

Mesh versus non mesh for repair of indirect inguinal hernia by cremasteric apparatus

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Abstract

Background: Open mesh repairs are commonly used, but the incidence of mesh infection is still recorded, the goal of this work is to evaluate using cremasteric muscles and fascia instead of the mesh (as foreign body) to strengthen the inguinal canal and to avoid the intractable infected mesh which may be incurred.

Patients and method: In this randomized prospective study, n=80 patients with unilateral inguinal hernia, 40 patients were repaired with this technique, (group B), and the other (group A), 40 patients were repaired with Lichtenstein technique. Operative time, hospital stay, overall complication rates, and cost-effectiveness were investigated. A time period of 1-2 years was determined for patient follow up.

Results: All the patients were followed up ranges (12 to 24 months). There was one case of recurrence in group B versus one case of recurrence in group A. Time of wound healing was significantly longer in group A versus group B. The deep wound infection and groin pain was more and significantly longer in group A, and work off time ranged from 14-23 days in group B versus 12-33 in group A.

Conclusion: The results of this new repair technique using cremasteric apparatus as an auto meshing appear promising especially after more studies with more number of patients.

Introduction:

Inguinal hernia repair is one of the most common surgical procedures performed worldwide. Improved surgical techniques and a better understanding of the anatomy and physiology of the inguinal canal have significantly improved outcomes for many patients.¹ These improvements have occurred most notably in centers specialized in hernia surgery, with some institutions reporting failure rates of less than 1%.^{1,2}

General surgeons today have access to a wider and more sophisticated range of synthetic biomaterials for use in hernia repair than ever before. The advantages and disadvantages of each of these devices must be understood, however, before surgeons select any of these implants. The surgeon's choice of the prosthesis used in hernia repair is based on a combination of factors, including: patient characteristics,

clinical experience, training, interest, skills, understanding of the range of products available and the clinical studies that may have been performed on each, and the surgeon's familiarity with a particular product and/or surgical approach.³

Ideal mesh characteristics include a porous material that would allow tissue ingrowth. The material must be reactive enough to stimulate fibroblast ingrowth, yet inert enough to minimize foreign body reaction, allergic reaction, and to reduce infection. The mesh must have enough strength to protect the groin and prevent early recurrence. Finally, it must have flexibility to accommodate the forces applied to the groin as a result of activity, and it must avoid fragmentation. The most commonly used material for mesh repairs currently uses polypropylene mesh.⁴

In contrast, failure rates for general surgeons

without expertise in hernia surgery remain significantly higher (up to 10% for primary hernias, and 5-35% for recurrent hernias).⁵ The search for a method that accomplishes all the above goals perfectly, preferably without the insertion of any foreign body such as mesh, continues.

This study aims to report a new method of inguinal hernia repair with cremasteric muscle apparatus as a method instead of a prosthetic mesh.

Patients and methods:

This is a prospective and retrospective study of 80 consecutive patients with 80 inguinal hernias, n=12 female, and n=68 male from June 2009 to June 2011, they were divided into two groups; group (B), 40 patients were operated on using the cremasteric apparatus as an auto meshing to strengthen the floor of the inguinal canal and for narrowing the internal ring. The muscle layer was fixed with non absorbable sutures. And group (A), 40 patients were operated on with Lichtenstein repair.

The mean age of the patients was 44.54 years (range: 23-67 years). All were operated on under regional or general anesthesia. There were no intraoperative complications. One injection of Diclofenac 50 mg once a day was given to all the patients. Patients were encouraged to ambulate after 8 h of surgery.

The patients were evaluated, and data collected included duration of hospital stay, pain, ambulation and complications recorded during the operations or the hospital stay. Pain was measured using the visual analog scale (VAS) with 0-3 signifying mild pain, 3 to 6 moderate pain, and >6 severe pain. "Limited ambulation" indicated movements inside the room, "free movements" were movements outside the room, and "no movements" mean that bed rest was advised. The follow-up schedule was explained to the patient at the time of discharge and was scheduled after 10 days for suture removal, then, after 1 month, 6 months, and then, yearly. The patients were evaluated in detail and the data recorded at each assessment.

