



Modified Sandwich Technique Mesh Implantation in Repair of Incisional Hernia

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ABSTRACT

Background: Many patients suffer from incisional hernia all over the world. Although various surgical techniques have been introduced in recent decades, the occurrence of this problem still remains as a challenge facing surgeons.

Objectives: To compare the modified sandwich technique (MST) to on-lay mesh repair technique (OMR) in the repair of huge incisional hernias.

Patients and Methods: In a randomized control clinical trial during 2004 - 2008 in Shiraz, Southern Iran, 90 patients with huge incisional hernias were randomly approached by two repair techniques namely MST and OMR. In MST group, polypropylene mesh was fixed in each side of fascia with nylon 2-0 and the wound closure was done with nylon loop 1, while in OMR technique, the fascia was released 5 cm in each side and polypropylene mesh was fixed with nylon 2-0. The wound closure was identical to MST group.

Results: The mean age of patients in MST group was 49.3 years with a standard deviation (SD) of 11.8 years and 48 years with SD of 13.6 in OMR group. Recurrences occurred primarily during the first two postoperative years in both groups. Total recurrence rate following MST procedure was 2.2%, compared to 18.2% for OMR ($P=0.01$). Mean of hospitalization was 3.4 days in MST group and 4 days in OMR ($P=0.6$). The percentage of female patients was 69.6% in MST group and 77.3% in OMR. Mean operation time was 2.3 hours in MST comparing to 2.1 hours in OMR ($P=0.7$).

Conclusions: Our results showed that in the repair of incisional hernias, MST led to a lower recurrence rate and fewer major complications in comparison to OMR.

Keywords: Incisional hernia; Modified sandwich technique; Recurrence

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▶ Implication for health policy/practice/research/medical education:

We hope the results of this article would be beneficial for both surgeons and patients who suffer from incisional hernia.

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1. Background

It is accepted that hernia following midline incision is a major surgical problem and is reported to be between 11% (1) and 20% (2, 3). Because of significant developments in surgical techniques, the recurrence rate following repair of incisional hernia indisputably decreased from 63%-50% (4, 5) to 30%-10% (6-8). Some studies reported that recurrence occurs within 1-3 years after repair (2, 3, 9). The rate is 33% after first repair and 44% after the second one (2). Numerous methods of repair have been described including primary repair in one or two layers, use of fascia (local or flaps) with darns suture and use of fascia with synthetic mesh (polypropylene or Marlex mesh, stainless steel, mersilene or expanded polytetrafluoroethylene) (10) but none of these has been proven to be superior (4).

2. Objectives

This study seeks to compare outcomes of two methods of incisional hernia repair with each other: A new method named Modified Sandwich Technique (MST) and a conventional one known as Onlay Mesh Repair technique (OMR).

3. Patients and Methods

In a randomized control clinical trial during 2004-2008 in hospitals affiliated to Shiraz University of Medical Sciences in Shiraz, southern Iran, 90 patients with huge incisional hernias, measuring more than 5 cm in diameter, were divided into two groups of MST and OMR by simple randomization. Patients with a severe underlying disease such as cancer, immuno-deficiency, diabetes mellitus, renal failure, cirrhosis, or on steroid consumption or heavy smokers (smoking more than 20 packs year) were excluded. This Study was approved by the Ethics Committee of Shiraz University of Medical Science and a written consent was taken from patients as well, before inclusion in the study. All operations were performed under general anesthesia. After skin preparation and draping, cutaneous scar was excised and hernial sac was dissected to expose the circumference of abdominal wall defect (Figures 1 and 2). We always tried to repair the whole defect, particularly if multiple hernias were present. In MST, fascia was cleared About 6cm in both ant & post surfaces, then a nylon mesh with a width of at least 12 cm was applied on the fascia and fixed to it by nylon loop 1 in 4 points in each side of the defect (Figure 3). Then the two sides of fascia and mesh (on-lay and below-lay) were entirely closed by nylon loop 1 using running sutures (Figure 4). In OMR, after release of hernial sac and identification of abdominal wall defect, both posterior and anterior rectus sheath were closed by running sutures of nylon loop 1. A 20 × 25 propylene mesh was then fixed over the defect as well as at least 5 cm of the abdominal

