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Postoperative Complications between Early and Delayed Cholecystectomy

Dr. BEZAN BALOCH¹ Associate Professor of Surgery, BMC Dr. SHAH WALI Assistant Professor ENT, BMC Dr ZAHID SAEED Associate Profesor of Surgery, Mohi Uddin Islamic Medical College Mirpur AJK Dr. SHER HASSAN Assistant Professor Neurosurgery Department BMC/PGMI Dr. SALEEM KHAN Assistant Professor Neurosurgery Department BMC/PGMI

Abstract

Introduction: Acute cholecystitis is a common surgical condition which is most commonly caused by gallstones. The traditional approach to management of acute cholecystitis has been to conservatively manage the initial acute attack and delay the cholecystectomy for 6-8 weeks. Early surgery is recently more favored in the treatment of acute cholecystitis as it is equally safe, cost effective and leads to less time off work compared to the traditional approach.

Objectives: The objective of this study was to evaluate the postoperative complications between early and delayed cholecystectomy.

Materials and Methods: This study was conducted at Surgical Unit II, Bolan Medical Complex Hospital Quetta, from June 2006 to June 2007. Seventy patients of acute cholecystitis were included in this study and were randomly allocated to two groups. Group I had early/same admission cholecystectomy while Group II were managed traditionally with an interval cholecystectomy. Patients with acalculous cholecystitis, peritonitis and progressive sepsis were excluded from the study. Open cholecystectomy was performed for all patients.

Results: Mean age of the patients was 44.15 ± 6.8 years. The mean operating time was 73 minutes in Group I and 63 minutes in Group II. The difference was statistically significant. Wound infection was comparable in Group I (8%) and Group II (5%). No bile duct injury was encountered in either group. Total hospital stay was significantly longer in Group II (11 days) than in Group I (7 days).

Conclusions: Early cholecystectomy for acute cholecystitis is safe and leads to a shorter total hospital stay.

Keywords: Postoperative Complications, delayed Cholecystectomy

INTRODUCTION

Acute cholecystitis, inflammation of the gallbladder, is most often caused by gallstones. More than 80% of people with gallstones are asymptomatic. Acute cholecystitis develops in 1-3% of patients with symptomatic gallstones. If the inflammation persists it may cause perforation or gangrene of the gallbladder^{1, 2}.

 $^{^1}$ Corresponding author: Dr. Bezan Baloch, Professor Colony BMCH, Quetta C/O CPSP Regional Center, Quetta near CENAR Hospital off Brewery Road Quetta, Quetta, Balochistan.

Diagnosis of acute cholecystitis is made on the basis of clinical history and is supported by results of ultrasound scanning¹. Ultrasonography may reveal the presence of pericholecystic fluid and thickening of gallbladder wall which suggest acute cholecystitis. A sonographic Murphy's sign has a positive predictive value greater than 90% in detection of acute cholecystitis if gallstones are also present ³.

About 20% of patients with acute cholecystitis need emergency surgery. Such surgery is indicated if the patient's condition deteriorates or when generalized peritonitis or emphysematous cholecystitis is present. These features suggest gangrene or perforation of the gallbladder ¹.

The timing of surgery for the 80% of the patients without gangrene or perforation is under debate. Open cholecystectomy traditionally has been performed 6-12 weeks after the acute episode to allow the inflammatory process to resolve before the procedure (interval surgery) 1 .

Early cholecystectomy is increasingly favored in the management of acute cholecystitis. Following initial conservative management and confirmation of the diagnosis, the patient is operated electively (scheduled urgent) on the next available operating list or within a few days of admission⁴.

Interval cholecystectomy has many disadvantages which include; failure of conservative treatment, premature readmission with a further attack while waiting for elective cholecystectomy, and patient defaulting after discharge ⁴.

The time between symptom onset and hospital admission (and consequent surgery) is significantly higher in patients with gangrenous cholecystitis, further emphasizing the need for an early (if not urgent) surgical treatment in acute cholecystitis, even with mild symptoms ⁵.

Early cholecystectomy for patients with acute cholecystitis is safe, costeffective and leads to less time off work compared with delayed surgery⁶.

