

# The “invisible cholecystectomy”: A transumbilical laparoscopic operation without a scar

Miguel A. Cuesta · Frits Berends · Alexander A. F. A. Veenhof

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## Abstract

**Background** Looking to further reduce the operative trauma of laparoscopic cholecystectomy, we developed, in patients with no history of cholecystitis and a normal BMI, a scarless operation through the umbilicus. The operative technique, along with the results of the first 10 patients operated in this way, are fully described.

**Methods** 10 female patients underwent transumbilical scarless laparoscopic cholecystectomy.

Through the umbilicus, two trocars of 5 mm were introduced parallel to another with a bridge of fascia between them (one for the 5-mm laparoscope and the other for the grasper). With the help of one 1-mm Kirschner wire, introduced at the subcostal line and bent with a special designed device, the gallbladder was pulled up and the triangle of Callot was dissected free, clipped, cut, and the gallbladder was subsequently resected. Finally the gallbladder was taken out through the umbilicus and the umbilicus reconstructed.

**Results** 10 female patients, mean age 36 years (range: 31–49), mean body mass index (BMI) 23 (range: 20–26), after one attack (six patients) or a second attack (four patients) and cholelithiasis confirmed by ultrasonography with no suspicion of inflammation were included in this

preliminary study. Mean operative time was 70 minutes (range: 65–85) with no conversions; hospital stay was less than 24 hours with no complications.

**Conclusion** Looking to reduce operative trauma and improve the cosmetic result following laparoscopic cholecystectomy, a transumbilical operative technique has been developed. Results of the operative procedure in a selected group of patients are encouraging with no signs of inflammation and normal BMI. The umbilicus can be developed as a natural port for performing various operative procedures with the help of the traction produced by thin Kirschner wires.

**Keywords** Laparoscopic cholecystectomy · Minimally invasive · Scarless cholecystectomy

The introduction of natural orifice transluminal endoscopic surgery (NOTES) has enabled the treatment of digestive diseases such as acute appendicitis and gallstones, and even the creation of some kinds of fundoplication by means of a flexible scope (with multiple instruments) introduced through the stomach, rectum or vagina. This approach has opened a new surgical frontier in which the patient is operated on with less pain, less discomfort, and probably without any scar [1, 2].

The experience related herein differs from NOTES surgery, but concerns the performance of an exclusive transumbilical laparoscopic cholecystectomy producing minimal postoperative discomfort and no new scars. The operative technique and results are described. This approach teaches us that a natural scar, such as the umbilicus, can be used for the introduction of multi-functional flexible scopes and other devices in the near future.

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M. A. Cuesta · A. A. F. A. Veenhof  
Department of Surgery, Vrije Universiteit Medical Centre,  
Amsterdam, The Netherlands

F. Berends  
Rijnstate Hospital, Arnhem, The Netherlands

M. A. Cuesta (✉)  
Department of Surgery, VUMC, De Boelelaan 1117,  
Amsterdam, The Netherlands  
e-mail: ma.cuesta@vumc.nl

## Patients and methods

Ten female patients, with an age between 31 and 49 years (mean: 36) with a first (six patients) or second attack (four patients) of cholelithiasis and without signs of acute cholecystitis were included in this preliminary study. Body mass index was between 20 and 24 (mean: 23). Diagnosis of gallstones was made by ultrasonography and all patients were classified as American Society of Anesthesiologists (ASA) grade I.

### Operative technique (Overview: Fig. 1)

The patient is placed in the French position with the surgeon between the legs looking at monitors at the shoulder level of the patient.

The umbilicus is opened longitudinally and insufflation is performed through it using the Veress needle. Two 5-mm trocars are introduced parallel to one another at the edge of the umbilicus, one on the right and the other on the left, leaving a small bridge of fascia between them. A 5-mm 30°scope is introduced through the right umbilical trocar and the patient is positioned in a slightly anti-Trendelenburg position with some rotation to the left. Once located

and if distended, the gallbladder is emptied by using a thin needle introduced subcostally. Thereafter a Kirschner wire ( $\varnothing$  1mm) is introduced in the subcostal area and, once in the abdominal cavity, is bent by a device introduced through the left umbilical trocar. This device was developed by the technical department of the VU University Medical Center in Amsterdam. By means of this hook the gallbladder is gently pulled in an upright direction to visualize Callot's triangle (Fig. 2A). A 5-mm grasper is introduced through the left umbilical cannula and dissection of the cystic duct and cystic artery is performed as described by Strasberg [3] (critical view of safety for cholecystectomy) (Fig. 2B). If not possible, conversion to standard laparoscopic cholecystectomy should follow. Once dissected free, the duct and the artery are clipped using a 5-mm clip applicator (Allport LS medium, Ethicon) and cut. From here, the gallbladder is pushed upright and dissected free from the liver by means of a hook. Once the gallbladder is free, it is grasped and the two small umbilical wounds are united by cutting the bridge and the gallbladder is subsequently extracted through this incision. The umbilical fascia is closed and the natural scar of the umbilicus is restored by intracutaneous stitches (Fig. 2C).

