

## Laparoscopic cholecystectomy fundus first

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**Abstract:**Background: Removal of the gallbladder with dissection at the fundus first is well recognized as a safe technique during difficult "open" cholecystectomy because it minimizes the risks of damage to the structures in or around Calot's triangle, and although feasible in laparoscopic cholecystectomy it has not been widely practiced. Laparoscopic cholecystectomy is most simply carried out using antegrade dissection with a grasper to provide cephaladfundic traction. Fundus-first dissection during laparoscopic cholecystectomy as an alternative to techniques previously described.Methods:This study included 24 patients treated over 24 months. The inclusion criterion was the presence of ultrasound proven gallstones. Patients were excluded from the study if there was evidence of common bile duct stones, a bilioenteric fistula, or carcinoma of the gallbladder.Results: Fundus-first dissection during laparoscopic cholecystectomy was used in 24 patients who underwent laparoscopic cholecystectomy. There were 5 male and 19 female patients. 8 patients had moderate or severe adhesions involving the gallbladder. Median duration of surgery in the 24 patients was 79.5 minutes (35–130). The procedure was successful in 23 patients, but in one patient it was converted to open operation because of dense adhesions. There was no mortality.Conclusions:Fundus-first dissection technique during laparoscopic cholecystectomy was easy to learn with a short learning curve, and it is therefore recommended that laparoscopic surgeons acquire this technique for use as a secondary approach when faced with a difficult case.

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1987 and in the United States in 1988. It is performed using laparoscopic visualization of the gallbladder and surrounding vital structures. After distention of the abdominal cavity with carbon dioxide gas (2).

Laparoscopic cholecystectomy decreases postoperative pain, decreases the need for postoperative analgesia, shortens the hospital stay from 1 week to less than 24 hours, and returns the patient to full activity within 1 week (compared with 1 month after open cholecystectomy). Laparoscopic cholecystectomy also provides improved cosmesis and improved patient satisfaction as compared with open cholecystectomy. (3-4).

Problems with laparoscopic cholecystectomy include bile duct injury, conversion or failure to convert to open operation.

Bile duct injuries still occur after the introduction of laparoscopic cholecystectomy. The reason for injuries may be suboptimal surgical technique, inflammation, and anatomic variations. Furthermore, local tissue damage caused by monopolar electrocautery may also be a pathogenic factor (5). Theoretically, these injuries may to some extent be prevented if ultrasonic dissection technique is used (6-7).

Fundus first cholecystectomy is a well-documented procedure that is used for difficult open cholecystectomy due to acute or chronic inflammation or in cirrhotic patients with portal hypertension. Fundus first laparoscopic cholecystectomy has been reported in only few series and used routinely in some studies

### 1. Introduction

The operative removal of the gallbladder is a standard and one of the most often performed procedures in general surgical hospital departments. Indications for cholecystectomy, either open or laparoscopic, are usually related to symptomatic gallstones or complications related to gallstones.

Biliary colic, biliary pancreatitis, cholecystitis, and choledocholithiasis are the most common indications for cholecystectomies.

Other indications include biliary dyskinesia, gallbladder cancer

Nowadays more than 90% of the elective cholecystectomies are performed laparoscopically. Without a doubt, operative therapy has to be judged as the method of choice in the treatment of symptomatic gallstone disease as opposed to conservative treatments.

Laparoscopic cholecystectomy has rapidly become the procedure of choice for routine gallbladder removal and is currently the most commonly performed major abdominal procedure in Western countries (1).

A National Institutes of Health consensus statement in 1992 stated that laparoscopic cholecystectomy provides a safe and effective treatment for most patients with symptomatic gallstones and has become the treatment of choice for many patients (2). Laparoscopic cholecystectomy is a new operation that was first performed in France in

gallbladder leading to bile and stone spillage; effect of bile spillage on hospital stay.

After insertion of the standard 4 ports, the gallbladder is retracted at the fundus and dissected from the liver fossa to create a space to insert the liver retractor. With the retractor in position, the gallbladder is now easily dissected off the liver bed till it hangs at the junction of the cystic duct with the CBD. At this stage, The cystic artery is usually isolated before the cystic duct and is divided using the monopolar electrocautery or clips then the cystic duct is divided between clips of Endoloops.

