

Table 1: Patient variables and number count

| Patients' variables | |
|-------------------------------------|----------|
| Male to female ratio | 1:5 |
| Average age | 58 years |
| Diabetes mellitus (n) | 5 |
| Known case of gallstone disease (n) | 5 |
| Elevated WBC count (n) | 6 |
| Average duration of symptoms | 7 days |
| Type I perforation (n) | 2 |
| Type II perforation (n) | 3 |
| Type III perforation (n) | 0 |
| Empyema GB | 1 |

n, number of patients

For the diagnosis of GB perforation, the CT scan is ideal. Ultrasound findings in acute cholecystitis, such as the GB wall thickening, GB distension, pericholecystic free fluid, and positive sonographic Murphy sign, may also be present in GB perforation cases.^{10,12} On the contrary, CT scan accurately picks up signs of free intraperitoneal fluid, pericholecystic fluid, GB wall thickness, and the defect on the wall due to perforation.

The mortality rate is high in patients with GB perforation. Hence, early diagnosis, stabilization of patient, and intervention are essential. Cholecystectomy, drainage of abscess, and abdominal lavage are the necessary treatment of GB perforation.¹⁵ The reported mortality rate is up to 7% in emergency cholecystectomy. Cholecystostomy is a reliable option for patients with biliary sepsis and can be done by ultrasound guidance or laparoscopically.

In our case series, we did laparoscopic cholecystostomy for all the six patients, i.e., five of them with perforation and one having empyema GB with dense adhesions. Cholecystostomy ensured external drainage of the infected GB through a tube inserted into it, which can be achieved by percutaneous method under ultrasound guidance, open method, and laparoscopic approach. Of these, laparoscopic cholecystostomy is considered the best as the surgeon can assess the disease severity and avoid trauma to the hepatic flexure and duodenum. All the six patients underwent ERCP and CBD stenting prior to laparoscopic cholecystostomy. One patient had incidental finding of choledochoduodenal stula, which was disconnected during the ERCP procedure.

Laparoscopic cholecystostomy can be done in two ways, namely, transperitoneal and transcannular techniques. In the transperitoneal technique, the Foley's catheter is introduced into the perforated site of the GB and the balloon is inflated and sutured to the anterior abdominal wall. In transcannular technique, the trocar is used to puncture the GB, the catheter is introduced through the cannula into the GB, and the balloon is inflated. Laparoscopic cholecystostomy is a safe procedure with minimum complications including dislodgment of Foley's catheter, bile leakage into the intraperitoneal cavity, and bleeding in a critically ill patient. Further resolution of sepsis can be achieved by cholecystostomy; and a definitive procedure like cholecystectomy can be planned electively when the patient is stable in calculous cholecystitis. No further procedure is required in case of acalculous cholecystitis. In our series, the average hospital stay for patients with GB perforation was 13 days. In a study by Nandyala et al. it was 8 days and 15 days for calculous and acalculous cholecystitis, respectively. In our series, all patients underwent interval cholecystectomy, of them were managed laparoscopically and one was converted to open cholecystectomy due to unclear anatomy. Average duration

from laparoscopic cholecystostomy to interval cholecystectomy was 82 days.

CONCLUSION

Cholecystostomy is an ideal procedure for patients in biliary sepsis associated with acute cholecystitis and can reduce the surrounding inflammation by definite elective cholecystectomy. Early diagnosis and emergency surgery are crucial in surgical management of gangrenous cholecystitis because of the high morbidity and mortality. So from our experience, we can conclude that laparoscopic cholecystostomy is a safe procedure and should be offered to patients who have GB perforation especially in patients with comorbid conditions and who are critically ill.

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