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Surgical management of gall bladder perforation as a complication of cholelithiasis: A case series

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ABSTRACT

Gallbladder perforation is a less common clinical disease due to its rarity and diagnostic challenge. It is a rare but potentially fatal adverse consequence of acute cholecystitis. A single institution's experience with managing this condition is incorporated into this case series.

Key words: Gallbladder; Perforation; Management

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INTRODUCTION

Perforation of the gall bladder (GB) complicates 2–11% of cases of acute cholecystitis.[1,2] This problem presents a challenge to the surgeon due to delay in recognition, difficulty in diagnosis, and associated high morbidity and mortality.[3,4] A number of improvements have been made in the recognition and management of this complication in the past two decades leading to a decrease in the mortality figures.[5] Niemeier classified GB perforations into three categories. Type I included patients with free perforation of the GB and generalized peritonitis, type II included those with a localized perforation, and type III consisted of those patients with a cholecystoenteric fistula with or without gallstone ileus. Although this classification was made nearly 60 years ago, few studies have tried to make a distinction between the management and outcomes of the three different groups of patients with this heterogeneous condition. We present our experience with these cases around 2 years with an emphasis on the differences between the three types of lesions.

MATERIALS AND METHODS

The current research was carried out at the Surgery Department at the Dr. Yashwant Singh Parmar Government Medical College and Hospital, Nahan, Himachal Pradesh, India. The Institutional Ethics Committee accepted the research's ethics, and the research was conducted between October 2022 and March 2024. According to the inclusion and exclusion criteria, the subjects who were considered for the research were based on clinical, laboratory, and/or surgical and pathological criteria.

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CASE PRESENTATION

Case no. 1

A 32-year-old male reported with abdominal discomfort for 5 days. The upper right quadrant was the point of origin of pain which progressed to the back. The patient had a history of recurrent nausea, particularly after meal. He also complained of fever 1 week ago. Vital signs including blood pressure (BP) of 100/70 mmHg, heart rate of 112 beats/min, and respiration rate of 26 beats/min were noted during the patient's physical examination.

On abdominal examination, tenderness was present in the right hypochondrium and epigastric region. Murphy's sign was positive. Laboratory tests found leukocytosis ($12.9\times10^3/mm^3$). Abdominal ultrasound examination showed distended GB containing multiple calculi of average size of 6–7 mm. GB showed a focal defect in the fundic region with localized collection of size 20×30×40 mm near the fundus. There was mild free fluid in Morrison's space and right hypochondrium region. The patient was diagnosed with cholelithiasis with GB perforation. The patient was kept nil per oral (NPO) for 2 days and managed conservatively. *In vitro* fertilization (IVF), intravenous (IV) antibiotics, analgesics, antipyretics, and antiemetic were given. Patient improved symptomatically and was discharged on day 9.

After 3 months interval, laparoscopic cholecystectomy was performed. Intraoperatively, adhesions were present between GB and omentum between liver and anterior abdominal wall. GB got perforated during separation from liver bed leading to bile spillage. Postoperatively, port site wound sepsis was seen over epigastric port. On wound culture and sensitivity, *Escherichia coli* was sensitive to gentamycin. Managed with ASD, antibiotics, and secondary suturing was done and discharged on post-operative day 17 (POD-17).

Case no. 2

A 60-year-old woman complained of abdominal pain for 10 days. The upper right quadrant was the point of origin of the pain which later radiated to the back. He experienced frequent nausea and vomiting in the past, particularly after eating. In addition, the patient experienced intermittent fever.

A physical examination of the patient showed vital signs including BP of 140/78 mmHg, heart rate of 120 beats/min, and respiratory rate of 24 beats/min. On abdominal examination, tenderness was present in the right hypochondrium and epigastric region. Murphy's sign was positive. Laboratory tests found leukocytosis ($13.1\times10^3/mm^3$). Abdominal ultrasound examination showed distended GB containing multiple echogenic foci giving PAS. There was defect in the anterior wall of GB with collection in the pericholecystic region. Patient was kept NPO for 3 days. IVF, IV antibiotics, analgesics, antipyretics, and antiemetic were given. Ultrasonography (USG)-guided aspiration was done and about 50 cc of pus was aspirated and was sent for culture which was found to be sterile. After 5 days, USG-guided aspiration of residual collection was done and 25 cc of pus was aspirated. On follow-up USG abdomen, GB perforation with the collection of approximately 13.4 cc in GB fossa region with air foci was observed. Patient improved symptomatically and was discharged on day 16. Laparoscopy was completed by open cholecystectomy with primary repair of cholecystoduodenal fistula after interval of 5 months. Operative findings showed that dense adhesions were present between GB, omentum, and duodenum; hence, operation was converted to open procedure. Upon opening, cholecystoduodenal fistula was found which was excised and cholecystectomy was completed. Primary repair of duodenal fistula was done. In Morrison's pouch, the drain was kept. Post-surgical time was uneventful and the patient was discharged on POD 12.