### 3. Results

Twenty four patients were included in this study and all operations were completed as intended using the laparoscopic fundus first technique. Patient characteristics are shown in Table 1. Median age was 37.5 years (17–60), and Median duration of surgery in the 24 patients was 79.5 minutes (35–130). Amount of bleeding was not measured specifically but was in the range of 20–50ml per patient. There seemed to be a learning curve, with the first 13 operations lasting median 96.5 minutes (80–130), and the subsequent 11 operations lasting 59.5 minutes (35–80).

Eight patients had adhesions from the greater omentum and/or bowel to the gallbladder. Intraoperative cholangiography was not performed in all patients. 22 patients had signs of chronic calculous cholecystitis with thickened gallbladder wall, and two had a non calculous chronic cholecystitis.

Two had pus inside the gallbladder when it was opened after the operation was completed. 5 patients was the only male in the Study. An accidental perforation occurred at the gallbladder during dissection of 4 patients only all patients had a suction drain that was removed the following day when the patient was discharged. One patient had acute cholecystitis 3 months prior to surgery.

During the 24 operations we found one patient where the cystic artery came directly from the right hepatic artery, one patient had a very short cystic duct, and 4 patients had hepatomegaly.

All patients had uneventful clinical courses with no intraoperative or postoperative complications resulted from the insertion of the trocars. There was no postoperative mortality in this study.

Hospital stay was median 0 days (range 0–1).

### 4. Discussion

Reddick-Olsen technique of fundic traction to expose Calot's triangle, published in 1989, that became the standard technique worldwide [10]. Publications of the use of retrograde dissection of the gallbladder via laparoscopy began appearing in the mid 1990s. Some authors have recommended routine use of fundus first

A low threshold for conversion is generally considered to be a marker of good practice, however conversion is associated with increased costs and both short and long term morbidity [8]. In the era of open surgery, retrograde or "fundus first" dissection was used routinely by many surgeons while others reserved it as a defensive technique for the difficult case. When a LC is converted to an open operation, retrograde dissection is generally used (9). "Fundus first" laparoscopic cholecystectomy appears to have been underutilized possibly because in the early days of LC only rudimentary instrumentation was available.

However, laparoscopic liver retractors are now readily available and the gallbladder can be mobilized fundus first whilst the liver is kept elevated by a retractor.

The aim of this study was to demonstrate the validity of a surgical procedure as a secondary technique. The associated difficulties and potential complications

### 2. Material and Methods

This prospective non-selected and non-consecutive randomized study was carried out on 24 patients admitted to the Department of Surgery, Alhussen hospital, Al-Azhar University from January 2010 to January 2012 with the diagnosis of symptomatic gallstone disease. Informed consent forms signed by all patients who were blinded as to which treatment (procedure) they would receive. Each patient was evaluated by detailed history and thorough physical examination. Investigations like complete blood picture, urine routine examination, serum urea and creatinine, fasting blood sugar, liver function tests, hepatitis screening and ultrasound abdomen were performed.

In all cases, the surgical procedure is carried out with patients under general endotracheal anesthesia. They are supine with their legs extended, in an anti-Trendelenburg position and inclined laterally to the left at an angle of 30 degrees to facilitate exposure of the hepatic region. A nasogastric tube is placed into the stomach at the beginning of the procedure. Prophylactic intravenous antibiotics are administered before surgery. The first surgeon stands on the patient's left, and the 2 assistants stand on the patient's left and right side. The laparoscopic equipment is placed on the cranial right side of the operating table. A 10-mm is introduced into the peritoneal cavity and placed in the periumbilical site with an open technique, and pneumoperitoneum to a pressure between 12 and 15 mm Hg is created following parameters were studied: time taken for the procedure (time from insertion of the first port to the withdrawal of the last port); rate of conversion to either procedure and to open procedure; injuries to viscera, viscus, and vessels; injury of the

participation with more position changes of the instruments during operation (14).

It was our impression that the technique was easy to learn with a short learning curve, and it is therefore recommended that laparoscopic surgeons acquire this technique for use as a secondary approach when faced with a difficult case.



