



A retrospective study of diagnosis and management of gallbladder perforation: 10-year experience from a tertiary health care centre

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ABSTRACT

Objective: The aim of this study was to perform retrospective analysis of data collected from patients of gallbladder perforations for diagnosis, management and outcome.

Material and Methods: A retrospective analysis of data was carried out for 40 patients of gallbladder perforations from the hospital record of patients who were diagnosed preoperatively and intraoperatively as a case of gallbladder perforation over a period of 10 years and were managed in our surgery unit of a tertiary health care centre. Patients were included irrespective of sex except cases of trauma and patients of the paediatric age group.

Results: Among 40 patients, 26 were females and 14 were males. As per Anderson modification of Neimeier classification, 13 (32.5%) had type 1, 23 (57.5%) had type 2, and four (10%) patients had type 3 perforations and none of the patients had type 4 perforation. Twenty-three patients (57.5%) were found to have fundal perforation, followed by body in 11 patients (27.5%), three (7.5%) in Hartman's pouch while in three patients (7.5%), there were multiple perforations. All patients of type 1 Neimer classification were diagnosed clinically as cases of biliary peritonitis, whereas most cases of type 2 Neimer classification were diagnosed preoperatively by CECT abdomen 12/23 patients (52%) and ultrasound abdomen 10/23 (43.47%). All patients underwent surgery, and there were three mortalities.

Conclusion: In our study, there was female predominance in patients having gallbladder perforation. Of the patients, 52.5% were diabetic and mean age was 55.9 years. CECT abdomen was the most useful modality for diagnosis of type 2 gallbladder perforations. Timely surgical intervention is mandatory for a better outcome of these cases.

Keywords: Acute cholecystitis, gallbladder perforation, biliary peritonitis, operative intervention

INTRODUCTION

Gallbladder perforation is one of the least but potentially fatal complication of acute cholecystitis, with a reported mortality rate of 12-42% (1-3). A low degree of suspicion coupled with a wide range of clinical symptoms makes preoperative diagnosis of gallbladder perforation difficult, more so in our setup with a limited access to radiological investigations such as CECT abdomen or MRCP preoperative, diagnosis is a challenge (4,5). As a result, most of such cases are either managed on the lines of acute cholecystitis or diagnosed on the operating table. This delay in diagnosis increases morbidity and mortality in such patients. Gallbladder perforation is almost always a sequelae of acute cholecystitis, mostly calcular, except for cases of injuries (trauma/iatrogenic) and infections (6). Infections, malignancy, trauma, drugs (e.g. corticosteroids), diabetes mellitus and atherosclerotic heart disease are known predisposing factors for gallbladder perforation (7). A gallbladder perforation may present as free biliary peritonitis or as chronic perforation with an internal fistula. However, the most common presentation is perforation with a localised collection, forming a peri-cholecystic abscess. Niemeier has classified gallbladder perforations into three types; type 1: free perforation, type 2: perforation with localised abscess, and type 3: chronic perforation with cholecysto-enteric fistula (8). Type 4 as cholecysto-biliary or external fistula has been added to the above types (9,10).

We herein present our experience of 40 cases of gallbladder perforation that presented to our hospital from January 2012 to July 2022.

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MATERIAL and METHODS

A retrospective analysis of data was carried out from the hospital record of patients diagnosed preoperatively and intraoperatively as a case of gallbladder perforation and managed in our surgery unit of a tertiary health care centre. Ethical approval for the study was obtained from the institutional ethics committee of the hospital to which the researchers are affiliated (IEC no: IEC/GMC/Cat C/2021/448). Informed consent was obtained from each participant prior to participation in the study. Forty patients were included in this study, who were diagnosed as a case of gallbladder perforation between January 2012 to July 2022. We used Anderson modification of Neimeier classification for gallbladder perforation cases in this study (8).

According to this classification, there are three main clinical subtypes. A fourth type has been suggested by Anderson et al (9).

- Type 1: Acute free perforation
- Type 2: Subacute pericholecystic abscess
- Type 3: Chronic cholecystoenteric fistulation
- Type 4: Cholecystobiliary fistula formation

All patients were included irrespective of sex except cases of trauma and patients belonging to the paediatric age group. History, examination and investigations including CBC, KFT, serum electrolytes, blood sugar, LFT, coagulation profile, X-ray abdomen and chest and USG abdomen were reviewed for all patients. CECT abdomen and MRCP were also reviewed if available during the preoperative period. Intraoperative findings were noted including type of perforation and amount of peritoneal contamination. Postoperative course in hospital including complications and histopathological examination reports were reviewed.

