

Preperitoneal mesh repair of incisional hernias: A seven-year retrospective study

Mahabhaleshwar G. Bhat, Santosh K. Somasundaram*

Department of Laparoscopy Surgery, Wockhardt Hospital, Bannerghatta Road, Bangalore - 560076, *General Surgery, Manipal Hospital, 98, Rustom Bagh, Airport Road, Bangalore - 560 017, Karnataka, India

For correspondence:

Dr. M. G. Bhat, Unit 102, I Floor, Prestige Towers, 99/100 Residency Road, Bangalore - 560 025, Karnataka, India.
E-mail: drmgbhat@gmail.com

ABSTRACT

Background: Incisional hernia is a common surgical condition with a reported incidence of 2-11% following all laparotomies. Results of repair have been disappointing. **Aim:** To evaluate our technique of preperitoneal mesh repair of incisional hernias. **Materials and Methods:** A seven-year retrospective study was done from January 1994 to December 2000 using a computerized database. Follow-up was initiated by a postal questionnaire on a response card. Our repair was evaluated by clinical examination, response card and telephone. Results were documented and statistically analyzed. **Results:** In our series of 105 patients, clinical details of 95 (90.5%) patients were available. Females (90.5%, $n = 90$) outnumbered males (9.5%, $n = 10$) and the highest incidence was in the 5th decade of life in females and the 6th decade of life in males ($P = 0.028$). Gynecological operations accounted for 68.4% ($n = 65$) of the index operations, with lower midline incisions resulting in 63% ($n = 60$) of the incisional hernias. The polypropylene mesh placed preperitoneally varied from 15 × 7.5 cm to 30 × 20 cm. Sixty-five patients (62%) attended our follow-up, ranging from 14 months to eight years. Method of follow-up in outpatients department (OPD): 44.6% ($n = 29$), postal: 40% ($n = 26$), telephone: 15.3% ($n = 10$). No recurrence was noted in the follow-up group. **Conclusions:** Based on our analyses, we believe that preperitoneal mesh repair is the ideal operation for incisional hernias. There are however, very few publications covering this technique of repair.

Key words: Incisional hernia, mesh repair, preperitoneal repair

How to cite this article:

Bhat MG, Somasundaram SK. Preperitoneal mesh repair of incisional hernias: A seven-year retrospective study. Indian J Surg 2007;69:95-8.

Incisional hernia occurs through an operative scar. It is the only hernia considered to be iatrogenic. It occurs due to the failure of the lines of closure of the abdominal wall following laparotomy. An incisional hernia occurs when all the layers except the skin, fail to heal.

Incisional hernia is one of the most common conditions requiring major surgery. The reported incidence in literature is 2-11% following all laparotomies.^[1]

Various types of repair have been described, both anatomical and prosthetic. But the results

have been disappointing with a high incidence of recurrence-about 30-50% after an anatomical repair and 1.5-10% following prosthetic mesh repairs.

The present study aims at evaluating our technique of preperitoneal mesh repair of incisional hernias that is being practiced in our surgical unit.

MATERIALS AND METHODS

A seven-year retrospective study of preperitoneal mesh repairs was done from January 1994 to December 2000. In all, 105 preperitoneal mesh repairs were done. The data and details of 95 (90.5%) patients were collected from operation registers and medical records. A computerized database was created for all these patients. For follow-up, a self-addressed response card

Paper Received: September, 2004. **Paper Accepted:** June, 2007.
Source of Support: Nil. **Conflict of Interest:** None declared.

was sent containing a questionnaire. Patients were either requested to attend the outpatients department (OPD) personally for follow-up or mail back the response card after answering the questionnaire, if they could not attend the OPD. A few of the patients who could not do either were questioned over the phone and the results of repair or complaints, if any, were recorded. Sixty-five patients attended our follow-up. Details were entered in our database and results statistically analyzed.

