CHOLECYSTECTOMY : FUNDUS TO PORTA APPROACH

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ABSTRACT

Cholecystectomy is a commonly performed operation but there is still controversy whether dissection of the gall bladder should proceed from the fundus to the cystic duct or in the opposite direction. In usual practice the fundus-first method is adopted whenever difficulty is encountered in visualizing the anatomy of the cystic duct and Calot's triangle. Although haemorrhage is a little greater than with the duct-first method the risk of damage to the common bile duct or right hepatic artery is minimized. This article describes a brief experience with thirty randomized patients in whom cholecystectomies were performed with planned fundus-first approach.

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KEY WORDS : Cholecystectomy; Surgical technique; Bile duct obstruction.

Introduction

Cholecystectomy today is the commonest major abdominal surgery performed throughout the world by general surgeons. Though no cumulative data are available from India, reports indicate that about 10-25 per cent of all surgeries are related to the biliary tract [1].

The technique of cholecystectomy has been undergoing constant refinement and at present there is a growing trend towards laparoscopic cholecystectomy. Though it is one of the simplest and safest of abdominal operations with a very low mortality (1%), iatrogenic injuries to biliary tract continue to plague surgeons.

The traditional approach to cholecystectomy is to begin at the Calot's triangle, identifying structures at the porta hepatis, and thence proceeding with dissection towards the fundus. The dissection is made difficult either by fibrosis in the region due to recurrent inflammation or normal variations in the anatomy in at least 50 per cent of patients. This increases chances of biliary tract injuries. While analyzing causes and management of biliary strictures, Lahey and Pyrttek proposed a modification to the surgical technique - proceeding from the fundus to the porta hepatis [2-5]. Our experience with 30 cases performed by this method is

reported.

Material and Methods

Thirty unselected patients admitted and treated at Command Hospital (SC) Pune in a general surgery unit during the period 1992-93 were included in the study group. Cases were systematically studied for their symptomatology, duration, relevant laboratory and imaging data. Diagnostic ultrasonography was done in all cases for imaging the biliary tree. Criterion for common biliary duct (CBD) dilatation was a width of 10 mm or more on sonography. Patients with only dyspepsia and flatulence were investigated for other causes before considering cholecystectomy. Indications for cholecystectomy were biliary colic and chronic cholecystitis (26 cases), obstructive jaundice (1), carcinoma gall bladder (1), and acute cholecystitis (2).

Pre-operative risk assessment was done by the simplified APACHE-II scoring system (Table 1). Post-operative complications were classified as per Claviens's classification [6] (Table 2).

Operative Technique

All patients were operated under general anaesthesia. Incisions for exposure were predominantly either Kochers' or midline. The liver was

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TABLE 1
Simplified Apache II Scoring System

a) Age	
Less than 45 years	0 points
45 - 54 years	2 points
55 - 64 years	3 points
65 - 74 years	5 points
75 years and above	6 points
b) Concomitant disorders	
5 points for the presence of one or more organ system insufficiency.	
Risk classification	
≤ 5 points	Low risk
6 - 9 points	Intermediate risk
≥ 10 points	High risk

TABLE 2
Clavien's Classification

Grade I	Alterations from the ideal post-operative course. Non-life-threatening complications that have no consequent lasting disability.
Grade II	Potentially life-threatening complications but with no lasting disability. Further classified as IIa and IIb depending on the need for invasive procedures. A hospital stay of more than twice the median stay for the procedure in the institution is a grade II complication.
Grade III	Associated with residual disability including organ resection or persistence of life threatening conditions.
Grade IV	Complication causing death.

mobilized downwards and retractors positioned to gain adequate exposure of the gall bladder and the free border of the lesser omentum.

The gall bladder was grasped at the fundus with a forceps and dissected free of the liver using sharp and blunt dissection taking adequate care to maintain haemostasis with the help of electrocautery or ligatures. Once free of the liver, the gall bladder was retracted caudally to display the cystic artery as it enters the gall bladder and to display the junction of cystic with the major bile duct. The artery was divided between ligatures. The cystic duct and common bile duct were milked towards the gall bladder and the cystic duct was ligated and divided leaving behind a stump of less than 5 mm. At no stages was the anatomy of the Calot's triangle defined by dissection.

Following cholecystectomy, meticulous control of haemostasis of the gall bladder bed was carried out and a thorough search for bile leakage from accessory cystic or cholecysto-hepatic ducts was made and when present it was controlled by ligature. Wound closure was achieved by mass closure with synthetic monofilament non-absorbable suture following placement of a drain in gall bladder fossa. Routine pre-operative cholangiography was not done unless indicated on pre-operative assessment [7]. It was done in 2 cases only. Patients were followed-up for one year at intervals.

Results

Data obtained were systematically analyzed. Most of the patients (60%) were less than 45 years of age. There were 23 females and 7 males.

