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Torsion of the gallbladder leading to gangrene: A case report and literature review

Sabrina Bhattacharya MbChB[1], Priyal Taribagil MbChB[2], Sanjay Taribagil FRCS[3] (Gen Surg) Vish Bhattacharya FRCS[4] (Gen Surg)

[1]Foundation Doctor, Royal Victoria Infirmary, Newcastle upon Tyne NHS Foundation Trust U.K.; [2]Academic Foundation Doctor,Barnet Hospital, Royal Free London NHS Foundation Trust U.K.; [3]Consultant General and Upper Gastrointestinal Surgeon, Queen Elizabeth Hospital NHS Foundation Trust Gateshead NE9 6SX U.K; [4]Consultant General and Upper Gastrointestinal Surgeon,Queen Elizabeth Hospital NHS Foundation Trust,Gateshead NE9 6SX U.K.

Background/Literature Review

Gallbladder torsion is a rare but potentially catastrophic presentation to an acute surgical unit. It was first described by Wendel in 1898 where this presentation was labelled as a 'floating gallbladder', with a high propensity for perforation[1]. Since then approximately 500 cases have been reported in the literature[2].

Anatomically, gallbladder torsion occurs where the gallbladder rotates along its mesentery causing vascular compromise and obstruction to biliary drainage. This leads to subsequent necrosis and perforation[3]. Shaikh A. et al have reiterated that the entire aetiological sequence of gallbladder torsion continues to remains a debated topic although, generally, a redundant mesentery is required for torsion to occur[4]. In most reported cases, the gallbladder has been shown to undergo a clockwise rotation [5]. As described later, this presentation has predominantly been reported in elderly females suggesting that age plays a role in anatomically predisposing to torsion. Factors hypothesised for this include decrease in visceral fat and liver atrophy making free movement of the gallbladder and ultimately volvulus more likely to occur[6].

The symptoms of gallbladder torsion are in keeping with those of cholecystitis, typically presenting with right upper quadrant pain, nausea and vomiting [2]. Clinical examinations of previously reported cases have documented abdominal distention, right upper

***Correspondence to Author:**
Vish Bhattacharya FRCS (Gen Surg) Consultant General and Upper Gastrointestinal Surgeon, Queen Elizabeth Hospital NHS Foundation Trust, Gateshead NE9 6SX U.K.

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quadrant pain and localised peritonitis[2]. These non-specific signs can make this specific phenomenon a challenge to diagnose in clinical practice. It has been documented that a partial volvulus can present with intermittent symptoms, similar to those seen in biliary colic, although the majority of cases will present acutely with signs described above [3].

Due to the relatively low numbers reported in the literature it is difficult to determine the most appropriate investigations in patients where this is expected. Classically, patients presenting with right upper quadrant pain will likely receive an abdominal ultrasound on admission. From the cases reported we have found that a range of investigations have been implemented in practice including ultrasound and computed tomography (CT), although this diagnosis is often pragmatically difficult to diagnose based on imaging alone [3]. Non-specific findings of gallbladder inflammation have been reported in cases of gallbladder torsion including gallbladder wall thickening and fluid collections surrounding the gallbladder neck [7]. Other imaging modalities useful in pre-operative diagnosis include Magnetic Resonance Cholangiopancreatography (MRCP) which may show tapering and twisting of the cystic duct [3, 8]. Interestingly, gallbladder calculi have not been considered a causative factor and where present in less than a third of patients carrying this diagnosis in a review performed by Reilly et al [5, 9].

Other baseline investigations including white cell count, CRP and liver function tests have been shown to be relevant in diagnosing the acute abdomen. However, these are generally non-specific as a predictor for gallbladder volvulus.

Reilly et al performed a systematic review of 324 cases shown in the literature between 1898 and 2011 [9]. From this the predominant risk factors associated with gallbladder volvulus include female sex, age over 60 years and patients with several co-morbidities [9] Previous authors have suggested that female to male ratios in presentation are approximately 4:1, although the condition is more prevalent in males in children [10].

Management of this condition is primarily surgical and the reports published show that these patients are mainly treated by cholecystectomy. In general, this is done laparoscopically in experienced hands where this presentation is identified [3, 4, 9]. It has been suggested that the gallbladder should first be decompressed if distended to allow for a more straightforward removal [3]. There has also been a case reported managed with ERCP although this is not the preferred method of managing this condition [11].

Prognosis of this condition is dependent on several factors. The literature has demonstrated that those patients with a pre-operative diagnosis have more favourable outcomes [9]. Reilley et al suggested from their review that overall mortality was approximately 6% [9].

In this report we discuss the case of gallbladder torsion managed at a large district hospital in North East England.

