choledocholithiasis or procedures such as Endoscopic Retrograde Cholangiopancreatography for biliary stones with cholangitis [1-3]. The blood-borne spread of septic emboli from an infectious cardiothoracic or abdominal foci has also been described [1]. Predisposing factors include age, medical conditions such as diabetes mellitus, immunosuppressed states such as solid organ transplant, hematologic malignancies, cancer chemotherapy, Tumor necrosis factor inhibitor treatment, hemoglobinopathies, HIV / AIDs and chronic Kidney disease patients on hemodialysis.

Gallbladder empyema and gangrene arises as a result of gallbladder wall distension and necrosis from impaired venous and lymphatic drainage from accumulation of purulent bile in the setting of cystic duct obstruction from gallstones – or a calculous cholecystitis [1-3]. Neimer described three classes of gallbladder perforation in 1934, class one is described as an acute free gallbladder rupture, classes two and three describe chronic pericholecystic abscess and chronic cholecystenteric fistulation respectively [4]. A fourth class of cholecystobiliary fistulation has been proposed by Anderson and Nazem [4,5].

Multiple pyogenic hepatic collections present more acutely. The interval of presentation may range from 5 to 120 days between the onset of symptoms of gallbladder disease and discovery of hepatic collections as a complication [1]. Our patient presented simultaneously with the hepatic abscesses and a gangrenous gallbladder and a short (1 week) duration of symptoms. Most patients present with constitutional symptoms such as fever and malaise coupled with right upper quadrant pain. They may present with septic shock coupled with features of end-organ damage such as altered mental status or acute kidney injury. There is typically a delayed presentation of hepatic abscesses occurring following surgical intervention for acute cholecystitis or biliary tree disease [1].

Hepatic pyogenic cultures are very dependent on the origin of infection are often poly-microbial. The most frequent bacteria isolated from cultures are *Escherichia coli* and *Klebsiella pneumoniae*. Parasites such as *Ascaris lumbricoides* and *Entamoeba histolytica* may be an etiology following visits to endemic regions [1-3]. Abnormal hepatic profile reflects the deranged liver physiology from the hepatic collection or the secondary cholestatic effect of compression of the distended gallbladder empyema sac against the common bile duct or hepatic ducts [1-4]. Ultrasound and an abdominal computed tomographic (CT) scan typically guide therapeutic management [6, 7]. CT may show a fluid-filled distended gallbladder with an adjacent circumscribed hepatic collection with surrounding contrast enhancement coupled with lack of hepatic continuity with the gallbladder wall [1, 2] There may be evidence of biliary tree malignancy or hepatic metastasis [1, 2].

Management of concomitant liver and gallbladder abscesses is mostly dependent on the clinical state of the patient and could either be a surgical or percutaneous image - guided drainage. Heneghan et al. (2011) recommend open drainage of hepatic abscesses following non-radiographic or non-clinical resolution 72 hours following radiologic - guided drainage or serial aspiration. Large multi-loculated and thick-walled collections with viscid pus would be more appropriately managed surgically [1]. In our case, we opted for open drainage because the patient was clinically stable for surgical intervention and the radiographic findings of large dual thick-walled hepatic abscesses and a concomitant gallbladder empyema met the criteria for open drainage [1- 3]. Some small case series have also advocated laparoscopic drainage of solitary small liver abscesses [1].

Parenteral antibiotics must be broad spectrum of anaerobic coverage and modified to positive cultures and consideration for unusual organisms such as fungi and protozoans such as *Entamoeba histolytica* especially in the immunocompromised and travelers to endemic regions. Complete clinical and radiographic resolution is expected to three weeks of bacterial-specific parenteral antibiotics. Successful parenteral antibiotic management alone has been described in patients with abscesses smaller than 3cm in diameter; such patients will probably benefit from a sub-

sequent course of oral antibiotic coverage following conclusion of 3 weeks of parenteral antibiotics [1-4].

## Conclusion

Management modality of multiple complex hepatic abscesses secondarily to a ruptured gallbladder empyema is dependent on factors such as the patient's ability to tolerate surgery, the availability of radiology - guided drainage and abscess characteristics such as size and wall thickness. Open surgical drainage should be first line for low surgical risk patients followed by repeat sonogram or CT imaging 24- 48 hours after surgical drainage to evaluate abscess resolution and need for adjunctive interventional catheter drainage.

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### Competing Interests

The authors declare no conflict of interest.

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