

Laparoscopic cholecystectomy in the grossly obese: 4 years experience and review of literature

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Background

Conventional abdominal surgery in grossly obese patients is associated with an increased rate of postoperative complications; thus, laparoscopic surgery may be preferred in these patients.

Patients and methods

A prospective analysis was performed of 20 grossly obese patients who underwent laparoscopic cholecystectomy between April 1996 and April 2000 for symptomatic non-complicated gallstone disease.

Results

Technical problems at operation included difficulty with induction of pneumoperitoneum and introduction of the

most lateral subcostal port, retraction of the gallbladder fundus, the need for longer instruments and the closure of the fascia. Laparoscopic cholecystectomy was successfully completed in 19 patients, but one patient required conversion to open operation. There were no anaesthetic difficulties. Two patients developed minor chest infections. The mean hospital stay was 2.9 days.

Conclusion

Laparoscopic cholecystectomy is feasible and can be recommended for symptomatic gallstone disease in grossly obese patients.

Keywords

Laparoscopic cholecystectomy, obesity

Introduction

Conventional abdominal surgery in the grossly obese is associated with an increased rate of wound infection, atelectasis, respiratory tract infection and deep vein thrombosis (DVT) in the postoperative period [6]. Furthermore, operations in the obese are also associated with technical problems such as difficulty with access and retraction of the abdominal wall and viscera [1–4]. For these reasons, grossly obese patients pose considerable anaesthetic and surgical risks to the extent that many referring doctors and indeed surgeons often postpone elective operation indefinitely. This policy will expose these patients with symptomatic non-malignant disease to the increased risks of potential emergency procedure.

Laparoscopic cholecystectomy (LC) results in less post-operative pain, a decreased incidence of atelectasis and chest infection, rapid mobilisation and early discharge from hospital [5]. Clearly LC has attributes, but are of benefit to the majority of patients, but can the grossly obese share these benefits?

We prospectively studied and report on a group of 20 grossly obese patients with gallstone disease undergoing cholecystectomy.

Patients and methods

Between April 1996 and April 2000 patients with a body mass index (BMI) greater than 35 were studied [BMI=Weight(kg)/Height(m²)]. The minimum BMI level chosen represents patients in the upper range of group II and group III obesity as defined by Garrow [6]. The major inclusion criteria for this study were gross obesity and symptomatic gallstone disease needing cholecystectomy. Patients were excluded from the study if there was a history of jaundice, deranged liver function tests, acute cholecystitis, the need for pre-operative ERCP or ultrasonographic findings to suggest biliary obstruction. All patients were admitted one day preoperatively for investigations including full blood count, urea and electrolytes, blood glucose, liver function tests, chest x-ray, electrocardiogram and abdominal ultrasound scan. Date of admission, discharge, hospital stay, operative time, operative difficulties, conversion to open procedure and any immediate postoperative complications were recorded. All patients were seen in out-patients clinic at 6 weeks, 6 months and one year postoperatively, when any symptoms were recorded.

A senior anaesthetist (consultant or senior registrar) examined all patients on the eve of the operation. When

deemed necessary, oral premedication with temazepam was given 2 hours before operation. Prophylaxis against DVT was provided in the form of thromboembolic deterrent stockings (TEDS) plus 5000 units of subcutaneous heparin (Minihep Calcium Syringe; Calcium Heparin: Leo Laboratories Ltd, Bucks, UK) given with the premedication. Each patient received cefuroxime 1g intravenously at the time of induction of anaesthesia, or erythromycin 1g if sensitive to penicillin.

Surgical technique

In each case operation was commenced using the standard method of insufflation, with the Veress needle inserted through an infra-umbilical stab incision. Once a 3.5 litre pneumoperitoneum had been established with a maximum intra-abdominal pressure of 12mm Hg, the Veress needle was replaced by a 10mm port and a camera was introduced. The other standard ports were subsequently inserted under direct vision. The procedure was performed with the patient in the reverse Trendelenberg position with the operating table rotated to the left. Because of the large size of these patients it was felt necessary to strap them to the operating table with appropriate cushioning of the pressure areas. The operations were performed in the standard way, with identification of the cystic duct and the cystic artery in the triangle of Calot and their subsequent division between clips. The gall bladder was then dissected off its bed using either a Dubois hook or endoshears according to the surgeon's preference. There was no need to perform an operative cholangiogram in any patient in this study and this was not done routinely. Drainage of the pouch of Morrison was not needed. The gallbladder was in all instances retrieved via the epigastric port. Deflation of the peritoneal cavity was always carried out via the epigastric port and all ports were removed under direct vision making sure that no loops of bowel were pulled into port sites. The infra-umbilical and epigastric wounds were both routinely closed using Vicryl sutures on a J-shaped needle (Ethicon Ltd., Edinburgh, U.K.) for the fascial layer and the skin was closed with subcuticular Vicryl.

Oral fluid intake was commenced upon transfer of the patients to the ward and patients were commenced on a light diet on the evening of the operation. Prophylaxis against DVT was continued for 24 hours postoperatively or until full mobilisation was attained.

