

DIAGNOSIS AND MANAGEMENT OF GALLBLADDER PERFORATION: A SINGLE-CENTER EXPERIENCE

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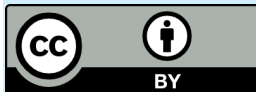
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ABSTRACT

Background: Gall bladder perforation is one of the uncommon serious complications of cholelithiasis and cholecystitis with high morbidity and mortality. Presentation of gall bladder perforation may vary from that of similar to acute calculus cholecystitis, perforation peritonitis, palpable gall bladder mass to gall stone ileus. Here, we present our experience on the diagnosis and management of the case of gall bladder perforation.

Methods: This is the retrospective review of the records of 24 patients who received medical and/or surgical treatment with the diagnosis of gall bladder perforation at Chitwan Medical College from January 2016 to December 2020. All the patients with suspicion of gall bladder perforation underwent contrast enhanced CT scan before an operation or prior intervention. The parameters including age, gender, type of perforation, comorbidities, symptoms, diagnostic procedures, treatment modalities, morbidity, and mortality were evaluated.

Results: A total of 24 patients were included in the study during the study period. Among them 62.5% (n=15) were male and 37.5% (n=9) were female. The median age of presentation was 69 years. One patient (4.1%) had type I, 87.5% (n=21) had type II, and 8.3% (n=2) had type III gall bladder perforation. CT scan visualizes the defect in gall bladder wall and identifies perforation in all cases. Operative management was done in 12.5% (n=3) patients and percutaneous drainage of gallbladder was done in 87.5% (n=21). The comorbid disease was present in 83.3% (n=20) of the cases. The median duration of hospital stay was 7 days and there was no mortality.

Conclusions: Gall bladder perforation is commonly seen in patients with acute cholecystitis and associated comorbidities. Type II gall bladder perforation is the most common type. Contrast-enhanced CT has an important role in diagnosing gallbladder perforation. Early suspicion, diagnosis, and appropriate management are of crucial importance for a better outcome in patients with gall bladder perforation.

INTRODUCTION

Gall bladder perforation (GBP) is a common intraoperative complication during cholecystectomy. But when the GBP occurs in the setting of acute calculus cholecystitis and/or cholelithiasis, it is serious and associated with high morbidity and mortality.¹ Some of them are diagnosed during surgery, whereas some presented with cholecysto-enteric fistula. The gallbladder fundus is the most common site of perforation because of its poor blood supply followed by the body and Hartmann's pouch.²

In the literature, the incidence of GBP is seen in 2 to 11% of acute cholecystitis cases.³ Because of the rare occurrence on our part, data regarding its true incidence and guidelines for management are still lacking. Here we aimed to present our clinical experience on the diagnosis and management of GBP in this study.

METHODS

This is the retrospective review of the records of 24 patients who received medical and/or surgical treatment with the diagnosis GBP at Chitwan Medical College (CMC) from January

2016 to December 2020. All the patients with the diagnosis of GBP were included in the study. Perforation due to trauma, iatrogenic causes, and gallbladder carcinoma were excluded from the study. Diagnosis of GBP was made by radiological evidence (ultrasound or CT scan of the abdomen) or confirmed intraoperatively when the perforation is seen in the gall bladder in type I perforation. All the patients with suspicion of GBP underwent a contrast-enhanced CT scan before an operation or prior intervention. Perforation was classified as per Niemeier's classification of GBP. Type-1 perforation is acute perforation into the peritoneal cavity with generalized peritonitis, Type 2 is sub-acute perforation with localized peritonitis or pericholecystic abscess or intrahepatic perforation and Type 3 is chronic perforation with cholecysto-enteric fistula (stomach, duodenum, small bowel, colon).^{4,5}

Patient data were recorded using the case records of the patients, collected from the Medical record section and the following data were analyzed: age, gender, type of perforation, comorbidities, symptoms, diagnostic procedures, treatment modalities, morbidity, and mortality. Ethical clearance was taken from the institutional review committee (CMC). The

data were analyzed using Statistical Package for Social Sciences (SPSS) for Windows version 21. Descriptive statistics were used to describe the data. Results were expressed in frequency and percentage.