The most common procedure-related complications are wound infections, abscess, cholangitis or pancreatitis, ileus, haemorrhage, and bile duct complications. Wound complications are slightly more common in the early surgery group ⁷.

Bile duct injury is a rare but one of the worst complications of this procedure. Although infrequent in expert hands, it is usually encountered when comparatively inexperienced surgeons are operating. The bile duct is prone to be damaged by use of diathermy and excessive dissection, required to delineate the anatomy of Calot's triangle, results in ischemic injury to the biliary tract. Other risk factors include difficulty in dissection due to acute or severe chronic inflammation, morbid obesity, unexpected bleeding, and presence of anomalous duct or vessel. These biliary injuries include leaks, strictures, transactions, or ligation of major bile duct. The risk of bile duct injury during open cholecystectomy ranges from 0.1-0.2%. These injuries present at variable time after the primary surgery. The prompt recognition and active management affects the morbidity and mortality associated with it⁸. Acute cholecystitis is a common surgical emergency presenting to the Surgical Department of Bolan Medical Complex Hospital Quetta. The existing conditions, like poor transportation facilities and inadequate primary health care structure in our country, and especially in Balochistan, often make it very difficult for people to follow up for an interval surgery for a condition which can be treated by an early or first admission surgery. So it is worthwhile to define success and complications of early or first admission cholecystectomy for acute cholecystitis, and compare it with the traditional way of conservative treatment of acute cholecystitis and subsequent interval cholecystectomy.

MATERIAL AND METHODS:

This study was conducted in the department of Surgery, Unit II, Bolan Medical Complex Hospital Quetta, from June 2006 to June 2007. Seventy patients were included in this study. The sampling technique employed was non-probability purposive sampling. The patients were admitted through either emergency department or outpatient department.

All patients aged 35-55 years, with history and clinical features suggestive of acute cholecystitis supported by ultrasound scanning, were included in this study.

Those patients with acalculous cholecystitis, peritonitis, gas in gallbladder lumen or pericholecystic tissues (indicative of gangrenous, emphysematous or perforated gallbladder) were excluded from this study. Patients with clinical jaundice, and progressive sepsis requiring immediate intervention were also excluded from the study as were patients with debilitating comorbid medical problems precluding general anaesthetic administration.

After taking informed consent the patients were randomly assigned to one of two groups; Group I comprised of the patients who were to undergo early/same admission cholecystectomy while Group II comprised of the patients who were planned for an interval/delayed cholecystectomy.

Detailed history was obtained and a complete examination performed with particular attention to Murphy's sign. The diagnosis was confirmed by ultrasonography with importance given to gallstones, sonographic Murphy's sign, gallbladder wall thickness >3mm and pericholecystic edema in the absence of ascites respectively. Baseline investigations like liver function tests (serum bilirubin, AST, ALT and Alkaline Phosphatase), complete blood count, blood glucose, serum urea and creatinine, serum electrolytes, chest X-ray PA view and plain X-ray of abdomen were obtained.

Both groups were initially treated, according to our institutional policy, with intravenous fluids, analgesics (Diclofenac Sodium 75 mg 8 hourly) and intravenous antibiotics (Cefuroxime 750 mg 6 hourly). The patients were treated for a couple of days till symptom resolution and clinical improvement, and then were either operated on next available list (Group I) or discharged and called upon for an interval cholecystectomy 6 weeks later.

Operative technique was essentially the same in both groups with abdominal access through a right subcostal incision, which was kept to a minimum allowing safe dissection but no attempt was made to perform a minicholecystectomy. Gallbladder dissection was commenced from Calot's triangle with the conventional cystic artery and cystic duct sequence of ligation and division. A drain was placed in subhepatic place in every case and was removed two days later if not draining bile or blood. Postoperative management was essentially the same in both groups and followed the institutional policy. The patients were kept NPO for 24 hours while given intravenous fluids analgesics (Diclofenac Sodium 75 mg 8 hourly with documentation of any additional analgesic required) and intravenous antibiotics (Cefuroxime 750 mg 6 hourly). Patients were allowed orally 24 hours later, starting with a soft diet and gradually shifting to normal diet.

