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Original Research

Laparoscopic ventral hernia repair with composite mesh: Analysis of risk factors for recurrence in 185 patients with 5 years follow-up

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HIGHLIGHTS

- The work is the result of the analysis of a case series conducted by a single surgical center on the effectiveness of laparoscopic surgical treatment of incisional hernias and primitive in order to identify the factors related to the patient and related to surgical technique that may influence the onset of recurrence.
- From the analysis we have shown that patients with recurrence were those with ASA score III, those with a BMI> 30 kg/m^2, or those with wall> 5 cm defect (larger diameter), or those in which the overlap of the mesh is was <5 cm.
- In our surgical center these interventions were conducted by a dedicated team, and already expert in the field of advanced laparoscopic colorectal surgery and obesity.

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ABSTRACT

Background: Laparoscopic ventral hernia repair is widely used although its clinical indications are often debated. The aim of this study is to describe our surgical experience in order to establish the safety, efficacy, feasibility of laparoscopic ventral hernia repair and to identify the factors that influence the risk of recurrence in a group of patients treated with only one type of prosthetic mesh and by the same surgical team.

Materials and methods: Between January 2007 and December 2016, 512 patients were admitted to the General and Urgent Surgery Unit, with diagnosis of ventral hernia. Of these, 244 were operated laparoscopically and 268 in a traditional open surgery. In 244 patients treated by laparoscopy we always used a composite mesh: 185 Parietex™ Composite mesh (Medtronic-Covidien, Minneapolis, USA), the remaining other with other types of prosthetic mesh. The type and size of surgical defects, features of surgical technique, length of hospital stay, rate of conversion, morbidity, mortality, and rate of recurrence at 5 years follow-up were retrospective analysed on the 185 patients who underwent surgery with Parietex™ Composite mesh.

Results: We performed 185 laparoscopic ventral hernia repair with Parietex™ Composite mesh: 108 (58%) for incisional hernias and 77 (42%) for primary abdominal wall hernias. Mean age was 58 years (19–80). The mean size of abdominal defect was 5 cm (1,5–18), mean BMI was 30,4 kg/m^2 (21–47), mean overlap of the mesh was 5 cm (3–6). The mean operative time was 54 min (30–180) and conversion rate was 3,2%. In 61 patients (33%) we performed a transversus abdominis plane block (T.A.P. block) to reduce postoperative pain. The mean length of hospital stay was 5 days (1–26) (2 days, mean value, in patient with preoperative T.A.P. block). The mortality rate was 0%; overall morbidity was 15,6%. At 5-year follow-up we observed 13 (7%) hernia recurrences. The features of patients with recurrence were as follows: mean age 50 years (19–74), mean ASA Score 3 (2–3), mean BMI 31 kg/m^2 (21–44), mean size of hernial defect 7,5 cm (larger diameter), mean overlap 4,5 cm (3–6).

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Conclusions: Laparoscopic repair of ventral hernia using composite mesh is an effective and safe procedure particularly suitable in the following cases: median and paramedian defects, diameter of defect between 5 and 15 cm, "swiss cheese" defects, obesity. In our experience the factors related to the patient and the surgical technique that may influence the onset of early or late recurrence as the follows: a defect size >5 cm (W2 of EHS Classification), an overlap of the mesh < 5 cm, a BMI of 30 kg/m^2 or superior and the presence of significant comorbidities (ASA score: 3). Finally, we observed that the T.A.P. Block preoperative procedure can lead to reduced the clinical costs through a lower administration of analgesics used and a lower length of stay.

1. Introduction

During the last twenty years, the use of laparoscopic ventral hernia repair has rapidly increased due to its advantages compared to open surgery. Recent studies have shown that in the short term laparoscopic repair is superior to open repair in terms of less blood loss, fewer abdominal wall complications and shorter hospital stay [1–4]. Long-term outcomes such as recurrence rates are yet unknown. The laparoscopic approach continues to evolve and many technical aspects of the procedure still remain controversial and are not standardized, particularly regarding the selection of patients, the choice of surgical mesh and means of fixation. The aim of this study is an analysis of our experience in laparoscopic ventral hernia repair in order to evaluate the effectiveness of laparoscopic approach and to identify risk factors related to the patient and related to surgical technique that can cause recurrence in a group of patients treated with only one type of prosthetic mesh and by the same surgical team.

