E-NOTES Transumbilical Cholecystectomy

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Abstract—Laparoscopic cholecystectomy has become the gold standard for the symptomatic gallbladder lithiasis. Usually, the procedure is performed using 4 trocars. Reducing the number of trocars is one of the ways of minimizing the invasiveness of this procedure. Single port laparoscopy through the umbilical scar, also known as “embryonic natural orifice transumbilical endoscopic surgery” (E-NOTES) was developed as an attempt to improve the aesthetic aspect after surgical procedures and to reduce the morbidity of minimally invasive surgery.

We report a case of transumbilical laparoscopic cholecystectomy without the use of clips, for symptomatic gallbladder lithiasis, the sealing of the cystic duct and cystic artery being obtained by using a LigaSure 5 mm. A 35 year old young male with history of pain in the upper abdomen and right upper quadrant, nausea and vomiting was diagnosed with gallbladder lithiasis after an ultrasound examination. The gallbladder was of normal size, with multiple gallstones. Under general anesthesia, a pneumoperitoneum was created. Three trocars were inserted into the peritoneal cavity for this intervention through the SILS port, through a single incision at the umbilical scar. The cholecystectomy was performed in a retrograde manner. One subhepatic drainage tube was inserted. The operative time was 50 min. There was no intra- or postoperative complications. The patient was discharged in the second postoperative day after a normal course. The 1 month follow-up was normal.

Keywords—laparoscopic cholecystectomy, SILS, LigaSure, E-NOTES.

I. INTRODUCTION

The first transumbilical cholecystectomy was performed by Navarra in 1997, followed shortly by Piskun in 1999 [1,2].

The fundamental idea of this new and revolutionary approach is having all „entry points” in the same place, the umbilicus, resulting in only one postoperative wound, almost invisible. Although this method is safe and feasible, it cannot be applied to all patients, being extremely difficult in obese patients. Other NOTES techniques are using different natural orifices in order to approach the peritoneal cavity, such as vagina, rectum or mouth, but these techniques require a total different set of instrument, extremely expensive and inaccessible for us at the moment and there is limited experience with these approaches.

II. CASE REPORT

We report the case of a 35 years old male who has been experiencing pain in the right upper quadrant of the abdomen for the last few months, nausea and vomiting especially after meals. An ultrasound examination was performed, showing gall bladder lithiasis. The patient was admitted one day before surgery. At admission, all laboratory tests proved within limits. No preoperative treatment was necessary.

The procedure was performed under general anesthesia with orotracheal intubation. The patient was placed in dorsal decubitus in anti-Trendelenburg position. A 2,5 cm vertical incision was performed inside the umbilicus penetrating all the layers of the abdominal wall in order to access the peritoneal cavity. Using small retractors we inserted the SILS device. In order to have enough room to manipulate the instruments inside the abdomen there is the need of inflating the peritoneal cavity with carbon dioxide (procedure called pneumoperitoneum insufflation), this being a standard procedure in all laparoscopic interventions. The SILS device has a special port for insufflating and maintaining the pneumoperitoneum. Intraabdominal pressure was kept at 12 mmHg throughout the intervention. The SILS device allows the insertion of 3 trocars, one of them being used for the optic system and the other two for surgical instruments. The optic system consists in a 5 mm diameter rigid video camera with a 30° direction of view connected to a monitor. This system is used in all laparoscopic procedures. The rest of the surgical instruments we used are common laparoscopic instruments (graspers, electrocautery, aspiration system, LigaSure sealer) (Fig.1). This system provides all necessary instruments for operation inserted using the same entry point, but in order to perform the cholecystectomy there is still need of holding the gall bladder in a still and elevated position.

In order to achieve that without inserting an additional trocar we performed the suspension of the gall bladder using a straight needle with a 2-0 silk stitch which was passed through the abdominal wall, through the fundus of the
The SILS device inserted through the 2.5 cm umbilical incision with the optic system, insufflation tube and surgical graspers attached.

Fig. 1 The SILS device inserted through the 2.5 cm umbilical incision with the optic system, insufflation tube and surgical graspers attached.

gall-bladder and again through the abdominal wall right under the 12th right rib, providing the necessary suspension of the gallbladder. Perforating the gall bladder means minor biliary leak, with no prejudice at all for the patient, all the bile being aspirated at the end of the procedure. A minor inconvenient is the lack of tension in the gall bladder wall after being emptied of bile, making the dissection of the surrounding peritoneum of the gallbladder a little more difficult. The next step of the operation is the isolation of the cystic duct and cystic artery (dissection of the Calot triangle). This was done in an usual manner using a grasper and the electrocautery. After isolating the cystic duct and artery, we used the 5mm LigaSure sealer to seal and cut the cystic duct and artery. Ordinary laparoscopic procedures make use of a clip applier to seal these elements with clips before being cut, but the dimension of the applier (10 mm in diameter) made it impossible to use in our case (Fig.2, Fig.3).

The LigaSure sealer proves to be reliable and safe in preventing hemorrhage and bile leakage, literature reporting the safe use of LigaSure on much larger vessels or biliary structures [3,4,5]. Dissecting the gallbladder from its liver site was done in a usual manner, using the hook electrocautery. The extraction of the gall bladder was performed through the umbilical incision along with the extraction of the SILS device.

A drain tube was inserted under the liver using the same umbilical entry point and the umbilical wound was sutured in a usual manner using separate fascial and skin stitches. The total duration of the operation was 50 minutes. The patient had a simple evolution being discharged on the 2nd day after surgery. No complications occurred during admittance and during the first month follow-up. The aesthetic result was perfect, practically no scar shows at the site of umbilical incision (Fig.4).

Fig. 2 The dissection of the Calot triangle using a grasper and a hook-tip electrocautery.

Fig. 3 The Calot triangle after dissection - notice the cystic duct (a) and the cystic artery (b) before being cut.

Fig. 4 The aspect of the abdominal wall one month after surgery (notice a previous appendectomy scar on the left inferior corner of the picture).