Nasogastric tube drainage was used in the patient who developed ileus and vomiting. Wounds were first examined on 3^{rd} postoperative day, and necessary measures taken if found infected. Otherwise dressing was changed and wound examined again at the first follow up for stitch removal a week after discharge and dealt with accordingly.

Patients were followed up for two months, resumption of daily activities and symptomatic improvement assessed, and biliary system investigated by liver function tests and ultrasonography at 1st and 2nd month after the operation. Data were collected on a prescribed proforma for their course of admission and follow up.

Data were analyzed on a computer using SPSS version 14.0. Descriptive statistics of both groups like frequency, percentage, mean and standard deviation were computed for variables such as age and gender of the patients, duration of surgery, postoperative complications, preoperative hospital stay, postoperative hospital stay and total hospital stay.

Both groups were compared regarding these data. Significance was determined by Chi-square test for categorical variables like postoperative complications, and student's t-test was employed for continuous variables like duration of surgery and hospital stay. A value <0.05 was considered significant for both tests.

RESULTS

This prospective quasi experimental study was carried out on 70 patients who had been randomly divided into two groups of 35 patients each. The study was performed at a tertiary care hospital, Bolan Medical Complex Hospital Quetta from Jan 2006 to June 2007.

The majority of the patients were females (n=62, 88.6%) while 8 patients were males (11.4%). The female to male ratio was 8:1 (Fig. 1).

The mean age of patients was comparable in both groups. In Group I (early/same admission cholecystectomy) the mean age was 43.68 years with a standard deviation of 6.8, while in Group II (interval/delayed cholecystectomy) the mean age was 44.6 years with a standard deviation of 6.87 (Table1, Fig. 2).

The duration of surgical procedure and peroperative bleeding was higher in Group I (early/same admission cholecystectomy) as compared to Group II (interval/delayed cholecystectomy) which was found statistically significant as shown in Table 2, 3, 4 and 5.

There was no significant difference in postoperative complications between the two groups. Wound infection was found to be the most common postoperative complication while only one patient, who belonged to Group II, developed postoperative ileus. Bile duct injury was encountered in none of the patients (Table 6 and 7).

Total hospital stay was longer in Group II (interval/delayed cholecystectomy) compared to Group I (early/same admission cholecystectomy) which was statistically significant as shown in (Tables 8 and 9).

While none of the patients in interval cholecystectomy group developed pancreatitis, cholangitis or obstructive jaundice (choledocholithiasis), 2 patients (5.7%) had an additional admission with acute cholecystitis and 2 patients (5.7%) were admitted twice more before the planned admission and interval cholecystectomy (Fig. 3).

In the interval/delayed cholecystectomy group 82.86% followed up for the planned cholecystectomy on the scheduled date while 17.14% patients followed up later than the planned date and so had to be admitted for a couple more days to find a space in operating list (Fig. 4).



Table 1: Age of the patients.

Type of management	Mean	Ν	Std. Deviation
Early/same admission cholecystectomy	43.6857	35	6.80731
Interval/delayed cholecystectomy	44.6286	35	6.87316
Total	44.1571	70	6.80715

Table 2. Duration of surgical procedure. Group Statistics

	Type of management	Ν	Mean	Std. Deviation	Std. Error Mean
Duration	Early/same admission				
of	cholecystectomy				
surgical procedure in minutes		35	72.9714	12.52171	2.11656
	Interval/delayed cholecystectomy	35	62.6571	12.93864	2.18703

Table 3. Duration of surgical procedure. Independent Samples Test

Levene's Test for Equality of Variances t-test for Equality of Means 95% Confidence Sig. (2-Mean Std. Error Interval of the F Sig. df tailed) Difference Difference Difference t Lower Upper Duration of Equal surgical variances 16.38750 10.31429 3.04350 4.24107 .002 .962 3.389 68 .001 procedure in assumed minutes Equal variances 3.389 67.927 .001 10.314293.043504.2409516.38762 not assumed

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					Peroperative l	oleeding	
					<200ml	200-500ml	Total
Туре	of	Early/same	admission	Count	25	10	35
management		cholecystectomy		% within Type of management	71.4%	28.6%	100.0%
				% of Total	35.7%	14.3%	50.0%
		Interval/delayed cho	lecystectomy	Count	35	0	35
				% within Type of management	100.0%	.0%	100.0%
				% of Total	50.0%	.0%	50.0%
Total				Count	60	10	70
				% within Type of management	85.7%	14.3%	100.0%
				% of Total	85.7%	14.3%	100.0%

Table 4: Crosstabulation of type of management and peroperative bleeding.