2. Materials and methods

Between January 2007 and December 2016, 512 patients were admitted to the General and Urgent Surgery Unit with diagnosis of ventral hernia. Of these, 244 were operated laparoscopically and 268 in a traditional open surgery. In 244 patients treated by laparoscopy we always used a composite mesh: 185 underwent laparoscopic repair with Parietex™ Composite mesh (Medtronic-Covidien, Minneapolis, USA), the remaining patients were operated with other types of composite prosthetic mesh. The type and size of surgical defects, features of surgical technique, length of hospital stay, rate of conversion, morbidity, mortality, and rate of recurrence at 5 years follow-up were retrospective analysed on the 185 patients who underwent surgery with Parietex™ Composite mesh. The inclusion criteria for the laparoscopic surgery were: ASA score 1–3, size of abdominal wall defect >3 cm or <3 cm in case of obesity (BMI = 30 kg/m^2), multiple abdominal wall defects (>2 defects), presence of other pathologies for potentially combined treatment (utero-ovarian cysts, endometriosis, uterine fibromatosis). The exclusion criteria were: ASA score 4, abdominal wall hernia with loss of domain, defect size >18 cm, bowel obstruction or perforation, peritonitis, local or systemic infection; other exclusion criteria were patients receiving corticosteroid therapy, radiotherapy, chemotherapy, patients with concurrent neoplasm.

2.1. Preoperative assessment

Patients were selected after a clinical examination and an abdominal ultrasonography to determine the exact size of the abdominal wall defect, show the multiple defects and exclude other intraabdominal pathologies. A preoperative abdominal CT-scan without contrast was routinely used in case of obesity (BMI = 30 kg/m^2), recurrent incisional hernia, suspected "swiss cheese" incisional hernia and incisional hernia located in the borders (pubis, anterior superior iliac spine, rib edges, xyphoid). The patients were prepared for laparoscopic repair as follows: identification of abdominal defects with a dermographic pencil, short-term antibioticoprophylaxis (cefotaxime 2 gr i.v. or amoxicillin-clavulanic acid 2.2 gr i.v., 1 h before surgery), deep vein thrombosis prophylaxis (antithrombotic stockings and calcic nadroparin 0.3 ml s.c. or 0,4 ml in case of BMI = 30 kg/m^2, 12 h before surgery). The patient was counselled regarding the procedure and a written consent was obtained.

2.2. T.A.P. Block (Transversus Abdominis Plane block)

From 2012 to today, patients undergo T.A.P. block which consists of an abdominal wall analgesia technique on ultrasound guidance. The aim of a T.A.P. block is to deposit local anaesthetic in the plane between the internal oblique and transversus abdominis muscles targeting the spinal nerves in this plane: thus you get a somatic anesthesia which affects the somites including from T7 to L2. The ultrasound probe is placed in a transverse plane to the lateral abdominal wall in the midaxillary line, between the lower costal margin and the iliac crest. The use of ultrasound allows for accurate deposition of the local anaesthetic in the correct neurovascular plane; upon reaching the plane, 2 ml of saline is injected to confirm correct needle position after which 20 ml of local anaesthetic solution (Naropina™ 7,5%) is injected: the transverses abdominis plane is visualized expanding with the injection (appears as a hypoechoic space). The procedure is always performed bilaterally.

2.3. Surgical technique

The laparoscopic ventral hernia repair was performed under general anaesthesia, after running the T.A.P. block procedure. We routinely use a 30° optical camera. Scissors and two graspers have to be prepared for laparoscopic hernia repair. The screen is placed at the opposite of the surgeon. The patient is placed in a supine position with both arms along the body. The site of trocars placing depends on the localization of the hernia; if the hernia is localized in the midline or in the right hemiabdomen, the trocars should be placed on the left side. Our technique involves the use of three trocars: on trocar for optical camera (10–12 mm), and two trocars for the right and left hand of the surgeon (Fig. 1). In case of the abdominal wall defect sized >10 cm, one or two other trocars were inserted in the opposite side of the abdomen, to perform a safe and proper fixation of the mesh. After establishing the pneumoperitoneum at 12–14 mmHg, a diagnostic laparoscopy is performed. Adhesions between the omentum and the bowel with the anterior wall surrounding the hernial orifice are divided, and the content of the hernia is completely reduced; adhesiolysis was undertaken by lateral blunt dissection with the scissors and minimal