Case Presentation

History & Examination

An 83-year-old lady presented to Accident and Emergency Department with a 1-day history of severe right upper quadrant pain, referred pain between the shoulder blades, nausea and vomiting. Her background medical history included heart failure, previous myocardial infarction, hypothyroidism and paroxysmal atrial fibrillation. Significant drug history included Rivaroxaban, Digoxin, Lisinopril, Bisoprolol, Amlodipine and Atorvastatin. She was a non-smoker.

Abdominal examination revealed right upper quadrant tenderness, positive Murphy's sign and peritonism. Her observations included temperature- 38 degrees, blood pressure- 153/89, respiratory rate- 19, heart rate- 84.

Investigations

The patient had an elevated white cell count 18×10^9 cells/L and c-reactive protein 216mg/L. Some liver function tests were abnormally elevated with a Bilirubin of 97umol/L and Gamma GT 56 u/L and Alkaline Phosphatase 97 U/L. Serum Alanine Transaminase 21U/L was normal. Renal function tests were also within normal

ranges: Urea 5.6mmol/L, Creatinine 46umol/L and eGFR 88 mls/min/1.73m^2. Arterial blood gas revealed a Lactate of 1.7mmol/L.

Contrast CT of the abdomen and pelvis suggested distended gall bladder with poor contrast enhancement of the gall bladder wall and associated mild pericholecystic inflammatory change. There was evidence of dilated common bile duct (CBD) to 11mm with mild intrahepatic biliary dilation. No radiopaque gall stones or CBD stones were identified. There were no other abnormalities, particularly pancreatic mass lesions, contributing to the dilated common bile duct and acute surgical presentation. CT scan was the first choice of investigation due to the concern of peritonitis. (Figs.1a and 1b). This showed a grossly enlarged gall bladder with common bile duct (CBD) dilatation.

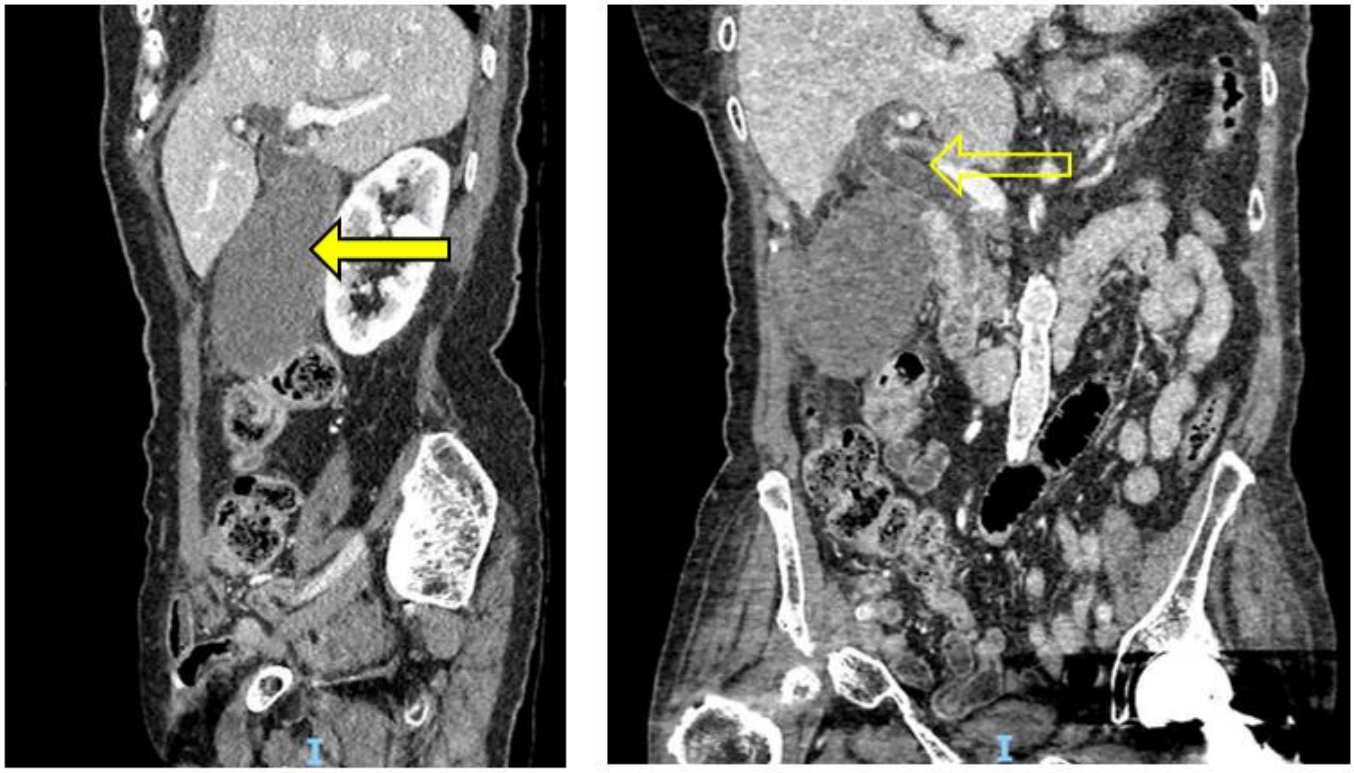

Figure 1a &1b: CT scan demonstrating grossly enlarged gallbladder (filled arrow) with common bile duct dilation (open arrow) in sagittal and coronal planes.

