

Management of a case of acute bacterial cholangitis with septic shock in a surgical intensive care unit: A case report

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ABSTRACT

Acute bacterial cholangitis is an emergency and needs prompt diagnosis and administration of appropriate therapy as soon as possible. The presentation of the condition may vary from case to case. As the mortality associated with this illness is huge, a thorough physical examination and high clinical suspicion may help in timely diagnosis and could be lifesaving. Our patient presented with sepsis and septic shock to the emergency department, on clinical examination, and point-of-care ultrasonography performed by a vigilant emergency team, and given high suspicion of cholangitis, the patient was redirected to surgical intensive care unit (SICU). In SICU, after initial resuscitation and stabilization, further diagnostic imaging studies were carried out and definitive interventional management was initiated by the multidisciplinary team of the hospital. The condition of the patient improved drastically on apt and targeted management. Hence, it is very important to rule out the possibility of acute cholangitis in patients presenting with septic shock with a suspected intra-abdominal source of infection. Acute bacterial cholangitis is a highly treatable condition with very encouraging outcomes on timely intervention and results in significantly reduced mortality, morbidity, length of hospital stay, and treatment cost of course.

Key words: Cholangitis, Intensive care unit, Sepsis, Septic shock

Acute cholangitis is a clinical entity caused by bacterial infection of the bile and biliary tract. It is most commonly caused by obstruction of the biliary system due to choledocholithiasis and neoplasia [1]. The diagnosis of this potentially life-threatening clinical condition is established by the presence of characteristic clinical signs such as fever, pain, jaundice (e.g., Charcot's triad), as well as confusion, and septic shock (e.g., Reynolds' pentad) [1-5]. This clinical condition may have a wide range of severity, from low-grade fever to severe sepsis. Acute cholangitis with sepsis and organ dysfunction has a fatal outcome. As this is a time-sensitive and very dreadful condition, a high clinical suspicion even in the absence of a classic triad or pentad should be considered while evaluating such cases. The definitive diagnosis and severity should be established using modern validated diagnostic criteria (i.e., Tokyo guidelines) [5]. The prompt diagnosis followed by appropriate clinical and interventional management led to a very satisfactory outcome wherein a little more delay could have cost the life of this patient.

Herein, we report a case presented with abdominal pain, drowsiness, and hypotension. After initial resuscitation and stabilization, a thorough clinical examination combined with appropriate laboratory and radiological evidence confirmed the case of severe acute cholangitis with sepsis and septic shock.

CASE REPORT


A 49-year-old non-smoker, a non-alcoholic male with no known comorbidities, was brought to the emergency room with complaints of increasing drowsiness, mild pain, and discomfort in the abdomen for 4–5 days.

On examination, the patient was drowsy but arousable, afebrile (98.6°F), pulse was of low volume and feeble on palpation, heart rate (HR) on the monitor was 129/min (min), blood pressure (BP) was 70/40 mm of Hg, respiratory rate (RR) was 30/min, regular but shallow, and oxygen saturation (SPO₂) on room air was 85%.

Initial resuscitation with crystalloids was started; oxygen supplementation with facemask at 6 L/min was given. The vasopressors (noradrenaline) had to be started for refractory hypotension after about 1 L of crystalloid infusion within 30 min. The SPO₂ has slightly improved to 90–92% on a non-rebreathing

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Access this article online	
Received - 30 March 2021 Initial Review - 04 May 2021 Accepted - 07 May 2021	Quick Response code 
DOI: 10.32677/IJCR.2021.v07.i05.009	

mask at an O₂ flow of 15 L/min. On general physical examination, icterus was noted, and on systemic examination, tenderness in the right hypochondrium was noticed.

A point-of-care ultrasound (POCUS) was done which revealed cholelithiasis with choledocholithiasis and circumferential thickening of the mid and distal common bile duct (CBD) and obstructive biliopathy. Considering the findings of clinical examination and POCUS study, a diagnosis of acute cholangitis was made, emergency venous blood and arterial blood gas (ABG) samples were taken and the patient was shifted to the surgical intensive care unit (SICU) for further management.

The patient had a Glasgow Coma Scale of 13/15, temperature of 98.8°F, HR of 115–120/min, BP 95–110 mmHg systolic, and 60–68 mm of Hg diastolic on nor-adrenaline infusion at 0.2–0.5 mcg/kg/min on continuous titration along with fluid therapy, RR of 22–25/min, regular, and SPO₂ of 88–92% on a non-rebreathing mask at O₂ flow of 15 L/min. A triple lumen 7.5 French (Fr) catheter was placed in the right internal jugular vein under ultrasonography guidance using Selinger's technique for central venous pressure monitoring and administration of vasopressors. Catheter tip position confirmed on chest roentgenogram and vasopressor infusion connected to the central line.

