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ABDOMINAL WALL TRACTION ASSISTED LAPAROSCOPIC CHOLECYSTECTOMY. CASE REPORT AND DISCRIPTION OF SURGICAL TECHNIQUE.

Subash Chander Gautam, FRCS(ED & Eng), FACS* Raafat Hussain Helmi, DS
Magdi Abdul Sathar, MS Rishi Mani, DA,MD,FFARCS**

Laparoscopic cholecystectomy is now widely accepted as a superior procedure to open cholecystectomy. The carbon dioxide pneumoperitoneum associated complications are still causes of concern. Increased intra abdominal pressure leads to decreased perfusion of intra-abdominal viscera, especially kidneys in addition to several other hemodynamic disturbances. The hypercarbia causes sympathetic stimulation and acidosis. We recommend the mechanical method for the exposure of operation area enabling the operation with reduced intra abdominal pressure. Simple instrument for abdominal wall lift is proposed to achieve this goal. Bahrain Med Bull 1995;17(4):

In 1988 Mouret in France performed the first laparoscopic cholecystectomy. Since then the use of CO2 to distend the abdominal cavity for proper visualization has lead to physiological changes due to pressure effects and hypercarbia. It is suggested that patients with congestive heart failure grade III to IV with diminished cardiac reserve are at risk of developing cardiovascular and respiratory complications[6-8]. These patients should undergo laparoscopic cholecystectomy with minimal pressure pneumoperitoneum. We report a patient with heart failure who underwent successful laparoscopic cholecystectomy. The surgical procedure will also be described.

THE CASE

Eighty five years old United Arab Emirate female national with insulin dependent diabetic for 30 years and osteoarthritis of knees and hips had biliary colics for the last 5 years. She also gave a history of congestive heart failure grade III to IV. Her ultrasonography showed thick walled gallbladder with multiple stones. The common bile duct (CBD) was dilated (10 mm). Intravenous cholangiography demonstrated free flow of contrast into the duodenum with no detectable stones in the CBD. These findings were also confirmed by HIDA isotopic scan.

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* Department of Surgery
** Department of Anesthesiology
Fujarirah Hospital, Fujarirah
United Arab Emirates

Technique

The patient was given general anesthesia. Nasogastric and urinary bladder catheters were inserted to ensure the stomach and bladder were deflated.

Through the periumbilical incision the peritoneum was opened under direct vision. A Hasson trocar was introduced and anchored to the peritoneum and sheath to prevent the CO2 leak. Pneumoperitoneum was created up to 14 mm of Hg. Through the periumbilical part, the laparoscope attached to endocamera was introduced and the abdominal cavity inspected.

The operation was observed on two video monitors, one on each side of the patient. A 5 mm trocar was placed at the level of the umbilicus in an anterior axillary line. A second 5 mm trocar was placed slightly medial and just below the right subcostal margin. Both trocars were introduced under vision.

A Redivac drain on a metal introducer was inserted into the abdominal cavity to the left of the midline just below the xiphisternum (Fig 1). Under vision, lifting the falciform ligament (Fig 2), it was brought out just medial to the right axillary line below the subcostal margin. Two ends of the Redivac drain were tied to a sterile cord. This cord was threaded over a pulley fixed onto an over-head frame. The other end of the cord was tied to hanging weights to achieve the upward lift of the anterior abdominal wall in the subcostal area (Fig 3). Under vision, a 10 mm operating port was placed in the subxiphoid area below the entry point of the Redivac drain. The abdominal pressure was reduced to 4 mm of Hg. The lateral 5 mm port was used to grasp the gallbladder and retract it upwards and laterally. It also helped in lifting the liver. The mid clavicular trocar was used to pull the Hartmann pouch inferiorly and to the left to open up the Calot's triangle. A cholecystectomy was performed by keeping the patient in the lithotomy reverse Trendelenburg position with rotation to the left assisting the stomach and bowel to be away from the field of operation. The lithotomy position helped the camera operator to stand between the patient legs with the surgeon standing to the left of the patient. Starting dissection at the neck of the gallbladder, the cystic duct was identified. Working medially towards the CBD, the cystic duct was double-clipped proximally and distally and cut. The cystic artery was identified by dissecting the tissue in the Calot's triangle. The cystic artery was double-clipped proximally and single-clipped distally and cut. The gallbladder was freed from the bed by cautery dissection. The gallbladder bed was inspected for finer haemostatic which was achieved by coagulation. A warm saline wash was carried out to the gallbladder bed.

The gallbladder was extracted through the umbilical port, under vision, with the laparoscope placed in the subxiphoid operating port. Under vision, the two lateral ports, umbilical port and Redivac drain, were removed. The umbilical incision was closed in layers with Vicryl (polyglactin) No 1 and subcuticular with polyglactin three zero. The whole surgical procedure was performed less than 4 mm of Hg and was completed in 93 minutes.

DISCUSSION

Many devices are suggested, such as the Mouret hook[1] and the metal abdominal suspender[2] to lift the anterior abdominal wall to enable the endoscopic surgeon to operate under low insufflation pressure.

There are definite complications involved in the process of creating pneumoperitoneum and the introduction of the first canula for the endocamera. The increased intra abdominal pressure created and maintained by CO2 insufflation, leads to decreased cardiac venous return, decreased preload, venous stasis and decreased renal perfusion[34]. The increased after-load may lead to decreased cardiac output. The CO2 insufflation causes stretching of the peritoneal surface and also causes local irritation to the peritoneum5. The hypercarbia may lead to serious arrhythmia, respiratory acidosis and sympathetic stimulation[6,7]. The cardiovascular changes are more pronounced in cardiac compromised patients leading to increased morbidity and mortality[8]. In our patient, the complications relating to initiation of insufflation were minimized by open laparoscopy following Hasson's method[9]. The changes relating to increased intra abdominal pressure were minimal since the intra abdominal pressure was kept at 4 mm of Hg or less. The volume of CO2 used for the procedure was far less than compared to our previous experience for a similar procedure for the same time frame. We have achieved our goal of operating under lower intra abdominal pressure by using a simple device already available in most of the hospitals. There is definite scope for improvement in the instrumentation and technique to make the procedure of the abdominal wall lift more acceptable. We propose operating under lower intra abdominal pressure and

a reduction in CO2 volume use will add to the safety of laparoscopic surgery, especially in ASA grade III and IV.

CONCLUSION

The laparoscopic cholecystectomy can be safely performed under low insufflation pressure with abdominal wall traction device. This minimized the total consumption of CO2 and reduced the physiological changes associated with increased abdominal cavity pressure, thus also reducing the chances of hypercarbia associated changes.

There is scope to develop better instruments to achieve this goal and eventually eliminate the use of CO2. The gasless laparoscopy is not very popular due to the required complexity of procedure. The definite theoretical advantages associated with low pressure and gasless laparoscopic procedures are yet to be proved in cardiac and respiratory reserve compromised patients. In a larger number of patients, the measurement of physiological changes at different insufflation pressures, are to be documented.

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