wall around it. In both groups after fixation of mesh, two suction drains were inserted in place in order to suck seroma and possible hemorrhages. Finally skin was closed by subcuticular vicryl 3-0. All patients received three doses of intravenous Cephalothin (1 gr). The drains were removed when there was less than 50 ml of drainage in 24 hours. Patients, post-operatively, were mobilized as soon as possible and discharged to home once the drains had been removed. All subjects were followed and evaluated for complications and recurrence of hernia up to 3 years; every three months in the first year, every six months in the second year and at the end of the third year. Recurrence was confirmed by presence of abdominal pain, protrusion, relevant findings in P/E and sonographic evaluation. The data was analyzed by SPSS software (Version 16, Chicago, IL, USA). The data had a non-parametric distribution. Mann-Whitney U-test was used to identify significant differences between independent samples. Fisher exact and Chi-Squire tests were applied to compare nominal variables.

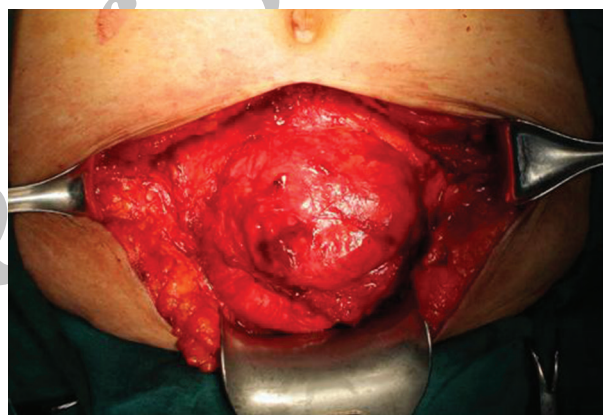


Figure 1. Large incisional hernia, below umbilicus

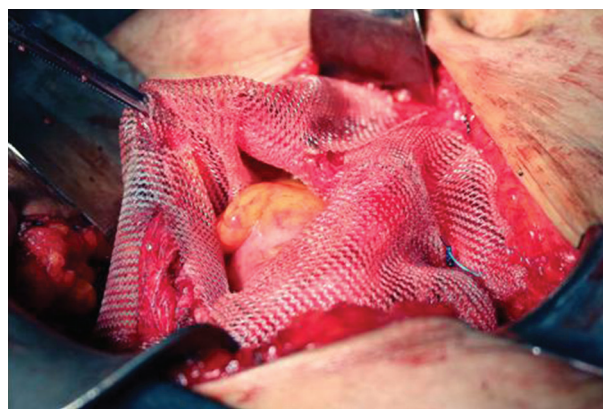


Figure 2. Large incisional hernia, opening of the sac

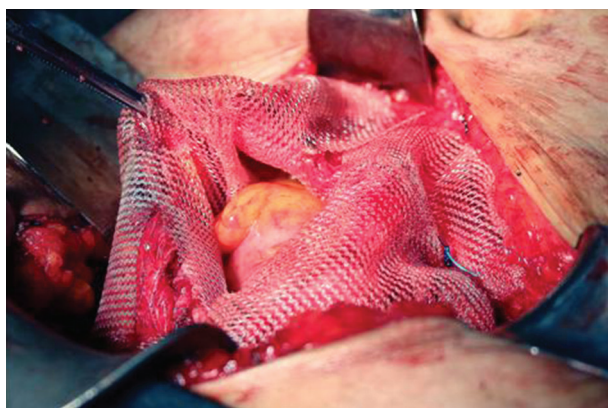


Figure 3. Large incisional hernia, modify sandwich technique and on-lay and sub-lay mesh applying