Our technique involves the placement of a permanent prosthetic mesh (polypropylene) in a preperitoneal plane. After incising the subcutaneous tissue, the sac is dissected and delineated. The defect, most often in the midline, is opened along the linea alba. A plane is created between the posterior rectus sheath and the rectus muscle for the placement of the mesh. The posterior rectus sheath along with the peritoneum is closed with continuous 1/0 polypropylene sutures. A polypropylene mesh cut to size is placed in the plane created. The mesh is secured with a few interrupted 3/0 polypropylene sutures. A suction drain is placed over the mesh. The anterior rectus sheath is closed with continuous 1/0 polypropylene sutures. Another suction drain is placed in the subcutaneous plane and the skin closed. The sheaths are lax and redundant due to the hernia and associated weakness. Due care is required not to excise any of the redundant tissue until final closure of the tissues. This will ensure good availability of the layers to close without any tension at the end. The peritoneum, posterior rectus sheath and anterior rectus sheath sometimes become short for closure. This is usually due to early excision of the sac / sheath during dissection. We have used a separate mesh to close the peritoneum to prevent tension in four cases [Figure 1].

The advantages of placing the mesh in this plane is as follows:

1. This plane is highly vascular, hence, it prevents infection.
2. Any infection occurring in the subcutaneous plane does not affect the mesh, as the mesh is retromuscular in a deeper plane.
3. The prosthesis adheres to the posterior rectus sheath

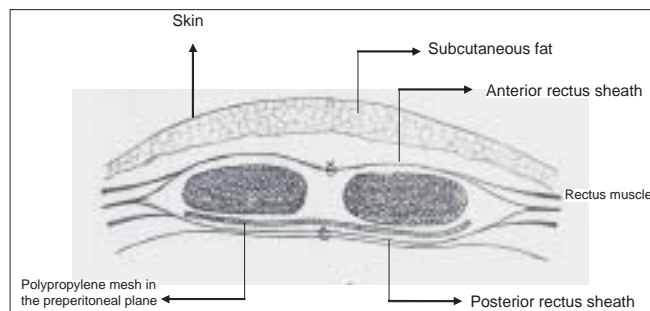


Figure 1: Cross section to demonstrate polypropylene mesh in the preperitoneal plane

and renders it inextensible, permitting no further herniation.

4. The prosthesis unites and consolidates the anterior abdominal wall.
5. The prosthesis in this plane cannot be dislodged or ruptured by intraabdominal pressure, but instead is held in place by the very force that caused the hernia.
6. Usually a virgin plane for recurrent incisional hernia repairs.
7. Tension-free repair.

RESULTS

Age and sex

One hundred and five patients underwent preperitoneal mesh repair of incisional hernia during the seven-year study described in this report. The youngest patient was 29 years old and the oldest was 75 years old. The average age of incidence of the hernia was 45.51 ± 10.77 years. Females (90.5%, $n=90$) outnumbered males (9.5%, $n = 10$) and the highest incidence amongst them was in the 5th decade of life.

Age at presentation among the males (52.60 ± 10.8 years) was greater than in the females (44.77 ± 10.54 years), which was statistically significant ($P = 0.028$).

Symptomatology

Clinical details were available in 95 (90.5%) of our patients. The main presenting complaint was a swelling (94.73%, $n = 90$) in the vicinity of the previous operative scar. The other main presenting symptoms were pain (35.78%, $n = 34$) and irreducibility (10.52%, $n = 10$). Of the 95 patients, 14.73% ($n = 14$) underwent recurrent incisional hernia repairs.

Index operation

An index operation is the previous surgery, which resulted in the incisional hernia. The duration of presentation since the previous surgery was 7.08 ± 7.53 years (minimum = 4 months, maximum = 30 years). Gynecological operations accounted for 68.4% ($n = 65$) of our incisional hernias. Patients who had undergone lower segment Cesarean section (LSCS) or tubectomy in the past, presented late- 10.19 ± 9.82 years and 11.87 ± 7.9 years, respectively as compared to the hysterectomy group (3.81 ± 4.25 years, $P = 0.004$). Time of presentation since the index operation was also earlier among our male patients (3 ± 3.93 years). Emergency laparotomies, which are the most common index operations according to literature, constituted only 7.36% ($n = 7$) in our series of incisional hernias.

