

# Research Analysis and Comparison of Various Surgical Techniques of Incisional Hernia Repair

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**Abstract:** ***Objective:** Cases of Incisional hernia are seen in increasing frequency now days. This research was done to identify the best method for incisional hernia repair with least recurrence rate and to give best results by providing most suitable surgical environment. **Methods:** The research study was conducted in 50 patients of incisional hernia admitted in surgical wards of general hospital. After admission all patients were studied according to proforma. Proforma was designed to record the history, chief complaint, past history, family history, personal history, obstetric and menstrual history (in case of female patient), physical examination, nutritional assessment, local examination, past surgical history, investigations and management. **Results:** In my study total 50 cases of incisional hernia were taken and studied for various methods of repair and followed for 1 year after hernia repair surgery. (5 shoelace repair, 22 onlay meshplasty, 18 preperitoneal meshplasty and 5 laparoscopic intraperitoneal meshplasty done.) Most of the patients between 40yrs to 60 yrs age group. Mean age of study group is 56.5 yrs. In our study one patient who had undergone onlay meshplasty developed mesh infection making removal of mesh mandatory. mesh infection rate is 4.55% in this study. In our study wound infection rate is 24%. Wound infection is more after onlay meshplasty (40.91%), as compared to laparoscopic (0%) and preperitoneal (11.11%) which is low. Overall recurrence rate is 4% in our study. **Conclusion:** All incisional hernias should be repaired surgically. Most common presenting complaint was swelling followed by pain over the scar site. Commonest predisposing factors for incisional hernia were wound infection in previous operation and obesity. Wound Infection is also more common in onlay meshplasty and shoelace method. If meticulous and good aseptic precaution taken, chances of complication of surgery like wound infection is minimized in recent era of highly effective antibiotics. Mesh infection is most important complication of incisional hernia repair as it can lead to surgical failure and recurrence. Recurrence was more in our study with on-lay repair and laparoscopic method. due to local complications and mesh migration respectively.*

**Keywords:** Incisional Hernia

## 1. Introduction

An incisional hernia, also called a ventral hernia, is a bulge or protrusion that occurs near or directly along a prior abdominal surgical incision. Repair of ventral hernias have always been a challenging procedure for the surgeons because of the distorted anatomy following previous surgery. Various surgical techniques varying from open repair to meshplasty have been used to repair the hernias. With the advancement of laparoscopy, ventral hernias are being repaired laparoscopically in increasing numbers. In spite of ventral hernias repair being done in large numbers there is still not a consensus about the best repair. A comparative study of various methods of incisional hernia repair was done in an effort to find out best method for repair.

Major abdominal surgery developed rapidly during later half of the 20th century and with it, increased the incidence of postoperative hernia. In history of incisional hernia the following points are not worthy.

- 1836: Gerdy repaired an incisional hernia.
- 1883: W.J.Mayo was credited with an incisional hernia repair.
- 1958: Ushers reports his experiences with polyamide mesh, later braided polyester mesh, polytetrafluoroethylene (PTFE) were introduced.

- 1993: Leblanc and booth reported the first laproscopic incisional hernia repair using expanded PTFE.

## 2. Aims and Objectives

This study was undertaken to find out the best operative method to treat Incisional hernia with least rate of recurrence.

## 3. Materials and Methods

The study was conducted in 50 patients of incisional hernia admitted in surgical wards of government general hospital. 50 cases of ventral hernia were divided in shoelace repair group, On-lay repair group, Pre peritoneal repair group and laparoscopic group. Observations were made with regards to duration and ease of operation, wound complications, mesh infection, hospital stay, morbidity and recurrence.

- All patients were assessed preoperatively, intra-operatively and postoperatively, and the findings were recorded in a pre-tested structured questionnaire (Proforma).
- Proforma was designed to record the history, chief complaint, past history, family history, personal history, obstetric and menstrual history (in case of female patient), physical examination, local examination, operative history, investigations and management.