## Results

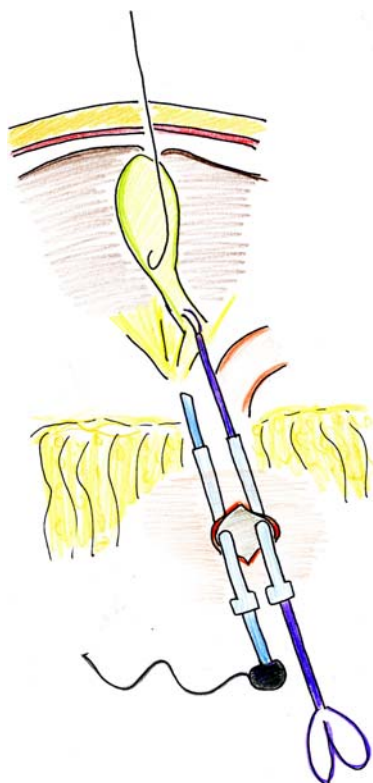
Mean operative time was 70 minutes (range: 65–85); no conversions were performed. Three gallbladders were punctured and drained to facilitate traction. Culture of the bile was sterile in all these three patients. One leakage of bile produced by traction was observed and the gallbladder was emptied by suction. No gallstones were lost during operation.

Patients were admitted for less than 24 hours and no postoperative complications were observed at follow-up in the outpatient policlinic one week after operation.

## Discussion

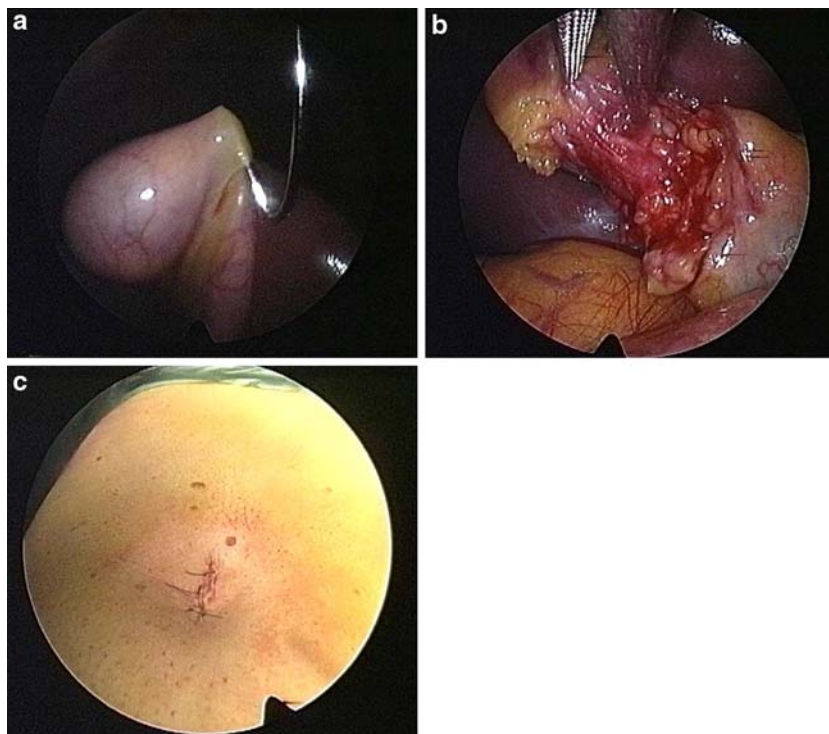
Many important advantages of laparoscopic surgery are produced by preservation of the integrity of abdominal wall, including less operative trauma and complications and better recovery and cosmetics.

For many operations, such as laparoscopic cholecystectomy, several attempts have been made to reduce operative trauma further by decreasing the number and size of the trocars used in the procedure. The use of three trocars instead of four, and the use of mini-instruments, is definitely a step in this direction [4, 5]. Moreover some patients, recorded as case reports, increasingly ask surgeons to be operated without external scars. The use of



**Fig. 1** Schematic overview of the scarless cholecystectomy technique

**Fig. 2** **A.** The gallbladder is kept under traction by the bent Kirschner wire; **B.** dissection of the triangle of Callot; **C.** postoperative result: one reconstructed umbilical incision



mini-instruments in combination with extraction of the gallbladder through the top of the vagina has been described [6, 7]. The patients presented in this series have been selected with a normal BMI and no inflammation of the gallbladder. Moreover, during operation good visualization and respect for the Strasberg safety rules was observed. Puncture of the gallbladder, if distended, was carried out on the understanding that the bile was not contaminated and no important leakage was observed thereafter. Bile culture confirmed this and no umbilical infections were recorded.

NOTES involves the extraction of some digestive organs through natural orifices, such as stomach or sigmoid, without the necessity for opening the abdominal wall [1, 2]. By introducing a multifunctional flexible scope into the abdominal cavity, various procedures can be performed. Nevertheless the goal of surgery is to accomplish a surgical procedure without collateral effects. Possible added complications produced by the opening in the stomach or colon may have disastrous consequences for the patient. The use of a natural scar, the umbilicus, for the introduction of this flexible scope reduces any added possible complication. Moreover, the umbilicus is located centrally in the abdomen and its closure at the end of the procedure will heal with no apparent new scar. Moreover, the introduction of other fine devices such as thin Kirschner wires through the abdominal wall for traction or pulling solves problems of the exposition of the organs to be

operated on. These results, obtained with this invisible cholecystectomy concept on selected patients, gentle operation technique, and observation of safety rules for cholecystectomy, can be extended in the near future under the name trans-umbilical flexible endoscopic surgery (TUFES).

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