

## A Study of Rives-Stoppa Retromuscular Mesh Repair for Incisional Hernia

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### Abstract

**Background:** Incisional hernia is an important source of morbidity following abdominal surgery, more commonly in the middle-aged females. It is the only hernia which is truly iatrogenic. It can be repaired using anatomical, mesh or laparoscopic methods. Despite potential advantages of Rives-Stoppa retromuscular mesh repair when compared to other commonly done hernia repairs, not many systematic studies have been done in this part of country. Hence, this study analyses the various etiological factors of Incisional hernia and complications and outcome after hernia repair using Rives-Stoppa retromuscular mesh repair.

**Materials and Methods:** This was a hospital based prospective study conducted among 30 patients with incisional hernia, who presented to Department of Surgery at Vijayanagar Institute of Medical Sciences, Ballari, from January 2020 to September 2021. Patients were subjected to mesh repair by using Rives-Stoppa retromuscular mesh repair technique. Clearance was obtained from Institutional Ethics Committee. Written informed consent was obtained from the study participants.

**Results:** The incidence was more common in females, who underwent gynaecological procedures by lower and midline incisions. It was found to be more common in the age group of 50 - 60 years. Predominant risk factors were midline infra-umbilical incision multi-parity, obesity, occupation with strenuous work, chronic cough and smoking. Most common presenting complaint was swelling over the previous surgical scar. Majority of hernias have occurred within 2 years of previous surgery. The postoperative complications noted were mainly seroma formation. Patients had good compliance with Rives-Stoppa retromuscular mesh repair technique, with less incidence of post-operative pain complications, good recovery, and no recurrence in our study.

**Conclusion:** Rives-Stoppa retromuscular mesh repair for incisional hernia provides good strength to the abdominal wall. Patient had good compliance, less post-operative pain, less complications, and no recurrence.

**Keywords:** Rives-Stoppa, Incisional Hernia, Retromuscular Mesh, Recurrence, Iatrogenic, Previous Surgical Scar

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## Introduction

Hernia has been known since evolution of man and the history of hernia is the history of surgery. Incisional hernia is defined as “Any abdominal wall gap with or without a bulge in the area of a post-operative scar perceptible or palpable by clinical examination or imaging”. [1]

It is the only hernia which is truly iatrogenic. Incisional hernia continues to be one of the most common post-operative complications of abdominal surgery. [2] However, no incision in the abdomen is immune to the development of incisional hernia as incisional hernias of the perineum and coccyx have been reported. Incisional hernias now constitute the second most frequent hernia, first being inguinal hernia.

Abdominal incisions are subjected to variable pressure from within. Hence, more physiological incisions should be preferred which produces less anatomical distortions. Among the abdominal incisions, the lower abdominal incisions are associated with highest incidences of incisional hernia. It is through this incision, most of the gynaecological operations are done. The pressure in the lower abdomen is more than upper abdomen and the posterior rectus sheath is deficient below the umbilicus and the stress and strain on the lower abdomen predispose for herniations. There are number of etiological factors for the development of incisional hernia but the increased intra-abdominal pressure and wound infections are the most important causes. Despite the advances in the understanding of the anatomy and physiology of the abdominal wall, choice of suture material and knowledge of closure techniques, incidence of incisional hernia is still high. Approximately 5 to 15 % of the individuals who have had an abdominal incision have the risk of developing incisional hernia. [3] Maximum incidence (63 %) of incisional hernia occurs during the first 24 months after surgery. [4,5] An incisional hernia usually starts as a

symptomless partial disruption of the deeper layers of a laparotomy wound during the immediate or very early post-operative period. [6] These hernias enlarge over a period of time leading to pain, bowel obstruction, incarceration and strangulation. Obesity, advanced age, malnutrition, ascites, pregnancy and the condition which increases the intra-abdominal pressure predisposes to incisional hernia. [7] The development of tension free incisional hernia repair employing a prosthesis has decreased the recurrence rate markedly, but these procedures are not without complications such as seroma formation, haematoma, infection, recurrences and intestinal fistulisation. [8] Use of the Rives-Stoppa procedure for incisional hernia repair, in which the prosthesis is placed between rectus abdominis muscle and the posterior sheath, may reduce occurrence of these complications. The retrorectal space has good vascularity and also the mesh placement is such that intra-abdominal pressure causes least disruption and disturbance to the position and function of the mesh. Despite these and other potential advantages of Rives-Stoppa retromuscular mesh repair when compared to other commonly done hernia repairs, not many systematic studies have been done in this part of the country. Hence, this study is designed to evaluate the outcome of Rives-Stoppa retromuscular mesh repair among incisional hernia cases.

### Aims and Objectives

To study the etiological factors of incisional hernia.