- After filling the details of Proforma detailed analysis was done & various observations derived, discussed & concluded.

#### 4. Study Profile

- Shoelace Repair :Anatomical repair
- On Lay Meshplasty : Mesh placement on the sheath after closing defect
- Pre Peritoneal Meshplasty: Mesh placement in the preperitoneal space
- Laparoscopic Intraperitoneal Meshplasty: Mesh placement in the peritoneal space

#### 5. Selection of Patients

##### A. Inclusion Criteria

All patients with swelling at scar site with previous history of surgery at the same site were included in my study.

##### I. Pre – Operative Preparation:

Patients were investigated as per the proforma:

Pre – operative orders:

- Nil by mouth from night prior to the surgery
- Written and informed consent for anesthesia and surgery
- Shaving from nipple to knee
- Anesthetic check-up
- Catheterization
- Prophylactic antibiotics given 30 minutes before surgery, cefotaxime and repeated if surgery continues more than 3 hours.

##### II. Anesthesia: spinal anesthesia, general anesthesia.

##### III. Operative Method: Patient has undergo shoelace repair or on-lay or Pre-peritoneal or laparoscopic incisional hernia repair.

##### IV. We have taken Prolene Mesh in both repairs, size variable according to the defect size.

##### V. Drain: Negative suction drain kept in subcutaneous plane to prevent seroma and depending upon type & character, it will be removed on successive post operative day.

##### VI. Post – Operative Management:

- Intra venous drip as per the need, intra venous antibiotics given and analgesic given as per need.
- The patient was given oral antibiotics for 3 to 5days and oral analgesic as required.
- Dressing was done on the post operative day 2<sup>nd</sup> and stitches were generally removed on 10<sup>th</sup> day as per wound status.
- Patients were advised to follow up on the 1<sup>st</sup>, 3<sup>rd</sup>, 6<sup>th</sup> month and at one year post operatively. We followed up patients for 1 year.

##### VII. Guidelines

Chronic pain: Pain persisting > 3 months (International society for study of pain)

#### 6. Results and Discussion

- In my study total 50 cases of incisional hernia were taken and studied for various methods of repair and followed for 1 year after hernia repair surgery. (5 shoelace repair, 22 onlay meshplasty, 18 preperitoneal meshplasty and 5 laparoscopic intraperitoneal meshplasty done.)
- Age Group:-The study range from 25 yrs to 72 yrs age group. Most of the patients between 40yrs to 60 yrs age group. Mean age of study group is 56.5 yrs.
- In my study group no. of female patients having incisional hernia were more as compared to no. of males. This may be due to particular surgeries like LSCS and TL.
- Weakness of abdominal wall due to pregnancies is also a confounding factor.
- Most of the patients who were having medium size defect swelling as a chief complaint.
- Patients with larger defects were presented with swelling and pain both.
- Interesting patients with small defect having significant pain.
- Incisional hernia was more common in midline abdominal incisions and lower abdomen.

##### 6.1 Early Complications

- Seroma Formation: seroma formation is more common with onlay meshplasty (50%) and shoelace repair (40%).In case of preperitoneal method it is 16% only and almost nil with laparoscopic method.
- Wound Infection: wound infection is encountered frequently. In our study wound infection rate is 24%.Wound infection is more after onlay meshplasty (40.91%),as compared to laparoscopic (0%) and preperitoneal (11.11%) which is low.
- Wound infection after preperitoneal and laparoscopic method is less because mesh is covered by sheath and peritoneum, sheath respectively. In case of onlay meshplasty dissection in subcutaneous tissue is mainly responsible for this.
- Mesh Infection: mesh is relatively less common with all methods owing great sterile precautions and highly effective antibiotics, but even than in our study one patient who undergone onlay meshplasty developed mesh infection making removal of mesh mandatory. Mesh infection rate is 4.55% in this study. Alaa Elsey, et al found 6.3% mesh infection rate.
- Chi-square value of this comparison is 1.2987 .An expected value is < 5. So it is statistically significant.
- Duration of Stay: duration of stay is around 10 to 15 days with shoelace repair which is highest among all methods. It is less with laparoscopic method.