RESULTS

Among forty patients included in this study, 26 were females and 14 were males. Most of these patients were above 50 years of age. As per Anderson modification of Neimeier classification, 23 (57.5%) had type 2 (as shown in Figure 1), 13 (32.5%) had type 1 (as shown in Figure 2) and four patients (10%) had type 3 perforations, and none of the patients had type 4 perforation. Twenty-three patients (57.5%) were found to have fundal perforation, followed by body in 11 patients (27.5%), three (7.5%) in Hartman's pouch while in three patients (7.5%), there were multiple perforations. Associated comorbidities were present in 21 patients (52.5%) as shown in Table 1. Thirteen patients had only diabetes mellitus, six patients had diabetes mellitus and hypertension and two patients had diabetes mellitus, hypertension and CRF. Out of 40 patients who had gallbladder perforation, 21 patients were diabetic. Patients of type 1 gallbladder perforation presented with features of generalised peritonitis and were diagnosed intraoperatively as

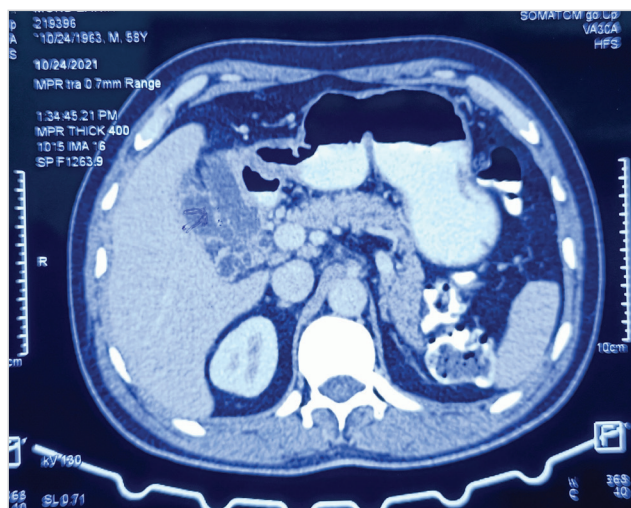


Figure 1. Showing type 2 gallbladder perforation on CECT abdomen.

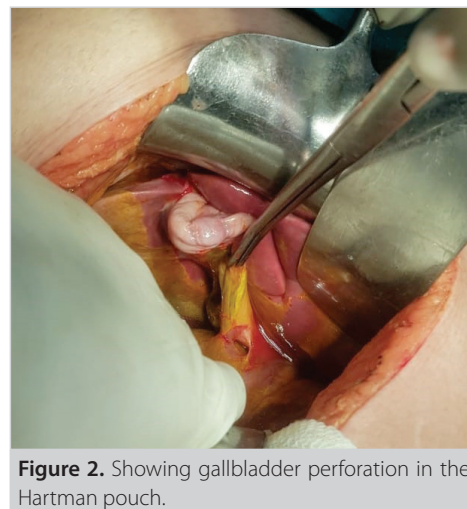


Figure 2. Showing gallbladder perforation in the Hartman pouch.

a case of gallbladder perforation, and type 2 and type 3 gallbladder perforations presented with pain in the right hypochondrium, nausea and vomiting mimicking acute cholecystitis. Type 2 perforations were diagnosed by CECT abdomen in 12 patients and 10 on USG abdomen in patients having non-settling pain, one patient on MRI with MRCP and one patient during surgery, and type 3 perforations were diagnosed during laparoscopic cholecystectomy for non-responding acute cholecystitis in two patients and by MRI and MRCP in two patients. In the present study, 16 patients were diagnosed intraoperatively (including 13 patients of type 1 on laparotomy, two patients of type 3 and one patient of type 2 during laparoscopic cholecystectomy). Thirteen patients were diagnosed by CECT abdomen, 10 cases by USG abdomen and three by MRI and MRCP. All patients of type 1 perforation underwent emergency laparotomy in view of generalised peritonitis and lack of laparoscopic set in the emergency department of our hospital. A total of eight patients (25%) with