To study the outcome of the Rives-Stoppa retromuscular mesh repair of incisional hernia cases.

To study the post-operative complications of Rives-Stoppa retromuscular mesh repair of incisional hernia cases.

### Materials and Methods

This was a hospital based prospective study conducted among 30 patients with incisional hernia, who presented to Department of Surgery at Vijayanagar Institute of Medical Sciences, Ballari, from January 2020 to September 2021. Patients were subjected to mesh repair by using Rives-Stoppa retromuscular mesh repair technique. Clearance was obtained from institutional ethics committee. Written informed consent was obtained from the study participants.

### Inclusion Criteria

All patients of incisional hernia between the age group of 18 to 60 years.

### Exclusion Criteria

### Results

Patients below 18 years and above 60 years of age

Pregnant women

Other hernias of anterior abdomen wall

Incisional hernia cases with active wound infection

Complicated hernia (incarcerated, obstructed and strangulated)

Unwilling patients

### Statistical Methods

Date was entered in MS Excel and analysed using Statistical Package for Social Sciences (SPSS) software. Results were presented as tables.

**Table 1: Demographic Distribution**

Sex	Number of Cases	Percentage
Male	6	20
Female	24	80
Total	30	100
Age in Years	Number of Cases	Percentage
20-29	5	16.67
30-39	6	20
40-49	6	20
50-60	13	43.33
Total	30	100

In this study, most of the patients were females who presented with the incisional hernia, about 24 cases which accounts to 80 %. Obesity, multiparity owing to loss of muscle tone and undergoing most of the surgical procedures below umbilicus where posterior rectus is deficient contributes to majority of the cases.

Majority of the cases presented were in the age group of 50 - 60 years, about 13 cases accounting for 43.33 %. Because of the age-related deficiency of collagen, aging

and weakening of the tissues i.e. tissue failure and associated co morbidities including chronic cough, obesity, raised intra-abdominal pressure lead to the presentation in middle and old age group commonly.

All the 30 patients presented with the swelling over the abdominal wall at the site of previous surgical scar, which accounts to 100 % of cases. 4 patients presented with pain along with swelling, which accounts to 13.33 % of cases.

**Table 2a: Distribution of Chief Complaints among the Study Participants**

Complaints	Number of Cases	Percentage
Swelling	30	100
Pain	4	13.33

**Table 2b: Distribution of Other Risk Factors among Study Participants**

Other Risk Factors	Number of Cases	Percentage
Previous wound infection	6	20
Obese	5	16.67
Smoking	2	6.66
Constipation	1	3.33

**Table 2c: Time Gap between Previous Surgery and Presenting Complaints**

Time Gap between Previous Surgery and Presenting Complaints (in years.)	Number of Cases	Percentage
0 - 2	13	43.33
2 - 4	5	16.66
4 - 6	2	6.66
6 - 8	1	3.33
8 - 10	3	10
10	6	20
Total	30	100

Only 4 patients (13 %) presented with pain along with swelling. We can conclude that majority of patients turn up for hospitals, for cosmetic purpose and with the apprehension of the swelling. Out of 30 patients, 6 patients had previous wound infection, which accounts for 20 %. 5 were obese, which accounts to 16.67 % of cases. 2 (6.66 %) patients had history of chronic smoking and 1 (3.33 %) patient was having history of chronic constipation. Out of 30 female patients in our study, 24 patients had multiparity.

About 13 (43.33 %) patients presented with incisional hernia within 2 years from the previous surgery. 6 (20 %) patients presented after 10 years post-surgery. Early recurrence is mainly due to post-operative complications including wound infection, wound dehiscence, faulty technique of closure, and wrong selection of suture materials. Recurrence in long term suggests tissue failure because of collagen deficiency and associated patient co morbidities.

**Table 3a: Distribution of Previous Surgical Incision among Study Participants**

Types of Incision	Number of Cases	Percentage
Below umbilicus horizontal	7	23.33
Below umbilicus horizontal + midline	3	10
Below umbilicus midline	7	23.33
Midline laprotomy	13	43.33
Total	30	100

**Table 3b: Distribution of Defect Size among Study Participants**

Defect Size in cm	Number of Cases	Percentage
0 - 1.9	3	10
2 - 3.9	15	50
4 - 5.9	12	40
Total	30	100

**Table 3c: Content of Sac**

Content of Sac	Number of Cases	Percentage
Omentum	14	46.67
Bowel	2	6.67
Bowel + omentum	14	46.67
Total	30	100

In this study, 14 patients (46.67 %) had undergone previous surgery below umbilicus, with horizontal below umbilicus and midline incision 23.33 % each. 43.33 % of patients underwent midline laparotomy. Majority of patients among the presentation were female who underwent obstetric and gynaecological procedures.

