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V. V. Grubnik, N. D. Parfentyeva, K. O. Vorotyntseva

LAPAROSCOPIC TREATMENT OF VENTRAL HERNIAS WITH NEW TYPE OF MESHES

The Odessa National Medical University, Odessa, Ukraine

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В. В. Грубник, Н. Д. Парфентьева, К. О. Воротынцева

ЛАПАРОСКОПИЧЕСКОЕ ЛЕЧЕНИЕ ВЕНТРАЛЬНЫХ ГРЫЖ С НОВЫМ ТИПОМ СЕТКИ

Одесский национальный медицинский университет, Одесса, Украина

Послеоперационные вентральные грыжи являются серьезной проблемой здравоохранения, частота рецидивов составляет от 3–20 %. Применение лапароскопических методов операции позволяет снизить частоту послеоперационных осложнений и рецидивов грыж, а также уменьшить период госпитализации по сравнению с открытыми операциями. Актуальными остаются вопросы выбора идеального материала сетчатого трансплантата, размер сетчатого трансплантата, а также вопрос выбора адекватного метода фиксации сетки к мышцам передней брюшной стенки. Частота рецидивов напрямую зависит от метода фиксации, а также размера сетчатого трансплантата.

Ключевые слова: лапароскопическая герниопластика вентральных грыж, сетчатые трансплантаты, такепы.



Introduction. Incisional hernias are a major health problem; the recurrence rate ranges from 3–20%. They also pose a difficult technical problem that affects any surgeon trying to solve it. Incisional hernias occur in up to 11% of surgical abdominal wounds and in up to 20% of patients that develop a postoperative wound infection. There is no description of a standard technique of mesh fixation. Common methods of mesh fixation are metallic tacks with or without transfascial sutures and transfascial sutures alone. Thus fixation of the mesh seems to play a key role in this procedure.

The aim of the study was to compare new type of mesh for laparoscopic ventral hernia repair with standard composite mesh.

Materials and methods. Patients with incisional hernia who met eligibility criteria for surgical procedures were enrolled in this study between January 2009 and December 2011. Patients were randomized in two groups: one group underwent laparoscopic incisional hernia repair with the use of MMDI meshes (new generation of mesh, made from lightweight PTFEe mesh strain on the nitinol framework) (Group I, n=39); the other underwent laparoscopic incisional hernia repair with the PTFEe meshes Gore-Tex (Group II, n=33).

Results. Mean operative time and mean hospitalization were significantly shorter ($p < 0.05$) in group I than in group II. The pain score was significantly less at 24 and 48 hrs in the patients of group I (mean visual analog scale score, 2.74 vs. 3.82, $p < 0.01$). The mean mesh fixation time was significantly higher in the group II (22 min vs. 67 min, $p < 0.01$).

Conclusion. Meshes of new generation with nitinol framework can significantly improve laparoscopic ventral hernia repair. Absences of tacks allows avoiding of postoperative pain. We consider that these new meshes can significantly improve laparoscopic ventral hernia repair.

Key words: laparoscopic ventral hernia repair, meshes, tacks.

Introduction

Incisional hernias are a major health problem; the recurrence rate ranges from 3–20%. They also pose a difficult technical problem that affects any surgeon trying to solve it [6; 13].

It represents a common problem in general surgeons practice, and it is often a source of complications and prolonged hospitalization. Incisional hernias occur in up to 11% of surgical abdominal wounds and in up to 20% of patients that develop a postoperative wound infection [2; 11].

Incisional hernia can be repaired by an anterior approach, through direct sutures or mesh placement, or by a laparoscopic transperitoneal approach, applying a mesh that can overlap the weakened area. Although there are data suggesting that laparoscopic repair leads to a lower rate of complications and relapses and to a shorter hospitalization compared to open surgery [3; 8; 12], randomized controlled trials with long-term followup are lacking, and it is still debated which of the two approaches is the better treatment [4; 7]. The technique of laparoscopic repair of incisional and ventral hernia

has almost been standardized, and issues, such as access to the abdominal cavity, mesh size, and extent of overlap, have been resolved. However, issues, such as ideal prosthetic material to be used, management of hernia defect, and technique of fixation of the mesh to the abdominal wall, are still areas of debate. There is no description of a standard technique of mesh fixation. Common methods of mesh fixation are metallic tacks with or without transfascial sutures and transfascial sutures alone [3]. Thus fixation of the mesh seems to play a key role in this procedure.

The aim of the study was to compare new type of mesh for laparoscopic ventral hernia repair with standard composite mesh.

Materials and Methods of Research

Patients with incisional hernia who met eligibility criteria for surgical procedures were enrolled in this study between January 2009 and December 2011. The inclusion criteria were performance status according to a Karnofsky score 80–100%, indication and eligibility for a surgical procedure with curative intent, and clinical confirmed incisional hernia. Exclusion criteria were obstruction

or strangulation, local infection, systemic infection, giant postoperative hernias and an American Society of Anesthesiologists (ASA) score >3 . Patients were randomized in two groups: one group underwent laparoscopic incisional hernia repair with the use of MMDI meshes (new generation of mesh, made from lightweight PTFEe mesh strain on the nitinol framework) (Group I, n=39); the other underwent laparoscopic incisional hernia repair with the PTFEe meshes Gore-Tex (Group II, n=33). There were no differences (chi square value of 0.47) between the two groups in age, ASA score, BMI, or incisional hernia diameter (Table 1, 2). All patients were required to give written informed consent.