The entire data were collated and analyzed at the end of the study. Patients were followed up for a mean period of 12.2 months (range:

7-18 months).

Surgical technique:

Skin and fascia are incised using a regular, oblique inguinal incision to expose and incise the external oblique aponeurosis (EOA). The cord was mobilized gently and hanged then incised longitudinally to be skeletonised, after excision of the sac and closure of the ring, **Figures(1,2).**

All the cremasteric apparatus {muscle and fascia} was dissected and incised at the distal end, **Figure(3).** This bulky structure [Cremasteric apparatus] was deviated around the cord for narrowing the internal ring, **Figure(4).** Then it is introduced superficial to the transversalis fascia to be fixed with non absorbable prolene sutures, one to the lacuner ligament, others to the inguinal ligament below and finally to the conjoint tendon above and one stitch to narrow the internal ring **Figures(4,5)** This is followed by routine closure of the superficial fascia and the skin.

Statistical analysis:

Data are expressed as mean±standard deviation unless indicated otherwise. The student t-test was used to compare the overall series of both groups. A p-value less than 0.05 was considered statistically significant.

Results:

The series was made up of 68 men and 12 women, a median age of 35 (23-67) years. Four patients had a pantaloon hernia and excluded from the study. **Table(1)** summarized the patients' clinical characteristics, and medical-surgical history. Mean operating time in Lichtenstein repair (group A) was 48 minutes (range 35 to 90), versus 45 (35-65) minutes. The median hospital stay was 24 hours versus 12 hours respectively. Ligation of inferior epigastric vessels was performed in (12) patients, versus (4) patients in the group B. Postoperative complications appeared in 11 and 5 patients in both groups respectively. Neuralgia developed in the early postoperative period in 15 versus 2 cases in both groups respectively, mostly located in the inguinoscrotal region. 6 patients complained of scrotal edema versus 3 patients, and in 2

developed a pseudohernia versus 3 in group B (transient serohemorrhagic accumulation into the distal hernial sac). One case of late recurrence was seen in the patients in group A after extraction of the mesh versus one in group B. One long-term complication was detected in group (A) as there was deep seated mesh infection which resisted the treatment

and was cured after mesh extraction. Return to work and/or their usual previous activity occurred after an average of 24 ± 3 (18-30) versus 14 ± 1.2 (10-20) days, although the vast majority of the patients reported to have unrestricted activity within a week after the operation in group B.

Table (1): Preoperative and postoperative characteristic.

	A	B	P value
Age	23-67(36 ± 0.8)	25-60(40 ± 1.5)	*NS
Sex M/F	33/7	35/5	*NS
Hospital stay (h)	24-72 (24 ± 0.2)	8-48 (12 ± 1.2)	
Operative time (mean)	48(35-90)	45(35-65)	
Ligation of inferior epigastric vessel	12(30%)	4(10%)	0.003
Neuralgia and groin pain scrotal edema	15(37.5%)	2(5%)	p
Scrotal edema	6(15%)	3(7.5%)	0.012
Pseudohernia	2(5%)	3(7.5%)	*NS
Wound infection			
Superficial	5(7.5%)	4(10%)	*NS
Deep	1(2.5%)	0	
Return to work (days)	24 ± 1.2 (10 -30)	14 ± 3 (9-15)	0.010
Recurrence	1(2.5%)	1(2.5%)	*NS



Figure (1): Inguinal canal exposure before skeletonization of the cord.



Figure (2): After excision of the sac and closure of the ring.