After clinical examination and ultrasonography, it was found that about 50 % cases had the hernia orifice defect of size varying from 2 to 4 cms. And 40 % cases were having defect size of 4 to 6 cms. The faulty technique of closure, use of absorbable sutures and wound infection are

the major causes for development of incisional hernia. Cases with defect less than 2 cms can sometime be managed by anatomical repair.

Content of the sac was found to be omentum in 14 patients (46.67 %). Omentum and bowel were found in 14 patients (46.67 %). Only 2 patients (6.67 %) had only bowel as content. A thorough clinical examination and radiological correlation of any incisional hernia is necessary to know the content of the sac prior to the surgery. Majority had omentum as content owing to the presence of smaller defect size and omental adhesion to the sac.

**Table 4a: Type of Mesh Used**

Type of Mesh Used	Number of Cases	Percentage
Prolene mesh 10*15cm	11	36.67
Prolene mesh 15*15cm	19	63.33
Total	30	100

**Table 4b: Time Duration of Surgery**

Time Taken for Surgery (in mins)	Number of Cases	Percentage
70 - 79	4	13.33
80 - 89	10	33.33
90 - 99	11	36.66
100 - 109	5	16.66
Total	30	100

**Table 4c: Distribution of Post-operative Complications among Study Participants**

Complications	Number of Cases	Percentage
Nil complications	27	90
Seroma	2	6.67
Wound infection	1	3.33
Mesh infection	0	0
Recurrence	0	0
Total	30	100

In this study, we used polypropylene mesh of size 15\*15cm in 19 cases (63 %) and 10\*15 cm in 11 cases (37 %). Mesh repair should be done for all incisional hernia cases. Mesh should cover minimum 5 cm away from the defect in all directions and should be sutured using non absorbable material.

About 11 cases (36.66 %) took 90 – 99 mins for surgery. 10 cases (33.33 %) took 80 to 89 mins for surgery. Incisional hernias, especially the one with the long-standing history are cumbersome to operate because of the adhesions and difficulty in creating the retromuscular plane.

The placement of polypropylene mesh in the retromuscular plane had a good outcome with minimal complications. 27 patients (90 %) out of 30 did not develop any complications and discharged uneventfully. 2 patients (7 %) developed seroma and 1 patient (3 %) developed wound infection. Proper sterile surgical technique, good dissection of plane and proper post-operative care counts for the better recovery. None of the patient had recurrence during the period of our follow-up

**Table 5a: Post-op Pain Day 1 (Visual Analogue Scale [VAS])**

Post-op Pain Day 1 (VAS)	Number of Cases	Percentage
1	4	13.33
2	20	66.67
3	5	16.67
4	1	3.33
Total	30	100

**Table 5b: Post-op Pain Day 5 (VAS)**

Post-op Pain Day 5 (VAS)	Number of Cases	Percentage
0	2	6.67
1	27	90
2	1	3.33
Total	30	100

**Table 5c: Post-op Pain Day 14 (VAS)**

Post-op Pain Day 14 (VAS)	Number of Cases	Percentage
0	29	96.67
1	1	3.33
Total	30	100

Post-operative pain in the patients was assessed based on the visual analogue scale

(VAS) on a scale of 0 to 10. These are self-reported measures of symptoms, recorded

along the length of a 10-cm line. Left side end represents “no pain” (0 cm) to the right end of the scale “worst pain” (10 cm).

Post-op pain on day1 during hospital stay, 20 patients (67 %) had a VAS score of 2, which accounts for mild pain. Only 1 patient (3 %) had a VAS score of 4.

90 % of the patients had VAS score of 1 on post-operative day 5. Only 1 patient (3 %) had a score of 2, which belongs to mild pain that improved later and had no pain on further follow up. 29 patients (97 %) out of 30, had no pain during follow up after 2 weeks. Only one patient had mild pain.

### Discussion

In this study, 30 cases of incisional hernia were examined, assessed and subjected to the Rives-Stoppa retromuscular mesh repair and were then followed up for the result. This study may not reflect all the aspects of Rives-Stoppa retromuscular repair for incisional hernia, as the series is small and follow up period is short.

Varieties of cases were encountered, presenting with the incisional hernias, and with associated co morbidities and precipitating factors. All cases were subjected to Rives-Stoppa retro muscular mesh repairs and final outcome was derived in terms of post-operative pain, complications, effectiveness of using Rives-Stoppa retro rectus mesh repair, patient compliance post-surgery, after the complete collection of data and analyzing the same.