The clinical outcome was determined by a follow-up evaluation which consisted of physical examination to evaluate possible relapses. Clinical assessments were made at the first, third, and sixth months after surgery and every year thereafter.

Surgical Technique

Pneumoperitoneum was established with a Veress needle. The three-trocar technique was used. A security test with a wa-



Patient Demographics

Parameters	Group I, n=39	Group II, n=33	P value
Men/Women	17/22	16/17	0.54
Mean age, years	57.4±10.9	54.2±6.8	0.43
BMI, kg/m ²	30.5±7.3	33.9±8.1	0.53
Size of hernia, cm ²	120.6±79.2	124.4±83.3	0.42

Table 1

of the group II, and no recurrence among the patients of the group I.

Discussion

The various methods of mesh fixation used in literature are staples, tacks in a single crown, tacks applied in a double crown, and transfascial sutures either alone or in combination with tacks [9; 10]. Currently, the most popular method of mesh fixation used worldwide is the use of tacks along with four-corner transfascial sutures [10]. The only large study where only transfascial suture fixation has been used is by Chelala et al. [5]. They have shown excellent results with a recurrence rate of 1.5% at a mean follow-up of 28 months. Not many studies in the literature compare various methods of mesh fixation in laparoscopic incisional and ventral hernia repair. We have reported our short-term results comparing tack versus suture fixation with different type of meshes. Mesh fixation time was calculated from time of introduction of mesh into the abdomen until firing of final tack/tying of last suture and the operative time was calculated from skin incision for Veress insertion until firing of last skin staple for skin closure. The pain is largely related to mesh fixation with tacks or sutures. The postoperative pain produced by the fixation techniques could play an important role in deciding between sutures and tacks for mesh fixation. The higher pain scores in the tack group are hypothesized to be due to the screwing action of the

Types of Hernia

Hernia type	Group I, n=39	Group II, n=33
Umbilical hernias	11	8
Paraumbilical hernias	7	5
Ventral post-operative hernias	22	19

Table 2

by analysis of variance (ANOVA; Kruskal-Wallis test) for continuous variables and by the Pearson chi squared test for categorical variables.

Results

Mean operative time and mean hospitalization were significantly shorter ($p < 0.05$) in group I than in group II (Table 3). Patients from the first group were able to return to work in a shorter time than patients of the second group. In group I was only one patient with seroma and one patient with mesh infection. In the second group four patients developed persistent seromas. In two patients of group II occurred mesh infection. Three patients of group II developed a long term intestinal paresis (see table 3). The pain score was significantly less at 24 and 48 hrs in the patients of group I (mean visual analog scale score, 2.74 vs. 3.82, $p < 0.01$). The mean mesh fixation time was significantly higher in the group II (22 min vs. 67 min, $p < 0.01$). The mean operative time also was significantly higher in the group II ((72±6) min vs. (117±15) min, $p < 0.01$). Mean follow-up time was 23 months. Recurrence of hernia was detected in 2 patients

ter-filled syringe was made before insertion of the first 5–12 mm trocar as far laterally as possible from the hernia. Two additional trocars were placed in the same side of the abdomen, forming a triangle. Adhesiolysis was performed using LIGASURE. The entire bowel was detached from the wall to expose the weakened area. No attempt was made to reduce or resect the peritoneal sac. In the group I the MMDI meshes with nitinol frame were fixed to the abdominal wall using only 3–4 transfascial sutures, without using the tacks. In the group II PTFEe meshes Gore-Tex were fixed by hernia stapler to the abdominal wall by method “DOUBLE CROWN”. It was associated with the using a lot number of tacks. In both group no drainage was used.

Statistical analysis

Data were expressed as mean and standard deviation (SD) for absolute numbers and percentages. Statistical analysis was done using Student’s t-test to assess differences between the different study groups. A p value < 0.05 was considered significant. Association and correlation between variables were assessed

Operative Finding

Table 3

Operative complication	Group I, n=39	Group II, n=33	P value
Seroma	1	4	< 0.05
Mesh Infection	1	2	> 0.05
Suture site infection	0	2	> 0.1
Long term intestinal paresis (more than 3 days)	0	3	< 0.01
Recurrent hernia (after 20 months)	0	2	< 0.05



sharp tips by which the tacks penetrate tissues, thereby causing compression and twisting of nerve fibers, which might not happen with transfascial sutures because they were tied softly after partial deflation.

The recurrence rate in our study was low; only two patients had recurrence with an average follow-up 16 months. Both patients were in the group II. The most probable cause of recurrence is mesh shrinkage or intrinsic factors related to the patient, such as abdominal wall weakness. Beldi et al. [1] have shown that mesh shrinkage is more in the tack group as compared with the suture group (12 vs. 2.9%).

Conclusion

Meshes of new generation with nitinol framework can significantly improve laparoscopic ventral hernia repair. The fixation of these meshes is very simple using 3–4 transfascial sutures. The absence of shrinkage of these meshes makes the probability of recurrence minimal. Absences of tacks allow avoiding the post-operative pain. We consider that these new meshes can significantly improve laparoscopic ventral hernia repair.

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