##### 6.2 Late Complications

- Chronic Pain: 40% of patients who underwent Shoelace Repair developed chronic pain as a late complication of incisional hernia repair. Laparoscopic hernia repair is also surprisingly associated with 20% rate of chronic pain occurrence. This complication is less common with preperitoneal method.

- Chi-square value of this comparison is 3.4213. An expected value is  $< 5$ . So it is statistically significant.
- Incidence of chronic pain after Laparoscopic hernia repair is 7.4% in a study by William S. Cobb, and in shoelace repair incidence of same complication is 9% in a study done by the Roland and his colleague.

## 7. Recurrence

Overall recurrence rate is 4% in our study. With laparoscopic method rate is as high as 20% due to mesh migration and improper fixation of mesh. Among patients who underwent onlay meshplasty recurrence rate 4.54% mostly due to local complications like wound infection and seroma formation. If mesh gets infected as in one of our patient relapse is inevitable.

- Chi-square value of this comparison is 4.3087. An expected value is  $< 5$ . So it is statistically significant.
- Recurrence rate is almost nil with preperitoneal and shoelace repair.

## 8. Conclusion

All incisional hernias should be repaired surgically. Repair is done upon diagnosis in order to avoid the technical and physiological consequences and complications that occur with delay, such as loss of domain, incarceration, bowel obstruction and similar complications.

- Incidence of incisional hernia is common between 40 – 60 years age group and females.
- Most common presenting complaint was swelling followed by pain over the scar site.
- Incidence of incisional hernia was more following emergency surgery than planned surgery.
- Commonest predisposing factors for incisional hernia were wound infection in previous operation and obesity.
- Early complications like postoperative pain, hematoma, seroma are more common in onlay meshplasty and shoelace method due to tissue dissection and lipolysis.
- Wound Infection is also more common in onlay meshplasty and shoelace method. If meticulous and good aseptic precaution taken, chances of complication of surgery like wound infection is minimized in recent era of highly effective antibiotics.
- Mesh infection is most important complication of incisional hernia repair as it can lead to surgical failure and recurrence.
- Recurrence was more in our study with on-lay repair and laparoscopic method due to local complications and mesh migration respectively. Preperitoneal method having low recurrence rate. However larger study and longer follow up is required to substantiate this difference.
- In pre-peritoneal meshplasty pain and seroma formation is less; return to routine work is early. Our study shows that the preperitoneal technique seems to be safe in terms of complication and recurrence rates for the patient. In addition this technique requires little tissue dissection with an easy access to the hernia repair. These advantages should be taken into consideration when choosing

between laparoscopic and open technique and when choosing between different open techniques.

- The onlay technique is a simple and effective repair operation with a short learning period for the surgeon. Middle to old age patients with any size of defect can be successfully managed by this method.
- In young patients laparoscopic method is preferred due to less chance of recurrence and less tissue dissection. Laparoscopic method is very useful for small to medium size defect repair. For larger defect dissection becomes little difficult with laparoscopy. Multiple previous surgery-laparoscopy not preferable. The laparoscopic approach is generally associated with at longer learning curve and higher cost. The introduction of laparoscopic technique is an increasingly used alternative to open surgery.

## 9. Future Scope

This comparison of various techniques has bright future aspect of helping proper appropriate and optimum method to repair incisional hernia in individual patient. Preperitoneal repair and laparoscopic repair are the best methods in terms of recurrence, postoperative pain and infection rate while shoelace repair remains the best method to repair recurrent incisional hernia as there is definitive and strong reconstruction of linea alba in this method future improvements in laparoscopic repair might change the scenario as newer types of mesh are being introduced.

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