International Surgery Journal
Ramachandra ML et al. Int Surg J. 2019 Feb;6(2):369-373
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: http://dx.doi.org/10.18203/2349-2902.isj20190385

Original Research Article

Gall bladder perforation; occurrence, clinical presentation, diagnosis and their outcome: a retrospective study in a tertiary care hospital in South India

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Received: 04 December 2018
Accepted: 02 January 2019

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ABSTRACT

Background: Gall bladder perforation (GBP), is an uncommon complication of acute cholecystitis but it often remains a cause for diagnostic dilemma among surgeons while managing patients presenting with signs and symptoms of peritonitis. This study was undertaken to study the clinical profile of the patients diagnosed to have GBP which would aid in early diagnosis and surgical intervention thus improving the patient's outcome.
Methods: A retrospective study from May 2013 to April 2018 with a sample size of 12 cases were studied. All cases were diagnosed either pre-operatively (based on radiological findings) or intra-operatively. Perforations of gall bladder caused due to trauma or iatrogenic reasons were excluded from the study. Intra-operative findings, post-operative sequelae and the outcome of the patient were evaluated.
Results: The mean age of the patients was 66 and females were more affected than the males. USG done preoperatively could pick up only 1 out of 12 cases. Whereas CT showed gall bladder perforation in 3 out of 4 cases for whom CT was done giving it a sensitivity of 75%. Gall bladder perforation was commonly found to be located in the fundus followed by corpus and infundibulum.
Conclusions: GBP is a rare complication of acute cholecystitis. It can present with full blown peritonitis features or vague abdominal symptoms. If promptly diagnosed and treated aggressively by laparotomy and cholecystectomy, the patient's outcomes are improved.

Keywords: Cholecystitis, Gall bladder perforation, Peritonitis

INTRODUCTION

Gall bladder is a pear-shaped organ on the underside of the liver in the main scissura at the junction of right and left lobes of the liver. Gall bladder functions as a reservoir of bile. It also helps in concentration of bile and mucous production.[1] Though relatively small in size, it is a surgically important organ of the body. The common pathological conditions that are associated with gall bladder are cholelithiasis, calculous and acalculous cholecystitis. As per literature, it is estimated that 10-15% of the population are affected by gall stone disease and approximately 1% to 2% of patients with gallstones are reported to develop secondary acute cholecystitis. Among the patients affected by secondary acute cholecystitis 2% to 11% will progress to gallbladder perforation (GBP).[2] Though GBP is rare, it has a reported mortality rate of 12-42%, making it a life-threatening complication.[3] In acute calculous cholecystitis patients, if the impacted stone from the cystic duct slips back into the gall bladder, the inflammatory changes subside. In cases of persistent gall bladder inflammation, where the obstruction is not relieved, there may be distention of the gall bladder causing ischaemic and necrotic changes to its wall finally

leading to perforation. If the perforation occurs at the fundus, it is less likely to be sealed off by the omentum leading drainage of the bile and stones into the peritoneum causing diffuse peritonitis. Whereas in perforations involving the neck and the duct, the omentum usually seals off the perforation leading to localized peritonitis and pericholecystic fluid.[4]

Patients with GBP usually present with features of peritonitis such as severe abdominal pain, vomiting, abdominal distension, constipation and fever. Many a times these features are indistinguishable from other causes of generalized peritonitis.

Niemeier OW, classified GBP as acute or type I for free perforation and generalized biliary peritonitis, subacute or type II for pericholecystic abscess and localized peritonitis and chronic or type III for cholecystoenteric fistula.[5] Of importance is the variation in which these three types of perforation present themselves. Patients with type I perforation usually have risk factors leading to free perforation and generalized peritonitis. Patients with type II perforations present with atypical features of acute cholecystitis and type III patients present with features similar to those of chronic cholecystitis and hence are difficult to identify preoperatively unless they have obstructive symptoms.[6]

Clinically on examination there will be icterus, signs of peritonitis such as guarding and rigidity, tenderness in the right hypochondrium (and elsewhere as the biliary fluid is displaced within the peritoneal cavity causing generalized peritonitis), positive Murphy's sign, abdominal distension, shifting dullness and absent bowel sounds. The usual investigations carried out in a case of acute abdomen are routine blood tests, chest X-ray (PA view), erect X-ray abdomen, ultrasonogram abdomen and CECT abdomen.

Clinically, patients with gall bladder perforation and diffuse peritonitis may mimic hollow viscus perforation. It remains a diagnosis by exclusion after pneumoperitoneum is ruled out on erect x-ray abdomen. Gall bladder perforation sometimes mimic acute cholecystitis and are managed conservatively. USG may rarely pick up a gall bladder perforation and is highly dependent on the experience of the sonologist. CT abdomen is a sensitive tool in establishing the diagnosis of gall bladder perforation but it would not always be possible to get a CT done in a case of an emergency.

Therefore, there is a need to study the clinical profile of the patients who have been diagnosed with gall bladder perforation, either as a pre-operative radiology-based finding or laparotomy finding, so that such patients can be picked up with more efficiency.

This would aid in early diagnosis and an immediate surgical intervention which are key determinants in improving the patient's outcome.

METHODS

A retrospective study was undertaken, spanning over 5 years from May 2013 to April 2018. All cases diagnosed with gall bladder perforation who had presented to the Department of General Surgery, KR Hospital, MMCRI, Mysuru during this study period were included in the study.

The cases diagnosed pre-operatively (based on radiological findings) and cases diagnosed intra-operatively were included in the study. Perforations of gall bladder caused due to trauma or iatrogenic reasons were excluded from the study.

The demographic details, symptoms of the patient at the time of presentation to the hospital and general physical examination findings were recorded using the case records of the patients and operation room registers. The signs elicited during patient's examination (icterus, pulse, blood pressure, tenderness and site of tenderness, guarding and its site, ascites, bowel sounds) were noted. The other parameters like erect-abdominal X-ray series, abdominal ultrasonogram (USG), abdominal contrast-enhanced computerized tomography (CECT), routine blood cell count, and blood chemistry tests were studied. Intra-operative findings, post-operative sequelae and the outcome of the patient were evaluated. All the findings were tabulated in a proforma and analysed for any correlation between various factors.

Statistical analysis was done using Epi Info TM 7.1.4 program (developed by Centers for Disease Control and Prevention, Atlanta, Georgia USA). Bar diagrams and pie charts were constructed to represent the data.

RESULTS

Data of 12 patients who underwent emergency laparotomy for gall bladder perforation over a period of five years was collected and analysed.

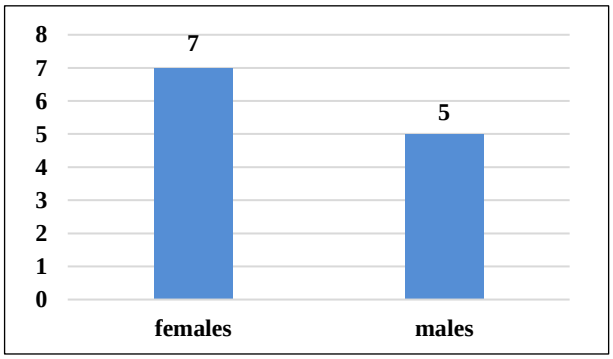

Figure 1: Sex distribution ratio of the study population.

The cases were between the ages 55-76 years with a mean age of 66. Females (n=7) were more frequently

affected than males (n=5) with a female to male ratio of 1.4:1. Females were more affected than males especially in the age group of 61-65 years.

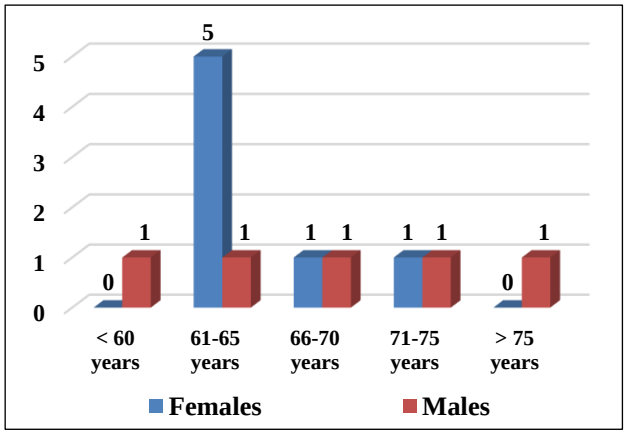

Figure 2: Age and sex distribution of the study population.

The occurrence of comorbidities like diabetes mellitus and hypertension were equal with each affecting 66.6% (n=8) of the study population. A total of 3 patients (25%) had ischaemic heart disease.

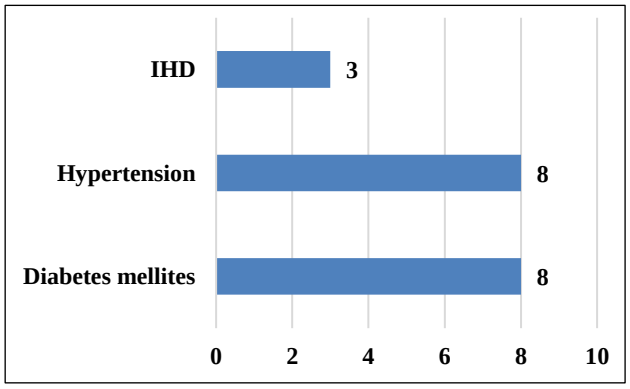

Figure 3: Frequency of presence of comorbidities in patients with GBP.

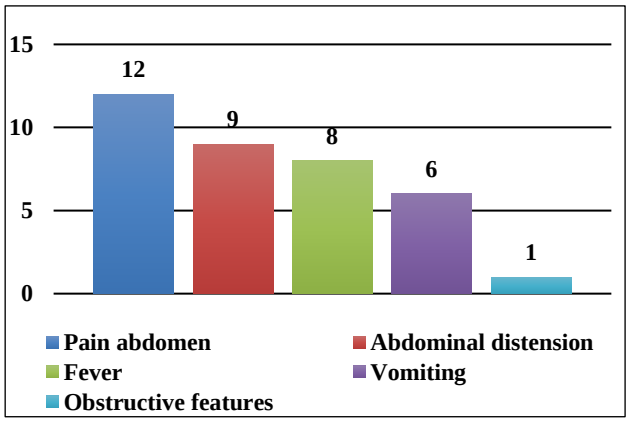

Figure 4: Symptoms of GBP with the frequency of its occurrence in the study population.

Pain abdomen (100%) was the common symptom in all the study subjects followed by abdominal distension (n=9, 75%), fever (n=8, 66.6%) and vomiting (n=6, 50%). Only one patient had features suggestive of bowel obstruction (8.33%). A total of 75% of the patients presented with 3 or more symptoms.

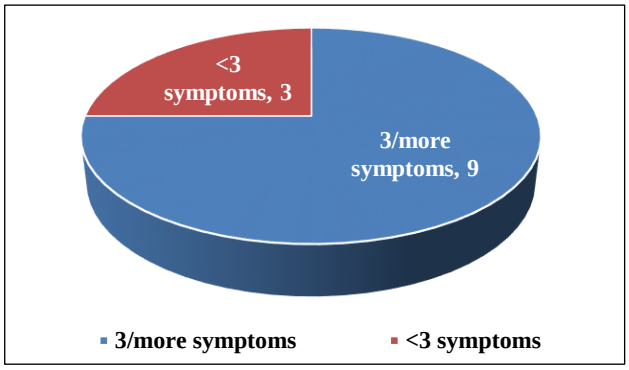

Figure 5: Percentage of patients presenting with 3 or more symptoms.

Out of all the cases, 4 (33.3%) were diagnosed preoperatively and 8 (66.6%) intraoperatively. Guarding was present in 100% of the patient with diffuse guarding and guarding in right hypochondrium seen in 33.3% (n=4) of study subjects each. A total 2 patients (16.6%) had guarding in the epigastric region and 2 patients (16.6%) had signs of guarding in both right iliac fossa along with right hypochondrium. Ascites and absent bowel sounds were observed in 50% (n=6) each. All the patients had leucocytosis. There were no significant abnormalities in the liver function tests.

USG done preoperatively could pick up only 1/12 cases. Whereas CT showed gall bladder perforation 3/4 cases for whom CT was done giving it a sensitivity of 75%.

Gall bladder perforation was mainly located in the fundus (n=10, 83.33%) followed by corpus and infundibulum. A total of 11 (91.66%) cases were found to be co-existing with cholelithiasis. Intraoperatively 5 (41.66%) cases were associated with empyema gall bladder.

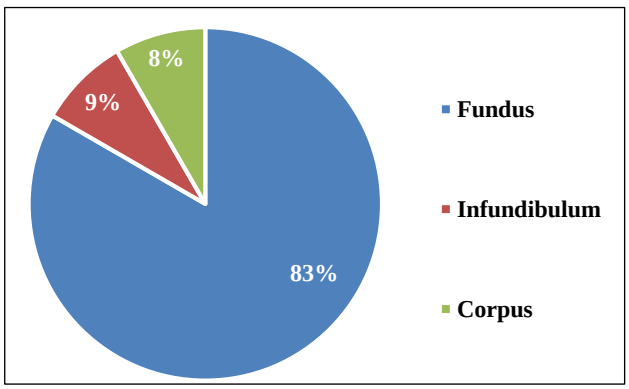

Figure 6: Site of perforation among the study population with GBP.

Type II gall bladder perforation (n=7, 58.3%) (according to Neimeier classification) was found to be more common. There was no type III GBP observed in this study.

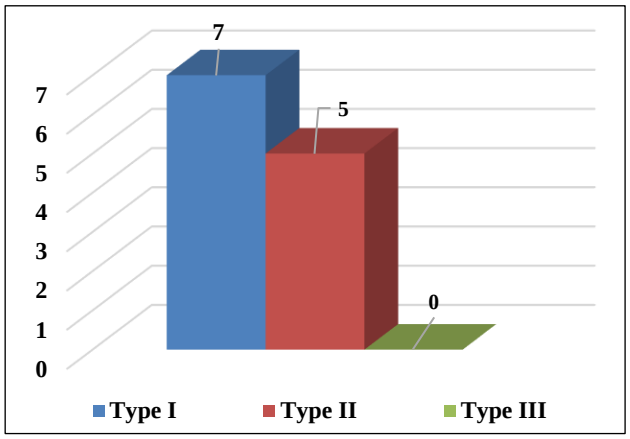

Figure 7: Frequency of different types of gall bladder perforation in the study population.

Postoperatively 58.3% (n=7) developed wound infection, 16.6% (n=2) developed pneumoniae and 25% (n=3) of the patients were discharged without any post-operative complications. One of the patients who developed pneumonia post operatively, expired (8.33%).

DISCUSSION

Gall bladder perforation is a rare complication of acute cholecystitis. During the study period author encountered 12 cases of gall bladder perforation. The cases were between the ages 55-76 years. The most common age group affected was 61-65 years. Out of 12 cases, 7 were found to be females and 5 males. Out of 7 female cases, 5 were in the age group 61-65 years. This observation was slightly different from a study conducted by Nandyala VN et al.[4] In their study, the commonest age group being affected was between 48-60 years with females being more affected within 38-48 years of age. A contradictory finding was seen in the study conducted by Derici H et al, were males were affected more than females with GBP.[6]

The youngest patient with gall bladder perforation was a 55-year-old male and the eldest patient was a 76-year-old male.

A total of 66.6% of the cases had diabetes mellitus in this study. This verifies the fact that diabetes mellites can lead to empyema of gall bladder following acute cholecystitis. This was a serious risk factor for gall bladder perforation.

The other comorbidities seen were hypertension (66.6%) and ischaemic heart disease (25%). Most of the cases in this study belonged to elderly age group. This could be the reason for higher prevalence of comorbidities. In other words, elderly patients with multiple comorbidities are at a higher risk for developing a catastrophic complication like gall bladder perforation. Clinical presentations of these patients were ambiguous. Pain abdomen was present in all the cases in this study. Abdominal distension was seen in 75% of the cases, followed by fever 66.6% and vomiting 50% of the cases. Only one case presented with obstructive features. An interesting finding to be noted was that, 75% of the patients who had GBP had three or more symptoms at the time of presenting to the hospital.

Guarding was present in 100% of the cases. In 33.3% of the cases signs of diffuse peritonitis was observed and in 33.3% of the cases guarding in right hypochondrium was elicited. A total 2 patients (16.6%) had guarding in the epigastric region and 2 patients (16.6%) had signs of guarding in both right iliac fossa along with right hypochondrium. Ascites and absent bowel sounds were observed in 50% (n=6) each.

The site of GBP was located at the fundus in 83.3% of the cases, vowing to the fact that fundus is the distal most part of gall bladder with respect to blood supply and hence easily prone to perforate. Next common site for GBP was found to be corpus followed by infundibulum. This is in agreement with various other similar studies.[4,6,7]

The incidence of type II and type I GBP was found to be 58.3% and 41.6% respectively. Author did not come across any type III GBP during the study period. In similar studies conducted by Derici H et al, and Jain S et al, type II was found to be more common followed by type I.[6,7] This is in contrary to the study done by Nandyala VN et al, in which type I was more common than type II.[4]

On clinical examination, most of the patients with type II GBP had guarding present in the right hypochondrium (n=4/7) and an USG finding of pericholecystic collection (n=6/7), whereas patients with type I GBP had diffuse guarding (n=3/5) and free fluid in the peritoneal cavity on USG (n=4/5).

With meticulous clinical examination and supportive radiological findings, 4 out of 12 cases were diagnosed pre-operatively. USG was done for all the 12 cases, in which positive finding for GBP was seen in only one case. CT abdomen was done for 4 clinically suspected cases of GBP. It could pick up 3 out of 4 cases giving it a sensitivity of 75%. CT abdomen though an expensive investigation, was found to be a better tool for diagnosing GBP.

All the patients had polymorphonuclear leucocytosis. Jaundice was present only in one case, making it an insignificant finding in a case of GBP.

Higher mortality and morbidity rates were reported in several other studies.[3,8-10] Present study documented a mortality rate of 8.33%.

CONCLUSION

Gall bladder perforation is an uncommon complication of acute cholecystitis which can be rarely diagnosed preoperatively. High degree of suspicion should be made in any elderly patients with pre-existing risk factors presenting with symptoms of acute cholecystitis and perforative peritonitis. CT abdomen could be a better radiological option in cases of high suspicion of GBP.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Ramachandra ML, Jabbar FA. Gall bladder perforation; occurrence, clinical presentation, diagnosis and their outcome: a retrospective study in a tertiary care hospital in South India. Int Surg J 2019;6:369-73.