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Original Article

Comparison of mesh plug and laparoscopic TEPP techniques in the repair of inguinal hernia

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Abstract

Aim: We aimed to compare the Mesh-Plug technique, which we used for tension-free inguinal hernia, with the anterior approach and Laparoscopic TEPP(Total Extraperitoneal Preperitoneal) technique, which we used routinely, in terms of operation time, postoperative pain, return time to work, post-operative complication and recurrence.

Material and Methods: Between February 1999 and December 2002, 60 patients who underwent Mesh-Plug and 62 patients with inguinal hernia who underwent laparoscopic TEPP between January 2012 and December 2014 were reviewed retrospectively in our clinic. The age, gender, hernia localization and type, duration of operation, type of anesthesia, duration of return to work and postoperative complications of the patients were recorded.

Results: The median age was 40.1 (17-69) in the Mesh-Plug group and 29.2 (20-44) in the TEPP group. The median duration of operation was 29 (20-55) minutes in the Mesh-Plug group and 66.3 (44-88) minutes in the TEPP group (p: 0.04). The duration of hospital stay was 1.2 (1-3) days in the Mesh-Plug group and 1.12(1.1- 1.3) days in the TEPP group (p>0.05). The TEPP group had a shorter duration of postoperative pain and shorter duration in returning to work and daily activities.

Conclusion: The Mesh-Plug method, which is quite cost effective, can be applied with anterior approach and spinal anesthesia. When the Mesh-Plug technique was compared with the laparoscopic TEPP, which is applied under general anesthesia, the duration of hospital stay, the return time to daily activities, and the complications rates were very close.

Keywords: Inguinal Hernia; Laparoscopic TEPP; Mesh-Plug Technique.

INTRODUCTION

Inguinal hernia repair is the most common surgical procedure in surgical clinics. Inguinal and femoral hernias are often categorized together and are called inguinal hernias. Inguinal hernias occur in approximately 3-8% of the population (1). Inguinal hernias constitute about 80-83% of all hernias (50% indirect inguinal, 25% direct inguinal, 5% femoral).

Indirect inguinal hernia is most common in both genders. Of hernias, 75-85% is seen in males. Femoral hernia is more common in women (1,2). Although inguinal hernia repair is the most common surgical procedure, the best repair form has not yet been established. Although many repair methods have been applied from the past to the present day, the development of recurrence has not been prevented. At the end of the 19th century, Mc-Vay and Bassini detailed the pathological anatomy of the inguinal canal and developed appropriate surgical techniques for the repair of inguinal hernias. During the golden period for hernias, 1750-1850; scientists such as Hunter, Cooper, Hasselbach, Scarpa, Gimbernant, Thompson, and Morton improved the hernia surgery with contributions to anatomic definitions (1). Endoscopic hernia repair was first described by Dulucq in 1992 and has gained considerable popularity today (3).

In the etiology of the inguinal hernia and hernia repair, the prominence of the posterior wall of the inguinal canal was later understood.

In the formation of hernias, transverse muscle aponeurosis and the defect in the transversalis fascia play an important role. The goal in repair is to reconstitute the facial transversal without tension (4). Frequent recurrences of classical anterior hernia repair and testicular complications have led surgeons to find different methods.

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Repair methods based on stitch as used by Bassini, Shouldice, Halsted, and Mc-Vay left their place more often with methods using prosthetic mesh such as "free tension" Lichtenstein, Nyhus, Plug-Mesh and laparoscopic hernia repair. Today, more than 80% of the hernia surgeries performed in the United States with using meshes (5). The aim of our study was to compare mesh plug method performed with anterior approach and the laparoscopic TEPP method in inguinal hernia repair.

MATERIAL and METHODS

Sixty patients who underwent mesh-plug repair between February 1999 and December 2002, and 62 patients who underwent laparoscopic TEPP for inguinal hernia in the General Surgery Clinic of Istanbul Training and Research Hospital between January 2012 and December 2014 were evaluated in this study.

Age, gender, hernia type, anesthesia type, additional diseases, process of hernia diagnosis, surgical method, and early complications such as pain, numbness, loss of sensation, hematoma, seroma, wound infections and late complications such as chronic pain or sensory loss recurrence was recorded. We used previously Nyhus classification for uniformity in the approach of the inguinal and femoral hernias (6).

