

Role of Mesh Repair in Incisional Hernia

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Design: A case series study

Purpose:

- 1) To study the protocol for repair of incisional hernia.
- 2) To compare different other methods of repair given in literature with prosthetic mesh repair in terms of advantages / disadvantages of the prosthetic repair.

Suit & period: The study was conducted in Surgical Unit, Bahawal Victoria Hospital, Bahawalpur from August 19, 1997 to January 31, 2000.

Material & method: This was a prospective type of case series study. Selection criteria of the patients in this study was that all adult patients of either sex being diagnosed as the case of incisional hernia and have undergone repair by the prosthetic mesh during this study period were included in the study.

A record of patient's data, previous surgery, the size of the defect, which gives idea about indication for surgery, was noted. A record of their postoperative course and a follow-up for four months was made.

Results: In this study we have included 23 patients. Out of these 15 were female and 8 were male. The age was ranging from 28 – 65 years, with an average of 43 years. Patients presented with pain/ discomfort, Gradual increase in size of defect and unacceptable appearance in all patients, sub acute obstruction in 3 patients, Intestinal obstruction in 2 patients & Skin ulceration in 2 patients. Ten patients had got uneventful satisfactory post-operative course. Six patients developed wound infection; one patient developed seroma & was cured by needle aspiration & antibiotic. Five patients developed sinus. 2 of them cured without any surgical intervention with antiseptic dressings and antibiotics after culture and sensitivity. 3 needed exploration, 2 of them cured satisfactorily but in 1 patient because of continuing infection mesh was removed after one year and recurrence took place. No mortality, enterocutaneous fistula or haematoma was noted. One patient developed M.I./ D.V.T. and was managed by Medical advice.

Conclusion: Although wide variety of procedures has been adopted for recurrent ventral hernia repair. The prosthetic repair with prolene mesh is most cost effective and efficient method of dealing with incisional hernia^{2,7,11,14,15}

Key Words: Mesh repair, ventral hernia, incisional hernia

“Incisional hernia is protrusion of abdominal viscera through the area of surgical incisions”¹. Incisional hernia arises through a weakness in the abdominal wall usually caused by previous surgery or trauma especially if there was a complication such as haematoma and wound infection³.

Due to increase in the number of intra-abdominal operations since the last century the incidence of Incisional hernia has increased. It arises through a weakness in an acquired scar in the abdominal wall. Large studies on Incisional repair have indicated recurrence rate 20–40% using opposition technique compared to less than 10% when prosthetic mesh is used.² Prosthetic repair has gained more popularity in the last half of the 20th century.

Prosthetic mesh being a foreign material when implanted has an increased risk of infection, adhesions, sinus formation, and enterocutaneous fistula and ultimately extrusion of the mesh.

Prosthetic material was introduced in the middle of 20th century in 1948 when Douglas and Koontz used tantalum mesh for hernia repair.⁴ Since that time different type of mesh has been used for the repair of Incisional hernia. Out of these Polypropylene (prolene), Expanded Poly tetraflouroethylene (ePTFE), Poly glactin (Vicryl),

Polyester (Dacron) and Reinforced silicon elastomer (Silastic) are commonly used as prosthetic material.

Metal gauze is susceptible to fatigue fracture, which leads to fracture of implant and recurrence of the hernia. Expanded polytetrafluoroethylene (ePTFE) is a new material, which is more flexible and superior, but it is not easily available⁵. Propylene (Prolene, Marlex) is most widely used material because it is easily available; cost effective, has good strength and has less chances of infection. Prolene when implanted results in intense desmoplast reaction and serous exudation and formation of connective tissue scar over the prolene mesh. As compared to Prolene connective tissue formation is less marked with other materials like polyester, polyglactin, silastic mesh.

Material and methods: -

The study was conducted in the surgical Units of Bahawal Victoria Hospital, Bahawalpur.

Study Design:

This was a prospective type of case series study.

