

OBSTRUCTED INGUINAL HERNIA: LICHTENSTEIN'S MESH VERSUS BASSINI REPAIR TECHNIQUE

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Abstract: Meshes have become indispensable for the repair of abdominal wall hernias. Meshes may not be the most significant feature affecting the clinical outcome of hernia repair; nevertheless, they still exert an influence and worth discussing. Inguinal nerve identification during open hernia repair is associated with less chronic postoperative pain. The aim of this study is to evaluate the use of synthetic meshes in obstructed inguinal hernia. In elective hernia operation, the use of synthetic meshes in hernia repair is the gold standard, but it is controversial in emergency operations. This prospective study evaluates the advantage of the use of mesh in emergency setting. In obstructed/strangulated hernia, infection is the main concern. **Methods:** Prospective randomized controlled single-blinded study with 40 patients in each group. One group for Lichtenstein repair with polypropylene mesh and the other group had modified Bassini repair with follow-up period of two years. The used statistical analysis was the t-student/ Fisher test and chi-square test. **Results:** The hospital stay was significantly less in Lichtenstein repair and the postoperative neuralgia, wound infection, seroma formation were less in mesh repair. **Conclusions:** In emergency surgery within emergency resection, perforation, the tension-free repair using polypropylene mesh in adults with obstructed hernia should be preferred to conventional hernia repair. For the long time results, a larger study population is indicated.

Cuvinte cheie: operația Bassini, operația Lichtenstein, hernie inghinală

Rezumat: Plasele au devenit indispensabile în refacerea herniilor peretelui abdominal. Meșele, poate nu sunt cele mai semnificative modalități de operare ce afectează clinica curei herniare, cu toate acestea ele exercită influență și merită discutate. Identificarea nervului inghinal, în cursul intervenției deschise se asociază cu o incidență redusă a durerilor postoperatorii. Scopul acestui studiu este evaluarea aplicării meșei sintetice în hernia inghinală încarcerată (ștrangulată). În intervenții electiv pentru hernii, folosirea meșei sintetice este standard de aur, însă este controversată în intervențiile de urgență. Acest studiu prospectiv a evaluat avantajele folosirii meșei în urgență. În herniile ștrangulate, încarcerate, infecția este de cel mai mare interes. **Metoda:** S-a efectuat un studiu controlat, randomizat-prospectiv, într-o singură secție, cu 40 de bolnavi în fiecare grupă. O grupă de bolnavi a beneficiat de cura Lichtenstein cu meșă din polipropilenă, iar cealaltă grupă a beneficiat de tehnica Bassini modificată, urmărirea fiind pe o perioadă de 2 ani. Pentru analiza statistică s-a folosit testul t-student/testul Fisher și testul chi pătrat. **Rezultate:** Durata de spitalizare a fost semnificativ mai scurtă în operația Lichtenstein, iar nevralgia postoperatorie, infecția plăgii, a seromului au fost mai reduse în procedeul aloplastic. **Concluzie:** În chirurgia de urgență, fără rezecție de urgență, perforație, tehnica tension-free folosind meșa de polipropilenă la adulți cu hernie ștrangulată poate fi preferată ca tehnică convențională. Pentru rezultate mai îndepărtate în timp este indicată analiza unui lot mai mare.

INTRODUCTION

Most of mesh related problems reflect a lifelong risk and typically occur long after the time of mesh deployment. There is evidence that the polymer and its structure influences infection, pain and adhesion formation.(1,2,3,4)

The median interval between operation and complication may be 2 years or more: 17 months for chronic pain (5), 2 years for infections (6), 2 years for migration.(7)

However, it is important that surgeons consider the logical and scientific background of the available materials if the most appropriate solution is to be adopted for the individual patient. In the integration of the mesh into the tissues, larger pores mean less surface area, less inflammatory foreign body response and less fibrosis, but increasing pore size is limited by tensile strength and elasticity.

Today, these structures are generally made of polypropylene, polyester or polyvinylidene fluoride; biological meshes are an alternative to these plastics. (8)

Most meshes, in particular the modern large-pore designs with minimal inflammatory stimulus are well tolerated in the tissues of majority of the patients, a few problems may still arise, these usually involve bacterial infection in contaminated areas or mesh migration with erosion of adjacent organs.(8)

The results from several meta-analyses have shown that the use of mesh is better to the non-mesh repairs in inguinal hernia surgery. In complicated hernias with obstruction, the use of mesh is presumed to further increase the risk of infections, but recent publications show that the mesh is safe and it does not increase infection risk.(8)

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This study compares the outcome of pure tissue repair and mesh repair in obstructed inguinal hernia in terms of hospital stay, postoperative complications, recurrence and operative time.

