

Outcomes of gallbladder perforation during laparoscopic cholecystectomy: A descriptive study

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Abstract

Introduction: Gallbladder perforation during laparoscopic cholecystectomy (LC) is a significant complication, occurring in approximately 5% of cases, particularly in acute cholecystitis. It poses challenges to both surgical management and patient outcomes due to the risk of bile spillage and associated infections. This descriptive study aims to evaluate the impact of gallbladder perforation on surgical outcomes, including ileus, site infections, and diarrhea.

Materials and Methods: The study was conducted at the Surgical Emergency and Outpatient Department, involving 225 patients undergoing LC. Inclusion criteria encompassed patients aged 18–70 years, while those with prior abdominal surgeries or open cholecystectomy were excluded. Data collection focused on postoperative complications, stratified by age, gender, and socioeconomic status. Outcomes such as ileus, site infections, and diarrhea were assessed.

Results: Gallbladder perforation occurred in 35 patients (15.6%). Among these, 14.3% experienced ileus, 8.6% developed site infections, and 5.7% had diarrhea. Stratified analysis revealed higher rates of ileus and infections in older age groups, with statistical significance observed across specific strata. Male patients comprised 58.7% of the study population, and the average age was 49.22 years, with most patients aged 46–60 years.

Discussion: Gallbladder perforation significantly increased the risk of postoperative complications. Early surgical intervention, ideally within 72 hours of symptom onset, is critical to minimize adverse outcomes. Postoperative management strategies, including antibiotics and drainage, were frequently employed but require further research to establish efficacy.

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Conclusion: Gallbladder perforation during LC is associated with increased morbidity, including ileus, site infections, and diarrhea. Timely surgical intervention and optimized postoperative care are essential to mitigate these complications and improve patient outcomes. Further studies are needed to refine management protocols and enhance surgical safety.

Keywords: Gallbladder perforation; Laparoscopic cholecystectomy; Postoperative complications; Acute cholecystitis; Ileus; Site infections; Diarrhea; Gallbladder disease; Bile spillage; Minimally invasive surgery; Antibiotics; Postoperative drainage

1. Introduction

Gallbladder perforation while performing laparoscopic cholecystectomy (LC) is one of the important complications that would interfere termination of the case and patient outcome as well. It is critical to comprehend the impacts of such complications on the clinical and surgical practice in order to increase performance and safety for both patients and surgeon. Gall bladder perforation is said to occur in 5% of cases of acute cholecystitis and is caused by ischemic changes in the gall bladder wall due to local widespread inflammation (1).

Such complication increases the risk of an existing infection getting aggravated and also calls for a critical look at management options aimed at minimizing the harmful effects of an already existing problem (2). As time passes the rate of gall bladder disease and disease requiring surgery increases with increased addition of medical facilities and increasing in carbonated food consumption and the result of laparoscopic cholecystectomy got better as improved surgical and programming techniques emerged and equipment got better reducing the number of complications was lower when compared to cholecystectomy via open surgery (3). What is better though is the rate of conversion to open surgery which increases in gall bladder cholecystitis, the only downside being the issue of gall bladder perforation (4).

What they found was that a major improvement in surgical outcomes in terms of complications occurring during surgery could be achieved through interventions done early on especially within 72 hours from commencement of symptoms (5).

It is important to provide surgical management in a timely manner in order to avert troubles resulting from gallbladder perforation.

Moreover, in practice, gall bladder perforation in LC is often managed by postoperative antibiotics and drainage in order to avert infection and other complications (2). Their usefulness has not as yet been fully established hence there is a need for more studies geared at defining the best way these complications can be dealt with. The ability to understand the outcomes of gallbladder perforation may complement the modification of some surgical procedures intended to better the management of the patients aiming for laparoscopic cholecystectomy to be safer and more efficient. Even though laparoscopic cholecystectomy is considered by many to be safe and effective, there exists a problem with the potential of gall bladder perforation incidence which is a problem that must be managed with care. By its nature, this descriptive study seeks to determine the impact of gall bladder perforation during laparoscopic cholecystectomy on the types of complications, management and outcomes in patients who go for cholecystectomy.

Objective

To determine the outcomes of gallbladder perforation during laparoscopic cholecystectomy.