Results

Over the four-year period elective LC was attempted in 20 consecutive patients with a BMI greater than 35 kg/m². Seventeen women and three men were recruited. Their mean age was 50 years [range 30–70 years] and their mean (SD) BMI was 38.2 kg/m² (2.7) [range 35.1–42.6].

Laparoscopic cholecystectomy was successfully completed in 19 patients. In one 35-year-old woman with a BMI of 39.5 kg/m², conversion to open cholecystectomy was required owing to an inability to establish a pneumoperitoneum. The range of operating time was 73–183 minutes (median 97.6 minutes). The range of hospital stay was 2–9 days (median 2.9 days). No patient required chest physiotherapy postoperatively. There were no anaesthetic problems either intraoperatively or postoperatively, and no patient required admission to a high dependency or intensive care unit. There were no episodes of clinical DVT or wound infection but patients had minor chest infections which delayed discharge from hospital. No port site hernia was recorded after a median follow up time of 25.1 months (range 6–54 months).

Technical problems at operation

Difficulty with insertion of the Veress needle was encountered in 5 of the 20 patients. There was one complete failure in which attempted cutdown for direct introduction of the port (Hassan technique) also failed. This was the reason for converting the only case to open operation in this series. Open insertion of the trocar can be virtually impossible when a thick layer of fat is present, especially when the pendulous nature of the abdomen causes the umbilicus to descend almost to the level of the pubic symphysis. To circumvent this problem we introduced the needle via a sub-costal stab incision (Figure 1).

Another difficulty was encountered in pushing the fundus of the gallbladder upwards into the suprahepatic space with grasping forceps placed in the lower or most lateral of the subcostal ports. This manoeuvre is important because the traction thus obtained helps expose the structures in Calot's triangle. If the lateral subcostal port is placed too close to the costal margin and inserted perpendicular to the skin, manipulation of the grasping forceps is made very difficult by the depth of subcutaneous fat. By inserting the port further caudally and at an angle towards gallbladder (Figure 2), the need for manipulating the forceps is much reduced. Once the gallbladder is

grasped, it need only be pushed along the axis of the port.

Problems were encountered on insertion of the lateral subcostal port in 3 patients. The port was placed too far laterally and the cannula skirted the peritoneal cavity without entering it (Figure 3). Inserting a long spinal needle or the Veress needle under direct vision to pre-judge the direction before the definitive port is introduced was found to be helpful.

In another 3 patients, additional strategically placed ports were required because of difficulty in reaching the

gallbladder using standard instruments via the standard ports. Usually changing ports and introducing grasping instruments via the epigastric port and scissors or hook via the medial subcostal port circumvented the problem. However in these 3 patients these manoeuvres did not solve the problem and an extra port was therefore required at a strategic site.

Finally some difficulty was encountered in all 19 patients when it came to closure of the fascia in the epigastric and infraumbilical wounds. The importance of closure of the fascia has been stressed by recent reports of intestinal

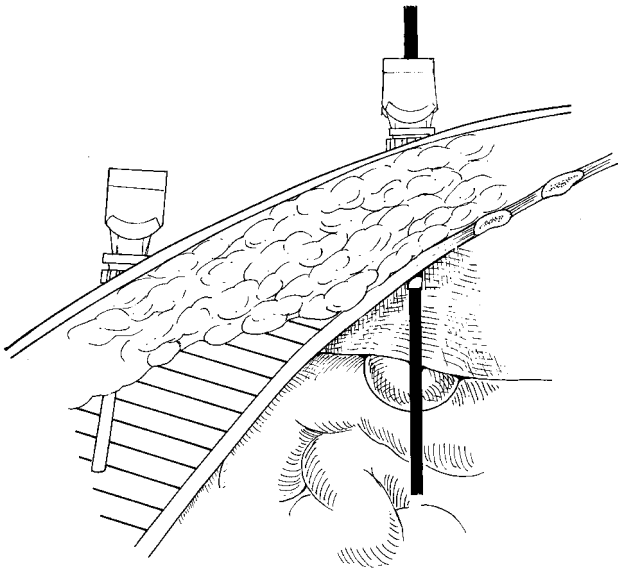


Figure 1. Pleumoperitoneum is best achieved by inserting the Veress needle via a subcostal stab incision (open insertion of a trocar at the umbilicus is not recommended).

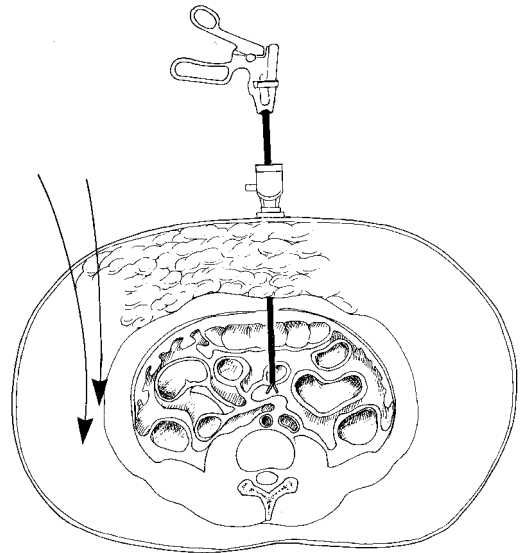


Figure 3. If the lateral subcostal port is inserted too far laterally, it may be difficult to enter the peritoneal cavity.

