

## COMBINED FASCIAL AND PROSTHETIC MESH REPAIR FOR ABDOMINAL INCISIONAL HERNIAS.

By

AbulNagah GM. (MD, FRCS), Shehab WI. (MD, FACS), Hamza YM. (MD, FRCS).

Department of Surgery, Faculty of Medicine, University of Alexandria, Egypt.

**Objective:** Incisional hernias complicate up to 11% of incisions with a possible recurrent rate of 44%. Assessment of the applicability and validity of combined fascial and prosthetic mesh repair in the management of incisional hernia.

**Methods:** Forty patients (17M: 23F) were included in the study. Patients were subjected to hernia repair by a technique using both combining fascia and polypropylene mesh in the repair of all ventral incisional hernias, regardless the site of previous incision. Patients were followed up for morbidity or recurrence.

**Results:** Post-operative complications included seroma formation in 6 patients, superficial wound infection in three and deep venous thrombosis in one. Post-operative hospital stay ranged from 1 to 22 days with a mean of 7.2 days. Patients were followed-up for a median of 21.3 months (range 9 to 49 months). Two patients (5%) reported a persistent small local induration and one (2.5%) reported persistent local pain. Single recurrence (2.5%) was encountered in this study.

**Conclusion:** This technique is a tension free repair applicable to all types of incisional hernias, most of the mesh is lying deep under the rectus sheath and it has an acceptable complication rate with low recurrence rate.

**Keywords:** Incisional hernia, mesh repair, fascial repair

### INTRODUCTION

The incidences of incisional hernia varies between 3.8 and 11.5 % of patients performing abdominal surgery.<sup>(1,2)</sup> The incidence depends on a number of factors including age, sex, obesity, type of surgery, suture type, chest condition, postoperative abdominal complication, and wound healing power.<sup>(1)</sup> It is more common in old, female, obese, urgent, major, prolonged operation, absorbable suture, smoker, chest infection, ilius, and wound infection respectively. Ninety percent of incisional hernias occur within 3 years of original operation.<sup>(2)</sup>

Repair of large abdominal incisional hernias is a difficult surgical problem, with reported high incidence of recurrence rate up to 33% after first repair and 44% after second repair,<sup>(3)</sup> mostly occurring within the first three years of the repair.<sup>(3,4)</sup> Numerous method of repair have been described; primary repair in one or two layers, Mayo overlap flaps, use of fascia with suture darns, and use of fascia with synthetic mesh (polypropylene, marlex, mersilene or expanded polytetrafluoroethylene or even stainless steel mesh).<sup>(3,5,6)</sup>

It had been suggested by Loh and associates<sup>(7)</sup> in 1992 that

the overlapping repair techniques, which includes combining both fascia and mesh repair, have impressive results and carry the advantage of avoiding excessive tension

Browse and Hurst<sup>(8)</sup> in 1979 described a technique for incisional hernias repair using fascia and polypropylene mesh This technique was subsequently applied to sub-costal hernias by Whiteley and associates<sup>(9)</sup> in 1998. In 2001, Khaira and associates<sup>(10)</sup> introduce a modification which involved an overlap and two points of anchor for the mesh. We describe our experience with a similar technique on Egyptian patients in Alexandria Main University Hospital.

### PATIENTS AND METHODS

This study included forty consecutive patients with abdominal incisional hernia admitted to Surgical Department, Alexandria Main University Hospital, between January 2001 and June 2003 for hernia repair.