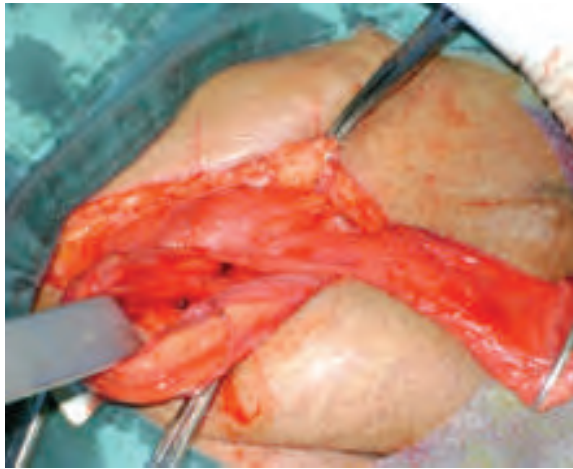


Figure (3): The cremasteric muscle apparatus after its release distally.



Figure (3): The cremasteric muscle apparatus after its release distally.

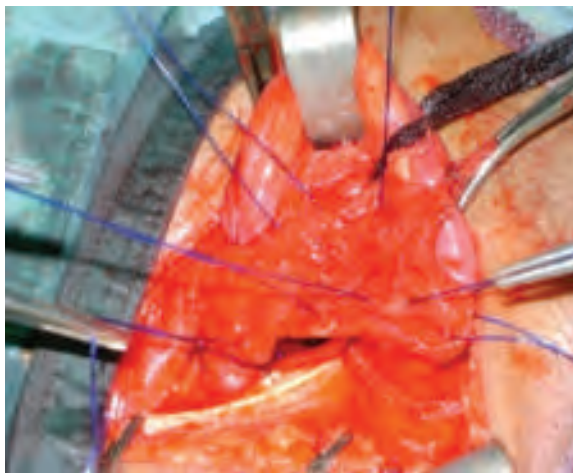


Figure (4): Cremasteric apparatus was deviated around the cord for narrowing the internal ring.

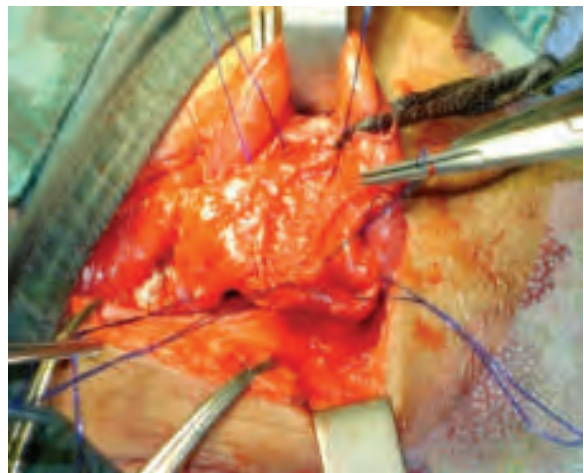


Figure (4): Cremasteric apparatus was deviated around the cord for narrowing the internal ring.

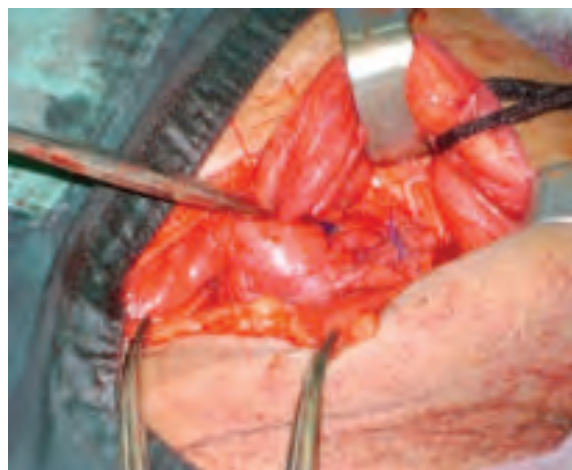


Figure (5): Cremasteric apparatus was fixed with non absorbable prolene sutures ,one to the lacuner ligament, others to the inguinal ligament below, and finally to the conjoint tendon above, and one stitch to narrow the internal ring .