A single lumen 20 G 8 cm arterial catheter was placed in the left radial artery for continuous hemodynamic monitoring ABG sampling. Foley catheterization was also done to measure urine output measurement. Blood culture and urine culture samples were taken as per standard of the intensive care unit (ICU) protocol and sent to the microbiology laboratory. Injection Meropenem a broad-spectrum carbapenem antibiotic, 1g intravenously (IV) at 8th hourly interval was added to the treatment regimen. The vasopressor support had to be increased, infusion of vasopressin at 0.03 unit/min also started along with noradrenaline, colloids, and albumin 20% was also administered to maintain the mean arterial pressure more than 65 mmHg.

Report of blood investigation revealed hemoglobin/packed cell volume 11.8 g%/30.8%, total leukocyte count 16,590/mm³, with 95% neutrophils, platelet count – 96,000/mm³, prothrombin time and INR – 16.9/1.4, serum bilirubin – 8.6 g%, SGOT – 80 U/L, SGPT – 85 U/L, alkaline phosphatase (ALP) – 385 U/L, gamma-glutamyl transpeptidase (GGTP) – 789 U/L, serum urea – 48 mg/dl, creatinine – 1.7 mg/dl, and serum CA 19.9 – 4448 U/ml. ABG parameters were pH – 7.484, pCO₂ – 28.5 mmHg, pO₂ – 162 mmHg, HCO₃ – 21.8 mEq/L, Na⁺/K⁺ – 135/3.1 mEq/L, lactate – 12.3 mmol/L, and Glu – 145 mg%. Electrocardiogram showed sinus tachycardia, no abnormality on chest roentgenogram was found.

Charcot's triad has an incidence up to 72% (range, 15.4–72%) and sensitivity of just 26% while Reynolds' pentad reported in only 3.5–7.7% of the patients [5]. The definitive diagnosis was established by a more clinically applicable tool, that is, Tokyo guidelines. In our patient, the combination of clinical criteria together with laboratory evidence of inflammatory response (raised TLC > 10,000/mm³), abnormal liver function tests (raised bilirubin, aminotransferases, ALP, GGT, etc.), and imaging study suggestive of biliary obstruction, was confirmatory for diagnosis

of acute cholangitis, as per Tokyo Guidelines. The assessment for severity as per the Tokyo guidelines placed our patient at Grade III or severe acute cholangitis due to the associated organ dysfunction leading to hypotension requiring vasopressors, and the presence of drowsiness or mental confusion.

After initial resuscitation and stabilization of vitals on vasopressor and oxygen support, the patient was shifted for non-contrast magnetic resonance imaging (MRI) of the upper abdomen and pelvis and cholangiopancreatography (MRCP). The MRI revealed multiple calculi in the gallbladder neck, proximal CBD, and distal CBD at the ampulla. Dilatation of proximal CBD, intra-hepatic biliary radicles (IHBR), and pancreatic duct to about 1.1 cm in the region of the head of the pancreas was noted. MRCP also revealed cholelithiasis and choledocholithiasis with impacted calculi at the ampulla, grossly dilated CBD and main pancreatic duct (MPD), and bilateral IHBR. There was no evidence of any mass lesion in either imaging study. The patient was planned for endoscopic retrograde cholangiopancreatography (ERCP) and brought back to SICU till preparation for ERCP given high vasopressor support. After 30–45 min, the patient was shifted to minor operation theater, where, under monitored anesthesia care, ERCP, and cholangioscopy with electrohydraulic lithotripsy (EHL) were followed by endoscopic 7 Fr nasobiliary drainages (ENBD) placement and partial CBD clearance was done. The bile specimen obtained was sent for conventional culture and automated identification and sensitivity. The patient was brought back to SICU after the procedure with nasobiliary drain (NBD) *in situ*. Post-ENBD patient's vital parameters gradually stabilized vasopressors requirement decreased and could be tapered off gradually over the next 24 h.

