

A COMPARATIVE STUDY OF POST-CHOLECYSTECTOMY COMPLICATIONS AMONG PATIENTS WITH AND WITHOUT DRAIN

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ABSTRACT

BACKGROUND

The disease of gallbladder is one of the most common abdominal ailment encountered by the surgeons since ancient times for which cholecystectomy is the most commonly performed operation. In the late 19th century, first successful open cholecystectomy was performed by Carl Langenbuch using aseptic technique, thereafter in the last 100 years, open cholecystectomy has remained the gold standard for definitive management of symptomatic cholelithiasis. It was a common practice to give a routine drain in each and every case of cholecystectomy, but Spivak and many other authors have advocated operation without drain which has dramatically reduced postoperative morbidity and hospital stay.

AIM

The aim of the study was to compare the postoperative complications such as pain, wound infection, respiratory complications, and incidence of postoperative thrombophlebitis, subhepatic collection and length of hospital stay in patients who have undergone open cholecystectomy with drain with those without drain.

DESIGN

This is a prospective longitudinal interventional study.

MATERIALS AND METHODS

This study was done in 70 patients admitted for cholecystectomy operation in Surgery Department of Midnapore Medical College. 35 of them selected randomly were assigned as Group A who were given a postoperative drain and rest 35 patients assigned Group B were without drain. The presence of postoperative complications such as pain, wound infection, respiratory complications (cough, breathing difficulty, pneumonitis, and pulmonary embolism), thrombophlebitis, subhepatic collection and length of hospital stay were compared between the two groups.

RESULT

91.42% patients of Group A had a significant pain compared to 51.42% patients of Group B. Wound infection and respiratory complications were present in 14.28% cases of Group A as against 5.71% cases in Group B. Fever was present in 42.85%, thrombophlebitis in 25.71% and subhepatic collection in 28.57% of patients of Group A compared to 8.57% fever cases and 5.71% cases of thrombophlebitis and subhepatic collection in Group B.

CONCLUSION

Drainage after simple cholecystectomy in the absence of definite indications is unnecessary and may be associated with higher incidence of morbidity.

KEYWORD

Cholecystectomy, Drain, Post-operative Complications.

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INTRODUCTION: It was from very ancient time that there was a clear recognition of 'Cholelithiasis'; however, pathogenesis was not clear at that time. Carl Langenbuch.¹ performed the first open cholecystectomy in 1882. It was a common practice to give routine drain in each case at that time.

In early 20th century, several authors were against putting routine drain in each and every case. Cholecystectomy without drain was first introduced by J. L. Spivak in Germany in 1913 and stated as "Ideal Cholecystectomy".²

Since then sporadic but unanimously favourable reports have been published by Desmarest (1927), Verbrycke (1927), Fowler (1931), Doberauer (1933), Neumann (1966), Drees (1963), advocating the omission of drains. Modified drainage using catgut as suture, as recommended by Mayo (1921) and subserosal cholecystectomy, as described by Desmarest (1927) were additional technique refinements, aiming at assuring uneventful recovery.

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Easier convalescence, lower rate of complications and shorter hospital stay were the advantages claimed by most of the authors. In spite of such reports, majority of the surgeons continued to drain the subhepatic space after cholecystectomy. The type of drain may vary from soft rubber to sump or whistle tip red rubber catheter as advocated by Glenn (1966), the stated objective to forestall collection of bile and blood and to prevent bile peritonitis. The role and effectiveness of drains in achieving this objective are in dispute. Such complication when occurred, was reported both in drained and untrained series. 31 years after Carl Langenbuch first performed the cholecystectomy, cholecystectomy without drainage was introduced. Since then pros and cons of drains have been debated. One would rather be confused than enlightened over the issue as both the proponents and opponents of drainage have reported excellent results with their respective methods. Edlund Gedda et al (1979), in their retrospective studies from hospital where both methods were used side by side, also found to be not too much helpful.

