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Original Research Article

Gall bladder perforation: critical analysis of management at tertiary care centre

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ABSTRACT

Background: Gall bladder perforation (GBP) is a rare complication of acute cholecystitis. Despite considerable advancements in diagnostic and therapeutic modalities, morbidity and mortality continues to be high, owing to delay in diagnosis and ill-defined treatment protocols.
Methods: We reviewed demographic profile, diagnosis and management strategies employed in 28 patients at our centre from Jan 2018 till Jul 2020. Patients were classified based on Niemeier classification.
Results: A total of 28 patients were identified but 3 excluded due to paucity of data. There were 21 patients of Niemeier type II perforation and 02 each of type I and III. Diagnosis of GBP was based on CECT in 18 patients. In patients with type II perforation, 03 underwent emergency laparoscopic cholecystectomy (LC) though one required conversion. Twelve patients were managed conservatively followed by interval cholecystectomy after mean duration of 14 weeks. Of these 08 successfully underwent LC and 03 were converted to open surgery. One patient underwent open radical cholecystectomy due to intraoperative suspicion of carcinoma. 06 patients of type II perforation underwent percutaneous drainage of collection followed by LC after mean duration of 23 weeks. Histopathology revealed chronic cholecystitis in 16 patients, acute cholecystitis in 05, carcinoma in 02 and xantho-granulomatous cholecystitis in one patient.
Conclusions: CECT should be employed early for diagnosis in suspected cases and percutaneous intervention should be used in cases unresponsive to conservative measures alone. There are higher chances of success in performing LC after 14 weeks leading to better outcomes.

Keywords: GBP, Percutaneous drainage, Emergency cholecystectomy, Interval cholecystectomy

INTRODUCTION

Gall bladder perforation (GBP) is a life-threatening complication of acute cholecystitis. Incidence of GBP ranges from 2-18% and mortality ranging from 12-42%.[1,2] In 1934, Niemeier classified the condition into three types: type I, acute perforation into the free peritoneal cavity; Type II, subacute perforation with abscess formation; and type III, chronic perforation with fistula formation between the gallbladder and another viscus.[3] Since this condition is rare, it poses diagnostic and therapeutic challenges for surgeons managing such cases. The main difference between these two types is that type I perforation is a clinical diagnosis (e.g., in the form of peritonitis) assisted by radiology, and its treatment is relatively straightforward in the form of urgent laparotomy (or laparoscopy) and cholecystectomy, or cholecystostomy. In contrast, the decision to treat type II perforations is far more complex due to the chronic nature of the perforation and the lack of consensus in the published literature about the most appropriate

investigative or treatment modality.[2] Traditionally surgical options have been preferred over minimally invasive techniques. In 1985, Felice et al reported mortality rates following open cholecystectomy (OC) and percutaneous drainage (PD) as 8.6% and 22% respectively.[4] However, with advances in interventional radiology there has been a trend towards PD with better results. Huang et al reported mortality rates after OC and PD as 50% and 0% respectively.[5] This is a single centre experience of management of cases of GBP. We aim to evaluate the diagnostic and therapeutic modalities employed for management of GBP at our centre.

METHODS

This was an observational study done at Base Hospital (Delhi Cantt), New Delhi from Jan 2018 till Jul 2020.

Inclusion criterion

All cases of GBP s managed at our centre were part of the study.

Exclusion criterion

Patients who did not undergo definitive treatment were excluded from the study.

Ethical clearance was taken from institutional ethics committee. The case details were collected from database of the hospital. Parameters such as patient demographics, presenting complaints, comorbidities, key investigations, treatment modalities, histopathology of gall bladder, and mortality were noted. The perforation of gall bladder was classified based on Niemeier classification. Patients were evaluated initially with ultrasound and managed conservatively with NPO and parenteral antibiotics. CECT was performed in case of diagnostic dilemma or clinical deterioration, to confirm the diagnosis and type of GBP. Patients who recovered on conservative management (with or without percutaneous drainage) were reassessed for interval cholecystectomy after 6-12 weeks. Decision for intervention in the form of percutaneous drainage, laparoscopy or laparotomy was taken based on clinical condition, lab parameters and imaging findings. LC was attempted in all cases however conversion to open procedure was done in cases of obscured Calot's triangle anatomy or if there was suspicion of malignancy. The data was tabulated in excel sheet and analyzed using SPSS version 23 software. The quantitative data was studied using mean and standard deviation.