Figure 1 fundus dissection

rather than reserving it for difficult cases. Cengizet *al.* randomized 80 elective patients to compare the two dissection techniques and found that fundus first combined with ultrasonic dissection was quicker and associated with less nausea and pain [11]. Neriet *al.* reported that fundus first reduced the operative time and was an easier technique to perform [12]. They proposed that it should be the standard procedure and not only reserved for difficult cases.

However, the fact that most surgeons do not use fundus first routinely shows that fundus first is a more complex operating than the conventional laparoscopic technique. Tuveriet *al.*'s report, even though they state that fundus first dissection was reserved for the very difficult anatomy at the Calot's triangle, but its adoption needs a good surgical judgment. Considering the high incidence of CBD stones in this series. [13].

The purpose of fundus-first laparoscopic cholecystectomy is to provide an alternative method for laparoscopic removal of the gallbladder in technically difficult cases, particularly when altered anatomy or acute inflammation exists. However, fundus-first laparoscopic cholecystectomy is not intended to replace good surgical judgment and converting to open cholecystectomy should be used when applicable.

The role of the assistant is, however, different with the fundus first technique requiring a more active

Numbers	Sex	Age	Chronic calcularcholecystitis	Chronic non calcularcholecystitis	Operative time	Adhesions to omentum or intestine	Perforation of gallbladder	Comment
1	F	30	+		105		+	
2	F	37	+		100	+		
3	F	40	+		90	+		
4	M	17	+		95	+		
5	F	27	+		95			
6	F	50		+	80			
7	F	30	+		120			
8	F	32	+		125	+		
9	M	42	+		105			
10	F	42	+		100			
11	M	55	+		110		+	
12	M	25	+		130	+	+	Convert to open
13	F	60	+		70			
14	F	19	+		60			
15	F	40	+		80	+		
16	F	40	+		55			
17	F	47		+	40			
18	F	18	+		60			
19	F	29	+		45	+		
20	F	50	+		70		+	
21	F	51	+		50			
22	M	39	+		50	+		
23	F	40	+		40			
24	f	40	+		35			



Figure 5 clipping of cystic duct

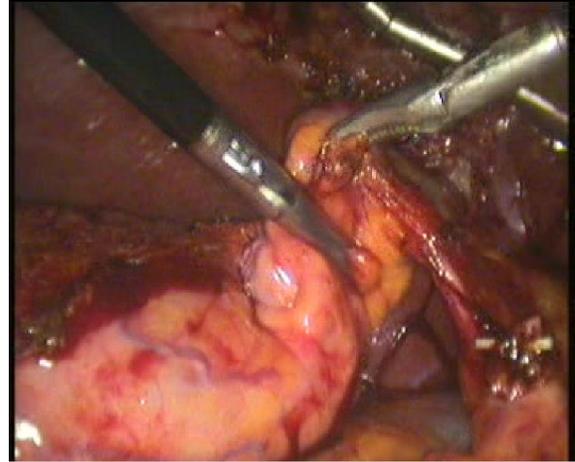


Figure 2 skeletonization of cystic duct after clipping of cystic artery

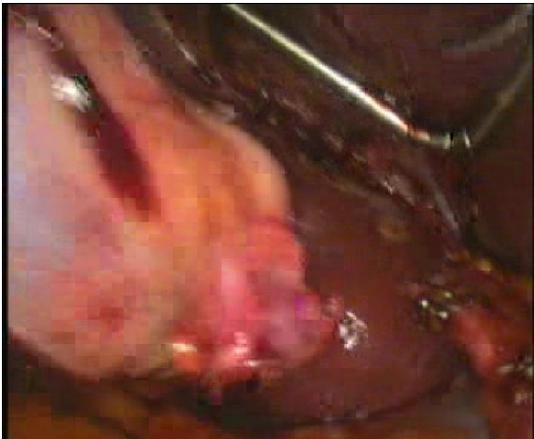


Figure 6 division of gallbladder



Figure 3 liver retractor at the gallbladder bed



Figure 7 gallbladder bed at the end



Figure 4 pedicle of the gallbladder

*Consensus tatement.* NIH; September 14-16, 1992. 10(3):1-28.

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