

Clinical Outcomes of Mesh Repair In Incisional Hernia at PMCH, Nawabshah

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ABSTRACT

Objective: to determine the outcomes of Mesh-repair and put forward the assertion for safe and effective repair with lowest recurrence rate.

Methods: A total 66 adult patients underwent for mesh repair in midline incisional hernia at surgical unit-I of PMCH, Nawabshah from 2010 to 2015 were analyzed. Patients having more than one hernia, signs of infection, previous repair with mesh and co-morbidities were excluded. Patient demographic characteristics, operative details, pre and post-operative complications and recurrence were studied.

Results: in this study, 40 females (60.6%) and 26 males (39.4%) with male to female ratio of 1:1.5 met the inclusion criteria. The patients underwent with onlay (30), inlay (22) and sublay (14) mesh repair. 27.27 % (18) of patients experienced early postoperative complication. While during follow-up period of 02 years, 8 patients developed recurrences (12.2%).

Conclusion: With lacking advance resources at our part of world, open polypropylene mesh repair of incisional hernia still remains to be safe and effective to avoid the recurrence of hernia. Sublay mesh repair indicates improved outcomes.

Key Words: Outcome, Polypropylene, Mesh repair, Incisional hernia

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INTRODUCTION:

Protrusion of peritoneum and abdominal contents through a defect in scar of previous abdominal operation is called an incisional hernia.

In every part of the world, the most common performed surgery is Laparotomy and about two millions laparotomies are done in the USA each year¹. Since last three decades incisional hernia remains to be the most common recorded complication, estimating 11 to 23% in mid line

Laparotomy incision of open abdominal surgery^{2,3}. The risk factors for incisional hernia are smoking, advanced age, immunocompromised status, obesity, poor technical closure and post-operative abdominal distension, wound hematoma and infections^{4,5}. The early development of incisional hernia results from congruent operative faulty technique and post-operative wound infection, while late development may indicate some other reasons, like connective tissue disorders⁶.

The good deal of techniques for repair of incisional hernia are available from simple to complex apposition vis-a-vis Mayo, Keel, de Silva and Meshes of various materials with various placements in anterior abdominal wall⁷. Unfortunately, the mirror of results in many techniques of repair is failing to meet the expectations, as the rate of recurrence range from 24% to 54% in suture repair and up to 34% in mesh repair^{8,9,10,11}.

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Currently, contaminated fields are often considered as contra indications for using synthetic mesh because of the feared complications of surgical site infections (SSI) or sepsis¹². Although the surgical literature with lacking data remains uncertain as to suture repair is superior or not? In spite of that mesh reinforcement has essentially become the standard of care during the majority of hernia repairs, but the ideal mesh for more challenging clinical scenario has yet to be defined^{13,14}.

There are a myriad of technical considerations applicable to this procedure, but at limited resource institutions, we hypothesized that in open ventral hernia repair, sub lay synthetic mesh (medium weight, mesoporous polypropylene) placement would be safe and effective with lowest recurrent rate.

METHODS:

A total of 66 adult consecutive patients who underwent for vertical mid line incisional hernia with mesh repair at Surgical Unit I of PMCH Nawabshah from March 2010 to February 2016 were analyzed.

The patients of both gender below 70 years of age with pre-operative fascial defect of mid line of abdomen with given informed consent were enrolled. While the patient having presence of more than one hernia, signs of infection, prior hernia with mesh repair and co morbid conditions were excluded.

Data review included patients demographics, presence or absence of obesity, cough, constipation, LUTS, smoking status and number of previous abdominal operations.

All patients received appropriate pre-operative antibiotics along with antithrombotic prophylaxis, All patients were approached with mid line Laparotomy under general anesthesia, after complete lysis of adhesions and resection of redundant soft tissue and skin, the size of hernia was measured and recorded, then fascial layers were closed first and Sub Lay Prolene Mesh (size 15 x 15cm or 30 x 30cm) repair was done. The cavity of wound was irrigated with 2 liters antibiotic laden normal saline. Two closed

suctions drains from right and left side were placed above secured mesh. The anterior rectus sheath was re-approximated in linea alba with mono filament sutures. Subcutaneous tissues were irrigated with saline and were closed in layers. Sterile dressing was placed over the wound followed by abdominal binder and were shifted to ward.