PURPOSE

The aim of this study is to evaluate the use of synthetic meshes in obstructed inguinal hernia. In elective hernia operation, the use of synthetic meshes in hernia repair is the gold standard, but it is controversial in emergency operations. This prospective study evaluates the advantage of the use of mesh in emergency setting.

METHODS

The study period was between January 2004 and January 2011, being analyzed 80 patients. The study was prospective, randomized, made by the 1st Surgical Clinic.

We evaluated hospital stays, postoperative morbidity, with hematoma, pain, swelling, wound infection, recurrence for a two years period.

For statistical analysis was performed the t-student/Fisher test and chi-square test.

The study included:

- a) both male and female patients between 20 and 65 years old with obstructed inguinal hernia;
- b) the operative technique performed was Lichtenstein's repair and the modified Bassini's method.

The study had exclusion criteria:

- a) age group <20 years old and >65 years old;
- b) preoperative peritonitis (hernia sac infection, local or diffuse peritonitis);
- c) resection/anastomosis

The used mesh material: polypropylene mesh, normal pore size, usually about 8-9 cm in length and 5-6 cm in width, Prolene mesh, Promesh, or Mersilene mesh.

In the day of the operations we used 1st Surgical Clinic's protocol (Ceftriaxane 1g twice daily or Amoxiplus 1,2 g twice daily, associated with Metronidazol 2 x 50 ml daily) for two days.

Type of operations: 50% mesh repair and 50% tissue repair.

Informed written consent was obtained from all of the participating adult patients we used for the study.

RESULTS

The majority (72%) of all hernias were unilateral and on the right side (table no. 1.)

Table no. 1. Side of inguinal hernia

Side	No	Percentage (%)
Right	56	72%
Left	24	28%
Bilateral	0	0%
Total	80	100%

The majority of the patients were between 30-45 years (table no. 2.)

Table no. 2. Age incidence

Age (years)	Incidence
25 – 35	27
35 – 45	40
45 – 55	17
55 – 65	16
Total	100

Mean operating time in mesh repair was 60 minutes, which is significantly less than tissue repair (69 minutes) with t test, $p < 0,00015$.

In the postoperative evolutions, overall early complications in less than a week, seem to be more in the tissue repair arm (table no. 3./no. 4, figure no. 1.)

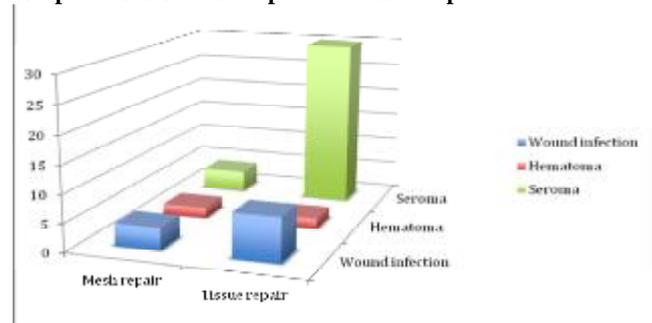
Table no. 3. Early postoperative complications in mesh repair (< 7 days)

Type of complications	No	Percentage %
Wound infection	4	10%
Hematoma	2	5 %
Seroma	4	10 %
Mesh rejection	0	0
Total	40	100

Table no. 4. Early postoperative complications in tissue repair

Type of complications	No	Percentage (%)
Wound infection	8	20
Hematoma	2	5
Seroma	30	25
Total	40	100

Figure no. 1. Comparison between postoperative complications of mesh repair and tissue repair



Wound infection was surprisingly higher in Bassini tissue repair but the difference was not very significant ($p=0,42$) (table no. 5.).

Table no. 5. Wound infection

Complications	Mesh repair	Tissue repair
Wound infection	6	8
No infection	34	32
Total	40	40

In tissue repair, seroma formation was significantly higher ($p=0,048$) (table no. 6.)

Table no. 6. Seroma formation

Complications	Mesh repair	Tissue repair
Seroma	2	12
No seroma	38	28
Total	40	40

In table no. 7 and table no. 8 we analysed the late postoperative complications (after 7 days).

