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OMENTUM PIECE FOR PREVENTION OF BILE LEAKAGE AFTER SUBTOTAL CHOLECYSTECTOMY

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Abstract

Introduction: Acute cholecystitis is an acute inflammatory condition of the gallbladder of which 95% of cases of acute cholecystitis are due to an obstructing calculus in the gallbladder neck or cystic duct. Acute cholecystitis and difficult gall bladder have severe inflammation and anatomical deformities i.e. empyema, Mirizzi syndrome and sometimes gangrene. In recent years, there is an increasing trend towards subtotal cholecystectomy and general acceptance is higher due to higher incidence of complications in difficult gall bladder. Although, the results of subtotal cholecystectomy are satisfactory but the post-operative bile leak is a problem of great concern. There are many techniques that have been adopted, but bile leakage compared to closing of cystic duct directly is very high in subtotal cholecystectomy.

Material and Methods: The Omentum Plugging Technique (OPT) and Primary Closure Technique (PCT) was done to prevent bile leak in cases were total cholecystectomy could not be performed. Patients were included in the study with the diagnosis of cholelithiasis and patients who had undergone subtotal cholecystectomy for gallstone diseases with both OPT and PCT Technique. Under general anaesthesia patients were operated. Patients were first decompressed at the fundus with the suction and harmonic scalpel or l-hook was used for transection of gall bladder and wash was given and both the anterior and posterior walls were excised leaving an anterior and posterior wall intact and OPT, a piece of omentum that matches the size of the opening of the gallbladder stump is resected from the greater omentum and plugged into the gallbladder stump.

Results: A total of 486 patients were operated, of which 36 patients (7.4%) underwent subtotal cholecystectomy because it was not possible to close their cystic ducts because they had difficult gallbladders, of which 18 patients in taken in OPT and 18 patients taken in PCT group. Average age in OPT group was 49.48 ± 9.59 years while in PCT group was 54.47 ± 16.21. In OPT group there were 10 (62.5%) male and 6 (37.5%) female, in PCT group 11 (68.75%) male and 5 (31.25%) female were observed. History of CBD Stone was recorded in 3 (18.75%) and 2 (12.50%) patients in OPT and PCT group respectively. No History of Abdominal Surgery was noted in both the group. Intra-operative Haemorrhage in OPT Group was 118 (16-359) ml while in PCT group was 164 (10-578) ml. Duration of Operation Time OPT Group was 156 ± 15.77 ml while in PCT group it was 105 ± 17.35 minutes. Total post-operative complications and post-operative bile leakage were seen in 2 patients in OPT group while in PCT group it was seen in 10 patients. (P= 0.0040). Post-operative intervention was done on one patient in OPT group and on 9 patients in PCT group. Mean Duration of drain was 3.5 ± 1.24 days in OPT group and 8.59 ± 2.46 days in PCT group (P< 0.0001). Post-operative hospital stay was 8.84 ± 2.14days in OPT group and 13.45 ± 2.11days (P< 0.0001).

Conclusion: In a difficult gall bladder SC is required during cholecystectomy and for prevention of postoperative bile leakage OPT technique can be safe and more feasible alternative than conventional procedures.

Keywords: Subtotal cholecystectomy (SC), Omentum Plugging Technique (OPT), Primary Closure Technique (PCT), gall bladder.

Introduction

Acute cholecystitis is an acute inflammatory condition of the gallbladder of which 95% of cases of acute cholecystitis are due to an obstructing calculus in the gallbladder neck or cystic duct. Acute cholecystitis and difficult gall bladder have severe inflammation and anatomical deformities i.e. empyema, Mirizzi syndrome and sometimes gangrene[i].Subtotal cholecystectomy (SC), involves removal of the body and sometimes part but not all of the infundibulum of the gallbladder and sometimes in which the cystic duct is not directly closed, that may be performed when the structures of Calot's triangle cannot be safely identified, which contraindicate total cholecystectomy[ii]. There is over-distension of the gallbladder and a rise in intraluminal pressure due to obstruction of the cystic duct. This increased pressure, along with cholesterol-supersaturated bile, triggers an acute inflammatory response[iii].