Pre-operatively every patient received appropriate antibiotics and remained on deep vein thrombosis prophylaxis during hospital stay. Liquid to regular routine diets were allowed accordingly as tolerated. Drains were removed when were without output. Patients were discharged after having adequate oral intake and pain control with oral analgesics, and were asked for follow up visits with clear instructions.

- Pre-operative data review included hernia defect size, location (Upper, middle a distal) operative time and length of hospitalization.
- Early post operative outcomes measures of this study were the symptomatic seroma, hematoma, surgical site infection, skin necrosis or wound dehiscence, and follow up outcomes were hernia recurrence rate.
- The designed post-operative follows up evaluation included physical examination at 4 weeks, 3 months, 6 months then annually for two visits.
- Patient's awareness of recurrence were evaluated and noted. The ultrasound examination or even CT Scan abdomen were taken in cases where physical examination to identify recurrence were suspicious.

Statistical Analysis: Statical analysis was performed with SPSS, version 21 (IBM amp), student t-test and chi-square were used for continuous and categorical variables respectively. The cumulative percentages of patients with recurrent free time and with or without complications were evaluated by Kaplan Meier estimator.

RESULTS:

A total number of 66 consecutive patients with incisional hernia under went for mesh repair briefed in their demographics at Table No. 1 were enrolled in this study.

Table-1: Demographic Data

Particulars	Data	
Age (Mean)	--	40.5+15
		rang 20-70 years
Male	26	39.4%
Female	40	60.6%
Male, Female ratio	00	1:1.5
Obesity (BM1>30kg/m ²)	15	22.7%
Smokers	18	27.3%

The patients in majority were with history of midline exploratory laparotomy because of secondary peritonitis, intestinal obstruction, blunt and penetrating abdominal trauma, and gynaecological surgeries.

Among these patients' majority had a history of wound infection with fibrous layer covering hernial defect and most of them presented with incarcerated hernia confined in defect. Three patients had history of multiple operations on abdomen through same ventral incision. These focused findings are briefed in Table No. 2.

There was no increase in operating time for large compared with small defects and post-operative recovery was fairly uneventful in all subjects. All patients received 1/v fluids, 3rd generation cephalosporin and good analgesics on a logical basis. However post-operative complications as outcomes are briefed in Table No. 3.

The pain was the most common complaint by the operated patients and intensity and frequency of pain was similar in small and large defect hernioplasty, which usually disappeared after one month of operation.

DISCUSSION:

In perspective of current literature, the frequently common problem confronting general surgeon is an incisional hernia repair, and this is so because the ventral hernia is one of the most common surgical procedure performed in the world and more than 386000 repairs are found in USA annually^{1,3}.

Inspite of that the relationship between hernia type and their subsequent outcomes/ complications has not yet been clearly defined. In this challenge the repair of incisional hernia with mesh in opposition to suture nature has taken a standard care with improved outcomes¹⁵.

In this challenge, the surgeon is continuously beating incisional hernia with mesh repair in opposition to suture repair as an step forward, and this has substantially improved the long term outcome and has essentially been accepted as standard of care, but the ideal mesh for more challenging clinical scenario has yet to be delineated^{13,14,15}.

Nevertheless, it is however prevailed the sense that apposition of hernia defect with suture leads to excessive tension and subsequent wound dehiscence as a result of tissue ischemia and cut through, while hernial defect of any size can be repaired without tension with synthetic mesh, further polypropylene mesh induces inflammatory response and sets up scaffolding with synthesis of collagen in it¹⁶.

We studied the demographics of patient as shown in Table No. 1 and find that majority of the patients were in between 35-51 years of age and among 66 patient 26(39.4%) males and 40 (60.6%) female, putting the male to female ratio of 1:1.5, which are similar to studies of Waqar et al. & Faisal et al^{17,18}.

In our study, the most common cause of incisional hernia was secondary peritonitis and Gynae-Obstetrical surgeries corresponding the similarities with Muhammad Zarin et al¹⁹ and shown in table: 2.

