

ORIGINAL ARTICLE

TENSION FREE FASCIAL REPAIR OF HUGE VENTRAL HERNIA REINFORCED BY POLYPROPYLENE MESH

By

Mohamed Shams

Department of Surgery, Faculty of Medicine, Suez Canal University, Ismailia, Egypt

Email: meshams2005@yahoo.com

Aim: Huge ventral hernias were and still a major challenging surgical condition. This study was a trial to evaluate tension free fascial repair reinforced by on-lay non-absorbable polypropylene mesh repair of huge ventral hernias without excision of the hernial sac.

Methods: Twenty patients, presented with huge ventral hernias were included in the study. Designed elliptical longitudinal incision followed by meticulous dissection without interruption of the hernial sac was done. A longitudinal incision was done at the anterior rectus sheath bilaterally. Each flap of the anterior rectus sheath was reflected medially and stitched with the other flap, preferably with double breasting of the flaps. A large polypropylene mesh was then used to cover the whole dissected area and stitched at least 5 cm from any rectus sheath incisions.

Results: All patients were followed up for at least 6 months. Except for only 2 (10%) minor necrosis of the medial edge of the abdominal wall flaps, no minor or major complications occurred. Also no recurrences occurred throughout the length of the study.

Conclusion: This study concluded that tension free fascial repair using the anterior layer of the rectus sheath reinforced by on-lay polypropylene mesh is a good, relatively easy method of repair of huge ventral hernias.

Keywords: incisional hernias, prosthetic mesh, wound healing.

INTRODUCTION

Incisional hernia and diastasis of recti abdominis are major types of ventral hernias.⁽¹⁾ Incisional hernias are a possible complication occurring after any laparotomy. It can be defined as any detectable defect in the wound at examination 12 months after the index operation.⁽²⁾ The incidence of hernia after midline incisions at one year ranges from 9% to more than 20%⁽³⁻⁷⁾. Giant ventral hernias are considered in cases where the hernial orifice is greater than 10 cm. in diameter,⁽⁸⁾ repair of such hernias always warrants the systemic use of a reinforcing prosthesis.⁽⁹⁾ To regain the structural and functional anatomy of the anterior abdominal wall without tension in these cases is a real surgical challenge, Pneumoperitoneum and even Ilizarov's external fixation system were used to solve this challenging problem.⁽¹⁰⁻¹¹⁾ Even after the advances in laparoscopic ventral hernia repair,⁽¹⁾ open ventral hernia repair may be still having its rule especially in huge hernias.

This study is a trial to evaluate the use of tension free fascial repair reinforced with on-lay polypropylene mesh for huge ventral hernioplasty

PATIENTS AND METHODS

Twenty patients, 12 males and 8 females, aged between 35 years and 65 years, mean age 52.6 years, were presented with huge anterior abdominal wall ventral hernias (Fig. 1). Eighteen patients had huge long-standing midline incisional hernias, six of them had mainly infra-umbilical midline incision, and 4 had mainly supra-umbilical midline exploratory incision. Only two patients had primary ventral hernias "diastases of recti" which actually caused large eventration of the infra-umbilical part of the anterior abdominal wall. The transverse diameter of the abdominal wall defect was at least 10 cm. while the anterior abdominal wall muscles are relaxed preoperatively; this diameter was confirmed surgically in all patients. All

patients were operated upon only on elective basis after proper preparation in the Suez Canal University Hospital. Any patient who needed any intra-abdominal procedure necessitates the opening of the hernial sac was excluded from the study. All patients had general anesthesia assisted with epidural anesthesia to reduce the dose of anesthetic drugs and the epidural catheter was left in place for maximally 48 hours postoperatively for postoperative pain management. In the supine position, all patients had a designed elliptical longitudinal incision over the hernia to remove the excessive skin with preservation of the proper length of the fascio-cutaneous flaps to close the surgical wound (Fig. 2). The fascio-cutaneous flaps were dissected very meticulously using scalpel sharp dissection with strict hemostasis using monopolar diathermy, sometimes for a very long distance laterally with specific preservation of the subfascial capillary plexus to supply sufficient blood to the most medial edges of the abdominal flaps to reduce or prevent medial flap necrosis. The skin ellipse over the hernial sac was dissected from the sac without the need to open the hernial sac and discarded. A longitudinal incision was done at the most lateral edge of the anterior rectus sheath bilaterally along the whole length of the hernial defect and dissected carefully from the rectus muscles. Each flap of the anterior rectus sheath was reflected medially and stitched with the other flap to cover the large abdominal defect with proper tension, preferably with double breasting of the dissected flaps (Figs. 3, 4). A large polypropylene mesh was then used to cover the whole dissected area and stitched at least 5 cm (using interrupted polypropylene suture no. 1) from any rectus sheath incisions (Fig. 5). After complete satisfactory positioning of the mesh and secure hemostasis, a closed suction drains were inserted along the borders of the dissected area and the fascio-cutaneous flaps closed primarily using interrupted vertical mattress polypropylene sutures no. 3/0. Drains were left in place until they produce less than 50 cm daily for at least 2 days. The mean operative time was 3.8 hours (minimum, 3 hours and maximum 5.4 hours). All patients were covered by antibiotics for at least 10 days postoperatively. All patients were followed up for at least 6 months and all complaints and complications recorded.