Operational definitions

- **LAPAROSCOPIC CHOLECYSTECTOMY:** It was a minimally invasive procedure performed via four minor incisions and using a camera to look into the abdomen to remove the diseased gallbladder.
- **GALLBLADDER PERFORATION:** It was diagnosed to observe the bile spillage with in the peritoneal cavity while performing the procedure by the surgeon.
- **OUTCOMES:** It was determined in terms of the following:
- **Ileus:** It was defined as the inability to tolerate oral food ingestion for at least 24 hours.
- **Site Infection:** It was defined as an infection on the operating site with in the 15 days of the procedure with clinical signs of redness, fever, tenderness, delayed healing, pain, and swelling.
- **Diarrhea:** It was defined as watery stool more than three times a day during hospital stay

2. Material and methods

This descriptive study was conducted at the Surgical Emergency and Outpatients Department. A total of 225 patients were included using non-probability, consecutive sampling. The sample size was calculated using the WHO sample size formula, with an anticipated diarrhea rate of 2.4%, a 2% absolute precision, and a 95% confidence level. Inclusion criteria comprised male and female patients aged 18–70 years who underwent laparoscopic cholecystectomy, while those who had open cholecystectomy, empyema gallbladder, or prior abdominal surgeries were excluded.

3. Results

This study was conducted on 225 patients undergoing laparoscopic cholecystectomy. The mean age of the patients was 49.22 ± 15.05 years (Table 1). According to age distribution there were 38 (16.9%) patients in the age group of 18 to 30 years, there were 31 (13.8%) patients in the age group of 31 to 45 years, there were 94 (41.8%) patients in the age group of 46 to 60 years and there were 62 (27.6%) patients in the age group of 61 to 70 years (Table 2). According to gender distribution there were 132 (58.7%) male while 93 (41.3%) female patients in our study (Table 3). In our study 35 (15.6%) patients had gallbladder perforation (Table 4). In patients having gallbladder perforation, ileus was found in 5 (14.3%) patients, site infection was found in 3 (8.6%) patients and diarrhea was found in 2 (5.7%) patients (Table 5). Stratification of outcomes with age, gender and socioeconomic status can be seen from table no 6 to table 14.

Table 1 Frequency of gallbladder perforation

Gallbladder perforation	Frequency	Percent
Yes	35	15.6%
No	190	84.4%
Total	225	100.0%

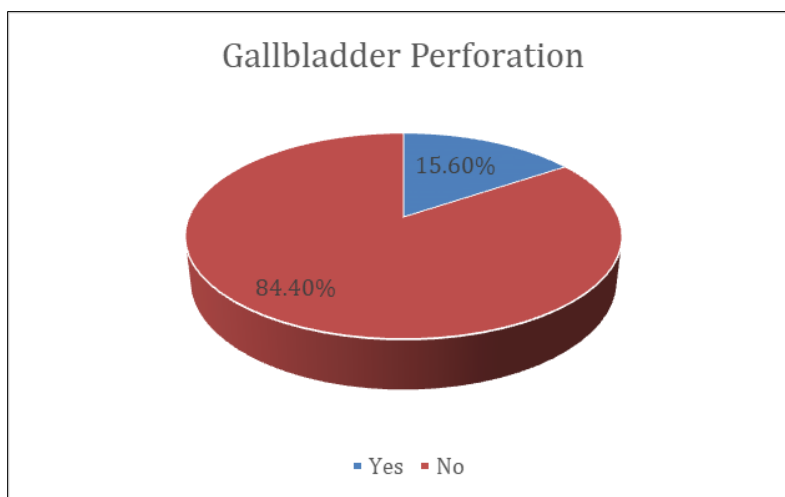


Figure 1 Percentage of Gallbladder Perforation

Table 2 Outcomes of gallbladder perforation

Outcomes	Gallbladder perforation				
	Yes		No		
	Frequency	Percentage	Frequency	Percentage	
Ileus	Yes	5	14.3%	0	0.0%

	No	30	85.7%	190	100.0%
Site infection	Yes	3	8.6%	0	0.0%
	No	32	91.4%	190	100.0%
Diarrhea	Yes	2	5.7%	0	0.0%
	No	33	94.3%	190	100.0%

Table 3 Stratification of ileus in gallbladder perforation with age

Age distribution			Ileus		Total	P value
			Yes	No		
18 to 30 years	Gallbladder perforation	Yes	1	7	8	0.05
			12.5%	87.5%	100.0%	
		No	0	30	30	
			0.0%	100.0%	100.0%	
	Total		1	37	38	
		2.6%	97.4%	100.0%		
31 to 45 years	Gallbladder perforation	Yes		3	3	0.002
				100.0%	100.0%	
		No		28	28	
				100.0%	100.0%	
	Total			31	31	
			100.0%	100.0%		
46 to 60 years	Gallbladder perforation	Yes	2	14	16	0.0001
			12.5%	87.5%	100.0%	
		No	0	78	78	
			0.0%	100.0%	100.0%	
	Total		2	92	94	
		2.1%	97.9%	100.0%		
61 to 70 years	Gallbladder perforation	Yes	2	6	8	0.0001
			25.0%	75.0%	100.0%	
		No	0	54	54	
			0.0%	100.0%	100.0%	
	Total		2	60	62	
		3.2%	96.8%	100.0%		