RESULTS

A total of 24 patients included in this study. Among them 62.5% (n=15) were male and 37.5% (n=9) patients were females with M:F ratio 1.6:1. The median age of presentation was 69 years (range from 35-86) (Figure 1) and the median duration of symptoms was 6 days with a range from 2 days to 14 days.

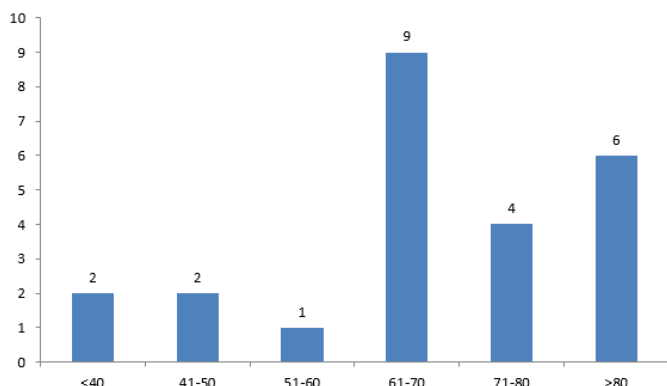


Figure 1: Age distribution of the patients with GBP

Right upper quadrant pain was the main complaint and present in all cases and the elevated temperature was seen in 58.3% (n=14). Murphy sign was positive in 87.5% (n=21) and all had type II perforation. All of them were managed with a percutaneous drainage catheter with intravenous antibiotics. There were 2 patients with type III perforation. Among these two patients, one presented with cholecysto-colic fistula for which open cholecystectomy with segmental resection of the colon was done, and another patient presented with Bouveret syndrome with cholecysto-duodenal fistula for which laparotomy, enterotomy, and, removal of stone was done. There was only one patient who had type I perforation who was initially admitted with acute calculus cholecystitis later developed frank perforation peritonitis for which laparotomy and cholecystectomy was done.

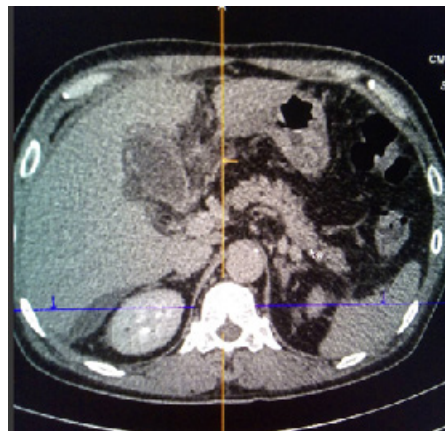
Table 1: Comorbidities seen in a patients with GBP (n=24)

Comorbidity	Frequency (%)
Diabetes	12 (50)
Hypertension	7 (29.1)
Coronary artery disease	4 (16.6)
COPD	5 (20.8)
Chronic liver disease	8 (33.3)
Steroid	3 (12.5)
Single comorbidity	10 (41.6)
Multiple comorbidities	10 (41.6)
No comorbidity	4 (16.6)

USG of the abdomen and pelvis was done in all patients as a routine protocol of evaluation of abdominal pain in the

emergency department and contrast-enhanced CT scan was done in all cases with suspected GBP pre-operatively or before the intervention, as the site of the defect could not be visualized on ultrasound in any patients. CT scan visualizes the defect in the gall bladder wall and identifies perforation in all cases (Figure 2).

Figure 2: Type II GBP at fundus and body of gall bladder



The comorbid disease was present in 83.3% (n=20) of the cases. Among them, 50% (n=12) patients were known diabetics. Multiple comorbidities seen in 41.6% (n=10) (Table 1).The median duration of hospital stay was 7 days (5-21 days) and 41.6% (n= 10) patients had pneumonia. There was no mortality.

