

CASE REPORT

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Delayed presentation of isolated gallbladder rupture after blunt abdominal trauma

Olaia Chalh, Khaoula Sibbou, Laila Jroundi, Fatima Zahra Laamrani

ABSTRACT

Isolated gallbladder rupture following blunt abdominal trauma is a rare condition. Delay in the diagnosis for several days or weeks is common due to the lack of specific symptoms in acute phase. Accurate diagnosis is highly required to determine the therapeutic approach. We report the case of a patient with delayed presentation of an isolated gallbladder rupture following blunt abdominal trauma accurately diagnosed by urgent imaging modalities such as ultrasonography (US) and computed tomography (CT), and confirmed by laparoscopic cholecystectomy. For hemodynamically stable patients, urgent imaging plays a key role in the accurate diagnosis and decreasing the morbidity of exploratory laparotomy.

Keywords: Blunt abdominal trauma, Gallbladder, Radiology

How to cite this article

Chalh O, Sibbou K, Jroundi L, Laamrani FZ. Delayed presentation of isolated gallbladder rupture after blunt abdominal trauma. Int J Case Rep Images 2021;12:101200Z01OC2021.

Article ID: 101200Z01OC2021

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Received: 14 October 2020

Accepted: 06 February 2021

Published: 09 March 2021

doi: 10.5348/101200Z01OC2021CR

INTRODUCTION

Isolated rupture of gallbladder due to blunt abdominal trauma is a rare entity [1]. The lack of specific signs and symptoms leads to delayed diagnosis and management [2]. The diagnosis is usually made at laparotomy because emergency operation is often necessary due to other concomitant visceral injuries [3, 4]. However, in separate cases where patients are hemodynamically stable, imaging tools such as ultrasonography (US) and computed tomography (CT) may establish an accurate diagnosis for an appropriate management. In this case report, we present the history of a patient with delayed presentation of isolated rupture of gallbladder after blunt abdominal trauma, preoperatively diagnosed by US and CT, and confirmed by laparoscopic cholecystectomy.

CASE REPORT

A 31-year-old man with history of tobacco and alcohol consumption, fixation of both-bone right forearm fractures secondary to a single motor vehicle collision with a car two weeks earlier and since then he complained of intermittent diffuse abdomen pain resolved with antispasmodic drugs, presented to our Emergency Department with a high abdomen pain and fever. On admission, the patient was conscious, sound, and hemodynamically stable, initial temperature was 38.5°C. On physical examination, abdomen was not distended, diffuse tenderness noted more pronounced on right up quadrant without peritoneal signs. Complete blood count revealed a white blood cell count of 24,000/mm³ and a hemoglobin level of 13.0 g/dL. Abdominal examination performed in the department of imaging emergency revealed a partially contracted gallbladder with thickened wall and echogenic intraluminal fluid, surrounded by pericholecystic fluid collection. Accurate examination demonstrated a bifocal mural disruption at the neck and the mid body of gallbladder (Figure 1). Free fluid was observed in hepatorenal fossa. No additional

intra-abdominal pathology was detected. For further and deep evaluation, a multidetector computed tomography (MDCT) with intravenous contrast was performed. It showed a large amount of fluid density surrounding the gallbladder which appeared partially contracted with wall edema and two defects were clearly identified at the neck and the mid body (Figure 2). The rest of the examination did not show anything out of the ordinary.

The patient underwent laparoscopic cholecystectomy. 300 cc of bile was suctioned from the abdomen. Exploration revealed 2 mm wall defects of the gallbladder located in the neck and the mid body as were seen on US and CT. No other injuries were found, and cholecystectomy was successfully performed. The patient had a favorable outcome and was discharged on the 4th postoperative day without any complications.

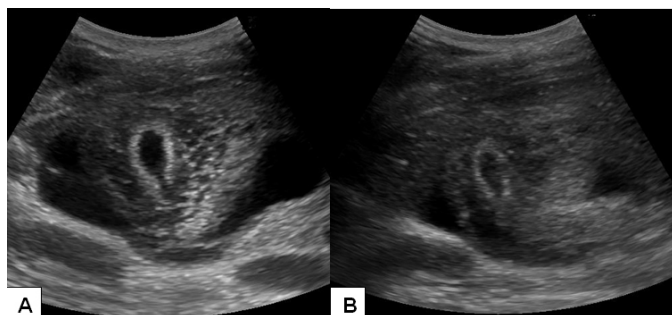


Figure 1: Ultrasonography of the gallbladder, transverse oblique views show partially contracted gallbladder with thickened wall, two small defects at the neck (A) and the mid body (B), with subsequent echogenic intraluminal and pericholecystic fluid collection.