RESULTS

All the 20 patients included in this study were followed up for at least 6 months, but no one of them completed more than 2 years of follow up (mean 9.8 months). According to this short term follow up period, no postoperative mortalities encountered. There were no cases of significant superficial or deep sepsis. Only 5 patients (25%) had very limited stitch sinus which needed no specific management. Two patients (10%) had minor necrosis of the medial edge of the abdominal wall flaps (Fig. 6). This necrosis involved the full thickness of the affected abdominal wall with exposure of the onlay polypropylene mesh. After proper

cautious debridement and proper wound dressings, the exposed area started to granulate cleanly and the wounds healed without the need for re-operation or even skin grafts within a month of their occurrence. These two flap necroses occurred in the first 5 patients included in the study but no patient of the following patients had any flap complications. Throughout the short period of postoperative follow up, no recurrences occurred, even in patients who were followed up for 2 years (Fig. 7).

DISCUSSION

Numerous methods of repair have been described for the repair of the midline incisional hernia.^(9,12-22) When using a mesh for repairing a huge incisional hernia, the sac -if really found- need to be opened, to dissect the bowel loops and intraperitoneal contents from the neck of the sac, and to anchor the mesh with the edges of the hernia to close the defect, this dissection can be very difficult and may be very dangerous especially in recurrent cases of huge incisional hernia. In some cases, the sac may be defective so the edges of the peritoneum might not come together to separate the mesh from the intraperitoneal contents. Also, you may not be able to separate bowels from the mesh by using the omentum, this may be hazardous because the gut may become adherent to or damaged by the mesh.^(19,23) Browse and Hurst, in 1979, originally described the technique using the anterior rectus fascia and polypropylene mesh for the repair of massive long midline incisional hernias.⁽¹⁶⁾ This technique was modified by others to be used in other parts of the anterior abdominal wall incisional hernias.^(23,24) The main difference in the present study is the double breasting technique of both leaflets of the anterior rectus fascia without any interruption of the hernial sac. Most of the anterior rectus fascia was incised and reflected to be used to cover the peritoneum in double layers. The mesh was sutured to the anterior abdominal wall muscles at least 5 cm from the line of the incision of the rectus fascia to prevent the lateral recession of the muscles. Also, the mesh was sutured to the lateral cut edge of the anterior rectus sheath evenly to distribute the tension over the mesh and to help also to prevent the lateral recession of the anterior abdominal wall muscles.

We did not encounter any case of recurrence during the follow up period of at least 6 months and even in the 4 cases that are followed for 2 years, there were no evidence of recurrences. Previous studies have shown that 70 - 75% of recurrences develop within 2 years and 80 - 90% develop within 3 years, so this period of follow up is probably not long enough to judge recurrence properly and should be extended at least for 3 years for all patients.⁽²⁵⁻²⁷⁾

Flap necroses occurred only in two patients. These patients are included in the first 5 cases of the study, but no other flap necroses occurred afterwards. This was assumed to the refined method of dissection where the subfascial plexus of

capillaries were preserved meticulously by the use of sharp dissection with specific wise use of coagulation diathermy for hemostasis. The flap necroses were actually full thickness with exposure of the mesh underneath. The necrosed part of the anterior abdominal wall fascio-cutaneous flap was excised conservatively with no specific measures to protect the exposed part of the mesh. Healthy granulation tissue actually soon invaded the exposed mesh and the wound healed soundly without the need for any specific measures. Validire et al. (1986) stated that they never had to remove the used stainless steel mesh from any of their patients even with the occurrence of wound sepsis.⁽⁹⁾

The selection of patients who were included in the present study where no intraperitoneal procedures were performed and the peritoneal covering of the hernia were actually uninterrupted may be the major reason of the absence of wound sepsis throughout this study. Also the use of antibiotics on therapeutic basis may be of major concern.

This study concluded that tension free fascial repair using the anterior layer of the rectus sheath reinforced by on-lay polypropylene mesh without excision of the hernial sac is a good, relatively easy method of repair of huge midline ventral hernias.