Incisions

The most common incision resulting in an incisional hernia was the lower midline incision (64%, $n = 60$),

followed by the Pfannensteil incision (13%, $n = 12$).

Surgical details

The most commonly used incision was the vertical elliptical incision excising the previous operative scar. The size of the mesh we have used ranged from 15 × 7.5 cm to 30 × 20 cm. Dermolipectomy was done in 20 (21.05%) patients.

Postoperative period

Drains were used in all the patients. The period of drainage ranged from 2-11 days, the average period being 5-6 days. Prolonged drainage was encountered in 8.42 % ($n = 8$) patients, minor wound infections in 10.5% ($n = 10$) patients and major wound infections in 2.1% ($n = 2$) patients. But the mesh was not removed in any of the cases. The duration of postop stay was 8.72 ± 3.54 days, (minimum = 4 days, maximum = 26 days). Postop stay was more in patients who underwent dermolipectomy (11.56 ± 4.66 days) than in patients who did not (7.94 ± 2.73 days, $P = 0.000$).

Follow up

Sixty-five (62%) patients attended our follow-up, which was carried during the first quarter of 2002. Follow-up period was 42.51 ± 22.99 months (~ 3.5 years); minimum = 15 months, maximum = 95 months (~ 8 years). Twenty-nine (44.6%) patients attended the OPD personally for follow-up. Twenty-six (40%) mailed back the response card after answering the questionnaire. Ten (15.3%) were questioned over the telephone and their response recorded. There was no recurrence in the follow-up group.

DISCUSSION AND CONCLUSION

A literature search was done to compare the results

of our technique with other published repairs for the treatment of incisional hernia. Anatomical repairs had a high incidence of recurrence with a reported incidence of 46% following Keel repair^[2] and 54% following Mayo repair,^[3,4] which was unacceptable.

Prosthetic mesh repairs had a lesser incidence of recurrence, especially with the Rives Stoppa repair [Table 1].

The incidence of incisional hernia was highest among females in the 5th and 6th decades of life. Gynecological operations with a lower midline incision accounted for the majority of the index operations, which resulted in incisional hernia. The preperitoneal plane is the ideal, logical plane for the placement of the prosthetic mesh.

Although this is not a new method of repair, no details are available in literature. The mesh size used in our cases ranged from 15-30 cm, thus indicating most of the cases in this series were large midline hernias. During the dissection, it is important to retain the redundant sheath and sac of the hernias until the end. Trimming of these are done before suturing. Excision in the early phase of the dissection can lead to shortage of tissues for closing and result in tension. Occasionally if the tissue approximation is difficult then another mesh is used to close and maintain the concept of tension-free repair. We had a follow-up of 62% with no recurrence in the follow-up group. We thus believe that preperitoneal mesh repair is the ideal repair technique and is highly recommended for large midline incisional hernias.

ACKNOWLEDGMENT

Our special thanks to Dr. Thenaarasu, medical statistician at NIMHANS Hospital, Bangalore for his valuable guidance and