We adopt a combined fascial and mesh repair as described by Khaira and associates<sup>(10)</sup> The surgical technique entails, excision of the previous cutaneous scar by elliptical incision

and the hernia sac dissected to expose the circumferences of abdominal wall muscular defect (Fig. 1). The sac was opened only if there was a history of recurrent attacks of sub-acute obstruction and chronic abdominal colic or if it was not reducible during operation. The skin flaps were dissected till the rectus sheath or external oblique aponeurosis was clearly exposed all around the circumference of the defect (for a suitable distance to allow next step). It was then incised at a distance from the edge equal to the defect width or slightly more. This is judged objectively to allow tension free opposition of the lateral margin of the medial leaves. The medial leaves were then elevated from the underlying muscle (Fig. 2) and their lateral margins turned medially and sutured together with continuous 0 polydioxanone sutures (Fig. 3), inverting the sac and in case of midline hernias providing a new midline fascial layer. The lateral leaves of rectus sheath were then elevated from underlying muscle. An adequate size polypropylene mesh was prepared and fixed under the lateral leaves of rectus sheath with loose interrupted 00 polydioxanone suture (Fig. 4). The medial borders of the lateral leaf of rectus sheath were then sutured together over the mesh with continuous 00 polydioxanone suture to partially cover the mesh (Fig. 5). In case of transverse incision care was taken to insure that the circumferential incision had aponeurotic tissue all around, and the mesh was sutured to the under surface of the external oblique muscle with loose interrupted 00 polydioxanone suture. Then, the fibrous margin of the lateral circumference of a transverse defect was sutured together over the mesh with continuous 00 polydioxanone suture for partial cover. A 16 F closed sterile suction drain was inserted and the subcutaneous and skin closed with 00 absorbable suture. The drain was removed when the drainage volume was less than 30 ml in the 24 hours.

Post operatively, the patients were mobilized with respiratory exercises as soon as possible and discharged home once the drain has been removed. A data sheet was completed for each patient noting intra-operative and post-

operative complications. Follow up data was compiled by history taken, and full clinical examination on 3<sup>rd</sup>, 6<sup>th</sup> months and annually afterward.

## RESULTS

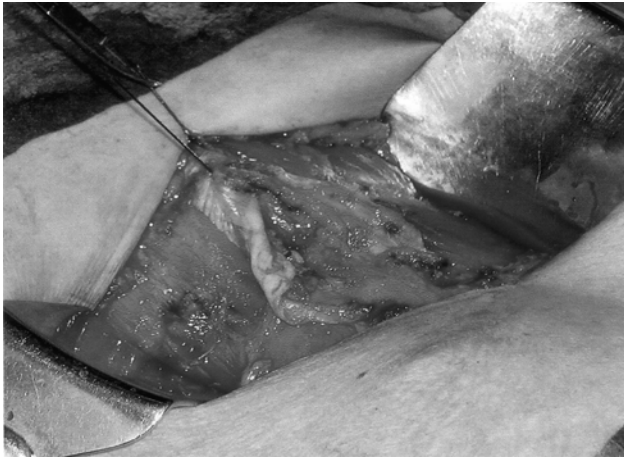
Forty consecutive patients were evaluated (17 men and 23 women). Their median ages were 48 years for men and 41.4 years for women. The original operation was bowel related in 17 cases, gynaecological in 10 and hepatobiliary in 5 patients. Eight patients had recurrence after previous attempts of para-umbilical or epigastric hernia repair. The incisions were midline in 23 cases, par median in 8, transverse in 7, and oblique in two patients. The hernias were considered subjectively to be large in 10, medium in 24 and small in 6 patients. None of the patients had previous incisional hernia repair.

There were no intra operative complications but two patients were electively ventilated for 24 hours because of morbid obesity with borderline respiratory functions. Three patients underwent the hernia repair combined with cholecystectomy for chronic calculalr cholecystitis.

Post-operative complications included seroma formation in 6 patients (15%), with two patients required repeated aspiration for 2 weeks. Three patients (7.5%) had a superficial wound infection one of them after haematoma formation and one patient (2.5%) developed a deep vein thrombosis with non fatal pulmonary embolism. Postoperative hospital stay ranged from 1 to 22 days with a mean of  $7.2 \pm 5.64$  days. All patients showed sound wound healing with primary intension. Of the 40 patients studied, 37 patients available for follow up. Follow-up was for a median of 21.3 months (range 9 to 49 months). Two patients (5.4%) in the early experience reported a persistent small local induration with no impulse on cough (probably suture granuloma or curgeled part of the mesh). Single recurrence (2.5%) was detected in a patient with two previous biliary surgeries.