In recent years, there is an increasing trend towards subtotal cholecystectomy and general acceptance is higher due to higher incidence of complications in difficult gall

bladder[iv]. Laparoscopic cholecystectomy (LC) was introduced in in the late 1980s into the field of general surgery and is widely accepted as the 'gold standard' treatment for symptomatic gall bladder (GB) diseases[v]. The identification and safe dissection of Calot's triangle is essential to minimize and to avoid vascular or biliary damage, and conversion to laparoscopic subtotal cholecystectomy is done when the biliary anatomy is unidentifiable[vi].

Although, the results of subtotal cholecystectomy are satisfactory but the post-operative bile leak is a problem of great concern. There are many techniques that have been adopted, but bile leakage compared to closing of cystic duct directly is very high in subtotal cholecystectomy[vii]. Plugging in of free omentum into the stump of the subtotal cholecystectomy and fixing it with interrupted stitches through omentum and both walls of the stump and other technique is adopted in this study with an aim to assess the safety and efficacy of both the operative techniques and determine as to which procedure is better in preventing post-operative bile leakage.

Material and Methods:

The present prospective, observational study was carried out in Department of Surgery at SSPM Medical College and Life time Hospital Sindhudurg. The omentum plugging technique (OPT)[viii] and Primary Closure Technique (PCT) was done to prevent bile leak in cases were total cholecystectomy could not be performed. Patients were included in the study with the diagnosis of cholelithiasis and patients who had undergone subtotal cholecystectomy for gallstone diseases with both OPT and PCT Technique. A total of 486 patients were operated, of which 36 patients (7.4%) underwent subtotal cholecystectomy because it was not possible to close their cystic ducts because they had difficult gallbladders, of which 18 patients in taken in OPT and 18 patients taken in PCT group. Control group were generated randomly by computer generated numbers. The outcomes of patients who had undergone OPT with PCT control group were compared. The outcomes compared were Per-operative data, post-operative complications including bile leakage and necessity for intervention duration of drainage and hospital stay. Inter-operative drainage tube was placed in all the patients. Macroscopic identification of bile coming out through the tube was considered as bile leakage.

Operative Procedures

Under general anaesthesia patients were operated. Patients were first decompressed at the fundus with the suction and harmonic scalpel or l-hook was used for transection of gall bladder and wash was given and both the anterior and posterior walls were excised leaving an anterior and posterior wall intact and OPT, a piece of omentum that matches the size of the opening of the gallbladder stump is resected from the greater omentum and plugged into the gallbladder stump. The length and width of this piece of omentum are approximately 2 to 3 cm. The tip of the piece is then plugged into the opening of the stump and over sewn with the edge of the gallbladder stump, including the surrounding tissues if necessary, thus fixing the omental tissue that has been plugged into the stump to Hartmann's pouch or the inside entry of the cystic duct, similarly to a cork in a wine bottle It was tight enough that the omentum formed a watertight can and edges are closed with close proximity. In PCT the same way the gall bladder was transected, but only non-absorbable stitches were used in closed proximity and the mucosa of the gall bladder was coagulated with diathermy and closed without Omentum. A sub-hepatic drain was placed in both the groups. During the study period, all the cases were done by experienced surgeons.

Statistical Analysis

Unpaired student T-test was used to find out statistical significance. Chi-square is calculated for categorical values and T value is calculated for continuous variables. A p-value <0.005 was taken as significant. SPSS version 20 was used for statistical analysis.

Results:

A total of 486 patients were operated, of which 36 patients (7.4%) underwent subtotal cholecystectomy because it was not possible to close their cystic ducts because they had difficult gallbladders, of which 18 patients in taken in OPT and 18 patients taken in PCT group.