type 1 perforation underwent exploratory laparotomy, open cholecystectomy, peritoneal lavage and peritoneal drainage, one patient (3.12%) underwent exploratory laparotomy, open subtotal cholecystectomy, peritoneal lavage and peritoneal drainage and one patient (3.12%) underwent exploratory laparotomy, tube cholecystostomy, peritoneal lavage and peritoneal drainage. Among the 23 patients of type 2 perforation, 17 (73.91%) underwent laparoscopic cholecystectomy and peritoneal lavage, three (13.04%) underwent laparoscopic converted to open cholecystectomy and peritoneal drainage and 3 (13.04%) underwent open cholecystectomy with drainage. Two patients (50%) of type 3 perforation underwent open cholecystectomy and two patients

(50%) of type 3 perforation needed laparoscopic to open conversion with duodenal/gastric fistula repair by pedicle omental patch. Cholecysto-duodenal fistula was present in three patients and cholecysto-gastric fistula in one patient. In the present study, a total of three patients (7.5%) died during the course of treatment, two patients in type 1 perforation and one in type 3 perforation. Mean hospital stay was 9.1 days in type 1, 4.4 days in type 2, and 8.2 days in type 3 gallbladder perforation. Histopathological examination showed acute cholecystitis in 16 patients, chronic cholecystitis in 23 patients, and mucinous adenocarcinoma of the gallbladder in one patient, which was investigated during post-operative period and diagnosed as a case of metastatic disease as shown in Table 2.

Table 1. Showing demographic and clinical features along with the type and site of gallbladder perforation

Parameter	Type 1	Type 2	Type 3	Type 4	Miscellaneous
Total no. of cases (n= 40)	13	23	4	-	-
Mean age	56.8	58.4	52.6	-	-
Male:Female ratio	3:6	1:1.5	3:1	-	-
Associated comorbidities	7	11	3	-	-
Site of perforation					
Fundus	13	10	-	-	
Body	5	5	1	-	
Hartmann's pouch	-	-	3	-	
Multiple perforations	-	-	-	-	3

Table 2. Showing modes of diagnosis, operation performed, mortality and histopathology of patients with gallbladder perforation

Neimeier classification	Type 1	Type 2	Type 3
Mode of diagnosis			
USG abdomen	-	10	-
CECT abdomen	-	12	-
MRI and MRCP	-	1	2
Intraoperatively	13	1	2
Surgery performed			
Laparoscopic cholecystectomy + PL	-	17	-
Laparoscopic converted to open cholecystectomy + PD	-	3	-
Open cholecystectomy + PL + PD	10	3	-
EL + tube cholecystostomy + PL + PD	1	-	-
EL + sub-total cholecystectomy + PL + PD	2	-	-
Open cholecystectomy + repair of duodenal fistula by pedicle omental patch	-	-	3
Open cholecystectomy + repair of gastric fistula by pedicle omental patch	-	-	1
Mortality	2	-	1
Histopathology			
Acute cholecystitis	9	10	-
Chronic cholecystitis	3	13	4
Malignancy	1	-	-

DISCUSSION

Gallbladder perforation is a fatal complication of acute cholecystitis (2), with a reported mortality rate of 12-42% (3). In the present study, there was a female preponderance, with a female to male ratio of 1.8:1, with an average age of 55.9 years at presentation. This is in accordance with the studies performed by Harland et al., Simmons et al., Menakuru et al., Derici et al., Stefanidis et al. and Ergul et al. showing elderly patients being more susceptible to gallbladder perforation especially in the 5th to 6th decade of life (3,11-14). Nevertheless, most studies show a male preponderance as compared to our study (4,12,15). Twenty-one patients (65.62%) in this study had one or more comorbidities present. Wang et al. and Alvi et al. have also postulated that comorbidities like infections, history of steroid intake, diabetes, hypertension and malignancy may be independent risk factors for gallbladder perforation, even in the absence of gallstone disease (16-17). The most common location of gallbladder perforation in our study was the fundus (n= 23, 57.5%), followed by the body (n= 11, 27.5%) and Hartmann's pouch (n= 3, 7.5%). Clinical presentation of gallbladder perforation varies and depends primarily on the location of the perforation. The patient may exhibit features of generalised peritonitis when there is free perforation or may show vague abdominal symptoms when the perforation becomes contained. A localised perforation often mimics the symptoms of acute cholecystitis, therefore making the diagnosis even more difficult (18). Gore et al. have suggested that perforation and abscess formation should be suspected in patients with acute cholecystitis who suddenly become toxic with rapidly deteriorating clinical condition (19). Chen et al. have also suggested that a sudden decrease in pain due to reduction in the intracholecystic pressure might indicate gallbladder perforation (20). The most common method of diagnosis was CECT abdomen diagnosing a total of 12 cases (30%). Abdominal ultrasonography was useful in diagnosing 10 cases (25%). Similar results have been seen by Sood et al. and Kim et al (18,21). However, they have found both modalities equally effective in demonstrating pericholecystic fluid collections, gallbladder wall thickening and cholelithiasis. It is therefore advisable to perform a sonography followed by CECT in a suspected case of gall bladder perforation. MRCP is better at delineating the biliary tree and useful adjunct in diagnosing type 3 perforations (22). In the present study, a total of three (7.5%) patients died during the course of treatment, of whom two patients had type 1 gallbladder perforation and one had type 3 perforation. Most of the deaths occurred due to sepsis. Histopathologic analysis revealed acute cholecystitis in 19 patients, chronic cholecystitis in 20 patients, and mucinous adenocarcinoma of the gallbladder in one patient.