After 48 h, culture and sensitivity (C/S) of bile showed growth of *Enterococcus faecium* sensitive to antibiotics teicoplanin, tigecycline, vancomycin, linezolid, and several other antibiotics. A blood culture report also revealed the same organism with the same sensitivity pattern. The antibiotic regimen was modified as per the C/S report and other supportive treatment and monitoring of vital parameters were continued. On the 2nd day of ICU stay, the patient was started on a soft diet and frequent flushing of NBD was advised. The patient was shifted to ward on day 3 of ICU. From the ward, after observation for 48 h, the patient was discharged to home with NBD *in situ* on the 5th day of hospital stay. The NBD care, antibiotics, and adjuvant drugs were prescribed on discharge and follow-up after 5 days advised, a plan ERCP, CBD clearance, and biopsy were discussed with the patient.

Contrast-enhanced computed tomography scan on follow-up showed bilateral IHBR dilatation with a drainage tube in dilated proximal CBD. There was mild wall thickening of CBD and central IHBR, suggestive of cholangitis. Few sub-centimetric hypodense lesions were seen in the left lobe of the liver, suggestive of cholangiolar abscesses. Endoscopic ultrasound with linear echoendoscope showed gallstones and CBD stones, no mass lesion or stone in MPD or pancreaticobiliary duct. ERCP performed, on cholangiogram CBD grossly dilated with multiple filling defects, one 7-Fr double pigtail plastic stent was placed in CBD. Lithotripsy was planned after 3 weeks.

After 3 weeks, the patient underwent ERCP cholangioscopy and EHL and biliary stenting again and partial clearance of CBD under general anesthesia uneventful. The next session of ERCP, cholangioscopy, and EHL for complete clearance was advised after 4 weeks.

DISCUSSION

The advancement in intensive care, safe, and effective therapeutic interventions, and newer antibiotics mortality from acute cholangitis has reduced drastically from over 50% to 8.4% in severe cases [5,6]. Early intervention within 24 h can significantly reduce 30-day mortality in acute cholangitis [7]. The clinical presentation of acute bacterial cholangitis can range from mild fever with chills or rigors to septic shock [8]. Several other conditions may present with pain in the right upper quadrant and jaundice, and fever as well in some of these. Thus, the likely differential diagnoses of acute cholangitis could be choledocholithiasis, acute cholecystitis, Mirizzi's syndrome, Lemmel's syndrome, biliary strictures/secondary cholangitis, primary sclerosing cholangitis, chronic pancreatitis, choledochal cyst, autoimmune/IgG4-related cholangitis, duodenal, ampullary, biliary or pancreatic malignancy, viral hepatitis, cirrhosis of the liver, liver abscess, septic shock due to any cause, right-sided diverticulitis, and righted sided pyelonephritis.

The early diagnosis and treatment as per the cholangitis management bundles and appropriate empirical antimicrobial coverage are of utmost importance in preventing mortality from this potentially life-threatening condition [6-11]. The most common microorganisms isolated from bile cultures among patients with acute biliary infections are *Escherichia coli* in 31–44% and *Klebsiella* spp. in 9–20% among Gram-negative and *Enterococcus* spp. in 3–34% and *Streptococcus* spp. in 2–10% among Gram-positive microorganisms [11]. The case in our report had Gram-positive *E. faecium* isolated in the cultures.

In a retrospective cohort study of cholangitis-associated septic shock patients, it was observed that these patients have significant mortality if appropriate antimicrobial therapy and biliary decompression were delayed >12 h after the onset of shock [12]. A similar case report and review also emphasized the importance of appropriate fluid resuscitation, broad-spectrum antibiotics to cover the likely enteric pathogens, confirmation of diagnosis by imaging and management with ERCP, and biliary drainage [13].

Thus, from the experience of this case and the availability of a plethora of evidence from the existing literature, a high clinical suspicion, early diagnosis, and appropriate empirical antimicrobial treatment coupled with timely intervention could be lifesaving for these patients. In resource-limited setups, early recognition and referral to higher centers with facilities for these lifesaving interventions should be advised.

CONCLUSION

The presentation of acute cholangitis may vary from case to case. For the patients presenting in sepsis with abdomen as a likely source of infection, a high clinical suspicion of the condition should be sought. A definitive diagnosis and appropriate management should be established as early as possible. Acute bacterial cholangitis is a fatal but treatable condition that if diagnosed early and managed appropriately may reduce morbidity, mortality, as well as the length of hospital stay, and the cost of treatment.

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Funding: None; Conflicts of Interest: None Stated.

How to cite this article: Singh R, Bhatnagar V. Management of a case of acute bacterial cholangitis with septic shock in a surgical intensive care unit: A case report. *Indian J Case Reports*. 2021;7(5):201-203.