This study, observed that surgical site infection (SSI) is the most common risk factor and reason of incisional hernia, this is in the line with other studies that have also shown it to be predictive of future recurrence²⁰. Jones with colleagues and Van't Riet M. et al demonstrated that any degree of post operative infection (SSI) can lead to potential complication with consequent mesh removal²¹. Thus decreasing the rates of SSI with incisional hernia repair will alleviate the surprising high rates of recurrence and re-operations.

Table-2: Causes / Characteristics

Particulars	Male	Female	Total	%
H/O Wound infection	12	18	30	45.5 %
Incarcerated Hernia	06	11	17	25.7 %
History of previous surgeries Secondary peritonitis	10	15	25	37.8 %
Internal Obstruction	05	07	12	18 %
Gynaecological Obstetrical	--	14	14	21 %
Penetrating trauma	06	02	08	12 %
Blunt trauma	04	02	06	9 %
Site of Incision Hernia Upper abdominal.	00	02	02	3 %
Mid abdomen.	25	24	49	74 %
Lower abdomen.	01	14	15	23 %
Pre operative width (defect) small < 10cm.	18	24	42	63.6 %
Large > 10cm clinical presentation.	08	16	24	36.4 %
Pain / discomfort.	23	28	51	77 %
Cosmesis.	03	07	10	15 %
Skin ulcers.	02	03	05	7.5 %
S.A Intestinal obst.	01	02	03	4.5 %
Acute Intestinal obst.	00	01	01	1.5 %

Table-3: Post Operative Complications / Outcome

Particulars	Male	Female	Total	%
Normal Wound	20	28	48	72.7 %
Infected wound	02	04	06	9 %
Sero sanguineous discharge.	02	03	05	7.5 %
Hematoma.	01	02	03	4.5 %
Wound dehiscence	01	02	03	4.5 %
Skin necrosis	00	01	01	1.5 %
Average hospital stay.	7 days	9 days	-	-
Recurrence	03	05	08	12.2 %
Mortality	00	00	-	-

Table-4: Recurrence:

Particulars	Male	Female	%
Ist Year	02	02	6%
2nd Year	01	02	4.5%
3rd year	00	01	1.5%
Mesh on Lay Total (30)	02	02	13.3%
In Lay Total (22)	01	02	13.6%
Sub Lay Total (14)	00	01	7%

While, some propose that the use of laparoscopy reduces SSI rates compared with open repair^{22,23}.

Another study suggest that increased use of mesh repair in every primary ventral hernia will prevent the successive incisional hernia^{24,25,26}.

While other studies intensify the proper surgical techniques, mesh selection and mesh placement at appropriate spaces of interior abdominal wall appear promising in outcome²⁷.

In contaminated scenarios, the use of expensive biological mesh remains under unending debate, as hernia recurrence rates have been recorded more than 40%^{27,28,29,30}, and are very alarming.

At the pace of advanced world most of the studies replicated with laparoscopic repair have reported the reduced rates of wound infection compared with open repair^{31,32}, so the impression on inference of this study will not be propounding conception over the laparoscopic subjects.

As many of the study subjected patients were lost in follow-up and thus finally this study

carries small Nos of 66 patients with mean follow-up of 2 years.

With mean follow-up of more than 2 years this study observed 8 cases (12.2%) of recurrence (Table 4) from 66 patients while among onlay (30), inlay (22) and sublay (14) mesh repaired patients, the recurrence was 13.3%, 13.6% and 7% respectively. While in this line, Diaz JJ and co-authors³³ and Perka DM & et al²¹ has reported to have a recurrence rate of 16% to 26% and this depicts our outcomes are favorably good. In this respect Holihan JL & et al has notified many studies with outcomes as under:

2 Study Characteristic and Outcomes of Synthetic Mesh Repair³⁴

Author	Year	Study Type	*Minors	N	Mesh Locations		Recurrence N (%)		
Afifi et al.	2005	PRCT	20	41	Onlay	22	Onlay	6	(27.3)
					Underlay	19	Underlay	0	
Weber et al.	2010	PRCT	20	550	Onlay	181	Onlay	22	(12.2)
					Sublay	369	Sublay	53	(14.4)
Venclauskas et al.	2010	PRCT	21	107	Onlay	57	Onlay	6	(10.5)
					Sublay	50	Sublay	1	(2)
Helgstrand et al.	2013	Prospective	17	2798	Onlay	454	Onlay	73	(16.1)
					Sublay	323	Sublay	39	(12.1)
					Underlay	2021	Underlay	328	(16.2)
Hope et al.	2012	Retrospective	12	58	Onlay	39	Onlay	14	(35.9)
					Inlay	10	Inlay	8	(80)
					Underlay	9	Underlay	5	(55.6)
Kumar et al.	2012	Prospective	13	63	Onlay	45	Onlay	4	(8.9)
					Underlay	18	Underlay	1	(5.6)
Li et al.	2012	Retrospective	14	134	Onlay	67	Onlay	12	(17.9)
					Underlay	67	Underlay	7	(10.4)
Rosen et al.	2012	Prospective	18	49	Sublay	23	Sublay	2	(8.7)
					Underlay	26	Underlay	7	(26.9)
Forte et al.	2011	Retrospective	12	246	Onlay	9	Onlay	3	(33.3)
					Sublay	207	Sublay	1	(0.48)
					Underlay	30	Underlay	0	
Prasad et al.	2011	Retrospective	16	279	Sublay	68	Sublay	2	(2.9)
					Underlay	211	Underlay	7	(3.3)
Scheuerlein et al.	2011	Retrospective	13	29	Onlay	10	Onlay	7	(70)
					Sublay	4	Sublay	0	
					Underlay	15	Underlay	1	(6.7)
Diaz et al.	2009	Retrospective	15	208	Onlay	28	Onlay	4	(14.3)
					Inlay	89	Inlay	18	(20.2)
					Underlay	91	Underlay	17	(18.7)

Lin et al.	2009	Retrospective	10	140	Onlay	3	Onlay	0	
					Inlay	34	Inlay	12	(35.3)
					Underlay	103	Underlay	24	(23.3)
Abdollahi et al.	2010	Retrospective	11	354	Onlay	33	Onlay	2	(6.1)
					Sublay	312	Sublay	2	(0.6)
					Underlay	9	Underlay	0	
Berrevoet et al.	2010	Prospective	19	116	Sublay	56	Sublay	2	(3.6)
					Underlay	60	Underlay	5	(8.3)
Gleysteen et al.	2009	Retrospective	13	125	Onlay	75	Onlay	15	(20)
					Sublay	50	Sublay	2	(4)
Demetrashvili et al.	2009	Retrospective	10	95	Onlay	44	Onlay	3	(6.8)
					Sublay	51	Sublay	1	(2)
Israelsson et al.	2006	Retrospective	14	296	Onlay	171	Onlay	33	(19.3)
					Inlay	2	Inlay	0	
					Sublay	123	Sublay	9	(7.3)
Lomanto et al.	2006	Prospective	12	100	Sublay	50	Sublay	5	(10)
					Underlay	50	Underlay	1	(2)
de Vries Reilingh et al.	2004	Retrospective	17	53	Onlay	13	Onlay	3	(23.1)
					Inlay	23	Inlay	10	(43.5)
					Underlay	17	Underlay	2	(11.8)
Kingsnorth et al.	2004	Retrospective	10	50	Onlay	16	Onlay	2	(12.5)
					Inlay	1	Inlay	0	
					Sublay	33	Sublay	1	(3)
Gulshan et al.	2015	Prospective	11	66	Onlay	30	Onlay		(13.3)
					Inlay	22	Inlay		(13.6)
					Sublay	14	Sublay		(7)

***MINOR (Methodological Index Of Non Randomized Studies)**

This study demonstrate that in incisional hernia repair, sublay repair also known as retro-rectus or preperitoneal or Reve's Stoppa repair has lowest recurrence rate as compared to inlay and onlay and this hypothesis is also supported by Silecchia G et al³⁵.

So, despite the advance surgical methods and material in this era of sky cutting edge, still current surgical wisdom still remains perplexed against the challenging realm of repair in incisional hernia.

CONCLUSION:

With lacking advance resources at our part of world, open polypropylene mesh repair of incisional hernia still remains to be safe and effective to avoid the recurrence of hernia. Sublay mesh repair indicates improved outcomes.

Suggestion

Prospective longitudinal studies with long term follow-up will properly analysis the desired outcomes.

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