CONCLUSION

In our study there was female predominance in patients having gallbladder perforation. Of the patients, 52.5% were diabetic, and mean age was 55.9 years. CECT abdomen was the most useful modality for the diagnosis of type 2 gallbladder perforations. Timely surgical intervention is a must for better outcome of these cases.

Ethics Committee Approval: This study was approved by Government Medical College, Jammu Institutional Ethics Committee (Decision no: IEC/GMC/Cat C/2021/448, Date: 13.02.2021).

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ORIJİNAL ÇALIŞMA-ÖZET

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Safra kesesi perforasyonunun tanı ve yönetimine ilişkin retrospektif bir çalışma: Üçüncü basamak bir sağlık merkezinden 10 yıllık deneyim

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ÖZET

Giriş ve Amaç: Bu çalışmanın amacı, safra kesesi perforasyonu hastalarından tanı, tedavi ve sonuç için toplanan verilerin retrospektif analizini yapmaktır.

Gereç ve Yöntem: Ameliyat öncesi ve ameliyat sırasında 10 yıllık bir süre boyunca safra kesesi perforasyonu tanısı alan ve üçüncü basamak bir sağlık merkezinin cerrahi ünitesinde tedavi edilen hastaların hastane kayıtlarından safra kesesi perforasyonu olan 40 hastanın verileri retrospektif olarak incelendi. Travma vakaları ve pediyatrik yaş grubu hastalar dışında cinsiyete bakılmaksızın hastalar dahil edildi.

Bulgular: Kırk hastanın 26'sı kadın, 14'ü erkekti. Neimeier sınıflandırmasının Anderson modifikasyonuna göre 13 (%32,5) hastada tip 1, 23 (%57,5) hastada tip 2 ve dört (%10) hastada tip 3 perforasyon vardı ve hiçbir hastada tip 4 perforasyon yoktu. Yirmi üç hastada (%57,5) fundus perforasyonu saptandı, bunu 11 hastada (%27,5) gövde, Hartmann poşunda üç (%7,5) ve üç (%7,5) hastada çoklu perforasyon saptanması izledi. Tip 1 Neimer sınıflandırmasındaki tüm hastalara klinik olarak biliyer peritonit vakaları olarak teşhis edilirken, tip 2 Neimer sınıflandırmasındaki çoğu vakaya preoperatif olarak CECT abdomen 12/23 hastası (%52) ve ultrason abdomen 10/23 (%43,47) tarafından teşhis edildi. Tüm hastalar opere edildi ve üç ölüm meydana geldi.

Sonuç: Çalışmamızda safra kesesi perforasyonu olan hastalarda kadın ağırlığı vardı. Hastaların %52,5'i diyabetikti ve yaş ortalaması 55,9'du. CECT batin, tip 2 safra kesesi perforasyonlarının tanısında en yararlı modaliteydi. Bu vakaların daha iyi sonuçlanması için zamanında cerrahi müdahale zorunludur.

Anahtar Kelimeler: Akut kolesistit, safra kesesi perforasyonu, biliyer peritonit, operatif müdahale

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