

Mesh repair versus non mesh repair of primary inguinal hernia

Safa M. Al-Obaidi * FRCS (Ed & G)

Salem A. Al-Sarraf ** FRCS (Ed)

Othman A.Salim MBChB

Summary

Background: Techniques of Inguinal hernia repair have seen an evolution from the pure tissue repair to the prosthetic repair and in the recent years past to laparoscopic repair. High recurrence rates using fascia for the hernia repair or the use of sutures under tension prompted the development of polypropylene mesh to reinforce the posterior wall of the inguinal canal. The aim of this study is to compare the post operative results of Lichtenstein mesh technique with Darning repair.

Patients and methods: A prospective study of "100" patients with inguinal hernia were conducted to evaluate two methods, of open repair of inguinal hernia Lichtenstein mesh technique with Traditional non-mesh technique (modified Bassini or Darning). Operation were done under general, epidural and local anaesthesia at the surgical units of Baghdad Teaching Hospital and Arbil Teaching Hospital.

Results: The study showed that Lichtenstein mesh technique is an effective operation for repair of inguinal hernia with low complication rate and less pain in comparison to the repair by traditional non-mesh technique. Also the results show that, mesh repair group returned to work earlier than non-mesh repair group.

Conclusion: Mesh repair of primary inguinal hernia repair is superior to non-mesh repair in term of early postoperative pain, return to the work and recurrence.

Keywords: Inguinal hernia repair, Lichtenstein mesh, Darning technique.

Fac Med Baghdad
2008; Vol.50, No.4
Received Sept, 2008
Accepted Oct., 2008

Introduction

Traditional hernia repair "tissue repair" described by Bassini "1880" emphasized the importance of reconstitution of transversalis facial layer of posterior wall of inguinal canal. He used interrupted silk suture in approximating of conjoint tendon to inguinal ligament including transversalis fascia (recurrent rate was <10% in 5 years follow up) then many modification of this technique done (1)

Some surgeons thought for re-enforcement of posterior wall of inguinal canal using either biological or synthetic material "Darning". Among earliest darning was McArthur 1901 who used strip of external oblique aponeurosis as woven between conjoint tendon and inguinal ligament, while among those who used synthetic material Oglive 1937 who use "silk lattice repair" until Moloney 1948 introduced modern nylon darn and this method became popular because of simplicity.(2)

The material that has emerged as suitable for routine use in hernia surgery that have classic ideal characteristic include polypropylene (monofilament prolene or poly filament) Dacron and polytetrafluoroethylene (PTFE). Absorbable prostheses such as those made of polyglactin are not durable and have no place in groin hernia surgery. (3)

The newer biological prostheses made of human Cadaver skin, porcine, cross-linked dermal collagen, or porcine small intestinal sub mucosa are more expensive and have no advantage over synthetic material for an uncomplicated hernia repair. However they can be useful in infected groin wound.(4)

Lichtenstein introduced the concept of tension free hemioplasty in repair of groin hernia such new method has gained world wide acceptance being preferred method in British hernia center in London, and it is also widely used by American and European surgeons. Lichtenstein used prolene monofilament and operation was done under local anesthesia (5).

Other modification made by Rutkow and Robbins by whom the mesh cone or plug bring a new approach to the correction of actual hernia defect (6). River and Stoppa introduced preperitoneal approach in placing of prosthetic mesh and it used specially in bilateral and recurrent hernia (7) TAPP (transabdominal preperitoneal) and TEP (totally extraperitoneal) is now the standard laparoscopic technique (8, 9).

Patients and Methods:-

This is a prospective randomized study which was done in Baghdad teaching hospital and Erbil teaching hospital from Jan 2006 -Jan 2008. A total of 100 patients with inguinal hernias were randomized into an open mesh technique, group (1)

* Dept. of surgery. College of medicine – Baghdad
** Baghdad Teaching Hospital.

50 patients, and open non mesh (modified Bassini or Dar ning technique , group (2) 50 patients.

Data form included history ,physical examination ,relavant investigations , type of operation , post operative pain , local complications , general complications , time of return to work. In Group(I) Lichtenstein mesh tension -free hernioplasty was done General anaesthesia used in "40" patients (80%), local anaesthesia for "8" patients (16%) with monitoring of vital signs during operation in the presence of anaesthetist. And two patients (4%) by epidural anaesthesia infiltrating 20cc of 2% xylocain by anesthetists. In Group II non-mesh (traditional) technique. Such group include "50" patients using general anaesthesia in "42" patients (84%) and epidural in "2" patients (4%) and local anaesthesia in "6" patients (12%).