Table 5. Peroperative amount of bleeding.Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	11.667(b)	1	.001		
Continuity Correction(a)	9.450	1	.002		
Likelihood Ratio	15.537	1	.000		
Fisher's Exact Test				.001	.000
Linear-by-Linear Association	11.500	1	.001		
N of Valid Cases	70				

Table 6: Crosstabulation of type of management and wound infection.

			Wound infection				
			no wound infection	Marked erythema and serous discharge requiring a stitch removal and simple dressing			
Type of I management of	Early/same admission cholecystectomy	Count	32	3	35		
	% within Type of management	91.4%	8.6%	100.0%			
		% of Total	45.7%	4.3%	50.0%		
Interval/delayed C cholecystectomy	Count	33	2	35			
		% within Type of management	94.3%	5.7%	100.0%		
		% of Total	47.1%	2.9%	50.0%		
Total		Count	65	5	70		
		% within Type of management	92.9%	7.1%	100.0%		
		% of Total	92.9%	7.1%	100.0%		

Table 7. Wound infection.

Chi-Square Tests

			Asymp. Sig. (2-	Exact Sig. (2-	Exact Sig. (1-
	Value	df	sided)	sided)	sided)
Pearson Chi-Square	.215(b)	1	.643		
Continuity Correction(a)	.000	1	1.000		
Likelihood Ratio	.217	1	.642		
Fisher's Exact Test				1.000	.500
Linear-by-Linear Association	.212	1	.645		
N of Valid Cases	70				

Table 8. Total hospital stay. Group Statistics

					Std.	Std.	Error
	Type of managemen	t	Ν	Mean	Deviation	Mean	
Total hospital stay in	Interval/delayed cholecystectomy		35	11.0857	4.23134	.71523	
days	Early/same cholecystectomy	admission	35	7.4286	1.75375	.29644	

Table 9. Tota	Table 9. Total hospital stay Independent Samples Test.									
		Leven	e's Test							
		for E	quality							
		of Vari	ances	t-test f	or Equali	ty of Mean	s			
						Sig.			95% C	onfidence
						(2-	Mean	Std. Error	Interval	of the
		F	Sig.	т	df	tailed)	Difference	Difference	Difference	e
									Lower	Upper
Total hospital stay in days	Equal variances	3.010	.087	4.724	68	.000	3.65714	.77422	2.11220	5.20208
	Equal variances not assumed			4.724	45.346	.000	3.65714	.77422	2.09810	5.21618



Fig. 4 follow-up for planned cholecystectomy



DISCUSSION

Gallbladder disease continues to be one of the most common digestive disorders encountered by surgeons. Cholecystectomy in fact, is the commonest surgical procedure in the abdomen worldwide.

Gallstones/cholelithiasis is the most common gallbladder pathology. Most of the gallstones (85-90%) are asymptomatic and some 1-2% per year become symptomatic with developing biliary colic while 0.2% per year develop complications like acute

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cholecystitis and 30% of patients with gallstones will undergo surgery.² Cholecystitis is the most complication of gallstones.

Despite many innovations in the treatment of symptomatic gallstones, cholecystectomy remains the gold standard. This situation is somewhat straightforward in cases of biliary colic but controversy still remains as to how treat acute cholecystitis. The traditional approach has been to conservatively manage the acute episode and perform an elective cholecystectomy at an interval of 6-8 weeks. This approach was based on fears that dissection of an inflamed gallbladder is associated with more complication than dissection of a quiescent gallbladder during an elective procedure.

