

Comparative Study between Preservation of Cremasteric Muscle versus Resection in Inguinal Hernioplasty

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Abstract

Introduction: The current trend in inguinal hernia surgical approaches leans towards emphasizing the preservation of anatomical structures to minimize postoperative complications and improve patient outcomes. The objective of this study was to compare the outcomes of preserving versus removing the cremasteric muscle during inguinal hernioplasty, focusing on postoperative pain, complications such as infection, testicular hematoma, and edema, early recurrence, and testicular ptosis. The follow-up periods included 0, 1 day, 1 week, 2 weeks, 3 months, and 6 months post-surgery.

Aim of the study:

Subjects and Methods: This randomized study involved 60 male patients (18–65 years) with unilateral, uncomplicated inguinal hernias and normal coagulation profiles. They were divided into two equal groups: Group A (cremasteric muscle preserved) and Group B (cremasteric muscle removed) during inguinal hernioplasty.

Results: The preservation group had significantly lower postoperative pain and infection rates ($P<0.05$) but showed no differences in hematoma, edema, or testicular ptosis. Later, they had less pain and testicular ptosis ($P<0.05$), with similar recurrence rates in both groups.

Conclusions: Inguinal hernioplasty with preservation of cremasteric muscle and preservation of inguinal canal anatomy showed better results compared to cremasteric muscle resection.

Keywords: Cremasteric Muscle; Inguinal Hernioplasty; Preservation; Resection.

1. Introduction

A hernia occurs when an organ protrudes through a cavity opening. Abdominal wall hernias affect 1.7% of the population and 4% of those over 45. Inguinal hernias make up 75% of cases, with a lifetime risk of 3% for women and 27% for men [1].

Inguinal hernia is a common cause of groin pain and the third leading reason for emergency gastrointestinal care. It appears as a groin bulge that may recede when lying down or with pressure. Pain is usually mild to moderate, worsening with activity, though one-third of surgery patients report no pain, and severe pain is rare [2].

For individuals with inguinal hernias, there are several treatment options available, including careful waiting, laparoscopic repairs, which are usually done with mesh prostheses, open primary repair, and open tension-free repairs. Numerous changes have been made to inguinal hernia repair since the Bassini procedure was first described. The several methods discussed have the goal to enhance results, specifically the rate of recurrence [3].

Recently, most surgeons prefer mesh hernioplasty, while only few surgeons are still conducting the traditional non-mesh operation. Testicular ptosis is a less significant complication of open inguinal

hernioplasty that is defined as testicles sagging beside a prior inguinal hernia operation [4].

The current trend in inguinal hernia surgical approaches leans towards emphasizing the preservation of anatomical structures to minimize postoperative complications and improve patient outcomes. This shift in thinking has led to a resurgence of interest in the role of the cremasteric muscle in inguinal hernia repair, with an increasing number of surgeons considering preservation as an integral part of their surgical technique [5].

The removal of the cremaster muscle during inguinal hernia repair is a subject of debate. Its excision interrupts an important collateral to the testicle, namely the cremaster artery. If the cremasteric artery is a major contributor to the testicular blood supply, its ligation may result in ischemic orchitis. Ptosis is a common complication that arises when the cord structures are skeletonized and the cremasteric muscle fibres are separated. This may be prevented by leaving the cremasteric muscle intact or by securing the muscle's medial stump to the pubic tubercle, as in the case of Shouldice repair [6, 7].

The purpose of this study was to compare the outcomes of preserving versus removing the cremasteric muscle during inguinal hernioplasty, focusing on postoperative pain, complications like infection, testicular

2. Subjects and methods

2.1 Subjects

This randomized study included 60 male patients (18–65 years) with unilateral, non-complicated inguinal hernias and normal coagulation profiles. Approved by the Ethical Committee of Fayoum University Hospitals, all participants provided written consent. Exclusion criteria were bilateral, obstructed, strangulated, recurrent hernias, and senile sagging. Patients were split into two groups: Group A (cremasteric muscle preserved) and Group B (cremasteric muscle resected). Pre-surgery, all underwent history review, physical exam, and cardiac assessment.

Intraoperatively, all patients received spinal anesthesia and were placed in the supine position. The operative field was sterilized with povidone-iodine. A horizontal incision was made 4 cm from the intersection above and lateral to the pubic symphysis. Dissection proceeded through Scarpa's fascia and compressive fascia, opening the

hematoma, and edema, early recurrence, and testicular ptosis. Follow-up evaluations were conducted at 0, 1 day, 1 week, 2 weeks, 3 months, and 6 months after surgery.

external oblique aponeurosis parallel to the inguinal ligament to expose the spermatic cord, iliopubic tract, and conjoint tendon. The ilioinguinal nerve was identified to prevent injury. The cord was delivered, and the cremasteric muscle was split into medial and lateral flaps as in Shouldice repair. Blunt dissection followed the fiber course, avoiding sharp instruments and electrocautery to protect the cremasteric artery and associated nerves. The medial flap was separated from the conjoint tendon to be sutured later after repair. Excision of the sac, plication of fascia transeversalis, and narrowing of the ring. Using double hole mesh with one aperture allocated for the spermatic cord and the other hole for the lateral aspect of the cremasteric muscle and the medial flap of the muscle sutured back to its origin. In certain cases, the medial and lateral flap were approximated by a suture to cover spermatic cord content again by cremasteric muscle and prevent direct contact between cord and mesh. The lateral part of the cremasteric muscle was left-

liberal in a separate opening for free action of the muscle fibers and to avoid any traction on the nerve by mesh aiming at decreasing postoperative pain. Closure in layers. In no preservation group, hernioplasty was done using classic Lichtenstein tension-free repair. Resection of cremasteric muscle without reconstruction only one hole mesh was used. Postoperatively, early follow up for postoperative pain, testicular ptosis and complications including hematoma,

testicular edema, infection. Late follow-up in six months for testicular ptosis, chronic pain inguinodynia and early recurrence.