The sex incidence of incisional hernia among the 30 cases studied is 4:1 (female:male). Most of the patients were females who presented with the incisional hernia, about 80 %, which is in favour of females clearly indicating that incidence of incisional hernia is more common in females than males. The incidence is more in female because of laxity of abdominal muscles due to multiple pregnancies. In males, the incidence of incisional hernia is

relatively rare as most of the operations are above the umbilicus and the integrity of abdominal wall is good because of well-developed muscles and fascia. About 84 % of the patients were in the age group of 30 - 60 years in our study. Maximum age incidence of incisional hernia was seen in 50 – 60 years in our study (43.33 %). Brendan Devlin states that in most series, the incidence is more around 40 years.

All the patients (100 %) in our study presented with the swelling over the previous surgical site. All of them were reducible swellings and about 13.33 % presented with mild pain in the swelling. While studying the predisposing factors for the development of incisional hernia, it was found to be previous abdominal incision, multi-parity, obesity, previous wound infection, smoking and constipation as the important predisposing factors in our study.

In our study most incisional hernias occurred following elective operations and most of them were gynaecological procedures. About 60 % of the cases developed incisional hernia in first 4 years following initial surgery (44 % cases developed within 2 years following initial surgery). About 20 % of the patients developed in the interval between 4 - 10 years post-surgery and about 20 % patients developed hernia after 10 years of previous surgery in our study. In a 10-year prospective trial involving 337 patients, Mudge and Herghe<sup>[5]</sup> showed that in 62 patients who developed incisional hernia, 56 % developed after the first post-operative year, and 35 % manifested their hernia after 5 years.

Most of the incisional hernias were found in lower abdominal midline incisions in nearly 57 % of the cases. This may attribute to the deficiency of the posterior rectus sheath below umbilicus and weaker muscle tone in female patients who is multiparous. About 47 % of the patients had omentum as the herniating content and 47 % patients had bowel and omentum as the content.

Only 6 % patients had only bowel as content. All incisional hernias were reducible hernias. About 50 % of the patients had hernia defect sized between 2 - 3.9 cm, and 40 % had defect size of more than 4 - 5.9 cm. 10 % of the patients had defect size of 0 - 1.9 cm. Irrespective of defect size, all patients underwent Rives-Stoppa retro rectus mesh repair. In 37 % of the patients, we used light weight polypropylene mesh of size 10 x 15 cm and in 63 % of the patients we used 15 x 15 cm mesh.

The cases were opened to reduce the sac content and redundant sac was excised, peritoneum was closed, and a plane was created in the retro-muscular plane. A mesh was placed and fixed with the polypropylene No.0 sutures. Suction drain was kept in about 11 cases in which dissection was more. These suction drains were removed once the drain was less than 30ml in a day, usually on the 4th or 5th day post-operatively. Foley's catheter was put to decompress the bladder and hence protect it during operation and was removed on the second day.

Time duration taken for the surgery is 1 and 1/2 hours or less in 80 % of the patients. Broad spectrum antibiotics were used prophylactically, which were injected intravenously at the time of taking incision after giving test dose. Sutures were removed on the 10th post-operative day. Seromas, noticed by suture line bulge (n-1) or serous discharge from the suture lines (n-1) were drained by removing one or two sutures. The final wound healing was good in all cases except one case which had wound infection. In none of the case, there was rejection of mesh or the recurrence. The patients were discharged with the advice to not do any strainous work. All the operated patients were followed up after 2 weeks to 6 months in the study period of 1 year 8 months. The follow up period being very short, it is difficult to comment about recurrences. Complications being seroma

formation in 2 patients with 7%, and one case with wound infection. 27 cases with 90% had no complications. There was no recurrence or mesh rejection, mesh infection, and foreign body sensation in the brief period of follow ups. Patient compliance was good with the use of retro rectus polypropylene mesh. Post-operative pain was assessed on day 1, day 5 and day 14 of follow up with the help of standard visual analogue scale (VAS) and the results we got were excellent, 29 (97 %) patients had mild pain, 1 case (3 %) had moderate pain in day 1 the of post-surgery and 28 patients had mild pain at day 5 and no patients had post-surgical pain on day 14 of follow up except one case. None of the patients developed chronic post-surgical pain, discharging sinus on further follow up.

### Conclusion

The major predisposing factors for incisional hernia are previous lower abdominal incision, multiparity, laparotomy wound infection, obesity, and smoking. Proper surgical technique, appropriate closure of the surgical site with good post-operative care can avoid and reduce the incidence of occurrence of incisional hernia. The use of Rives-Stoppa retromuscular mesh repair, with adequate overlying of mesh on the defect, yields good patient compliance and less foreign body sensation, less incidence of chronic pain, with good outcome and adds on the advantage of good repair. As the area has good vascularity and the placement of mesh is ergonomically more suitable to sustain intra-abdominal pressures. There were no mesh related complications in our study. There were no recurrences of hernia found in the specified follow up period of the study. There were no mortalities following repair in our study.

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