RESULTS

A total of 28 patients were identified however 3 patients were excluded due to paucity of relevant data. Data of 25 patients was subjected to statistical analysis. There were 21 patients of Niemeier type II perforation followed by 2 each of type I and III perforation. Mean age of patients were 45, 63.3 and 64 years in type I, II and III perforations respectively. There were 17 male and 08 female patients (Table 1).

Out of 25 patients 20 patients had associated comorbidities, most common was type II Diabetes mellitus. Ultrasound was done in all cases but could diagnose GBP in 2 patients both of which were type II and they recovered on conservative management. CECT was done in rest of the patients and was diagnostic in 18 patients. Out of these, 01 patient was type I and rest 17 were type II. In 5 patients the diagnosis could only be made during surgery (Table 1).

A total of 05 patients required emergency surgery. Both patients of type I GBP were taken up for diagnostic laparoscopy and proceed, in one of which CECT was suggestive of GBP and in other GBP was identified during surgery. The 03 patients of type II GBP underwent emergency surgery due to failure of conservative management. Out of these 02 successfully underwent LC while one patient required conversion to open procedure. Emergency surgery was not required in any case of type III GBP in our series. Mean duration of emergency surgery in type I and II GBP was 3.5 (due to delayed presentation from onset) and 08 days respectively (Table 2).

A total of 12 patients were managed conservatively without percutaneous drainage, followed by interval cholecystectomy between 08 to 20 weeks. In 08 (66%) patients LC was successfully accomplished however in 03 patients procedure was converted to open due to dense adhesions obscuring the anatomy at Calot's triangle. In One patient radical cholecystectomy was done due to intraoperative suspicion of carcinoma which was confirmed on frozen section. The mean duration for interval cholecystectomy performed laparoscopically and laparoscopy converted to open was 14 weeks and 12 weeks respectively (Table 2).

Six patients required intervention in the form of percutaneous drainage of collection followed by interval LC after mean duration of 23 weeks (Range- 12-28 weeks). LC was successfully performed in 100% of percutaneously drained patients. One patient died after 08 weeks of discharge following Enteric perforation (Table 2).

In type III perforations both patients were initially managed conservatively followed by interval LC at mean duration of 18 weeks (Table 1).

The site of perforation was identified as fundus in 10 cases followed by anterior wall in 6 and neck of gallbladder in 1 case. In 08 patients the site of perforation could not be identified. Histopathological examination revealed acute cholecystitis in 5 cases, 16 cases had chronic cholecystitis. In 02 patients carcinoma gall bladder was found and one case had xantho-

granulomatous cholecystitis. Tumor stage was pT2N0Mx in patient who underwent radical cholecystectomy due to intraoperative suspicion and pT2NxMx in other patient who was lost to follow up. (Table 1).

Table 1: Demographic details, comorbidities, basis of diagnosis, management details, site of perforation and histopathology of patients of GBP.

Variables		Type I	Type II	Type III
No. of patients, (n=25)		2	21	2
Age (Mean, years)		42	63.3	64
Gender	Male	1	14	2
	Female	1	07	-
Associated comorbidities		2	17	1
Basis of diagnosis	USG	-	2	-
	CT scan	1	17	-
	Intraoperative	1	2	2
Surgical Management	Emergency	2	3	-
	Interval	-	17	2
Duration between onset and definitive surgery (Mean)	Emergency (Days)	3.5	08	-
	Interval (Weeks)	-	17 (1 patient managed with pigtail, recovered but died due to enteric perforation after 08 weeks, hence excluded)	18
Site of perforation of gall bladder	Fundus	1	9	-
	Ant wall		6	-
	Neck	-	-	1
	Unidentified	1	6	1
Mortality		-	1	-
Histopathology	Acute cholecystitis	2	3	-
	Chronic cholecystitis	-	15 (1 patient managed with pigtail, recovered but died due to enteric perforation after 08 weeks, hence excluded)	1
	Xantho-graulomatous cholecystitis	-	-	1
	Carcinoma gall bladder	-	2	-

Table 2: Details of management of patients.

Management	Type I	Type II	Type III
Emergency lap cholecystectomy	2	2	
Emergency lap converted to open cholecystectomy		1	
Conservative followed by interval lap cholecystectomy		8	2
Conservative followed by interval lap converted to open cholecystectomy		3	
Conservative followed by radical cholecystectomy		1	
Percutaneous drainage of collection followed by interval lap cholecystectomy		6*	
Total	02	21	02

*1 patient managed with pigtail, recovered but died due to enteric perforation after 08 weeks.