Discussion:

Hernia repair is currently the most commonly performed general surgical operation; it occurs with a greater frequency in men than women (12:1 ratio). The ratio in our study was 6:1.

Success of groin hernia repair depends largely on the surgeon's understanding of the functional anatomy and pathophysiology of the abdominal wall and groin. Bassini,⁷ is considered today to be the "father of modern herniorrhaphy", he repaired the transversalis fascia defect by reinforcing the canal's posterior wall using a 3-layer technique, with suturing of local tissues in multiple layers by imbricating the full thickness of the transversalis fascia to the inguinal ligament in a "vest-over-pants" fashion, followed by further reinforcement of the transversus muscle to the undersurface of the external oblique aponeurosis.⁸

In our work we do suturing the cremasteric muscle apparatus from around the cord, as local tissues in multiple layers to be administered superficial to the fascia transversalis, and to the inguinal ligament, followed by further reinforcement of the transversus muscle to the undersurface of the external oblique aponeurosis like Shouldice procedure.

Since Shouldice introduction, more than 280,000 repairs have been performed, mainly under local anesthesia,^{7,8} and the recurrence rate was decreased to reach about 1% to 2% nearly the same recurrence rate in our study (2.5%).

Other studies published that although the Shouldice technique, was considered the gold standard in open no-mesh techniques, it has recurrence rates of 1-4% in specialized centers, and the long-learning curve, the risky dissection of the inguinal floor and a lack of experience make these figures unattainable for the general surgeon practicing outside these specialized centers.^{9,10}

Versus our work, where we had a significant difference in both procedures when compared to each other in favor of the non mesh repair.

In spite that Lichtenstein tension-free mesh repair opened a new era in groin hernia repair with superior results, it is still considered a foreign material, and deep infection is

catastrophic for the patient, which happened in our work with one case of infection that resisted treatment until we removed it.

Results from 3,019 repairs from 5 sites have demonstrated a 0.5% recurrence rate, and an overall 0.6% infection rate.⁶ The slightest movement of the mesh from the sutured area is a leading cause of failure of mesh repair of inguinal hernias.

Agreeing with our work, there was a high incidence of chronic groin pain following mesh hernia repair, reportedly in the range of 28.7-43.3%. by some studies.^{11,12}

Chronic groin sepsis after mesh repair requires complete removal of mesh to treat the sepsis. Possible damage to the spermatic cord, and nerve entrapment following mesh repair due to extensive fibrosis are also raised by this technique.¹³

Discarda has already published the results of two series based on his new technique of inguinal hernia repair,^{4,5,6} they used interrupted sutures made of a non-absorbable material for repairs in both series. In a third study, the author described the results of repairs done with continuous absorbable sutures.

All open non-mesh repairs are done by using interrupted sutures made from non-absorbable material. Interrupted sutures are used in open repairs to distribute the tension equally on all the sutures, to avoid recurrence of the hernia due to splitting of the tissue by the pull of the displaced muscles. Non-absorbable material is used to keep those structures together for unlimited lengths of time to make them blend properly and gain full strength.

We also believed that, the well vascularized cremasteric muscle and fascia was a sufficient bulky structure that made the floor of the inguinal canal well formed and strong.

Strong cremasteric structures around the cord, and its administration above the fascia transversalis, usually give protection to prevent herniation in such individuals. This protection is lost if those muscles are weak, and this is only observed in some individuals who had developed the hernia early, as we believe that its bulk and strength is related to the long standing hernia.

Hence, this technique will prove to be very effective, even in the hand of junior surgeons.

The good results seen with this repair technique in this study confirm its efficacy.

Conclusions:

The results of this new repair technique using cremasteric apparatus as an auto meshing appear promising. This technique does not use any foreign body, has minimal complications, same recurrence rate of hernia, and minimal chronic groin pain. The hernia repair without leaving any foreign body inside the patient may be a step forward in future.

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