Cholelithiasis is a disease more common in females in their forties. In this study the female to male ratio was found to be 8:1. It was higher than the female to male ratio found in other studies like 2.7:1 in a study by Aurangzeb M and Hashmi MI ⁹, 5:1 in a study by Zahid MA and colleagues¹⁰, 4:1 in a study by Amjad N and Fazal A¹¹, and 3:1 in a study by Mills LD ¹². However this ratio is much less than the ratio of 13:1 reported by Bhutta AR and colleagues ¹³.

The mean age of the patients in this study was 44.15 years which is comparable to other studies. The mean age of patients with cholecystitis or cholelithiasis reported by other studies include 53 years reported by Asoglu O and colleagues¹⁴, 50 years reported by Bhutta A and colleagues¹⁵, 43.7 years reported by Al Salamah¹⁶, 43 years reported by Rathore MA and colleagues¹⁷, 46 years reported by Aurangzeb M and Hashmi MI⁹, and 56 years reported by Johansson M et al¹⁶.

Cholecystectomy during the acute phase of cholecystitis has been traditionally feared for resulting more frequent complications. This was mainly due to a difficulty in gallbladder dissection necessitating a more cautious dissection thus prolonging the duration of surgery. The mean duration of surgical procedure in this study was 73 minutes for early cholecystectomy and 63 minutes for interval/delayed cholecystectomy. The difference was statistically significant and is comparable to other studies. The reported mean operating times for early cholecystectomy in acute cholecystitis include 80 minutes by Johansson et al¹⁶and 97±22 minutes by Khan SSA⁷. The reported mean operating times for interval/delayed cholecystectomy include 85±30 minutes by Khan SSA⁷, 68.1±15 minutes by Bhutta A¹⁵,35 minutes by Aurangzeb M and Hashmi MI⁹, and 80 minutes by Watanapa P.¹⁷

Wound infection is the most common cholecystectomy related complication. The rate of wound infection is higher in early cholecystectomy. In this study the wound infection rate was 7.1% being slightly higher in early cholecystectomy group as compared to interval/delayed cholecystectomy group (8.6% vs 5.7%) which was insignificant statistically. This wound infection rate was comparable to other studies. The wound infection rates reported for early open cholecystectomy are 5.7% by Johansson et al¹⁶, 13.6% by Khan SSA⁷, 6% by Siddiqui K and Khan AFA¹⁸, and 6.9% by Khan MI et al.¹⁹

Bile duct injuries are the most feared cholecystectomy related complications: and were the prime reason for advocating a conservative approach to the initial acute phase and performing a cholecystectomy as an elective procedure later on. Most textbooks state the incidence of iatrogenic bile duct injuries in open cholecystectomy procedures to be less than 1%⁴. In this study no bile duct injury was encountered in either group. This is compatible with the findings of Johansson et al¹⁶, and Ghani AA and colleagues²⁶¹²⁰. Other studies have reported an iatrogenic biliary injury rate of 0.22% and 0.88% ¹³, 0.39% ¹⁵ to 2.1%^{.9}

Early/same admission cholecystectomy is increasingly favored in the management of acute cholecystitis. This is because the early/same admission cholecystectomy is safe, provides the definitive treatment on 1st admission and eliminates the possibility of multiple admissions for the same disease and any complication developing hitherto. Early/same admission surgery also results in a shorter hospital stay compared to the interval cholecystectomy where the patient needs to get admitted at least twice.

In this study 11.4% patients of the interval cholecystectomy group needed admission for the same diagnosis before the planned admission while 17.14% patients followed up for the planned surgery later than scheduled. The mean total hospital stay was 11 days for the patients in interval cholecystectomy group, and 7 days for patients in the early cholecystectomy group. The difference was found statistically significant. This data was almost similar to the mean total hospital stay and the difference in total hospital stay as described by other studies^{7,21,22,23}.

CONCLUSION

Early/same admission surgery, when compared to interval/delayed cholecystectomy, for acute cholecystitis is equally safe and results in a shorter total hospital stay and thus a lower total cost of treatment. In a country like Pakistan, with limited health resources and poor compliance of patients to follow up regimens, it is a good and viable alternative to the traditional approach of treating acute cholecystitis.

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