Fig 1. Huge ventral incisional hernia (preoperative lateral view).



Fig 2. Design of the abdominal wall incision "The margins of the hernia are the outer circle".



Fig 3. The first layer of the rectus sheath while stitched to the medial side of the other side.



Fig 4. The double breasting of the rectus sheath is nearly complete.



Fig 5. The final view after putting the mesh in place.



Fig 6. Superficial necrosis of the medial edge of the abdominal wall flap.



Fig 7. Postoperative view on the same patient in fig. 1 (lateral view).

REFERENCES

1. Holzman MD, Pappas TN. Laparoscopic incisional and ventral hernia repair. In: Eubanks WS, Swanstrom LL, and Soper NJ (eds.). *Mastry of endoscopic and laparoscopic surgery*. Lippincott W&W, Philadelphia, USA. 2000 1st ed.
2. Congiz Y, Israelsson LA. Incisional hernias in midline incisions: an eight year follow up. *Hernia*. 1998;2:175-7.
3. Israelsson LA. Wound failure and incisional hernia: mechanisms and prevention. In: Nyhus and Condon's *Hernia*. Lippincott W&W, Philadelphia, USA. 2002 5th ed.
4. Bucknall TE, Ellis H. Abdominal wound closure: a comparison of monofilament nylon and polyglycolic acid. *Surgery*. 1981;89:672-7.
5. Ellis H, Gajraj H, George CD. Incisional hernias, when do they occur? *Br J Surg*. 1983;70:290-1.
6. Harding KG, Mudge M. Late development of incisional hernia: an unrecognized problem. *Br Med J*. 1983;286:519-20.
7. Mudge M, Hughes L.E. Incisional hernia: a 10 year prospective study of incidence and attitudes. *Br J Surg*. 1985;72:70-1.
8. Flament JB and Palet JP. Prosthetic repair of massive abdominal ventral hernias. In: Nyhus and Condon's *Hernia*. Lippincott W&W, Philadelphia, USA. 2002 5th ed.
9. Validire J, Imbaud P, Dutet D, Duron JJ. Large abdominal incisional hernias: repair by fascial approximation reinforced with a stainless steel mesh. *Br J Surg*. 1986;73:8-10.
10. Devlin HB, Kingsnorth A. *Management of abdominal hernias*. Chapman & Hall Medical, Cambridge, United Kingdom. 1999 2nd ed.
11. Schmitz RF, van der Werken C, van Vroonhoven TJ. Iizarov's method for repair of a huge incisional hernia. *Eur J Surg*. 1997;163:711-12.
12. Jenkins TPN. Incisional hernia repair: a mechanical approach. *Br J Surg*. 1980;67:335-6.
13. 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.
14. Hunter RR. Anatomical repair of midline incisional hernia. *Br J Surg*. 1971;58:888-91.
15. Loh A, Rajkumar JS, South LM. Anatomical repair of large incisional hernias. *Ann R Coll Surg Engl*. 1992;74:100-5.
16. 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.
17. Usher FC. New technique for repairing incisional hernias with marlex mesh. *Am J Surg*. 1979;138:740-1.
18. 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.
19. Molloy RG, Moran KT, Waldron RP, BradMP, Kirwan WO. Massive incisional hernia: abdominal wall replacement with Marlex mesh. *Br J Surg*. 1991;78:242-4.
20. Liakakos T, Karanikas I, Panagiotidis H, Dendrinis S. Use of Marlex mesh in the repair of recurrent incisional hernia. *Br J Surg*. 1994;81:248-9.
21. Adolff M, Arnaud J-P. Surgical management of large incisional hernias by an intraperitoneal Mersilene mesh and aponeurotic graft. *Surg Gynecol Obstet*. 1987;165:204-6.
22. Van der Lei B, Bleichrodt RP, Simmermacher RKJ, van Schilgraffe R. Expanded polytetrafluoroethylene patch for the repair of large abdominal wall defects. *Br J Surg*. 1989;76:803-5.
23. Whiteley MS, Ray-Chaudhuri SB, Galland RB. Combined fascia and mesh closure of large incisional hernias. *JR Coll Surg Edinb*. 1998;43:430-1.
24. Khaira HS, Lall P, Hunter B, Brown JH. Repair of incisional hernias. *J R Coll Surg Edinb*. 2001;46:39-43.
25. Mudge M, Hughes LE. Incisional hernia: a 10-year prospective study of incidence and attitudes. *Br J Surg*. 1985;72:70-1.
26. Langer S, Christiansen J. Long-term results after incisional hernia repair. *Acta Chir Scand*. 1985;151:217-19.
27. Read RC, Yoder G. Recent trends in the management of incisional herniation. *Arch Surg*. 1989;124:485-8.