2.2. Statistical Methods

Statistical analysis was performed using SPSS v26. Quantitative data are presented as mean $\pm$ SD and compared with an unpaired t-test. Qualitative data are shown as frequencies (%) and analyzed using the Chi-square or Fisher's exact test as appropriate. A two-tailed $P < 0.05$ was considered significant.

3 Results

Demographic data of the studied groups was enumerated in table 1.

Table 1: Demographic data of the studied groups

		Preservation (n=30)	No preservation (n=30)
Age (years)		41.3 $\pm$ 14.5	40.7 $\pm$ 11.9
Sex (male)		30(100.0%)	30(100.0%)
Comorbidities	DM	2(7.0%)	3(10.0%)
	HTN	4(13.3%)	5(16.7%)
	Smoking	7(23.3%)	9(30.0%)
	Chest diseases	3(10.0%)	2(7.0%)

Data is presented as mean $\pm$ SD or frequency (%). DM: Diabetes mellitus, HTN: Hypertension.

edema, and testicular ptosis showed no significant differences. **Table 2**

The preservation group had significantly lower postoperative pain scores and infection rates ($P < 0.05$), while hematoma,

Table 2: Outcomes related to the early follow-up period of the studied groups

		Preservation (n=30)	No preservation (n=30)	P
Postoperative pain score		4.1±1.7	6±1.8	0.01*
Postoperative complication	Infection	0(0.0%)	2(7.0%)	0.01*
	Hematoma	0(0.0%)	1(4.0%)	0.6
	Oedema	1(4.0%)	2(7.0%)	0.7
Testicular ptosis		5(16.7%)	23(76.7%)	0.6

Data is presented as mean ± SD or frequency (%). * Significant P value < 0.05.

Pain and testicular ptosis were significantly lower in the preservation group (P<0.05),

with no difference in recurrence rates. **Table 3**

Table 3: Outcomes related to the late follow-up period of the studied groups

		Preservation (n=30)	No preservation (n=30)	P
Pain incidence		8(26.7%)	16(53.3%)	0.03*
Testicular ptosis		8(26.7%)	22(73.3%)	0.01*
Recurrence		0(0.0%)	0(0.0%)	1

Data is presented as mean ± SD or frequency (%). * Significant P value < 0.05.

4 Discussion

Inguinal hernia repair is a common surgery, with an annual incidence of 10 per 10,000 in the UK (3).

Considering the technique in our study's preservation group, we retained the cremasteric muscle by splitting the muscle into two flaps medial and lateral medial flap, but we separated the medial flap for better exposure of internal inguinal ring (IIR) to be sutured later. Valenti et al. [8] describe separating the cremasteric fibers longitudinally and isolating the spermatic cord up to the IIR, preserving both the cremasteric attachment and the secondary neurovascular bundle. In group A, Nashat

Noman et al. used Shouman repair, modifying it to preserve the distal cremasteric muscle for maintaining its function.

In our study, postoperative pain and inguinodynia were lower in the preservation group compared to the no preservation group. Pain in the preservation group was primarily localized to the groin, while in the no preservation group, it was mainly testicular pain. Among the four sexually active patients, postcoital testicular pain was reported. The mean visual analogue scale (VAS) score for pain in the preservation group was 4.1, while in the no preservation

group, it was 6, showing a significant difference between the two groups. In 2019 Li et al. [8] found that the mean postoperative VAS score for pain was 3 which is nearly like our results. Furthermore, Saini et al. [9] reported that the mean VAS score for pain at the time of the discharge after laparoscopic hernioplasty was 4.

According to postoperative complications, in our study in the preservation group no infection or hematoma only one case of testicular oedema while in no preservation group two cases of infection, two cases of testicular oedema, and one hematoma. Valenti et al. [10] modified Marcy repair using cremasteric muscle sparing, there was no postoperative infection, or oedema only one case of hematoma.

There was no recurrence documented in the two groups preservation and no preservation as we used mesh in two groups for the follow-up period of 6 months. Besides, Saini et al. [9] did not experience any recurring

5 Conclusion

Inguinal hernioplasty with preservation of cremasteric muscle and preservation of inguinal canal anatomy showed better results compared to cremasteric muscle

cases during the 6-month follow-up period. Vara Thorbeck [11], In his study, there were no recurrences for up to five years. His Thovara repair technique minimizes disruption to the cremasteric muscle, preserving its position around the cord.

Considering testicular sagging in our study, the incidence in the no-preservation group was higher in about 22 patients, this is due to the skeletonization of the cord and resection of the cremasteric muscle and detachment of the medial part from its origin without reconstruction on the other hand preservation group only 8 patients had post-hernioplasty ptosis this may be due to interruption of cremasteric nerve or its blood supply. Valenti et al. [8] emphasized the importance of safeguarding the cremaster attached to the testicle to avoid accidental injury from testicular drooping during sitting. The study's limitations included a small sample size, being conducted at a single center, and a relatively short follow-up period for the patients.

resection concerning postoperative pain and testicular ptosis with no affection for early recurrence.

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Authors' Contributions

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