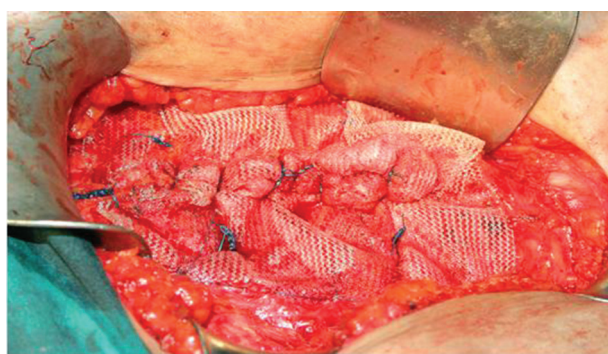


Figure 4. Closure of fascia (continues non-absorbable suturing)

4. Results

The mean age of patients was 49.3 years with a standard deviation (SD) of 11.8 years in MST group and 48 with a SD of 13.6 in OMR group, the difference was not statistically significant. The mean weight, size of hernia and days of hospitalization also were not significantly different between the two groups (Table 1).

Table 1. Demographic data of patients with incisional hernia

Parameters	MST (n = 45)	OMR (n = 45)	P value
Gender, No. (%)			
Male	14 (30.4)	10 (22.7)	0.4
Female	32 (69.6)	34 (77.3)	0.4
Age, mean ± SD	49.3 ± 11.8	48 ± 13.6	0.6
Weight, kg	76.7 ± 12.7	75.3 ± 15.2	0.7
Size of Hernia, cm	27.8 ± 23.5	31 ± 24.6	0.6
Day of hospitalization, d	3.4 ± 2.9	4 ± 2.7	0.7

Formation of wound seroma and hematoma were in a higher proportion and wound infection in a lower proportion in MST group compared to OMR but these differences were statistically insignificant (Table 2), and these minor complications were treated conservatively. Emergency re-operation was needed in one patient in MST group and 2 patients in OMR. Recurrences occurred primarily during the first two postoperative years in both groups. (P = 0.01). The mean operation time was 2.3 hours in MST group compared to 2.1 hours in OMR (P = 0.6).

Table 2. Post-operative complications in 90 patients

Complications, No. (%)	MST (n = 45)	OMR (n = 45)	P value
Seroma formation	6 (13)	3 (7)	0.3
Wound haematoma	9 (19.6)	4 (9.1)	0.2
Superficial wound infection	2 (4.3)	6 (13.6)	0.1
Deep vein thrombosis	0	1 (2)	0.5
Emergency re-operation	1 (2.2)	2 (4.5)	0.6

5. Discussion

In our study patients who underwent MST had a better outcome regarding recurrence rate and got more wound infection in comparison to OMR. It is generally perceived that recurrence is the most common complication following hernia repair. Although it mostly occurs 1-3 years after surgery (9, 10), there have been cases of recurrence of up to 10 years after repair (11). Using mesh in repairing large incisional hernias is established to result in a better repair with less recurrence (7, 12). Reviewing literature, we found that different methods of mesh repair have already been described such as On-lay, Sub-lay: mesh placed deep to the rectus sheath, Sandwich method: mesh and rectus sheath with overlapping and points of fixation, Complex mesh-peritoneal sandwich, Rives-Stoppa, combination of fascia and mesh, and double mesh intra-peritoneal repair (3, 4, 13-15). However none of these has been proved to be superior (4). At the same time, mesh repair has been criticized by those who claimed that better results of mesh repair are due to the inadequate length of follow up (16). There are also authors who believe that suture repair is safe enough and does not result in a higher recurrence rate compared to using mesh (17). They also point a number of complications associated with the use of mesh. By way of illustration, wound infection is reported to be more frequent in many types of mesh repair

(10%-15%) (9, 12) but in our experience the rate of wound infection was considerably less (4.3%). Regarding seroma formation some techniques have better outcomes (18) in comparison to MST but considering the easy treatment of seroma, it is obviously overlooked. Finally, it should be noted that our follow up is probably not long enough and should be extended more for at least one year. In conclusion, our results showed that (MST) mesh repair has a lower recurrence rate and less infection in comparison to OMR. However, more studies with large sample sizes and longer follow up time are needed for better conclusion.