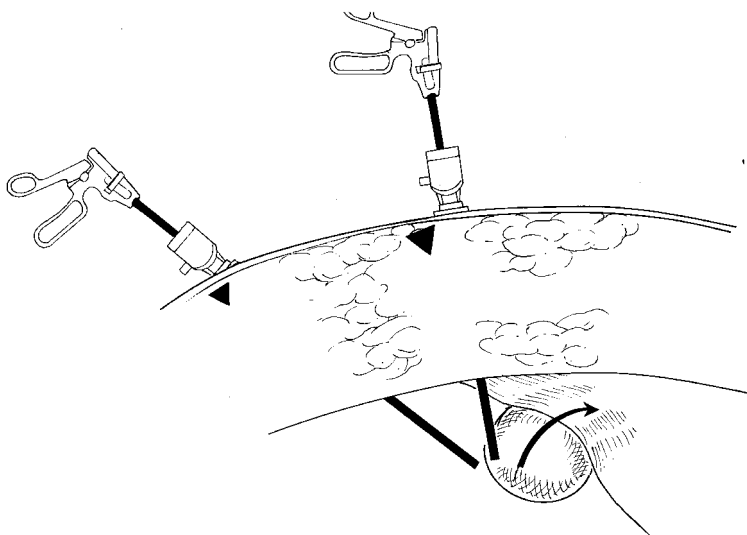


Figure 2. Subcostal ports are best introduced at an angle towards the gallbladder (not perpendicular to the skin). The lateral subcostal port is inserted further caudally (not too close to the costal margin).

obstruction and umbilical hernia following laparoscopic surgery [7,15]. It is therefore routinely performed in all patients in our unit. Some difficulty in this regard was encountered in this group of grossly obese patients. We managed the problem by withdrawing the infraumbilical port and camera simultaneously until the fascia came into view. The fascia was then picked up under direct vision by Kocher's forceps inserted alongside the port. The camera and port were then removed, and closure was effected using Kocher's forceps as a guide.

Discussion

This prospective analysis studied 20 grossly obese patients undergoing laparoscopic cholecystectomy, concentrating on the technical difficulties, operative time, conversion rate, complications and hospital stay. The study shows that there are several technical problems associated with the large size of these patients. These problems can be overcome by modifying standard surgical techniques, however. The only technical problem that necessitated conversion to operation was failure to establish a pneumoperitoneum. Once a pneumoperitoneum was established, each operation followed lines similar to LC in normal-size patients. Although the amount of fat in the triangle of Calot may be greater in the grossly obese, careful dissection still allows identification of the relevant structures and their safe management. The availability of longer instruments would have been useful, but they are not absolutely necessary for the safe conduct of LC in this special group of patients.

The ventilatory problems that are posed by creation of a pneumoperitoneum during laparoscopy – increased PaCO₂, risks of pneumothorax and pneumomediastinum, gas embolism – are compounded by obesity. Up to 23% of the obese population have coexisting respiratory diseases [9]. The decrease in pulmonary compliance together with ventilation-perfusion mismatching and intra-pulmonary shunting of blood predisposes to hypoxia. Against the background of an increased oxygen consumption and carbon dioxide production in the obese [10], this hypoxia may prove difficult to correct. Obesity is also a major risk factor for ischaemic heart disease [11,12] and hypertension [13], both of which serve to increase the risk from general anaesthesia. A high incidence of hiatus hernia and gastroesophageal reflux has been reported in this population [14]. Nonetheless, our patients did not require ventilation, and there were no anaesthetic difficulties.

Conversion rate and complications associated with LC depend on the experience of the surgeon [8]. This study showed a low rate of conversion to open cholecystectomy (5%). Champault and colleagues reviewed 110 obese patients who underwent (LC); the conversion rate was 4.5% in obese patients and 1.8% in non-obese patients [16]. The conversion rate reported in grossly obese ranges from 1.1% [17] to 11.4% [18] depending on surgical experience and the inclusion of gallstone complications, notably acute cholecystitis. Although some studies have shown a higher conversion rate in grossly obese patients [16], most reports show no significant difference from the rate in the non-obese [17,18,21].

Likewise, obesity increased the difficulty of LC and prolonged the operative time in some reports [18,20], but not in others [17,21]. In this study the median operative time was 97.6 minutes, which compared favourably with other published data [16,21].

The long-held assumption that morbid obesity is associated with an increased incidence of postoperative complications is supported by few objective data. The incidence of wound infection [22] and pulmonary complications [23] may be higher following open abdominal operations, but most recent reports of LC in obese and non-obese patients showed no significant difference in complication rate or hospital stay [16,17,20,21,24]. In our series of patients there were no wound infections, no ventilatory problems and no episodes of DVT. Two patients developed minor chest infection which was treated successfully by antibiotics.

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