INTERNATIONAL JOURNAL OF CURRENT ADVANCED RESEARCH
ISSN: O: 2319-6475, ISSN: P: 2319-6505, Impact Factor: 6.614
Available Online at www.journalijcar.org
Volume 11; Issue 12(A); December 2022; Page No. 1717-1719
DOI: http://dx.doi.org/10.24327/ijcar.2022.1719.0384

Research Article

WIDE OPENING OF CALOT'S TRIANGLE AS THE INITIAL STEP- A SAFE ALTERNATIVE TO STANDARD PROCEDURE IN LAPAROSCOPIC CHOLECYSTECTOMY

Ajay Verma[1], Mohamad Afzal ud din[2], and Suhail Amin Bhat[3*]

Department of general surgery, AlFalah School of medical science and research center, Dhauj faridabad.

A R T I C L E I N F O

Article History:

Received 29th October, 2022
Received in revised form 15th November, 2022
Accepted 16th December, 2022
Published online 28th December, 2022

Key words:

cholecystectomy, laparoscopy, common bile duct injury.

A B S T R A C T

Background: Laparoscopic cholecystectomy is associated with relatively high risk of biliary injury, if not controlled can prove counterproductive to the benefits of minimal invasive surgery. This injury can be avoided by wide opening of calot's triangle as the initial step. **Method:** The procedure is done in 3steps. First step initial dissection in anatomical space flush with gall bladder wall. The posterior gallbladder peritoneum is divided first followed by anterior gallbladder peritoneum. The neck is then retracted upwards and downwards to facilitate section of fibrous tissue,at a distance from both the liver and cystic duct and artery, until calot's triangle is widely opened. Second step is pulling of cystic duct and artery perpendicular to the CBD and dissecting them safely at distance from CBD, followed by clipping of cystic artery and cystic duct. Finally the fundus and body of the gallbladder are detached from liver. **Results:** Laparoscopic cholecystectomy was done by this method in 200 patients. The conversion rate was 4% and there was no bile duct injury. **Discussion:** These techniques avoid the bile duct and vascular injuries and helps to detect the anatomical abnormalities.

INTRODUCTION

Laparoscopic cholecystectomy is the most commonly performed general surgery procedure. It is associated with relatively high risk of biliary injury as compared to open cholecystectomy(1,2). This complication if not controlled can prove counterproductive to the benefits of minimal invasive surgery. Though complications are decreasing but it is very important to recognise the safe technicality. A safe cholecystectomy is the need of hour that is safe both for the patient and operating surgeon. Factors predisposing to bile duct injuries are related to anatomy, structure misidentification and improper techniques (3, 4). The most common injuries are due to identifying CBD or CHD as cystic duct or hepatic artery as cystic artery. Laparoscopic surgery has the benefits like reduced hospital stay , less postoperative pain, minimal scar but biliary injuries and conversion to open procedure may negate the benefits(5). To avoid these problems we started with a newer surgical technique in laparoscopic cholecystectomy which decreased the incidence of bile duct injury considerably.

MATERIALS AND METHOD

The procedure is done under general Anaesthesia with patient placed in supine position. The technique of wide opening of Calot's triangle comprises three steps that are described below. Four or five laparoscopic ports are used. The subhepatic region is explored to identify the CBD, hepatic artery, gallbladder neck and Calot's triangle. Before any dissection of the biliary tree, any adhesions between the gallbladder and the omentum are divided together with adhesions between the duodenum and the gallbladder neck, which is grasped.

Step 1.Opening Calot's triangle: The gallbladder neck is retracted upwards. The posterior peritoneum is divided along its attachment to the liver for a length of 3-4 cm between the neck and body of the gallbladder. Once the posterior peritoneum has been divided, fibrous tracts under tension between the gallbladder neck and the liver are also divided flush with the gallbladder wall. If the gallbladder neck lies behind the hepatoduodenal ligament, it is progressively detached by dividing fibrous leashes that attach it to the hepatoduodenal ligament and the liver. The gallbladder neck is now retracted downwards. The anterior peritoneum, which is under tension, is divided. the fibrous leashes that stretch (under tension) between the gallbladder neck and the liver are also divided flush with the gallbladder wall.The gallbladder neck is successively retracted upwards and downwards, and the fibrous tissue between the gallbladder neck and the liver is progressively divided flush with the gallbladder wall until Calot's triangle has been opened widely. This manoeuvre is usually easy, but it can be difficult in the presence of cholecystitis, when the fibrous tissue is sclerotic and bleeds easily, or when the gallbladder wall is fragile due to inflammation or is frankly gangrenous. Once Calot's triangle has been opened widely, the gallbladder neck appears detached from the liver. Retracting the gallbladder neck will demonstrate that the cystic duct and artery are now separate

Corresponding author:* **Suhail Amin Bhat
Central Research Laboratory, Apollo Institute of Medical Sciences and Research, Jubilee Hills, Hyderabad, Telangana, India

from the liver and lie perpendicular to the CBD, and the connection between the cystic duct and the CBD can be clearly identified.