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Table no. 7. Late postoperative complications (>7 days) in mesh repair

Type of complications	No	Percentage (%)
Wound dehiscence	0	0
Neuralgia	2	5
Total	40	100

Table no. 8. Late postoperative complications (>7 days) in tissue repair

Type of complications	No	Percentage (%)
Wound dehiscence	0	0
Neuralgia	8	20
Total	40	100

In tissue repair we have more neuralgia but statistically, the difference is not significant (Fisher test).

Average postoperative hospital stay was significantly less in mesh group (3,5 – 0,5 days) than 6,5 – 0,5 days in tissue repair ($p < 0,0001$).

In table no. 9 we summarised the overall comparison of the two methods with mesh repair showing the advantages of each method through operating time, seroma, hospital stay. In two years follow up we have no recurrence in either group.

Table no. 9. The results of the two methods

Parameters	Early complications (%)		Late complications (%)	
	Wound infections	Seroma		Wound infections
Mesh repair	10	10	10	3,5
Tissue repair	20	25	20	6,5
p	0,629 non-significant	0,048 significant	0,341 non-significant	<0,001 significant

DISCUSSIONS

Apart from an appropriate surgical implantation technique, complications may be reduced by improvements in the device itself.

These modifications may include permitting magnetic resonance imaging of the mesh by incorporating paramagnetic particles within its fibres, coating the mesh's surface with antibiotics to reduce infection.(9,10)

Conventional open repair relies on the suture to close the hernia defect but its major drawback is hernia recurrence which can be found in 10% up to 15% of operations.(11)

The European Hernia Trialists Collaboration group assesses whether mesh technique reduce the risk of recurrence and whether they are associated with more persisting pain.

These data indicate that the use of synthetic mesh reduces the risk of groin hernia recurrence by around 50% regardless of method of placement and the persisting pain was also less frequent.(12,13)

In evolution of the inguinal hernia, the obstruction is a common emergency, with around 10% incarceration and 0,29-2,9 % strangulation.(14)

The past 15 years have seen an impressive rise in the popularity of the tension-free mesh repair, originally popularised by Lichtenstein and Shulman. This operation is simple to perform and gives excellent early results with low complications rates and an early return to free activity; this method is the choice for the management of uncomplicated inguinal hernias

(15), but the use of mesh in emergency, in cases of strangulation or incarceration is controversial because of the risk of infection in synthetic tissue.(17,18)

The difference in seroma formation between tissue repair and mesh repair was statistically significant.

The notion that mesh infection is difficult to eradicate made the surgeons to clean the wound more thoroughly in this group and less operating time and tension in mesh repair group may have contributed to these findings.

The incidence of complications did not differ significantly between groups, similar to the results of other randomised trials comparing mesh and non-mesh repair.(19,20,21)

Foreign body reactions constitute a specific problem in mesh repair and sometimes are underestimated, and some studies has demonstrated that the extent of such reactions differs between individuals and is dependent on the amount of material and structure of the mesh.(22,23)

Clinical studies and animal experiments have both shown that a considerable difference exists in the inflammatory capability of meshes influenced by pore size. Pores smaller than 1 mm lead to extensive inflammation and fibrosis, large-pores meshes are associated with a diminished fibrotic reaction, the formation of a scar and preservation of elasticity.

Higher ratio of seroma is reported after the use of Lichtenstein's method in an elective setting (24), but there can't be found any differences between mesh and non-mesh groups for hematoma, seroma or wound infections in elective operations.(24,25)

The difference of elective surgery versus obstructed hernia could influence the outcome of the procedure. The wound infection was less in mesh repair patients, without statistically significance. In case of mesh infection only deep severe infection may need mesh removal but the fibrosis caused of tissue reaction with the mesh helps prevent the recurrence.

In some studies, the Lichtenstein's repair of strangulated groin hernias is safe because of less wound infection, mesh complications and recurrence (26), but in other studies the emergency mesh repair is inferior of elective Lichtenstein plasty.(27)

In our study, mesh infection rate was 15%, <2% in an elective surgery, but with 10% in contaminated surgery. Most of the infections were mild, treated with conservative therapy. We observed more neuralgia in the tissue repair group. We used a small number of study subjects in each of the arms of the trial.

We chose a simple polypropylene mesh because of easy availability and costs.

Studies have shown that Lichtenstein technique is preferred in incarcerated inguinal hernia because of lower recurrence.(28)

CONCLUSIONS

Tension-free repair with polypropylene mesh in obstructed hernia, has an advantage in terms of seroma formation, hospital stay, especially without resection with anastomosis or perforation.

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