Case no. 3

A 36-year-old female reported with abdominal discomfort for 2 days. Initially noticed in the upper quadrant, the discomfort then radiated to the back. In addition, the patient experienced intermittent fever.

On abdominal examination, tenderness was present in the right hypochondrium and epigastric region. Murphy's sign was positive. There was a lump of size 8×6 cm in the right hypochondrium and epigastric region, firm, tender, moving with respiration, mobile in craniocaudal direction, and sideways.

Abdominal USG examination showed distended GB containing multiple calculi of largest of size 14.9 mm. There was the presence of pericholecystic fluid with free fluid in Morrison's pouch and cystic lesion in the left ovary giving an impression of acute cholecystitis with cholelithiasis. The patient was kept NPO for 3 days. IVF, IV antibiotics, analgesics, antipyretics, and antiemetic were given and discharged after 6 days. Subtotal cholecystectomy was performed after interval of 1.5 months. Operative findings showed GB was distended with pus and calculi. Dense adhesions were present between GB, omentum, and duodenum. Due to frozen calot's triangle and thick adhesions, surgery had to be changed to an open procedure. On opening retrograde (fundus first) approach was adopted, stones were removed from GB and subtotal cholecystectomy was done. In Morrison's pouch, the drain was kept. Post-surgical time was insignificant and the patient was discharged on POD 12 (Table 1).

DISCUSSION

GB perforation presents as an uncommon but potentially fatal disease which poses as a challenge for early identification due

Table 1: Summary of Cases

Case No.	Age	Sex	Type of Perforation	Co-morbidity	Management	Complication
1.	32Yrs	MA	Type-II	None	Interval Laparoscopic Cholecystectomy	Wound Sepsis
2.	60Yrs	FA	Type-III	None	USG guided aspiration of pus followed by Interval Laparoscopy completed by open cholecystectomy with primary closure of duodenal fistula	None
3.	36Yrs	FA	Type-II	None	Interval Laparoscopy completed by open sub-total cholecystectomy	None

to its variable presentation. Typically, it is a consequence of acute cholecystitis, regardless of the presence of gallstones.[1] Due to its poor blood supply, the GB fundus is the most often perforated location.[2] In 1934, Niemeier classified free GB perforations into three groups. Acute type I is associated with extensive biliary peritonitis; subacute type II is defined by localized fluid collection at the site of perforation, pericholecystic abscess, and localized peritonitis; and chronic type III is associated with the formation of either internal or external fistulae.[3] In our series, there were 0:2:1 GB perforations of type I, type II, and type III. In type II GB perforations, cholecystectomy may be undertaken following infection relief with USG-guided percutaneous draining.[4] A conversion may be required in the event of complications such as uncertain anatomy, but laparoscopic cholecystectomy is a viable procedure for acute, gangrenous, and/or perforated cholecystitis.[5] Finally, it should be noted that GB perforation poses unique surgical and diagnostic challenges. Therefore, it is crucial to diagnose, classify, and treat patients appropriately.

CONCLUSION

GB perforation represents a special diagnostic and surgical challenge. Early diagnosis, classification, and appropriate management are crucial. Type-I perforation is the most severe form of GB perforation usually present with peritonitis and is diagnosed on exploratory laparotomy. Type-II and Type-III GB perforation are usually managed conservatively with IV fluid, antibiotics, and USG-guided drainage, and subsequently, interval cholecystectomy is performed.

Ethical approval

The protocol underwent review and received approval, and the work was carried out in alignment with the directives set forth by the Institutional Ethical Committee of Dr. Yashwant Singh Parmar Government Medical College and Hospital, Nahan, Himachal Pradesh.

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SK- Conceptualization, formal analysis, resources, methodology; **PJ-** Validation, formal analysis, writing-review; **SK-** Writing original draft, data curation, methodology, resources; **MK-** Concept and design, manuscript preparation, revision of manuscript and treating physician; **SK-** Writing-review, methodology; **AK-** Validation, conceptualization.

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