



IMPACT OF OBESITY ON TECHNICAL FEASIBILITY AND POSTOPERATIVE OUTCOMES OF LAPAROSCOPIC CHOLECYSTECTOMY

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ABSTRACT

Introduction: 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.

Methods: A prospective analysis was performed of 20 obese patients who underwent laparoscopic cholecystectomy between April 2013 and April 2015 for symptomatic non-complicated gallstone disease. 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.

Results: 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 4.9 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 period¹⁻⁶. Furthermore, operations in the obese are also associated with technical problems such as difficulty with access and retraction of the abdominal wall and viscera¹⁻⁴. 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 postoperative pain, a decreased incidence of atelectasis and chest infection, rapid mobilisation and early discharge from hospital⁵. 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.

METHODOLOGY

Between April 2013 and April 2015 patients with a body mass index (BMI) greater than 35 were studied [BMI = Weight(kg)/Height(m²)]. 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 outpatient's clinic at 6 weeks, 3 months post operatively.

A senior anaesthetist examined all patients on the eve of the operation. Prophylaxis against DVT was provided in the form of thromboembolic deterrent stockings plus 5000 units of subcutaneous heparin given with the premedication. Each patient received cefuroxime 1g intravenously at the time of induction of anaesthesia.

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 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 two-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 4–9 days (median 4.9 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.

Technical problems

Difficulty with insertion of the Veress needle was encountered in 5 of the 20 patients. There was one complete failure in which attempted cut down 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. Pneumoperitoneum is best achieved by inserting the Veress needle via a subcostal stab incision.

Another difficulty was encountered in pushing the fundus of the gallbladder upwards into the supra hepatic 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. Once the gallbladder is grasped, it need only be pushed along the axis of the port. 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). If the lateral subcostal port is inserted too far laterally, it may be difficult to enter the peritoneal cavity.

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

gallbladder using standard instruments via the standard ports.

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 obstruction and umbilical hernia following laparoscopic surgery^{6,14}. It is therefore routinely performed in all patients in our unit. 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 and closure was affected using it 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.

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 co-existing respiratory diseases⁸. 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 obese⁹, this hypoxia may prove difficult to correct. Obesity is also a major risk factor for ischaemic heart disease^{10,11} and hypertension¹², 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 population¹³. 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 surgeon⁷. 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 patients¹⁵. The conversion rate reported in grossly obese ranges from 1.1%¹⁶ to 11.4%¹⁷ 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 patients¹⁵, most reports show no significant difference from the rate in the non-obese^{16,17,20}.

Likewise, obesity increased the difficulty of LC and prolonged the operative time in some reports^{17,19}, but not in others^{16,20}. In this study the median operative time was 97.6 minutes, which compared favourably with other published data^{15,20}.

The long-held assumption that obesity is associated with an increased incidence of postoperative complications is supported by few objective data. The incidence of wound infection²¹ and pulmonary complications²² 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^{15,16,19,20}. 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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