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Authors' Contribution

The main idea was proposed by Seyed Vahid Hosseini. Design study and writing was done by Seyed Hossein Hosseini, Seyed Vahid Hosseini, Leila Ghahramani, Abbas Rezaianzadeh, Ali Reza Safarpour and Salar Rahimikazerooni. Collecting data was done Seyed Hossein Hosseini, Leila Ghahramani, Salar Rahimikazerooni and Seyed Vahid Hosseini. Data analysis was done by Abbas Rezaianzadeh and Ali Reza Safarpour.

Financial Disclosure

There is no conflict of interest.

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References

1. Dur AH, den Hartog D, Tuinebreijer WE, Kreis RW, Lange JF. Low recurrence rate of a two-layered closure repair for primary and recurrent midline incisional hernia without mesh. *Hernia*. 2009;**13**(4):421-6.
2. Luijendijk RW, Hop WC, van den Tol MP, de Lange DC, Braaksma MM, I. Jzermans JN, et al. A comparison of suture repair with mesh repair for incisional hernia. *N Engl J Med*. 2000;**343**(6):392-8.
3. Read RC, Yoder G. Recent trends in the management of incisional herniation. *Arch Surg*. 1989;**124**(4):485-8.
4. Williams RF, Martin DF, Mulrooney MT, Voeller GR. Intraperitoneal modification of the Rives-Stoppa repair for large incisional hernias. *Hernia*. 2008;**12**(2):141-5.
5. Paul A, Korenkov M, Peters S, Kohler L, Fischer S, Troidl H. Unacceptable results of the Mayo procedure for repair of abdominal incisional hernias. *Eur J Surg*. 1998;**164**(5):361-7.
6. Gleysteen JJ. Mesh-reinforced ventral hernia repair: preference for 2 techniques. *Arch Surg*. 2009;**144**(8):740-5.
7. Langer S, Christiansen J. Long-term results after incisional hernia repair. *Acta Chir Scand*. 1985;**151**(3):217-9.
8. Courtney CA, Lee AC, Wilson C, O'Dwyer PJ. Ventral hernia repair: a study of current practice. *Hernia*. 2003;**7**(1):44-6.
9. Yaghoobi Notash A, Yaghoobi Notash A, Jr, Seied Farshi J, Ahmadi Amoli H, Salimi J, Mamarabadi M. Outcomes of the Rives-Stoppa technique in incisional hernia repair: ten years of experience. *Hernia*. 2007;**11**(1):25-9.
10. Anthony T, Bergen PC, Kim LT, Henderson M, Fahey T, Rege RV, et al. Factors affecting recurrence following incisional herniorrhaphy. *World J Surg*. 2000;**24**(1):95-100.
11. Burger JW, Luijendijk RW, Hop WC, Halm JA, Verdaasdonk EG, Jeekel J. Long-term follow-up of a randomized controlled trial of suture versus mesh repair of incisional hernia. *Ann Surg*. 2004;**240**(4):578-83.
12. den Hartog D, Dur AH, Tuinebreijer WE, Kreis RW. Open surgical procedures for incisional hernias. *Cochrane Database Syst Rev*. 2008(3):CD006438.
13. Costanza MJ, Heniford BT, Arca MJ, Mayes JT, Gagner M. Laparoscopic repair of recurrent ventral hernias. *Am Surg*. 1998;**64**(12):1121-5.
14. Heartsill L, Richards ML, Arfai N, Lee A, Bingener-Casey J, Schwesinger WH, et al. Open Rives-Stoppa ventral hernia repair made simple and successful but not for everyone. *Hernia*. 2005;**9**(2):162-6.
15. Afifi RY. A prospective study between two different techniques for the repair of a large recurrent ventral hernia: a double mesh intraperitoneal repair versus onlay mesh repair. *Hernia*. 2005;**9**(4):310-5.
16. Loh A, Rajkumar JS, South LM. Anatomical repair of large incisional hernias. *Ann R Coll Surg Engl*. 1992;**74**(2):100-5.
17. Korenkov M, Paul A, Sauerland S, Neugebauer E, Arndt M, Chevrel JP, et al. Classification and surgical treatment of incisional hernia. Results of an experts' meeting. *Langenbecks Arch Surg*. 2001;**386**(1):65-73.
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**(6):768-70.