Use of drain is a must in case of open cholecystectomy when obvious collection of blood or infected fluid existed, but prophylactic drainage is still a matter of controversy because numerous literature reveals many reported cases where adequate drainage procedures failed to prevent bile peritonitis or pericholecystic abscess whereas the fear of major bile peritonitis following bile leakage is the major cause for subhepatic drainage. Goldberg I. M. in his article 'Cholecystectomy with and without surgical drainage' stated that 'Surgical drainage after every uncomplicated cholecystectomy is unnecessary and may be unwise. Such drainage may result in an increased incidence of postoperative morbidity and prolonged hospital stay.'³

The argument against routine drainage of an uncomplicated cholecystectomy are lower incidence of postoperative infection, lowered postoperative fever, shorter hospital stay and overall postoperative comfort. The actual indications of subhepatic space are adhesions, concomitant pancreatitis, injury of common bile duct, empyema, gangrene, gall bladder perforation, etc. Based on the above facts, the present study has been conducted to find out whether there is higher incidence of postoperative complications after open cholecystectomy with routine drainage.

MATERIALS & METHODS: A prospective longitudinal study was carried out in Midnapore Medical College from January 2010 to December 2010. 192 patients admitted in surgery department with chronic calculous cholecystitis (Diagnosed on the Basis of Symptomatology, Clinical Examination, and were confirmed by Ultrasonography) were included in the study.

Inclusion Criteria:

1. Absence of empyema or other evidence of gross infection.
2. A relatively dry gall bladder bed at the end of operation.

3. Elective operations that did not include exploration of common bile duct.

Exclusion Criteria: Patients with acute cholecystitis, cholangitis or pancreatitis were excluded from the study. They were posted for open cholecystectomy and following preoperative conditions were to be maintained.

1. Minimum or no adhesion around gall bladder.
2. Minimum or absence of biliary oozing from gall bladder bed.
3. Minimum or absence of oozing of blood from the gall bladder bed.
4. No gross spillage of infected biliary content.
5. Cystic duct and cystic artery, securely tied.
6. No oozing of blood from the operative field.

Fortunately, all our patients fulfilled these preoperative conditions. These patients before surgical procedure were divided into two groups (Group A & B) each of 35 patients by simple randomisation. Group A were given postoperative drain and no drain was given in Group B. Postoperatively, all cases were followed up for pain, wound infection, fever, and respiratory complication, thrombophlebitis and subhepatic collection. Ultrasound examination was done between 3rd to 5th postoperative day, when suspected to have collection (if they have persistent shoulder pain, fever, elevated leucocytic count, persistent vomiting).

STATISTICAL ANALYSIS: Data was presented as actual numbers and percentages, Epi info software was used to find out statistical significance, $p < 0.05$ was considered as significant.

RESULT: Verbal Descriptor Scale (Category Scale) used to measure the intensity of postoperative pain consisting of verbal descriptors such as no pain, mild, moderate, severe and excruciating pain. We have clubbed the moderate, severe and excruciating pain in one group i.e. significant pain. In the present study in Group A, i.e. cases with drain only 2 patients had no pain and 1 patient had mild pain. The rest i.e. 32 patients (91.42%) suffered from significant pain compared to 18 patients (51.42%) who experienced a significant pain in Group B i.e. cases without drain. We also found that postoperative pain was definitely increased in presence of infection.

Wound infection was suspected when pus was found at the wound site. 5 cases of Group A i.e. 14.28% had a wound infection compared to only 2(5.71%) cases of infection in Group B. There was no drain site infection. Rise of temperature within 24 hrs. of operation was considered as reactionary and was not taken into account. A persistent rise of temperature of 100°F or more were considered as significant. In this study, 15 patients (42.85%) had a postoperative pyrexia in Group A compared to only 3 cases of pyrexia in Group B. We have seen that there is a statistically significant association of pyrexia with presence of postoperative drain.

Respiratory complications such as cough, breathing difficulty were present in 14.28% cases in Group A, and 5.71% of Group B. Postoperative thrombophlebitis was found in 25.71% in Group A and 5.71% in Group B. Postoperative hospital stay was found to be prolonged in drained group. Average being 7.25 days compared to 4.11 days in undrained group. USG was done on 4th and 5th postoperative day revealed subhepatic collection in 28.57% in Group A and 5.71% in Group B. We also found a significant association of subhepatic collection with presence of postoperative drain. Though these collections disappeared within 7th postoperative day.