Table 1: Literature search for comparison

Anatomical repair	Author	Journal	Number of repairs	Follow-up period	Recurrence rate %
Keel repair	George CD ^[2]	Ann R Coll Surg Eng 1986	81		46
Mayo repair	Langer C	Chirurg 2003	241	9.7 ± 8.8 years	37
	Luijendik RW ^[4]	World J Surg 1997	68	1 st year, 3 years	35, 46
	Mittermair RP ^[5]	Eur J Surg 2002	208	5 years, 10 years	48, 54
				4-8 yrs	29
Prosthetic repair					
Intraperitoneal Dacron mesh + aponeurotic graft	Antoine Hamy MD ^[6]	JACS 2003	350	-	3.1
Sublay / Inlay technique	Langer C	Chirurg 2003	180	9.7 ± 8.8 years	15
Combined fascial and mesh repair	Khaira HS ^[7]	J R Coll Surg. Edin 2001	35	6-54.1 months	6
Rives Stoppa repair	Horeyseck G	Eu Hernia Society 1999	81	7-58 months	10.5-14
	Ferranti F ^[8]	Chir Ital 2003	35	-	2.8
	Veilette G ^[9]	Conn Med 2001	76	-	18.2
	Bauer JJ ^[10]	Hernia 2002	57	11.7-81.9 months	Nil
Pre peritoneal mesh repair	Bhat MG		105	14 months-8 years	Nil

help in analyzing the results.

REFERENCES

1. Santora TA, Roslyn JJ. Incisional hernia. *Surg Clin North Am* 1993;73:557-70.
2. George CD, Ellis H. The results of Incisional hernia repair: A twelve year review. *Ann R Coll Surg Engl* 1986;68:185-7.
3. 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;164:361-7.
4. Luijendijk RW, Lemmen MH, Hop WC, Wereldsma JC. Incisional hernia recurrence following "vest-over-pants" or vertical Mayo repair of primary hernias of the midline. *World J Surg* 1997;21:62-6.
5. Mittermair RP, Klingler A, Wykypiel H, Gadenstatter M. Vertical mayo repair of midline incisional hernia: Suggested guidelines for selection of patients. *Eur J Surg* 2002;168:334-8.
6. Hamy A, Pessaux P, Mucci-Hennekinne S, Radriamananjo S, Regenat N, Arnaud JP. Surgical treatment of large incisional hernias by an intraperitoneal Dacron mesh and an aponeurotic graft. *J Am Coll Surg* 2003;196:531-4.
7. Khaira HS, Lall P, Hunter B, Brown JH. Repair of incisional hernias. *JR Coll Surg Edinb* 2001;46:39-43.
8. Ferranti F, Triveri P, Mancini P, Di Paola M. The treatment of large midline incisional hernias using a retromuscular prosthetic mesh (Stoppa-Rives technique). *Chir Ital* 2003;55:129-36.
9. Veillette G, MacGillivray D, Whalen G. Practical experience with the Stoppa repair of ventral/incisional hernias. *Conn Med* 2001;65:67-70.
10. Bauer JJ, Harris MT, Gorfine SR, Kreel I. Rives-stoppa repair of giant incisional hernias: Experience with 57 patients. *Hernia* 2002;6:120-3.

Presentation at a meeting:

Organization Karnataka State Chapter -ASICON
Place: Mysore, Date: February, 2003.

Author Help: Online Submission of the Manuscripts

Articles can be submitted online from <http://www.journalonweb.com>. For online submission articles should be prepared in two files (first page file and article file). Images should be submitted separately.

1) First Page File:

Prepare the title page, covering letter, acknowledgement, etc., using a word processor program. All information which can reveal your identity should be here. Use text/rtf/doc/pdf files. Do not zip the files.

2) Article file:

The main text of the article, beginning from Abstract till References (including tables) should be in this file. Do not include any information (such as acknowledgement, your names in page headers, etc.) in this file. Use text/rtf/doc/pdf files. Do not zip the files. Limit the file size to 400 kb. Do not incorporate images in the file. If file size is large, graphs can be submitted as images separately without incorporating them in the article file to reduce the size of the file.

3) Images:

Submit good quality colour images. Each image should be less than **400 kb** in size. Size of the image can be reduced by decreasing the actual height and width of the images (keep up to about 4 inches) or by reducing the quality of image. All image formats (jpeg, tiff, gif, bmp, png, eps, etc.) are acceptable; jpeg is most suitable. The image quality should be good enough to judge the scientific value of the image. Always retain a good quality, high resolution image for print purpose. This high resolution image should be sent to the editorial office at the time of sending a revised article.

4) Legends: