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Gallbladder Perforations

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Abstract **Original Research Article**

Gallbladder perforations are a rare cause of acute abdomen with high morbidity and mortality rate. Its incidence has been reported to be between 2 and 11% [1, 2]. Complaints and timing of hospital admission vary in these patients. This is a significant obstacle to early diagnosis. Known risk factors are male gender, acute cholecystitis, other gallbladder diseases, cardiovascular system, and systemic diseases such as diabetes [3, 4].

Keywords: Gallbladder Perforation, Acute Abdomen, Peritonitis, Cholecystitis, Risk Factors.

INTRODUCTION

Gallbladder perforations; It is divided into three types according to the classification defined by Niemeier in the 1930s. Type 1 perforations are defined as perforations that develop freely into the peritoneal cavity and cause generalized acute biliary peritonitis, Type 2 perforations are defined as subacute perforations with pericholecystic abscess, and Type 3 perforations are defined as perforations with chronic inflammation and cholecystoenteric fistulas that develop as a result of this inflammation [5-9].

In this study, the information of patients with gallbladder perforation was examined and perforation types and risk factors were determined.

METHODS

After obtaining ethics committee approval for the study, the information of patients with gallbladder perforation was retrospectively examined at the Hatay Mustafa Kemal University General Surgery Clinic between 2013 and 2021. The cause of perforation, the age, gender, diseases of the patients, and the time between the onset of complaints and the operation were determined. The patients were divided into groups as type 1, type 2 and type 3 according to Neimer's classification of gallbladder perforation [5]. The patients' age, gender, comorbidities, surgery performed, complications, and mortality were determined. The white blood cell count of the patients at the time of admission and their CRP values were determined and compared. Pathology examination results were determined and the groups were compared.

All patients were evaluated preoperatively by an anesthesiologist. Those with additional diseases were seen by the relevant departments and their recommendations were implemented. The patients were operated under general anesthesia. The operations were performed laparoscopically and open surgery. Preoperative antibiotic prophylaxis with 3rd generation cephalosporin was administered. Laparoscopic operations were performed by placing 4 ports into the abdomen, and open operations were performed by making a midline median incision. Postoperative antibiotic therapy was administered for the duration and dose deemed appropriate by the infectious diseases department.

STATISTICAL ANALYSIS

SPSS 23.0 package program (IBM, USA, Mac) was used to analyze the data. Frequency (%) and median (interquartile range (IQR): 25th and 75th quartiles) were used to present descriptive statistics of categorical and continuous variables, respectively. Shapiro-Wilk normality test was used to evaluate whether continuous data conformed to normal distribution. Mann-Whitney U test and Chi-square test were used to compare continuous variables and categorical variables between groups, respectively. A P value of <0.05 was considered statistical significance.

FINDINGS

35 patients with gallbladder perforation were included in the study (16 females, 45.7%, 19 males, 54.3%). The average age of the patients was 63.5± 12 (38-88) years. While the median (IQR:25-75q) age of men was found to be: 67 (57.0-74.0) years, the median (IQR:25-75q) age of women was found to be: 64.5 (56.5-68.5) years.

In the literature, type 1 perforation is seen in 68% of patients, type 2 perforation in 16% of patients, and type 3 perforation in 16% of patients (1). In our study, type 1 perforation was observed in 12 patients (34.2%) and type 2 in 17 patients (48.6%). and type 3 perforation was observed in 6 (17.2%) patients.

When the age and mortality of the patients were evaluated according to the perforation type, Type 1: 68.0 (63.3-74.0) years, mortality: 0/12 (0%); Type 2: 64.0 (55.0-74.0) years, mortality: 3/17 (17.6%); Type 3: 58.7 (58.3-63.3) years, mortality: 2/6 (33.3%).

When comorbidities accompanying perforation in patients are evaluated, comorbid diseases (such as diabetes, hypertension, heart disease) occur in 83.3% of patients with type 1 perforation, 82.3% in type 2 perforation and 83.3% in type 3 perforation. was available. There was no statistically significant difference between perforation types and the presence of additional diseases (p = 0.769), (Table)

No significant difference was found when perforation location and types were compared (p = 0.556), (Table). There was no statistically significant difference between perforation types and pathology results (p = 0.680), (Table).