Figure 2: Axial (A) and (B), sagittal (C) contrast enhanced CT images of the abdomen through the gallbladder show wall thickening and bifocal mural disruption at the neck and the mid body with pericholecystic fluid.

DISCUSSION

In blunt abdominal trauma, gallbladder rupture is found in approximately 2% of laparotomies [2]. Due to the small size and the anatomic location of gallbladder (partially embedded in the liver tissue, surrounded by the omentum and intestines, and overlaid by the rib cage), the isolated rupture is even much rarer [5]. Most commonly associated injuries include liver or splenic laceration, and mesenteric tears [6].

Men are more commonly affected with an average age of 27 years [5]. There is a high probability for kids to be affected due to their vulnerability to direct abdominal trauma as well as their poor anterior abdominal wall muscular development [1]. The most commonly reported causes of blunt traumatic gallbladder injury include motor vehicle collisions just like the case we are dealing with, falls from height, and direct blows to the abdomen [6].

Three predisposing factors of gallbladder rupture that are frequently described: thin-walled normal gallbladder, postprandial distended gallbladder, alcohol ingestion, and gallbladder malposition [5, 7]. Chronically diseased gallbladder wall is less likely to be injured [5]. Cirrhotic liver is reported as a probable risk factor which may exacerbate shear forces in the gallbladder fossa due to the difference in mass between these two organs [8, 9].

Gallbladder injuries can be classified into three main categories: contusion, perforation, and avulsion. Contusion is defined as an intramural hematoma. Perforation, also referred to as rupture or laceration, is the most common gallbladder injury reported and occurs mostly in the dome and neck of the gallbladder. Avulsion injuries are divided into three subtypes. In partial avulsion, the gallbladder is partially detached from the liver bed. In complete avulsion, the gallbladder is completely detached from the liver bed, but the cystic duct and artery remain intact. Total avulsion is when the gallbladder is free in the abdomen without any attachments [4, 5]. Contusion is the least frequent of these injuries, but it is important and should not be ignored. Intramural hematoma can lead to necrosis area and delayed perforation. Moreover, blood clot occluding the cystic duct can result in cholecystitis (traumatic cholecystitis), gangrene, and late perforation [1, 4]. The American Association for the Surgery of Trauma (AAST) Extrahepatic Biliary Tree Injury Scoring Scale classified gallbladder injury into three grades: Grade I: contusions, Grade II: partial gallbladder avulsions or laceration/perforations, Grade III: complete gallbladder avulsion [2].

Clinical symptoms depend highly on other concomitant visceral injuries. More commonly in patients with isolated gallbladder rupture, presentation is nonspecific and delayed [4, 5]. Damage to uninfected gallbladder leads to sterile bile in abdomen and may take up to six weeks to become apparent [1]. In our case, the rupture of gallbladder is discovered two weeks after a blunt abdominal trauma.

Intraluminal bleeding of gallbladder wall or hemobilia may be presented as melena. This can be the only sign and the delayed one detected not before weeks or even month after the initial injury [4].

The diagnosis is frequently made at laparotomy for associated intra-abdominal injuries. For patients who are hemodynamically stable and do not have an indication for immediate operation, imaging tools are established to get an accurate diagnosis and oriented therapeutic procedure. US and CT are equally effective to demonstrate indirect signs of gallbladder perforation, such as pericholecystic fluid collection, an ill-defined or thickened gallbladder wall, a collapsed gallbladder in a fasting patient, a mass effect on the duodenum, echogenic, or dense intraluminal fluid due to hematoma, extravasation of intravenous contrast material when there is cystic artery transection, free intraperitoneal fluid [10]. Gallbladder wall defect is the only specific sign of perforation, but is not always demonstrated preoperatively and this may be due to collapsed gallbladder during diagnostic imaging.