Prophylaxis with first-generation cephalosporin (Cefozin™ 1 gr) was performed half an hour before the onset of the operation. Patients without postoperative complications were discharged after an average of 16 hours.

Written informed consents were obtained from all the patients who were included in this study. Since the present study was designed in the retrospective nature, there was no need to obtain ethical committee approval.

Statistical Analysis

The distribution of the variables was analyzed by the Kolmogorov-Smirnov test. The Independent samples t-test was used for quantitative data analysis, the Fisher's Exact test was used for binary comparisons, and the Chi-Square test was used for numbers and for qualitative comparisons. P<0.05 was considered to be statistically significant.

RESULTS

The age, hernia type, localization and classification (Nyhus Classification) of the patients are given in Table 1. All of the patients included in the study were males. Mesh-plug method was used for hernia repair of 1 patient with type IIIc and 6 patients with type IV (femoral and recurrent inguinal hernias) according to Nyhus Classification.

In the anterior approach, 53 (88.4%) of the patients who underwent hernia repair were operated under spinal anesthesia and 7 (11.6%) were operated under general anesthesia. All patients undergoing TEPP were operated under general anesthesia. The median duration of operation was 29 (20-55) minutes in the Mesh Plug group and 66.3 (44-88) minutes in the TEPP group. The difference between the groups was statistically significant (p: 0.004). The method of anesthesia, the duration of operation and the mean length of hospital stay were stated in Table 2.

Table 1. Comparison of two groups according to age, hernia type and localization, and Nyhus Classification

		Mesh-Plug group	Laparoscopic TEPP group
Mean Age		40.1 (17-69)	29.2(20-44)
Hernia Type:	Direct	8 (13.3%)	11(17,7%)
	Indirect	45(75%)	51(82,2%)
	Recurrent hernia	6(10%)	-
	Femoral	1(1.66%)	-
Localization:	Right	44(73.3%)	38(61,2%)
	Left	16 (26.6%)	24(38,7%)
Nyhus Classification:	Type I	6(10%)	12(19.3%)
	Type II	10 (16,6%)	20(32.2%)
	Type IIIa	8(%13,3)	11(17.7%)
	Type IIIb	29(48.3%)	19(30.6%)
	Type IIIc	1(1.66%)	-
	Type IV	6(10%)	-

Table 2. Comparison of the two groups due to anesthesia techniques, operation time and hospitalization

	Mesh-Plug group	Laparoscopic TEPP group	P value
Spinal anesthesia	54(90%)	-	
General anesthesia	6(10%)	62(100%)	
Duration of operation	29(20-55) min	66.3(44-88) min	0.004
Average hospitalization time	1.2(1-3) day	1.12(1.1-1.3) day	>0.05

Table 3. Comparison of the two groups according to early and late term complications

	Mesh-Plug group	Laparoscopic TEPP group	P value
a) Avg. pain duration	2 (1-6) (day)	1	0,003
b) Mild-to-moderate pain	60 patients	10 patients	
c) Severe pain	-	-	
Hematoma	-	-	
Wound infection	2 (3.3%)	-	>0.05
Scrotal edema	-	-	>0.05
Seroma	2 (3.3%)	-	>0.05
Testicular atrophy	-	-	
Urinary retention	12 (20%)	-	0.003
Hospitalization	1.2 day(s)	1.1 day(s)	>0.05
Time to return to daily activity	4-7 days	2-4 days	0.004
Recurrence	-	-	
Number of drain	-	1	>0.05
Drainage time	-	1 day	>0.05

The visual analog scale (VAS) was used to evaluate the postoperative pain of the patients. Postoperative VAS scores were significantly lower when laparoscopic TEPP group was compared with Mesh-Plug group (p: 0.003).

There were no complications in the patients who required re-admission. The rate of wound infections and seroma was higher, however, not statistically significant (p>0.05) in Mesh-Plug group. Urinary retention and return to working were statistically significant when compared to the TEPP group (p: 0.003, p: 0.004, respectively). The duration of hospitalization was close in both groups and was not statistically significant (p>0.05). All of early and late term complications are explained in Table 3.

DISCUSSION

Nowadays inguinal hernia repair is performed to more than 20 million patients per year and continues to be the most frequently performed operation (7). It should be selected as a safe technique that is easy to apply in hernia repair, requires minimal dissection, provides sufficient exploration, and recurrences are minimized. In this technique, patient comfort, cost of surgery, loss of labor, length of stay in hospital and return to work should be observed in the early period.