DISCUSSION

In the majority of the patients, GBP is seen in the background of acute calculus cholecystitis.⁶ Its incidence varies in different studies and also can be seen in patients with acalculous cholecystitis which is very rare.⁷ Literature also reported the overall higher incidence of GBP in acalculous cholecystitis as compared to calculus cholecystitis.⁸ GBP with cholecysto-enteric fistula rarely encounter in the surgical practice and the majority of cases are diagnosed during surgery,^{9,10} whereas, in this study GBP, was associated with cholelithiasis in all cases and were diagnosed preoperatively or prior intervention.

There is a contradiction in the relationship between gender and GBP in the literature. The majority of the literature shows a higher incidence of GBP in male patients,¹¹⁻¹³ In our present study also there is a higher incidence of GBP in male patients. In contrast, some literature shows a higher incidence of GBP in female patients.¹⁴ Similarly, a study was done from the eastern part of Nepal also shows the higher incidence of GBP in female patients.¹⁵ Exact cause of this is not well explained, probably this is related to the degree of inflammation, the virulence of the organism, presence, and absence of associated comorbidities and body response toward infection and inflammation.

There are high differences in the proportions of the three different types of GBP in different studies. The majority of them shows the Neimers type I and II perforation are more common, while some studies reported a high proportion of type II perforation as compared to type I and III ^{11,14 6} In our study also, the major bulk of the perforation was type II followed by type III

and only one patient is the type I perforation.

A higher incidence of GBP was seen in the patients with old age, comorbidities such as diabetes, coronary artery disease, immunocompromised status, and chronic airway disease.^{11,16} In our study 50% (n=12) of the patient had diabetes, 41.6% (n=10) patients had more than one comorbidities and the majority of them were above the age of 60.

Cholecystectomy, drainage of abscess if present, and peritoneal lavage is sufficient for the patients with type I and II perforation. This can be done by open or laparoscopic means, whereas for type III, repair of the fistula may be required. For the patients with type II perforation, initial percutaneous drainage followed by cholecystectomy can be done at a later date. In our cases, all type II perforation, initial management were done with IV antibiotics and percutaneous drainage.

Ultrasound of the abdomen is the initial investigation of choice in patients with gallbladder disease. Ultrasound shows pericholecystic fluid collection(s) with a layering of the gallbladder wall in a patient with GBP.¹⁷ The most specific sign of GBP is the “sonographic-hole” sign (gallbladder wall defect can be visualized on ultrasound) and the visualization of gallstones outside of the gallbladder.¹⁸ Other sonographic signs of GBP are distended gallbladder, thickened gallbladder wall, the striated appearance of the gallbladder wall, gallstones, debris/sludge, and adjacent abscesses.¹⁹ As the intestinal gas, pain and personal experience limit its accuracy

of ultrasound, these limitations can overcome by a contrast-enhanced CT scan. Apart from the above finding, a CT scan also shows the site, size and, number of perforations more accurately thus demonstrate the extension of a lesion more clearly.²⁰ In comparison to the ultrasound CT scan is more sensitive for the detection of the perforation.^{17,21,22} Our study also showed the better accuracy of contrast-enhanced CT scan to diagnose GBP.

In a patient with GBP, higher mortality and morbidity rates are encountered during treatment. The reported mortality and morbidity rate is 12% to 42% and 37.5% to 57% respectively.^{6,11,23} There was no mortality in our study however morbidity was 29% (n=7) and the majority of them had co-existing comorbidities.

CONCLUSION

Gall bladder perforation is commonly seen in patients with acute cholecystitis and associated comorbidities. Type II gall bladder perforation is the most common type. Contrast-enhanced CT has an important role in diagnosing gallbladder perforation. Early suspicion, diagnosis, and appropriate management are of crucial importance for a better outcome in patients with gall bladder perforation.

CONFLICT OF INTEREST: None

FINANCIAL DISCLOSURE: None

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