In hemodynamically stable trauma patients, US is usually the initial mode of investigation in cases of suspected gallbladder perforation because it is noninvasive, rapid, easily repeated, and non-irradiant especially for children [10, 11]. The defect in the gallbladder wall can be accurately demonstrated by Doppler US as a flow signal passing through the perforation site.

Akay and Al concluded that repeated US in the first 24 h of fasting with a linear probe is useful and strongly recommended for demonstrating perforation site when unexplained equivocal abdominal symptoms persist. With time, gallbladder collapse should become more prominent with greater fluid accumulation. The wall defect will be discernible [10].

In our case, wall defects of the neck and the mid body were clearly seen on US at the initial examination using a convex probe because of the gallbladder was not completely collapsed and the pericholecystic fluid was prominent.

Nowadays, CT is often preferred over ultrasound for hemodynamically stable trauma patient. This offers a more detailed anatomical view of the intra-abdominal organs and is less dependent on the skills and experience of the operator [4]. The sensitivity of CT in the detection of gallbladder perforation was found to be 88%. Kim and Al in their comparative study of CT and ultrasonography on 13 patients with gallbladder perforation detected the site of perforation in 50% of patients on CT but in no patient on ultrasonography [11].

Literally, the mean diameter of wall defect is 2, 8 cm, with a scale of 1 up to 5 cm and there is no significant correlation between the defect size and its visibility with imaging tools. In our case, two small wall defects which are less than 1 cm in the neck and the mid body were clearly demonstrated by US and CT at the initial examination.

Magnetic resonance cholangiopancreatography, hepatobiliary scintigraphy performed with technetium-

99m iminodiacetic acid derivatives (HIDA), and Endoscopic Retrograde Cholangio Pancreatography (ERCP) can be used as diagnostic modalities to determinate the source of the bile leakage. However, they are not always available in emergency departments.

In suspected cases, imaging tools especially US may guide percutaneous drainage of pericholecystic fluid or ascites [3, 6]. When CT shows extravasation at the site of the cystic artery transaction, selective angiography offers the advantage of the possibility to treat active hemorrhage directly by performing embolization [4]. Up until now, the recommended treatment of gallbladder rupture is cholecystectomy [1, 6, 9].

As gallbladder rupture is often associated with multiple organ injuries leading to peritonitis, laparotomy is often used [3]. In selected hemodynamically stable trauma patients, when diagnosis of solitary gallbladder rupture is accurately made by imaging modalities, laparoscopic procedure could be performed [9]. Using a minimally invasive approach, laparoscopy can establish the final diagnosis, offer a successful management, and reduce the potential morbidity of a negative laparotomy [3, 4].

Our patient may benefit from a laparoscopic cholecystectomy after accurate preoperative diagnosis of gallbladder perforation made by emergency imaging modalities (US and CT).

The prognosis of gallbladder injury is related to earlier diagnosis and associated injuries. Biliary peritonitis is the main complication of a missed or delayed diagnosis with a high rate of morbidity. The follow-up after surgery for isolated gallbladder rupture remains quite favorable and no deaths have been reported.

CONCLUSION

Isolated gallbladder rupture following blunt abdominal trauma is uncommon. However, delayed cases are more common because of the lack of specific symptoms at an early stage. The diagnosis is often made at laparotomy that is indicated for concomitant visceral injuries. In hemodynamically stable trauma patients, imaging modalities (US and abdominal CT) play an optimum role in accurate preoperative diagnosis, which may change the therapeutic strategy from open to laparoscopic cholecystectomy and reduce the potential morbidity of an invasive laparotomy.

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Olaia Chalh – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Khaoula Sibbou – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Drafting the

work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Laila Jroundi – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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Guarantor of Submission

The corresponding author is the guarantor of submission.

Source of Support

None.

Conflict of Interest

Authors declare no conflict of interest.

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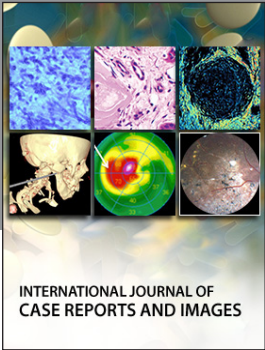
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