DISCUSSION

GBP occurs in 2-11% of cases acute cholecystitis which may occur due to inflammation leading to ischemia and necrosis, ultimately causing perforation.[6] Acute uncomplicated cholecystitis is more frequent in females with a female to male ratio of 2:1, but GBP is more common in males.[7] A recent systemic review by Date et al showed median male gender proportion of 55.4% (range 33.3-76.7%) in patients of GBP.[2] In our study proportion of males was found to be 68%. The same review reported most common gallbladder perforations as type II (median 46.2%, range 7.4-83.3%), followed by type I (median 40.6%, range 16.7-70.0%) and type III (median 10.1%, range 0-48.1%).[2] In a recent article by Kundan et al type II GBP was commonest (44.6%)[8]. In

our study too Type II perforations were most common (84%).

Old age, infection, trauma, tumour, prolonged use of corticosteroid and systemic disease like diabetes mellitus and atherosclerotic heart disease are common risk factors for GBP.[9] In the study by Kundan et al 25 out of 56 patients had associated comorbid conditions.[8] In our study 80% of patients had associated comorbidities, most common being Diabetes mellitus. Mean age of all cases in our series was 61.8 years with mean age in Type I, II and III being 45, 63.3 and 64 years respectively. In the systemic review by Date et al mean age of patients was 62.1 years.[2] In our study the most frequent site of perforation was fundus (40%). Similar results have been observed in studies by Kundan et al and Derici et al.[8,10]

The diagnosis of GBP is difficult to confirm on clinical examination as there are no specific signs. Patients presenting with acute abdomen needs evaluation with cross sectional imaging for early and accurate diagnosis. CECT Abdomen can show signs of free intraperitoneal fluid, pericholecystic fluid, and pericholecystic abscess. It can also show increased gall bladder wall thickness and at times may suggest the site of perforation.[11,12] In our study, pre operative diagnosis of GBP was made with help of CECT in 72% of cases. This emphasizes the fact that CECT should be performed early in suspected patients which not only helps in diagnosis but also helps in planning treatment in these elderly patients who are at high risk for surgery in view of associated comorbidities.

Management of type I perforations is usually straight forward (immediate surgery) in view of signs of peritonitis. However, in patients with type II perforation, therapeutic options ranging from conservative management with antibiotics or percutaneous procedures (cholecystostomy/ drainage of collection) followed by interval cholecystectomy have been tried. Close monitoring and a low threshold for surgery needs to be kept based on non response to conservative treatment or deterioration while on conservative treatment. With the advancement of interventional techniques, the recent case series by Date et al have shown that ultrasound /CT guided drainage can be an effective alternative to surgery.[2]

Patients who initially recovered on conservative treatment underwent cholecystectomy at varying intervals which ranged from 08 to 20 weeks in our study. In our series, out of 21 patients of type II perforation 12 patients were managed with conservative treatment. Out of these 08 (66%) underwent successful LC after mean duration of 14 weeks. In study by Date et al, of the 09 type II GBP patients, 05 underwent open cholecystectomy.[2] In another recent series by Kundan et al out of 25 patients of type II perforation, LC could only be performed in 10 patients and rest 15 were converted to open.[8]

In our study we managed 06 patients of type II perforation with percutaneous drainage followed by interval LC after mean duration of 23 weeks. None of these required conversion to open surgery. There was no mortality in our series except one in conservative group who died of enteric perforation after 08 weeks. Our data suggests that this approach is feasible and has lesser morbidity and mortality.

The limitations of this study are small cohort of patients and observational study design. Hence, it needs further evaluation in a larger cohort of patients with predefined treatment protocols. The same approach has been advocated in some of the studies and in one of the systemic reviews.[2,7,10]

CONCLUSION

GBP is rare complication of acute cholecystitis, predominantly seen in elderly patients with comorbidities. Clinical suspicion and early CECT are key to timely diagnosis and appropriate management of these cases. Treatment options should include use of percutaneous intervention for drainage of collection or gall bladder followed by interval lap cholecystectomy. This approach may prevent morbidity and mortality of undertaking emergency cholecystectomy in these high risk patients. There is a higher chance of successfully performing interval cholecystectomy laparoscopically in cases of GBP, if we wait for 14 weeks or more.

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