Table 4 Stratification of site infection in gallbladder perforation with age

Age distribution			Site infection		Total	P value
			Yes	No		
18 to 30 years	Gallbladder perforation	Yes	1	7	8	0.05
			12.5%	87.5%	100.0%	
		No	0	30	30	
			0.0%	100.0%	100.0%	
	Total	1	37	38		
	2.6%	97.4%	100.0%			
31 to 45 years	Gallbladder perforation	Yes	1	2	3	0.002
			33.3%	66.7%	100.0%	
		No	0	28	28	
			0.0%	100.0%	100.0%	
	Total	1	30	31		
	3.2%	96.8%	100.0%			
46 to 60 years	Gallbladder perforation	Yes	1	15	16	0.02
			6.2%	93.8%	100.0%	
		No	0	78	78	
			0.0%	100.0%	100.0%	
	Total	1	93	94		
	1.1%	98.9%	100.0%			
61 to 70 years	Gallbladder perforation	Yes		8	8	N/A
				100.0%	100.0%	
		No		54	54	
				100.0%	100.0%	
	Total		62	62		
		100.0%	100.0%			

Table 5 Stratification of diarrhea in gallbladder perforation with age

Age distribution			Diarrhea		Total	P value
			Yes	No		
18 to 30 years	Gallbladder perforation	Yes		8	8	N/A
				100.0%	100.0%	
		No		30	30	
				100.0%	100.0%	
	Total		38	38		
		100.0%	100.0%			

31 to 45 years	Gallbladder perforation	Yes		3	3	N/A
				100.0%	100.0%	
		No		28	28	
				100.0%	100.0%	
	Total		31	31		
			100.0%	100.0%		
46 to 60 years	Gallbladder perforation	Yes	1	15	16	0.02
				6.2%	93.8%	
		No	0	78	78	
				0.0%	100.0%	
	Total		1	93	94	
			1.1%	98.9%	100.0%	
61 to 70 years	Gallbladder perforation	Yes	1	7	8	0.009
				12.5%	87.5%	
		No	0	54	54	
				0.0%	100.0%	
	Total		1	61	62	
			1.6%	98.4%	100.0%	

4. Discussion

This study of demographic data including the age and sex of 225 patients undergoing laparoscopic cholecystectomy (LC), focusing on the incidence of gallbladder perforation and complications, adds real-world data on this subject. The average age of patients was 49.22 years, among which the majority (41.8%) had their ages ranging from 46 to 60 years. This association is consistent with current literature that reports higher prevalence of gallbladder disease in middle-aged people owing to the aforementioned reason of the build-up of gallstones and other age-associated physiological changes. (6)

Male patients were found to be more prevalent (58.7% were male) which correlates with previous studies that show males are more prone to complications during surgery of gall bladder due to anatomical and physiological factors. (7) The incidence of gallbladder perforation was 15.6%, with 35 patients having this complication in this study. This rate is consistent with other reported studies, which state perforation can occur in 5% to 30% of cases during laparoscopic procedures, specifically in patients with acute cholecystitis (8).

Complications of gallbladder perforation were ileus (14.3%), site infection (8.6%) and diarrhea (5.7%). These post-operative morbidities underscore the need for close follow-up and management to reduce these associated challenges in the repair of perforation (9). Outcomes stratified by age, gender, and socioeconomic status provide further insight into the role that these characteristics play in the complication rates. Ileus identified in older age groups (61 to 70 years) occurred more as a complication, indicating that age could be an important factor for postoperative recovery (10).

The study found gender differences indicating that the males in their study had a higher rate of ileus and also a higher rate of site infections post perforation, and there are anatomical and physiological characteristics that make them more susceptible to such complications (11). Plus, it seems that the social economic level played a factor in the outcome. It was noted that people belonging to lower classes had more complications, possibly because they received treatment late or were given few health facilities (12).

Summing up the results of this study, gallbladder perforation during laparoscopic cholecystectomy is a complex procedure and the factors that make it even more difficult vary significantly across populations thereby suggesting the need for tailored interventions to the specific population. In broad terms, the conclusions support the development of

better preoperative triage and postoperative management policies for different population groups such as the elderly and poorer people with the aim of achieving better surgical outcomes .

5. Conclusion

This research highlights the considerable frequency of gallbladder rupture during laparoscopic cholecystectomy (LC), affecting 15.6% of patients. The resulting complications, including intestinal paralysis (14.3%), wound infections (8.6%), and loose stools (5.7%), emphasize the importance of careful post-surgery monitoring. Advanced age, especially in the 61-70 year range, was found to be a crucial factor impacting recovery. Additionally, sex differences and economic background influenced complication rates. Prompt surgical action and comprehensive preoperative evaluations are crucial for improving patient results. The study suggests implementing standardized post-surgery care protocols to effectively address complications stemming from gallbladder rupture. Subsequent investigations should concentrate on enhancing surgical methods and establishing guidelines to reduce risks, thereby promoting safer LC procedures.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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