The first example of a Mesh-Plug operation is Lichtenstein and Shore's by introducing the mesh into cigarette configuration and application in recurrent and femoral hernias. Gilbert applied the mesh directly to recurrent inguinal hernia, shaping it like a cone or umbrella. Gilbert's mesh plug procedure uses 2 meshes (8). Unlike Gilbert, Rutkow and Robbins used mesh which consisted of only one part and it was conical in all hernia varieties. While Gilbert stated that fixation of the mesh was not necessary, Rutkow and Robbins stated that fixation of mesh with absorbable sutures was necessary (9,10).

Rutkow and Robbins stated that ligation of the hernia sac during indirect hernia repair should result in miniaturized peritonitis and that the released sac should be pushed backward from the internal ring because of the pain. The same researchers noted that in large scrotal hernias, the hernia sac might be transversely bisected in the middle of the sac, where it is unnecessary to completely dissolve, and that the proximal part could be ligatured and that the distal part could be left in place with a wide mouth (10,11). Peliser and Blum evaluated the results of mesh-plug technique applied to 118 inguinal hernia patients. The most important goal of the hernia surgery is to prevent the recurrence of the hernia. However, nowadays, the rapid maintenance of the activities of the patient is of great importance.

These two goals can be achieved in two different ways. One of these is the laparoscopic method, where pain is less due to the fact that the usual incision is not used. The other is the mesh-plug technique, and this technique is close to the tension-free technique. (12,13)

Zieren et al. reported that there are two studies on mesh-plug. In the first study, there is no difference between laparoscopy inguinal hernia repair and mesh-plug technique due to recurrence and postoperative complications and that mesh-plug method is cheaper and operation time is shorter than the laparoscopic method. In the other study, they applied mesh-plug to 147 inguinal hernia patients over 65 years of age and indicated that this technique was performed in a short period of time in returning to social life, thus providing high quality of life for the elderly (14,15,16).

In the literature, recurrence rates for inguinal hernia repair ranged from 0 to 3.4% in mesh repair, while these rates ranged from 2.9 to 21% in the technique applied without mesh repair. Patients who were operated on in our study were followed for 6 to 30 months (mean 18 months).

There was no significant difference between the mesh-plug and laparoscopic TEPP group in wound infections, testicular atrophy, duration of hospital stay, return to daily activity and recurrence. In the laparoscopic TEPP group, post-operative pain was less and mobilization was earlier than the Mesh-Plug group.

We believe that the reason for not having any recurrences in our study is due to the short duration of follow-up especially when we look at the TEPP group, and we believe that we need longer follow-up to evaluate the TEPP group.

In this study, we compared mesh-plug and laparoscopic TEPP techniques, we included type IIIc femoral hernia and type IV recurrent hernia according to Nyhus classification in the Mesh-Plug group. Our goal here was to dissect less in these hernias, which required larger dissections actually. Six of these patients have had previous hernia repair without mesh. Four of these patients were indirect and 2 were direct repairs. The average operation time of these patients was 45 minutes.

The patients were requested to compare this operation with the previous operation. The patients stated less pain and easier mobilization than the first expression. Studies in recent years have shown that recurrence rates of 5-20% up to 20-30 years ago were unacceptable, and the surgeons have turned to non-tensioned repair.

In the anterior approach, mesh-plug technique and in the laparoscopic TEPP technique, we performed tension-free hernia repair. Early postoperative complications of the patients were found to be close to each other in the Mesh-Plug group and the TEPP group. Early complications were less in the TEPP group. The patients did not have to be re-admitted for the treatment of these complications. In both groups, we found that mobilization times returning to daily activities were similar. All of these results were consistent with the literature.

CONCLUSION

The inability to prevent recurrence of inguinal hernia surgery suggests that the point reached in hernia surgery is not sufficient. Currently, the laparoscopic TEPP method is preferred; mesh-plug procedure may be preferred for patients who are scheduled for anterior approach when the laparoscopic learning curve is not completed and that the recurrent hernias can be easily applied. The short duration of the mean operation time and low cost in the Mesh-Plug group made this technique advantageous.

We think that both methods are reliable in terms of recurrence.herefore, both methods may be the reason of preference.

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Ethical approval: Written informed consents were obtained from all the patients who were included in this study. Since the present study was designed in the retrospective nature, there was no need to obtain ethical committee approval.

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