Difference between continues variables measured by using t-test .P<0.05 considered as level of significant.

Results:-

In this study (100) patients were evaluated, the age range was 18-80 years mean age 50 years there were 91 male patients (91%) and 9 female patients (9%). The patients were followed in the outpatient clinic and by personal communication (by phoning them) during period of follow up.

Table (I): Show the distribution of variables.

Variable	Group I	Group II
	50	50
Age range	18-70	18-80
Gender	Male	45 (90%) 46 (92%)
	Female	5 (10%) 4(8%)
Type of hernia	Indirect	35 (70%) 32(64%)
	Direct	13(26%) 15(30%)
	Both	2 (4%) 3 (6%)
Type of anaesthesia	General anaesthesia	40 (80%) 42 (84%)
	Local anaesthesia	8 (16%) 6(12%)
	Epidural anaesthesia	2 (4%) 2 (4%)
Smoker	15 (30%) 17(34%)	
Past surgical history	9(18%) 10(20%)	
Past medical history	5 (10%) 5 (10%)	

Post operative complications:

General complications:There was no mortality, no deep vein thrombosis and no respiratory insufficiency in any group, however, two patients had developed systemic complication in group II as shown in table (2), one of them developed urinary retention treated by urethral catheterization while other one who had previous heart disease developed supraventricular tachycardia and ischaemic change admitted to CCU and improved after two days of admission .

Local complications:Two patients (4%) in group I and 4 patients (8%) in group II developed scrotal

swelling, treated by rest, scrotal elevation analgesic and antibiotic as shown in table (2).

As shown in table (2) two patients (4%) in group I and II develop subcutaneous infection in form of minor redness of skin edge and clear serous discharge that treated conservatively by antibiotic and no need for mesh removal.

Three patients (6%) in group I and two patients in group II develop wound haematoma, treated conservatively by analgesic and antibiotic.

Table (2): Shows the number of patients who developed post operative complications according to the type of hernia repair

Early complications	Group I	Group II
Urine retention	0 (0%)	1 (2%)
Cardiac complication	0 (0%)	1 (2%)
Scrotal swelling	2 (4%)	4 (8%)
Subcutaneous infection	2 (4%)	2 (4%)
Wound haematoma	3 (6%)	2 (4%)
Total	7 (14%)	10(20%)

P. value = 0.4813 (non-significant)

Post operative pain:

As shown in figure (1) within 5-8 days post operative 30 patients (60%) become pain free in group I, in comparison to 10 patients only (20%) in group II. 15 patients (30%) in group I in comparison to 10 patients (20%) in group II had no more pain within 8-14 days from time of operation. The remaining 5 patients (10%) in group I and 30 patients (60%) in group II relieved from pain in 15-30 days after operation.

Return to work:

Office workers: (which include 15 patients in group I and 12 patients in group II). As shown in figure (2), 9/15 patients (60%) in group I return to their job between 8-15 days post operatively in comparison to 2/12 patients (16.7%) in group II. While 5/15 patients (33%) in group I and 4/12 patients in group II (33.3%) return to their work after 16-20 days from operation. Remaining 1/15 patient (7%) in group I and 6/12 patients (50%) in group II return to their work after 21 days post operation.

Manual worker: (which include 27 patients in group I and 30 patients in group II) Figure (3) shows that 4/27 patients (15%) in group I return to their job with in 8-15 day in comparison to 2/30 patients (6.6%) in group II.

While 16/27 patients (60%) in group I and 10/30 patients (33%) in group II return to work within 16-20 days.

After 21-30 days post operation, 7/27 patients (25%) in group I in comparison to 18/30 patients (60%) in group II return to their work.

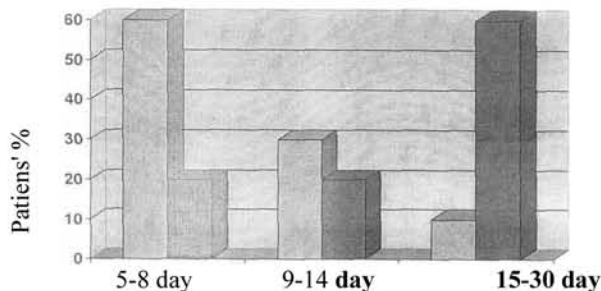
Note: Retired patients from work were excluded from the study (8 patients in each group).