Step 2. Dividing the cystic artery and duct: Once detached from the liver, the cystic duct and artery are dissected out and cleaned flush with the gallbladder neck and at a distance from the CBD. The cystic lymph node is removed. The cystic artery is clipped and divided followed by cystic duct at a distance from the CBD. The gallbladder neck is now completely separate from the liver, and the body and fundus of the organ can be safely detached.

Step 3.Completing the cholecystectomy: The gallbladder neck is successively retracted upwards and downwards to assist division of the posterior and anterior peritoneum overlying the body and fundus of the gallbladder, followed by gallblader by the fibrous tissue which crosses between the liver and the gallbladder wall and is now placed under tension. This dissection is carried out at a distance from the main CBD and any accessory bile duct. Once the gallbladder has been completely detached from the liver, it is placed in a protective bag and is extracted through the port in the left upper quadrant.

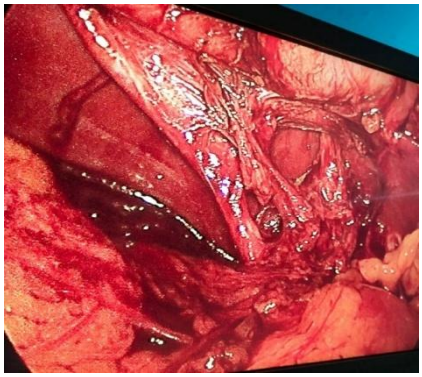

Figure1 wide opening of calot's triangle.

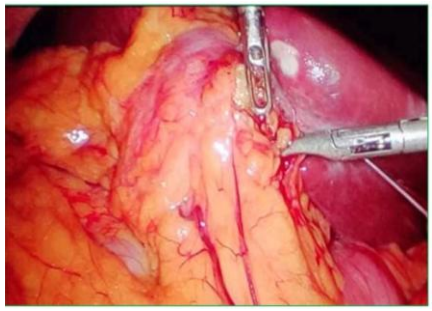

Figure 2 Adhesions covering the gallbladder which necessiates conversion to open procedure.

RESULTS

In our study 200 patients underwent laparoscopic cholecystectomy between 2019 and 2022 by this technique. 152 out of 200 patients were females with majority in age group of 30-40 years (64 females). All the patients were operated electively. Conversion from Laparoscopoc to open cholecystectomy was done in 08 patient's (4%). Reason for conversion was Adhesions, difficult dissection and abnormal anatomy. Male patients had the higher rate of conversion to open procedure (12.5% in males and 0.65% in females). There was no bile duct injury among these patients.

Table 1 Reason for conversion to open procedure

Reason	**No.of patients**	**Percentage**
Adhesions	4	2%
Difficult dissection	3	1.5%
Abnormal anatomy	1	0.5%
Total	**8**	**4%**

Table 2 Gender basis for conversion

Gender	**Total no.of patients**	**Conversion to open**	**Percentage**
Male	48	6	12.5%
Female	152	2	0.65%
Total	**200**	**8**	**4%**

DISCUSSION

Using the technique of wide opening of calot's triangle as the initial step, several advantages are gained over the standard method. It allows safe dissection of the cystic duct and artery and any anatomical anomalies are easily detected before any duct is divided. Injury to the CBD or right hepatic duct can easily be avoided, as can injury to a hepatic artery that runs along the cystic duct and reaches the gallbladder neck before entering the liver. Thereafter bile duct injury cannot occur during detachment of the body and fundus of the gallbladder since by now the neck lies well free of the liver. Many studies were conducted in which improved techniques for laparoscopic cholecystectomy led to significant decrease in biliary injuries (6, 7, 8), which are comparable to our study in which no patient suffered bile duct injury.

In conclusion, this is a safe and useful technique that provides a good operative strategy for the avoidance of CBD injury during laparoscopic cholecystectomy. We recommend the technique in all cases, with conversion to open procedure if adhesions or inflammatory tissue still preclude safe identification of the anatomy of the biliary tree.

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