Respiratory Complication	5(14.28%)	2(5.71%)
Thrombophlebitis	9(25.71%)	2(5.71%)
Subhepatic Fluid Collection	10(28.57%)	2(5.71%)
Table 1: Table Showing Frequency of Postoperative Complication in Group A and Group B		

	Pyrexia	No Pyrexia	Total
Drain	15	20	35
Undrain	3	32	35
Total	18	52	
Table 2: Table Showing Frequency of Pyrexia in Group A and Group B			

$X^2 = 9.05$ (Yates Corrected), $p = 0.002$, significant Group A patients suffered more from pyrexia and this association is statistically significant.

Postoperative Complication	Group A (%) (n=35)	Group B (%) (n=35)
Pain (Moderate+ Severe+ Excruciating Pain)	32(91.42%)	18(51.42%)
Wound Infection	5(14.28%)	2(5.71%)
Pyrexia	15(42.85%)	3(8.57%)

Sl. No.	Name	Age	Sex	Drain	Postoperative Complication in Patients						
					Pain	Infection	Pyrexia	Resp. complication	Thrombophlebitis	Sub hepatic collection	Hosp. stay
1	RH	43	m	p	y(sev)	p	p	p	p	P	9
2	FH	29	f	p	y(mod)	a	a	a	a	A	8
3	PS	48	m	p	y(mod)	a	p	p	p	P	7
4	BB	41	f	a	Y(mod)	a	a	a	a	A	4
5	SC	42	m	a	y(sev)	p	p	p	p	P	5
6	AB	43	f	p	y(mod)	a	p	a	a	P	9
7	RM	41	f	p	N (mild)	a	a	a	a	A	5
8	HS	34	m	a	y(mod)	a	a	a	p	P	5
9	JB	65	f	a	y(mod)	p	p	a	a	A	4
10	BG	24	m	p	y(mod)	a	a	a	a	A	7
11	GD	41	f	p	y(mod)	a	a	a	a	A	8
12	DD	43	m	p	y(mod)	p	a	p	p	A	7
13	RM	30	f	a	y(mod)	a	a	a	a	A	4
14	JR	42	f	a	y(mod)	a	a	a	a	A	3
15	PB	19	f	p	y(mod)	a	p	a	a	A	6
16	MB	38	f	p	y(mod)	a	p	a	a	A	6
17	FS	42	m	a	y(mod)	a	a	a	a	A	4
18	MS	38	f	a	y(mod)	a	a	a	a	A	5
19	AS	38	f	p	y(mod)	a	p	a	p	p	6
20	PG	33	f	p	y(mod)	a	p	a	a	a	8
21	GB	51	m	p	y(sev)	p	p	a	a	p	8
22	RB	51	f	p	y(mod)	p	a	a	a	a	8
23	EB	26	f	a	N (mild)	a	a	a	a	a	5
24	LP	29	f	a	N (mild)	a	a	a	a	a	4
25	BS	41	m	a	N (mild)	a	a	a	a	a	4
26	BS	34	m	p	y(mod)	a	a	a	a	a	7
27	SP	32	f	a	y(mod)	a	a	a	a	a	4
28	AB	45	f	p	y(mod)	a	a	p	p	a	8
29	PK	51	f	a	y(mod)	a	a	a	a	a	4
30	BB	43	f	p	N(no)	a	a	a	a	a	6
31	SM	42	f	p	y(sev)	p	a	a	a	a	9
32	DL	51	m	p	y(exc)	a	p	a	a	p	8
33	MR	28	f	a	y(mod)	a	a	a	a	a	4