Patients underwent cholecystectomy for varying symptoms of which pain and dyspepsia were the commonest and most of them (46.6%) were symptomatic for more than 6 months. The second largest group of patients (26.6%) were those who reported within one day to one week of symptoms. Significant number had associated illnesses like ischaemic heart disease or hypertension or a combination of these. One patient had myelofibrosis.

Of the 23 females patients, nine (39.1%) were considered obese by virtue of being greater than 50 per cent of expected weight or having a flabby fatty abdomen. None of the males in the series were obese probably because they were members of the Armed Forces. All patients had biliary stones either in the gall bladder or in the bile ducts or in both. Ultrasonographic findings are listed in Table 3.

TABLE 3
Ultrasonographic findings in 30 patients

Finding on ultrasonography	No of cases	Percentage
Gall stones	29	96.7
Solitary	8	26.7
Multiple	21	70.0
Bile duct stones	2	6.7
Thickening of gall bladder wall	19	63.3
Oedema of gall bladder wall	6	20.0
Mass in the gall bladder	1	3.3
Pericholecystic collection	1	3.3
Dilated bile duct (10 mm or more)	2	6.7

Pre-operatively, cholecystohepatic ducts were seen in three cases (10%). One case each of sessile gall bladder, long cystic duct opening low down into the common hepatic duct, and one case of gall bladder lying embedded in the gall bladder fossa were seen. Twenty three patients were rated as low risk, three as intermediate risk and four as high risk.

There were no intra-operative complications. Post-operatively, 12 patients (40%) had complications of which 7 were Grade I (Table 4). Complications observed were usually minor and their incidence was comparable to those reported in Indian literature [8]. Only one patient of the four high-risk patients had complications. He was an 87-year-old individual who presented with obstructive jaundice and died of respiratory failure on the 5th post-operative day due to severe chest infection. One patient of the low risk group had post-operative jejunal perforation due to tuberculosis and made an uneventful recovery following surgery for the same.

TABLE 4
Post-operative complications and their grading

Clavien's grading	No of patients	Type of complication (No of cases)
Grade I	7	Minor wound infection (4) Unexplained fever (3)
Grade IIa	3	Hypertension and hyperglycaemia (1) Hypotension (1) Atelectasis (1)
Grade IIb	1	Intestinal perforation with peritonitis (1)
Grade III	—	—
Grade IV	1	Obstructive jaundice and respiratory failure leading to death (1)

Surgery was technically difficult in three cases. In one case the cause was the gall bladder being embedded in the fossa. In another there were dense adhesions between the right hepatic duct and the neck of the gall bladder. In the third case extreme obesity made exposure difficult and this was compounded by dense adhesions. Moderate technical difficulty was experienced in eight cases due to bleeding and fibrosis. Approach from the fundus made dissection in the correct plane easier and provided good exposure to control bleeding. The

approach also helped in good visualization and confirmation of the junction of the cystic and common bile duct and thus the cystic duct ligation was simpler.

Discussion

The origin of the alternative technique lies in the quest of surgeons, who had to deal with post-operative biliary strictures, for a safer technique. Lahcy and Pyrtok [2] enunciated that the Calot's triangle deserves the surgeon's respect and advocated the fundus-first cholecystectomy.

The commonest reasons for biliary tract injuries are fibrotic adhesions and the numerous anatomical variations. The fundus-first approach has proven to have a low incidence of biliary stricture post-operatively [9] and such a stricture was not observed in any of our 30 cases. The site of opening of the cystic duct is seen much better when the gall bladder is detached from its bed.

The critical areas i.e., the junction of (a) the cystic duct to the common hepatic duct and (b) the cystic artery to right hepatic artery were well delineated once the gall bladder was detached and retracted caudally.

In the fundus-down approach, dissection has to enter the acute angle of the junction of the cystic and hepatic ducts hence leaving no room for doubt on structure identification. Fundus-down technique is more flexible since it allows conversion of a cholecystectomy into a cholecystostomy or a subtotal cholecystectomy without the necessity of dissecting the porta hepatis. However, this need did not arise in our study.

The principal objections raised against the procedure are :

- Excessive bleeding from the cystic artery as it is not ligated. This can be minimized by ensuring that the right plane is entered during dissection [3].
- Dislodgement of stones from gall bladder into common bile duct.
- Traction distortion of the junction of cystic and common hepatic duct. This can be avoided by relaxing all traction prior to ligation.

The safe and confident dissection of gall bladder with fundus-first approach enabled us to identify the cystic duct and cystic artery clearly before

ligating them and the safety of common duct and right hepatic artery was better ensured.

The safety of the fundus-first procedure more than offsets the objections and has prompted some surgeons to advocate that the traditional 'unsafe' cholecystectomy procedure be abandoned totally [3,5].

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