Duration:

The study was conducted from August 19, 1997 to January 31, 2000.

Suit:

Study was conducted in the Bahawal Victoria Hospital, Bahawalpur. Incisional hernia is not an uncommon presenting problem to the surgical unit. Different options were provided to the patients in our department & a number of patients are treated with prosthetic mesh implant.

Selection Criteria of the patients in this study was:

- ❖ All adult patients of either sex having diagnosed as the case of Incisional hernia were included in the study. They have undergone repair by the prosthetic mesh during this study period.
- ❖ A criterion was also made for the surgeon having passed FCPS/FRCS or equivalent degree and having 5 years post fellowship surgical experience.

Data collection & Analysis:

The clinical record of the patients was made on a Performa. It has a record of patient's data, previous surgery, the size of the defect, which gives idea about indication for surgery. A record of their postoperative course and a follow-up for four months was made. Computer program SPSS was used for analysis.

The patients are followed-up as out patient and in a few patients by the telephonic and mailing contact. Despite of all these efforts in a very few patients follow-up for four months was not possible due to non-compliance. Anyhow postoperative course during hospital stay of all such patients was quite satisfactory.

Mesh was implanted because:

- Primary repair was failed due to unrealistic material and/or technique.
- There was a tissue defect and the repair was not possible without tension¹

To reinforce the apposition technique especially in the presence of other factors like obesity, previous surgery and very large defect².

Results:

During this study period, 25 patients presented with incisional hernia. Two patients were high risks having C.O.P.D. and cardiac failure so their operations were deferred. Remaining 23 patients included in the study were operated and repair was done with prolene mesh. Out of these 15 were female and 8 were male. The age was ranging from 28 – 65 years, with an average of 43 years. Clinical Presentations of these patients recorded are as under: Table-1

The pain rather discomfort was common in all 23(100%) cases. Gradual increase in size of defect was another common complaint of all the patients. The appearance was unacceptable especially to young female but all subjects have this complaint. 3(13.04%) patients presented with the symptoms & signs of sub acute intestinal obstruction, so early operation was done due to risk of strangulation.

2(8.69%) patients presented with acute intestinal obstruction. In one case gut was stuck at the neck of the sac but was reduced and operation was postponed for 3 days. While the other one was strangulated and operated in emergency.

Two patients presented with necrosis of the skin and 9(39.13%) presented with mild to moderate amount of skin infection or ulceration. Etiological Factors in Previous Surgeries were also recorded. The common etiological factors were obesity, post-operative infection of wound, anemia/malnutrition, postoperative pulmonary complications, faulty technique and multiple operations; the details are given in Table 2.

Anyhow in some cases complete details were not available due to non-availability of previous data and operative notes especially if the surgery was done in periphery hospitals. Operative details are given in Table-3. Postoperative Course was as under: (Table 4). Ten patients have an uneventful recovery. Infection was the most common problem seen in 6(26.08%) patients, which was from mild serous exudation & wound indurations to skin devitalization. Mild infections were treated with ASD & antibiotics. The later cases were treated by multiple wound debridement & antiseptic dressings and secondary closure of the wound was delayed even up to 45 days in the post-operative period.

Respiratory problems were severe in 2 patients having loss of domicile but 5 patients in total have chest infection and respiratory problems. Paralytic ileus was another common problem in 11 subjects of either sex. But luckily in 10 patients ileus was transient and we were able to manage in 3–5 days by nasogastric aspiration and electrolyte balance. In 1 patient ileus was prolonged up to 10 days. In 1(4.34%) female patient subcutaneous Seroma was formed which was treated with aspiration of seroma under aseptic conditions and antibiotics (within 2 months). Haematoma was not seen in any case in the study.