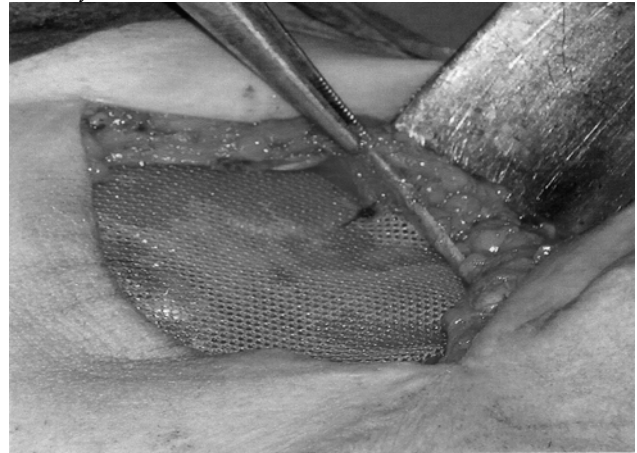


*Fig 1. Dissection of hernial sac all around*



*Fig 3. Suturing of lateral edges of medial leaves of ARS to form new linea alba*

*Fig 2. Hernial sac reduction & dissection of medial leaves of anterior rectus sheath*



*Fig 4. Fixation of polypropylene mesh under the lateral leaves of ARS*



*Fig 5. Fixation of medial edges of lateral leaves of ARS over the polypropylene mesh*

## DISCUSSION

The use of prosthetic mesh to repair large incisional hernias is well established. Different techniques have been described including a sandwich of mesh and rectus sheath with overlapping and two points of fixation, mesh placed deep to rectus sheath with overlap and mattress suture fixation, a complex mesh peritoneal sandwich, fixation of a large mesh anterior to the rectus sheath with two points of fixation, and a combination of a fascia and mesh.<sup>(4,8,11,12)</sup> It has been suggested that overlapping leads to better repair when one considered fascia alone or in combination with mesh.<sup>(4,9-11)</sup>

Langer and Christiansen<sup>(3)</sup> compared their results using primary repair with historical data using a mesh and suggested that the use of mesh gave a better repair with less recurrence. Loh and colleges<sup>(7)</sup> in their literature

review, suggested that the better results with mesh were simply a manifestation of inadequate length of follow up and further more they highlighted a number of complications associated with the use of mesh. Liakakos and colleges<sup>(13)</sup> in a non-randomized study comparing the postoperative complication of primary closure versus the use of mesh, they found out that the recurrence rate was less with mesh at a mean of 7.6 years of follow up.

The method used in this study has incorporated fascial repair with mesh placement behind the anterior leaf of the rectus sheath with considerable overlap (thus most of the mesh is not lying subcutaneously) and two point of fixation. This method has been used for hernias arising from incisions other than those in midline.<sup>(9)</sup>

Wound infection is potentially major complication that fortunately, is usually superficial but can be severe enough

to necessitate removal of the mesh. However, in this study, fortunately we faced only three cases (7.5%) of superficial wound infection and non of them progressed to fulminating wound sepsis.

In the present study, seroma was the commonest complications (15%). Matapurkar and colleges<sup>(14)</sup> reported no seroma formation because their mesh was incorporated into a peritoneal sandwich, thus avoiding subcutaneous irritation. Other investigators<sup>(15-17)</sup> reported seroma rate between 4% and 15%. They noted that accumulation of seroma occurred 3-17 days after operation and that this complication was easily managed by multiple aspirations and usually subsided within a week.<sup>(17)</sup> Usher<sup>(18)</sup> reported a 6% incidence of seroma formation after inguinal hernia repair with a mesh and suggested this lower rate was due to the deeper position of the mesh.

In the present study, one recurrence (2.5%) developed within a median follow up of 21 months. Previous studies have shown that 70-75% of recurrence develop within 2 years and 80-90% within 3 years.<sup>(2-4)</sup> Loa and colleges<sup>(7)</sup> reported no recurrence using the combined technique for large incisional hernias, in limited number of patients (13 cases). Likewise, Whiteley and associates<sup>(9)</sup> reported no recurrence in ten patients. Khaira and associates<sup>(10)</sup> using the same technique as that used in this study, reported 6% recurrence rate in 23 patients.

In summary, we advocate this method of incisional hernia repair as it is applied to all sites of ventral abdominal incisional hernia; the mesh is mostly hidden behind the rectus sheath and is anchored with two points of fixation and tension free. The complication rate is low and there is a low recurrence rate.

## REFERENCES

1. Buchnell TE, Cox PJ, Ellis H. Burst abdomen and incisional hernia: a prospective study of 1129 major laparotomies. *BMJ* 1982; 284: 931-3.
2. Mudge M, Hughes LE. Incisional hernia: a 10-year prospective study of incidence and attitudes. *Br J Surg* 1985; 72: 70-1.
3. Langer S, Christiansen J. Long term results after incisional hernia repair. *Acta Chir Scand* 1985; 151: 217-21.
4. Read RC, Yoder G. Recent trends in the management of incisional herniation. *Arch Surg* 1989; 124: 485-8.
5. Young D. Repair of epigastric incisional hernia. *Br J Surg* 1961; 48: 414-6.
6. Van Der Linden FIPM, Van Vroonhoven ThJmV. Long term results after surgical correction of incisional hernia. *Neth J Surg* 1988 ;40: 127-9.
7. Loh A, Rajkumar JS, South LM. Anatomical repair of large incisional hernias. *Ann R Coll Surg Engl* 1992; 74: 100-5.
8. Browse NL, Hurst P. Repair of long, large midline incisional hernias using reflected flaps of anterior rectus sheath reinforced with marlex mesh. *Am J Surg* 1979; 138: 738-9.
9. Whiteley MS, Ray-Chaudhuri SB, Galland RB. Combined fascia and mesh closure of large incisional hernias. *J R Coll Surg Edinb* 1998; 43: 29-30.
10. Khaira HS, Lall P, Hunter B, Brown JH. Repair of incisional hernias. *J R Coll Surg Edinb* 2001; 46: 39-43.
11. Manninen MJ, Lavonius M, Perhoniemi VJ. Results of incisional hernia repair. A retrospective study of 172 unselected hernioplasties. *Eur J Surg* 1991; 157: 29-31.
12. Usher FC. New technique for repairing incisional hernias with marlex mesh. *Am J Surg.* 1979;138:740-1
13. Liakakos T, Karanikas I, Panagiotidis H, Denderinos S. Use of Marlex mesh in the repair of recurrent incisional hernia. *Br J Surg* 1994; 81: 248-9.
14. Matapurkar BG, Gupta AK, Agarwal AK. A new technique of marlex-peritoneal sandwich in the repair of large incisional hernias. *World J Surg* 1991; 15: 768-70.
15. Molloy RG, Moran KT, Waldron RP, Brady MP, Kirwan WO. Massive incisional hernia: abdominal wall replacement with Marlex mesh. *Br J Surg.*1991; 78: 242-4.
16. Lewis RT. Knitted polypropylene (Marlex) mesh in the repair of incisional hernias. *Can J Surg* 1984; 27: 155-7.
17. Jacobs E, Blaisdell FW, Hall AD. Use of knitted Marlex mesh in the repair of ventral hernias. *Am J Surg* 1965; 110: 897-902.
18. Usher FC. Hernia repair with Marlex mesh. An analysis of 541 cases. *Arch Surg* 1962; 84: 73-6.