Recurrence: There were 3 recurrences in group II (non-mesh) and no recurrence identified in group II (mesh repair group).First recurrences occurred after 6 months , second one after 10 months and third one

after 18 months post operation , first two patients were manual worker, and third one was office worker .

Follow up: 20 patients (20%) were followed up to 2 years, 45patients (45%) between 10 months to 18 months, 35 patients (35%) less than 10 months in both groups.

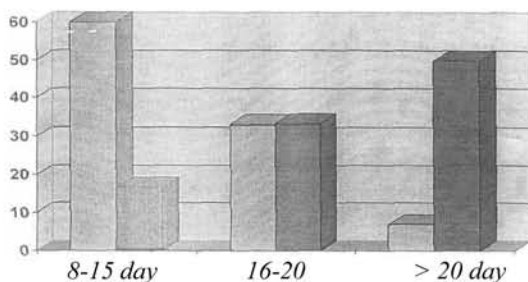
- Mesh repair
- Non - mesh repair



Duration of pain relief
P. value = 0.0001 (significant)

Figure (1): Shows the distribution of patients were relieved from pain in post operative period with type of repair and duration of pain relief.

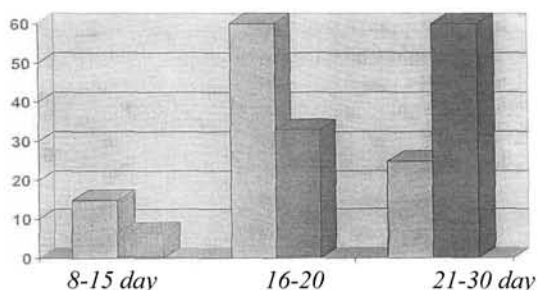
- Mesh repair
- Non - mesh repair



Duration post operatively
P. value = 0.0473 (significant)

Figure (2): Shows the distribution of patients according to time required to return to their job in days with the type of operation.

- Mesh repair
- Non mesh repair



Duration post operatively
P. value = 0.4077 (non-significant)

Figure (3): Shows the distribution of patients according to the time required to return to their work with the type of operation.

Discussion:-

The mesh repair described by Lichtenstein is now the standard operation for inguinal hernioplasty it is simple to perform with very low recurrence rate(10)

The groin appear to be a protected area as wound infection after inguinal hernia repair is less than 5% and in specialized ambulatory surgical unit the incidence is around less than 1%, and infection is a potential cause of recurrence of hernia if it involves the depth of incision or lead to abscess formation and purulent discharge from the wound.(11)

In our study subcutaneous infection occur in 2 patients (4%) and it was in the form of redness and serous fluid discharge that did not lead to removal of mesh. The results of a study done by Grant Am. on a meta-analysis of 20 trials (5016 participants) of open mesh versus non-mesh repair of groin hernias showed that the rate of infection, was similar following both procedures and it is 1-6%.⁽¹⁾ However it is mentioned that even when a prosthetic mesh was inserted and wound becomes deeply infected with purulent discharge, the wound might be managed with drainage and antimicrobial agent only and the mesh need rarely be removed (12).

About type of anesthesia in inguinal hernia repair in our study only 16% in group I and 12% in group II were operated on under local anesthesia, but in classical Lichtenstein the procedure is performed under local anesthesia in an outpatient facility and this improves immediate postoperative mobility afforded by repair without tension and avoidance of general anesthesia so it decreases postoperative morbidity (ex: Deep Vein Thrombosis, pulmonary complication etc.).(13) Scrotal swelling develop in 2 patients (4%) in group I and 4 patients (8%) in group II treated conservatively, and this complication is due to excessive dissection of the spermatic cord.The incidence is decreased by avoiding this excessive dissection, also this complication were decreased by dividing of large inguino-serotal sac (rather than excision) and leaving the distal sac open in situ. Other complication which is not seen in our study is ischaemic orchitis occur within 1 -5 day after surgery especially in recurrent hernia and this also due to excessive dissection of cord lead to thrombosis of vein draining the testicle. Other study done in 1995-1996 by Bellone D. on (119) primary groin hernia operated by tension free hernioplasty, scrotal swelling developed only in two patients (4%). (15)

30 patients (60%) in group I become pain free after first post operative week in comparison to 10 patients (20%) in group II because traditional non-mesh repair are painful operation by deep suturing of the muscle to the ligament causing tension on muscular exertion and a major cause of post operative disability, and by using tension free technique both intensity and duration of pain is significantly less.(16) In our study (60%) of the patients in group I return to their office work within 2 week post operation while in group II within third or fourth week postoperative.

Other study done by Pappalardo *et al* in 1995 after four year follow up showed that mesh group return to normal activity after 7 days while non-mesh group after 17 days.(17)

Recurrence is a major problem encountered by surgeon, in our study no recurrence were seen in mesh repair group, while it occur in 3 patients (6%) in non-mesh repair group, they were re-operated on under general anesthesia by open mesh technique .

References:

1 - Micheal J. Zinner, Seymour I Schwartz ; Maingot's of abdominal surgery, 10th edition Massachusetts: Prentice hall international, 1997, Chapter 14: 479-483.

2- Blackwell Synergy" Randomized clinical trial in hernia repair". British Journal of Surgery March 2002, 89, 3, 293-297.

3- Brunicardi, Dana K. Anderson, Billiar, Dunn. Schwartz's principles of surgery, 8th edition 2005 chapter 36 inguinal hernia, page 1352-1394.

4- Cappelletti JA, Berkersfield JA, Cherry JK, repair of inguinal hernia in adult with prolen mesh, Surg. Gynaec. & Obstet. 1998, 167: 124.

5- Irving L. Lichtenstein, Alex G. Shulman Tension free hernioplasty, Am. Journal Surgery 1989, 157: 188-193.

6- Rutkow I. Epidemiologic, economic and sociologic aspects of hernia surgery in the United States in the 1990s. Surgical Clinics of North America 1998; 78: 941-51

7- Soppa RE; The midline preperitoneal approach and prosthetic repair of groin hernia, in Fitzgibbons Jr. RJ, Greenburg AG(eds); Nyhus and Condons hernia. 5th ed Philadelphia; Lippincott Williams and Wilkins, 2002, p 199.

8- Wellwood J, Sculpher MJ, Stoker D, et al: Randomized controlled trial of laparoscopic versus open mesh repair for inguinal hernia outcome and cost. BMJ 1998. 317: 103.

9- Kukur S, Nixon SJ, MacIntyre IM: Laparoscopic or Lichtenstien repair of recurrent inguinal hernia: one unites experience. J R Coll Surg. Edinburgh 1999.44: 301,

10- Scott N, Go. PMNYH, Graham P., McCormack-K, Ross SJ mesh for groin hernia repair, cocharance Data base of systemic. Review 2002 Issue 4.

11- M. E. Falagas, S. K. Kasiakou (2005) Mesh-related infections after hernia repair surgery Clinical Microbiology and Infection , January 2005 Volume 11 Issue 1 Page 3-8.

12- Petersen S, Henke G, Freitag M, Faulhaber A, Ludwig K. Deep prosthesis infection in incisional hernia repair: predictive factors and clinical outcome. Eur J Surg 2001; 167: 453- 457.

13- Szell K., Local anaesthesia and inguinal hernia repair : Annals of the Royal College of Surgery Engl. 1994, 76: 137-140.

14- Wantz GE: My experience without tension, primary inguinal hernia in man, Chirurgie 1997, 122: 111-116.

In a study done in university of Rotterdam, in Netherlands by a group of surgeon on 300 patients, 3 years follow up showed that recurrent rates were (1%) for mesh repair and (7%) for non mesh repair.(18) Tension is a cardinal factor in the failure of a hernia repair, tissue sutured under tension will tend to pull a part and the suture create an area of ischaemic pressure necrosis.(19)

15- Bellone D, Sacco D. "Tension free hernioplasty our experience" Minerva-chir 1999 March, 54, 123-5.

16- A.E. Kirk, M. Kurzer, K.J. Worters: British hernia center tension free mesh hernia repair. An. R.C. Surgery. Ergl. 1995, 77, 299-304.

17- Pappalardo G, Guadalajara A, Illomei G, Frattaroli FM, Trifero M.The Bassini techniques versus Tension free repair. A prospective randomized trial. Chirurgia 1995; 8:293-5.

18- W. W. Vrijland, M. P. van den Tol, R. W. Luijendijk, W. C. J. Hop, J. J. V. Busschbach, D. C. D. de Lange, D. van Geldere, A. B. Rottier, P. A. Vegt, J. N. M. Uzermans, J. Jeekel (2002) Randomized clinical trial of non-mesh versus mesh repair of primary inguinal hernia, British Journal of Surgery 1989 (3) , 293-297.

19- Liem M.S., van Duyn E.B., van der Graaf Y., van Vroonhoven T.J.M.V. Recurrences after conventional anterior and laparoscopic inguinal hernia repair - a randomized comparison. Ann Surg 2003 Jan 237(1): 136-141.