In 5(21.73%) cases there was a Sinus Formation. Out of these 2(8.69%) did not need any sort of surgical intervention and were treated with antibiotics according to culture and sensitivity report. In 1(4.34%) patient removal of the underlying prolene stitch was needed to treat it. In remaining 2(8.69%) cases an extensive wound debridement was needed. In 1(4.34%) female patient small infected patch of mesh was removed and she cured. While in other 1(4.34%) patient due to delayed graft rejection and continuing low-grade infection, mesh had to be removed after one year. So the hernia reoccurred in that one (4.34%) patient after one year of the repair. Anyhow during this period (4 months after surgery) no recurrence of hernia was reported. No case of enterocutaneous fistula was seen.

No Mortality was seen during the post-operative period. One old lady (4.34%) suffered from acute M.I. and in other one (4.34%) developed D.V.T. During the early post-operative period but diagnosed early and treated.

In 6(26.08%) patients more than one complication were seen like ileus, respiratory problems, wound infection and D.V.T. collectively.

Discussion:

The incidence of recurrent rate of incisional hernia may be as high as 20% in surgical practice and 80% of these recur within 2 years^{6,7,9}. The data available from literature shows that incisional hernia is relatively female and middle age disease its occurrence is usually between 40–70 years of age.^{5,6,7,16,12} In our study it has been confirmed as the average age was 43 years and male to female ratio was 1: 1.87. All patients below 40 years were female and they have undergone some sort of lower abdominal obstetric surgery. This may be due to trend of early marriages in our society.

Polypropylene mesh has been the most widely used prosthetic material in repair of hernia. In comparison to polypropylene mesh, PTFE mesh is nonabrasive, minimally irritant (inert), with a few chances of gut/ organ adhesions or enterocutaneous fistulae and strong enough to support.^{8,17} But its use was not possible due to its restricted availability in Pakistan and very limited and short experience with PTFE mesh^{7,9,17,20}.

Recurrence/extrusion of mesh occurred in one case (4.34%) while recurrence reported in different studies is about 10% in cases of mesh repair and 20–40% when other techniques are used^{1,2,4,6,7}. The low recurrence rate in this series was due to proper choice of prosthetic material and its placement under the muscles.¹⁹ Because placement of the prosthetic material under the muscles not only snugged it tightly in the defect but also helped to keep the hernia in a reduced position and to provide a secure anchor^{12,13,14,19}.

Infection was the most important complication as it was seen in 6 cases (26.08%), which was higher as compare to that (9.6%-24%) of other different studies^{10,11,14 & 15}.

Factors supposed to be contributory were: -

1. Pre-operative Skin infection/ulceration (68.7%)
2. Repeated previous surgeries. (13.04%)
3. Large dead space
4. Defect in sterilization.
5. Poor weight control prior to surgery.
6. Lack of isolation and hospital acquired infection in some cases.
7. Missed seroma under the muscles during early post-operative period.
8. Emergency surgery and gut resection for strangulation/Gangrenous gut (8.69%)

Although antibiotics chosen according to culture and sensitivity treated all these cases successfully, yet in 1(4.34%) patient debridement was needed. Better preoperative wound care, judicious use of antibiotics, avoidance of dead space by Pusek principle, and use of suction drains, are the main stay of prophylaxis¹.

Sinus formation was noted in 6 (26.08%) patients after 8-15 weeks of repair. It is high incidence in comparison to standard (2%)^{12,17}. This high incidence of sinus formation was either due to low-grade infection of the synthetic sutures placed to anchor the mesh or sheet of implant might become infected. In all these patients sinuses were drained adequately followed by repeated wound irrigations and antibiotic therapies³. Patients cured with above treatment while in 1 patient mesh was removed after one year of first surgery thus leading to recurrence of the hernia.

The most common post-operative complication was paralytic ileus (68.7%) which was very high to that (3%) of most studies^{2,12,16,17}. It may be due to extensive adhesionolysis and abdominal wall dissection. In most of these cases ileus was cured in 3–5 days while in one case in 10 days by nasogastric aspiration & correction of electrolytes.