34	RB	33	f	p	y(mod)	a	a	a	a	a	7
35	SL	62	m	p	y(sev)	a	p	a	a	a	7
36	PK	47	f	a	y(sev)	a	a	a	a	a	4
37	AT	60	f	p	y(mod)	a	a	a	a	a	7
38	PD	23	f	a	N(no)	a	a	a	a	a	4
39	MN	55	f	p	y(mod)	a	a	a	a	a	7
40	DK	23	f	p	y(mod)	a	a	a	a	a	7
41	AB	47	f	a	N (mild)	a	a	a	a	a	4
42	SS	44	f	a	N (mild)	a	a	a	a	a	4
43	BS	31	m	p	y(mod)	a	a	a	a	a	7
44	JD	33	f	a	N (mild)	a	a	p	a	a	4
45	JC	39	m	a	N (mild)	a	a	a	a	a	5
46	KT	32	f	a	y(mod)	a	a	a	a	a	4
47	KD	32	f	a	y(mod)	a	a	a	a	a	4
48	RB	37	f	p	y(sev)	a	p	a	a	a	7
49	SM	35	f	p	y(mod)	a	a	a	a	a	7
50	SK	39	m	a	y(mod)	a	a	a	a	a	3
51	SK	35	f	p	y(mod)	a	a	a	p	p	8
52	HL	37	f	a	y(mod)	a	a	a	a	a	3
53	KM	44	m	p	y(sev)	a	p	a	p	p	8
54	GD	30	m	a	N(no)	a	a	a	a	a	4
55	AD	32	f	a	N(no)	a	a	a	a	a	4
56	SD	42	m	p	y(mod)	a	a	a	p	p	6
57	AB	41	f	p	N(no)	a	a	a	a	a	6
58	JA	28	f	a	y(mod)	a	p	a	a	a	5
59	AT	39	f	a	y(mod)	a	a	a	a	a	5
60	SR	30	f	a	N(no)	a	a	a	a	a	5
61	MN	32	f	p	y(mod)	a	p	a	a	a	8
62	SM	39	f	a	N (mild)	a	a	a	a	a	4
63	SP	61	f	p	y(sev)	a	p	p	p	p	8
64	TL	32	m	a	N (mild)	a	a	a	a	a	4
65	DP	41	m	a	N(no)	a	a	a	a	a	3
66	KP	53	m	p	y(mod)	a	p	a	a	a	7
67	JG	37	f	a	N (mild)	a	a	a	a	a	4
68	MB	35	f	a	N(no)	a	a	a	a	a	4
69	NB	45	f	p	y(mod)	a	a	a	a	A	7
70	SG	37	f	a	N (mild)	a	a	a	a	A	4

p = present, a = absent,

N (no) = No pain N (mild) = Mild pain	} Non – Significant pain
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y (exc) = excruciating pain y (sev) = severe pain y (mod) = moderate pain	} Significant pain
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m = male.
f = female.

DISCUSSION: Many surgeons routinely insert drain after elective cholecystectomy in spite of doubts regarding its effectiveness. There are several published studies questioning this routine use of drain and has shown better results if it is not used.

They have shown a lower incidence of postoperative complications like fever, respiratory complications, wound infection, pain, etc. in undrained group. In the present study, we have seen that 91.42% patients suffered from significant pain while Bose et al⁴ found it in 81.25% cases compared to a very low incidence of postoperative pain in the patients without a postoperative drain. As most patients relate success or failure of an operation to the degree of postoperative pain, the psychological advantage offered due to decreased pain in undrained group cannot be underestimated.

Williams et al⁵ found a higher incidence of wound infection (7.8%) in drained group compared to 1.4% in undrained group. Higher incidence of wound infection in drained group were also found by Goldberg.³ (8.1%), Frederick P. Ross.⁶ (6.6%), Umberto Baraldi.⁷ (4.2%) etc. In our present study, we also found a higher incidence of wound infection (14.28%) in drained group.

We found a higher incidence of postoperative pyrexia in drained group (42.85%) than undrained group. This higher incidence of pyrexia in drained group compared to undrained group also found in studies conducted by Mayers M.B⁸, Goldberg et al (48.5%).³ Lal et al⁹ (40.0%) etc. As already mentioned that in present study, we found a higher incidence of respiratory complications such as cough, breathing difficulty, pneumonitis, pulmonary embolism, etc. in drained group, Frederick.⁶ Gordon et al¹⁰ and Umberto Baraldi⁷ also had a similar result. U. Baraldi.⁷ commented that the reason for the differences in two groups were not due to use of drainage but rather due to anatomical and clinical conditions that warranted its use. Irwin et al found that out of 100 consecutive patients undergoing elective cholecystectomy, eleven patients had clinical and or radiological signs of basal atelectasis, eight of these patients had drain.¹¹

Many surgeons insert drain after elective cholecystectomy to prevent subhepatic fluid collection and biliary peritonitis, but these drains instead of draining away intraperitoneal fluid paradoxically causes higher incidence of subhepatic fluid collections. Gordon et al¹⁰ and Umberto Baraldi.⁷ found no fluid collection or bile peritonitis in both drained and undrained groups. In all other studies (Elboim et al, Irwin et al, Kripalni et al, Lal et al, Bose et al) including our present study, there was a higher incidence of subhepatic fluid collection in drained group compared to undrained group.^{12,11,13,9,4} Elboim et al¹² in a prospective study of 105 patients who had undergone cholecystectomy showed the incidence of fluid collection in the gall bladder fossa to be 24%, 2 to 4 days after operation. The relationship between the presence of fluid and other variables such as drain and surgical technique were studied with the help of ultrasonography, which is a useful modality for the detection of intra-abdominal fluid collections and the nonoperative percutaneous drainage of intra-abdominal abscesses. With increased use of ultrasound, the clinically unsuspected subhepatic fluid collections were detected more often in post-cholecystectomy patients.

In their study, 25 of the 105 patients (23.8%) were found to have subhepatic fluid collections. Subphrenic collections were not found. Most of them were small, loculated collections, in area consistent with the gall bladder bed. Totally 27 patients underwent emergency cholecystectomy operation and were all drained. Despite the drains, 11 patients (40.7%) developed subhepatic fluid collections. 54 of the 78 elective cases were drained. Even in the presence of drains, 14 of 54 patients (25.9%) developed fluid collections. None of the 24 patients who underwent elective cholecystectomy without drainage developed subhepatic fluid collection.

Therefore, 14 out of 78(17.9%) elective cases were found to have fluid collections. None of these patients had common bile duct explorations. Combining all emergency and elective cases, overall fluid collection was found in 30.9% of the drained cases versus 0% of undrained cases. According to Elboim et al (1983), among the complications that occur following cholecystectomy, subhepatic abscesses

or biliary collections can be very difficult to diagnose clinically.

Their diagnosis and localisation are very important, since these collections need to be drained and ultrasound is a diagnostic tool uniquely adapted to the rapid identification and localisation of such collections, because it causes minimum discomfort and low morbidity for the patient. They used ultrasound in the 2nd and 4th postoperative day in both drained and undrained group to detect subhepatic collections. They stated that their mere presence on ultrasound is not an indication for drainage. However, once the collection is drained, Gram stain and culture of this is mandatory.

The postoperative hospital stay was calculated as the interval between the first postoperative day and the day of discharge from the hospital. Average postoperative hospital stay was prolonged in studies conducted by Williams et al (12 days), Goldberg et al (5.0 days), and Gordon et al (10.3 days), P.E. Trowbridge (7.3 days).^{5,3,10,14} We have also found a similar result in our study. Farha et al stated that open drainage resulted in increased morbidity and a prolonged hospital stay.¹⁵

The rationale behind use of drain routinely in elective cholecystectomy was to detect biliary leakage if any during postoperative period. But the fact is that the dreaded complication of symptomatic biliary leakage is extremely rare (Mittelman and Dobemeck, P.E. Trowbridge, Goldberg) and do not justify routine use of drain with its associated morbidity and prolonged hospital stay.^{16,14} Surgery, especially major ones cost a lot of money if large number of them subsidised by the government in their free-bedded hospital. Therefore, any cost effective measures, however minor each of them may be, their sum total taking into account the number of patients undergoing such procedures would be of great benefit. Thus non-drainage in elective cholecystectomy means a saving of money.

CONCLUSION: Though there is an age old controversy regarding whether to put a postoperative drain routinely in each and every case of elective cholecystectomy or not, we found in our study that the incidence of postoperative complications was more in cases of drained group compared to undrained group with a prolonged postoperative hospital stay. So it can be concluded that drainage after simple cholecystectomy in the absence of definite indications is unnecessary and may be associated with higher incidence of morbidity.

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