Tab. 1

	Type 1	Type2	Type3	P value
Number (n)	12	17	6	
Age	68.0 (63.3-74.0) yıl	64.0 (55.0-74.0) yıl	58.7 (58.3-63.3) yıl	
genus				
Perforation site Fundus Corpus/ Hartman pouch	 6 8 2	 2 4 1	 3 5 3	0.556
Operation type Open surgery Laparoscopic surgery	 7 5	 10 7	 6 0	
Pathology Acute cholecystitis Chronic cholecystitis Cancer	8 3 1	11 5 1	2 3 1	0.680
Comorbidity None Hypertension Diabetes Heart disease	 2 6 3 2	 3 8 4 6	 1 2 1 3	
Complication None Bile duct injury Post-op icterus İntra-abdominal abscess Wound site infection	 5 0 1 2 3	 6 1 0 3 7	 1 1 2 1 2	
Mortality	2	2	1	

DISCUSSION

Gallbladder perforation usually occurs as a result of increased intra-bladder pressure, development of intense inflammation and epithelial damage as a result of healing of the cystic duct by a stone. Infection, malignancy, trauma, diabetes and ischemic heart disease are known risk factors [5, 6]. The gallbladder fundus is the most common location of such perforations due to poor blood flow [5-8].

Unlike acute cholecystitis, all three types of gallbladder perforation are more frequently reported in men, but there are studies indicating that it is more common in women.

Gallbladder perforations are most common in men and women in the 5th and 6th decades [7, 8]. In our study, we found that gallbladder perforations were more common in men. The age of the cases was also observed to be consistent with the literature.

In our study, no intraoperative or postoperative complications were encountered in 34.2% of the cases. Among the existing complications, the most common complication was wound infection with 34.2%. The

second most common complication was intra-abdominal abscess with a rate of 17.1%. The third most common complication was postoperative obstructive icterus with a rate of 8.5%, while the least common complication was biliary tract injury with a rate of 5.7%. Necessary treatments were applied to the complications that developed in the patients.

When we look at the mortality rates in our study, the mortality rate for type 1 perforation was calculated as 16.6%, for type 2 perforation 11.7%, while this rate was found to be 16.6% for type 3 perforation.

Gallbladder perforations, which Neimer described in 1934 and classified as types 1,2,3, are still used in the diagnosis and treatment of patients today [8].

Gallbladder rupture following cholecystitis is observed in type 1 patients. These patients usually have risk factors (such as diabetes, cardiovascular system diseases) that prevent peritonitis that develops due to inflammation from being localized. Most of these patients were operated on with symptoms of acute cholecystitis and intraoperative gallbladder perforation was observed [2-10].

Patients with type 2 perforation have widespread abdominal tenderness, high fever, and ultrasound findings that are not compatible with acute cholecystitis. In these patients, computed tomography is more useful than ultrasonography in diagnosis [2-10].

Type 3 patients, on the other hand, have clinical findings consistent with obstructive gastrointestinal symptoms in addition to chronic cholecystitis symptoms, and cannot be diagnosed unless obstructive symptoms occur. If these patients do not have symptoms of obstruction, they are usually diagnosed when elective cholecystectomy for cholelithiasis is performed and the patient converts from laparoscopic surgery to open surgery [8-10].

The fact that type 1 and 2 perforations have clinical symptoms similar to uncomplicated cholecystitis makes the differential diagnosis of these patients through physical examination, laboratory tests and radiological imaging difficult, and this prevents preoperative diagnosis [8]. Delay in diagnosis is the main reason for high morbidity and mortality [10].

Treatment methods to be applied to patients after diagnosis are methods such as cholecystectomy, abscess drainage, and abdominal lavage. Emergency cholecystectomy is the main treatment method to be applied, especially in patients with type 1 perforation and type 3 perforation as well as obstructive symptoms. In type 2 perforations, cholecystectomy is performed under elective conditions in addition to abscess drainage. In type 3 perforations, fistula repair may be required in addition to elective cholecystectomy [8].

CONCLUSION

Despite advances in diagnostic methods and the widespread use of laparoscopic surgery, the incidence of gallbladder perforations continues to increase. This requires caution in the presence of risk factors in patients and the necessary diagnostic methods to be used to confirm this when in doubt. Gallbladder perforations present many difficulties, especially in diagnostic and surgical terms. It is very important to make early diagnosis and treatment accordingly in these patients.

Many studies have shown that early diagnosis reduces complications and mortality that may occur during the operation.

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