Seroma formation was seen in 1 female only (4.35%), which is less than literature (14.5 %). Reason for low incidence may be due to placement of 2 suction drains in each case. Seroma was aspirated twice under aseptic techniques in OPD. Proper antibiotic coverage was also given.

Respiratory distress was one of the most challenging post-operative complication in 5(21.73%) cases, which was high to that (6%) of standard^{12,17}. It was most dangerous and difficult to manage complication with high incidence of mortality. Out of these, 2 cases were operated for a very large hernia with the loss of right of domain. Some surgeons do indicate pneumoperitoneum pre-operatively for such cases but is obsolete now due to available ICU facilities and positive pressure ventilation in the early post-operative period¹³.

Table 1. Clinical presentation record

Presenting problem	Male	Female	%age
Pain/discomfort	8	15	100
Enlargement	8	15	100
Cosmetic Reason	8	15	100
Sub-acute obstruction	1	2	13.04
Obstruction/ Strangulation	2	0	8.69
Skin infection	1	8	39.13
Skin ulceration	1	1	8.69

Table 2. Etiological factors of previous surgery resulting in hernia

Factors	Male	Female	%age
Obesity	2	6	34.78
Infection	4	11	65.22
Anemia/ Malnutrition	1	9	43.48
Pulmonary complications	2	5	30.44
Faulty Technique	2	7	39.13
Multiple Operations	1	3	17.39

Table 3. Operative details 3

Factors	Detail	Male	Female	%age
Size of Defect	Small defect (upto 6 cm)	1	0	4.35
	Medium (6-10 cm)	4	10	60.86
	Large (> 10 cm)	3	5	34.79
Mesh placement	Under the muscle	7	13	86.96
	Above the muscle	1	2	13.04
Anti-biotics	Prophylactic	8	15	100
	Up to 7 days	2	2	17.40
	7 to 14 days	3	8	47.83
	> 14 days	3	5	34.79
Drains removed	Within 1 st week	3	10	56.52
	After 1 st week	5	5	43.48

Table 4. Post-operative results /complications

Complaint	Male	Female	%age
Satisfactory	3	7	43.48
Infection	2	4	26.08
Respiratory Problems	2	3	21.73
Paralytic Ileus	3	8	47.83
Seroma	0	1	4.35
Sinus formation	2	3	21.74
D.V.T./M.I.	0	1	4.35
Extrusion/ Recurrence	0	1	4.35
Enterocutaneous fistula	0	0	0
Mortality	0	0	0
More than one complication	2	4	26.09

Conclusion:

A number of methods are used for repair of Incisional hernia yet the best one is by mesh implant.^{2,11,14,15} Some times it is not possible to close the defect without excessive tension due to insufficient tissue or large tissue defects, which lead to respiratory distress, ileus and ultimately recurrence of the hernia. With mesh repair closure of the defect without excessive tension becomes quite easy. We recommend repair of all recurrent hernia with synthetic patch irrespective of the size of the defect to avoid the recurrence as all these patients are harboring multiple etiological factors like obesity, insufficient tissue and other causes of raised intra-abdominal pressure. Site of implant must be extra-peritoneal either below or above the muscle to avoid the complications like enterocutaneous fistulae, adhesions of mesh with intra-abdominal organs and extrusion of the mesh.^{6,7,13,17,18} Weight reduction prior to surgery, pre-operative skin care by shower twice daily with germicidal/ fungicidal solution, pre-operative prophylactic antibiotics, sharp dissection, good haemostasis, suction drain, early mobilization, antibiotic coverage till the removal of drain, early diagnosis of seroma/haematoma and its prompt treatment are main

factors to avoid complications. To avoid delayed sinus formation, antibiotic incorporated biomaterials and relatively inert material (PTFE) should be used^{7,17}. Good anesthesia coverage with muscle relaxation during surgery is a contributory factor. The I.C.U facilities can reduce the chances of respiratory failure and mortality.

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