Subsequent abdominal ultrasound scans suggested a well distended gall bladder containing small amount of biliary sludge without evidence of obvious gallstones (Figs. 2a and 2b). The gall bladder wall appeared grossly thickened and oedematous measuring up to 7mm in size. Ultrasound appearance was in keeping with acute cholecystitis. Common bile duct was dilated measuring 12mm with no evidence of choledocholithiasis or intrahepatic biliary duct dilation. MRCP revealed dilated common bile ducts with abrupt tapering at the ampulla. There was no evidence of common bile duct calculus or pancreatic duct dilation. There was clear evidence of acute cholecystitis. All these subsequent investigations were supportive of each other however did not identify the torsion of the gallbladder.

Initially the patient was treated conservatively with broad spectrum antibiotics due to her complex cardiac co-morbidities. However, she showed clinical deterioration over the next few hours and underwent emergency laparoscopic cholecystectomy. Rivaroxaban was appropriately withheld.

Surgical Technique

Intraoperatively there was evidence of distended thick walled gangrenous gall bladder with 360-degree clockwise rotation around the cystic duct pedicle (Figs. 3 and 4). The gall bladder was not attached to the liver. De-torsion of the gall bladder was possible after aspiration and full de-compression of the gall bladder. Cystic artery and duct were clipped and divided to complete the cholecystectomy.

Figure 2a & 2b: Ultrasound scan and MRCP supporting the findings a distended gallbladder and dilated common bile duct

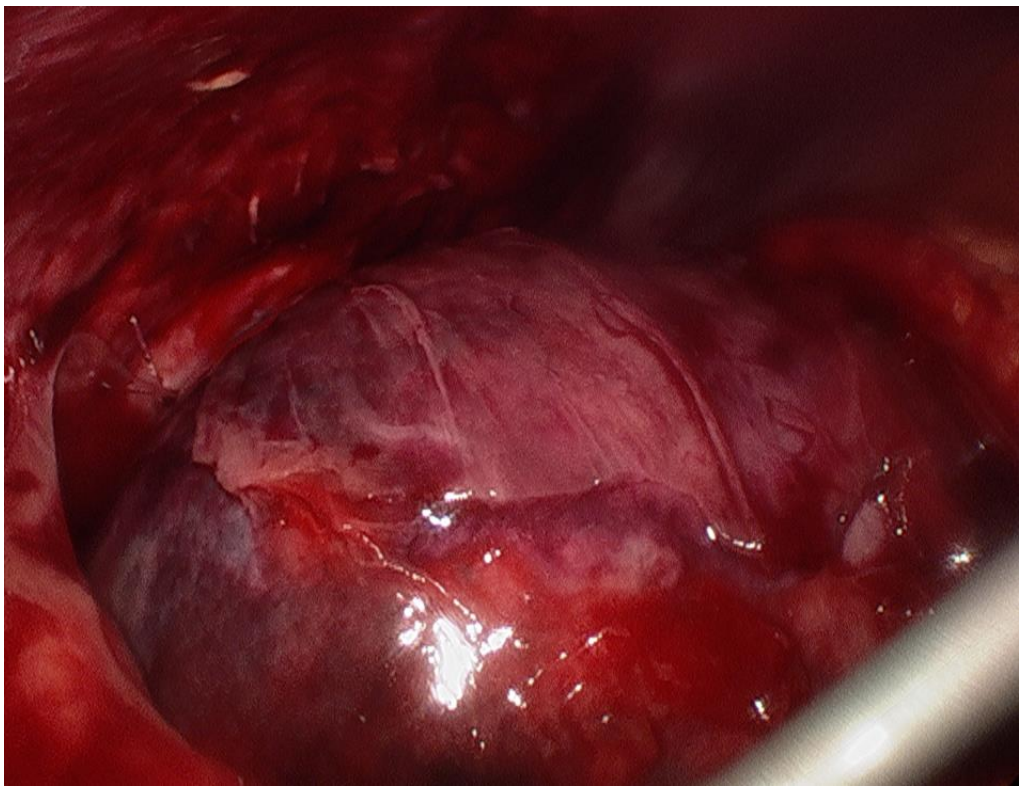

Figure 3: Laparoscopic view showing grossly distended gangrenous gall bladder.

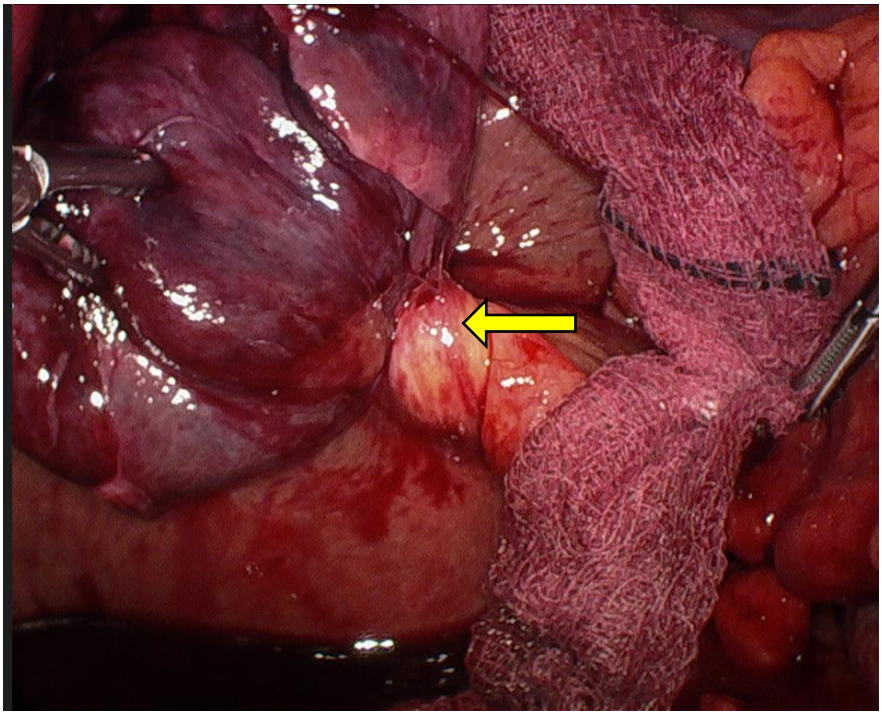

Figure 4: Laparoscopic view demonstrating total (360 degree) clockwise rotation of the gallbladder about the pedicle. Yellow arrow showing point of torsion.

Outcome and Follow up

The patient made a significant recovery and was discharged 3 days postoperatively. Histology of the specimen suggested features of haemorrhagic infarction fully in keeping with torsion of the gall bladder. There was no evidence of underlying malignancy or gallstones. The patient remained asymptomatic after surgery.

Discussion

From this case and the literature it is evident that torsion of the gallbladder presents with symptoms in keeping with acute cholecystitis although the demographics reported are generally in an older age group [9]. Though this condition is incredibly rare, it is often seen in elderly undernourished patients with significant comorbidities. A large number of these patients are on anticoagulants or antiplatelet agents for cardiac risk which can therefore be a challenge when considering operative management. This patient had all risk factors mentioned in the background, namely female sex, age over 60 years and multiple co-morbidities.

As outlined by this case, one of the challenges in management of gallbladder torsion is in making the diagnosis. As shown blood tests including elevated LFTs, CRP and WBC are helpful in demonstrating an inflammatory process but are often non-specific for a variety of abdominal pathology. In addition, imaging is often non-diagnostic. As demonstrated by the literature, Ultrasound can often show a distended or inflamed gallbladder wall although the aetiology of this is not demonstrated.

In addition, CT and MRCP as performed in this patient did not demonstrate the typical appearance of a twisted gallbladder around the cystic duct pedicle. Gallbladder volvulus can often fail to declare itself on ultrasound, CT or MRCP and the lack of pre-operative diagnosis can make subsequent planning and management a challenge. From our case and the literature we suggest that a grossly distended gallbladder without evidence of gallstones with a poorly enhanced wall could be suggestive of torsion of the gallbladder and early surgical intervention should be performed in these patients [3, 7, 8].

Emergency laparoscopic cholecystectomy is the treatment of choice for most acute gallbladder pathology presenting to acute surgical centres. High risk elderly patients are often initially

managed conservatively with intravenous fluids and antibiotics where biliary pathology is concerned given the risks of operative management. However, the literature shows that surgical management in the form of laparoscopic cholecystectomy as an urgent procedure is the main stay of management in this patient and the most likely to lead to resolution [3, 4, 9]. As demonstrated in this case, clockwise rotation seems to be the most common presentation of gallbladder torsion [5].

In this cohort of patients a thorough anaesthetic assessment giving careful consideration to the risk and benefit of the procedure is mandatory. This case shows that a high index of suspicion and early surgical management was vital in preventing further complications and treating this pathology.

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