Table 1: Clinical Characteristic in the Study Group

Characteristics	OPT Group n=18	PCT Group Control n=18
Age (years)	49.48 ± 9.59	54.47 ± 16.21
Male	10 (62.5%)	11 (68.75%)
Female	6 (37.5%)	5 (31.25%)
History of CBD Stone	3 (18.75%)	2 (12.50%)
History of Abdominal Surgery	Nil	Nil
ASA Classification (1/2/3/4)	2/ 3/ 10/ 1	3/ 5/ 7/ 1
Intra-operative Haemorrhage(range) (ml)	118 (16-359)	164 (10-578)
Duration of Operation Time (min)	156 ± 15.77	105 ± 17.35

Average age in OPT group was 49.48 ± 9.59 years while in PCT group was 54.47 ± 16.21. In OPT group there were 10 (62.5%) male and 6 (37.5%) female, in PCT group 11 (68.75%) male and 5 (31.25%)female were observed. History of CBD Stone was recoreded in 3 (18.75%) and 2 (12.50%) patients in OPT and PCT group respectively. No History of Abdominal Surgery was noted in both the group. Intra-operative Haemorrhage in OPT Group was 118 (16-359) ml while in PCT group was 164 (10-578) ml. Duration

of Operation Time OPT Group was 156 ± 15.77 ml while in PCT group it was 105 ± 17.35 minutes.

Table 2: OPT and PCT Group: Comparison of outcome

Outcome	OPT Group n=16	PCT Group Control n=16	Chi-square/ T value	P value
Total post-operative complication	2	10	8.267	Post-operative bile leakage
Post-operative bile leakage	2	10	8.267	0.0040
Major complications	0	5	5.741	0.0166
Minor complication	3	2	0.230	0.6318
Post-operative intervention	1	9	9.018	0.0027
Duration of drain (days)	3.5 ± 1.24	8.59 ± 2.46	7.391	< 0.0001
Post-operative hospital stay (days)	8.84 ± 2.14	13.45 ± 2.11	6.136	< 0.0001

The various outcomes of our study are shown in table 2. Total post-operative complications and post-operative bile leakage were seen in 2 patients in OPT group while in PCT group it was seen in 10 patients. (P= 0.0040,) No major complication was seen in OPT group while in PCT group major complications were observed in 5 patients. In major complications two patient s were re-operated while in 3 patients percutaneous interventions was done because of subhepatic abscesses. Post-operative intervention was done on one patient in OPT group and on 9 patients in PCT group. Mean Duration of drain was 3.5 ± 1.24 days in OPT group and 8.59 ± 2.46 days in PCT group (P< 0.0001) . Post-operative hospital stay was 8.84 ± 2.14days in OPT group and 13.45 ± 2.11days (P< 0.0001).

Discussion:

In 1955 Madding first reported SC as an alternative for conventional total cholecystectomy for technically difficult total cholecystectomy that minimized the potential for injury to the bile duct and vascular structures[ix]. SC is generally performed in patients with a difficult gallbladder in whom inflammation, fibrosis, and adhesions increase the risk of complications with dissection of the cystic duct[x].

In a study it was shown that regardless of whether the gallbladder stump is closed, postoperative bile leakage occurs more frequently after SC than after total cholecystectomy also there is no clinically relevant difference in the incidence of postoperative bile leakage and sub-hepatic collections when the stump is closed versus left open[xi]. Similar results were observed in our study post-operative bile leakage were seen in 2 patients in OPT group while in PCT group it was seen in 10 patients. As the oedema of the cystic duct and gallbladder stump increase the risk of bile leakage. Once the edema has resolved and the suture loses the water tightness loses that was achieved when the gallbladder stump was closed and there may be a leakage of bile[xii].

In our study there was a significant difference observed in the Major complications, Duration of drain (days), Post-operative hospital stay (days) in OPT and control group. Some studies demonstrated the advantages of laparoscopic SC for patients with "difficult gallbladders[xiii, xiv].

Conclusion:

The small number of cases in our study limits us to make a generalized conclusion but in a difficult gall bladder SC is required during cholecystectomy and for prevention of postoperative bile leakage OPT technique can be safe and more feasible alternative than conventional procedures.

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