



**A COMPARATIVE STUDY OF OPEN VERSUS AND LAPAROSCOPIC INCISIONAL HERNIA REPAIR**

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**ABSTRACT**

**Introduction:** An incisional hernia is defined as any abdominal wall defect with or without a bulge in the area of postoperative scar perceptible or palpable by clinical examination or imaging. **Aim & Objectives:** The Aim of this study is to compare the results of laparoscopic inlay mesh repair of incisional hernia with that of open onlay repair. **Material & Methods:** The study will be conducted in Department of Surgery. A total of 46 patients were included in the study, out of which 20 underwent laparoscopic incisional hernia repair and 26 underwent open incisional hernia repair. All the patients were followed up till 3 months from day of incisional hernia repair. All patients with proven incisional hernia, on USG / CECT abdomen will be conducted in the study. Only those patients who have no obvious neurological impairment, coagulopathy or hematological disorder and fit for surgery will be included in the study. **Results:** Laparoscopic inlay mesh repair is associated with less intra operative blood loss (Mean intraoperative blood loss 26 ml versus 90.77 ml), less postoperative pain (Mean VAS at POD 0 was 5.35 versus 7.08, Mean VAS at POD 2 was 2.5 versus 4.1), shorter duration of hospital stay (Mean day of discharge 2.55 versus 5.38), quicker resumption of daily activities (Mean day of resumption of daily activity 2.0 versus 3.38), early return to work (Mean day of return to work 8.05 versus 13.67) and less postoperative complications (Total number of postoperative complications 0 versus 7) as compared to open onlay mesh repair. **Conclusion:** Laparoscopic inlay mesh repair is associated with less intra operative blood loss, less postoperative pain and shorter duration of hospital stay, quicker resumption of daily activities, early return to work and less postoperative complications. However, in our results we observed longer operative time in laparoscopic inlay mesh repair as compared to open onlay mesh repair.

**KEYWORDS :** Incisional hernia, Laparoscopic inlay mesh repair, Open repair

**INTRODUCTION**

An incisional hernia is defined as any abdominal wall defect with or without a bulge in the area of postoperative scar perceptible or palpable by clinical examination or imaging<sup>1</sup>. Although incisional hernia mostly manifest clinically between 2 to 5 years after surgery, studies have shown that, the process starts within the first postoperative month. They are said to occur as a result of a biomechanical failure of the fascial tissues to heal coupled with clinically relevant impediments to acute tissue repair and normal support function of the abdominal wall, during post-operative period<sup>2</sup>. Prospective studies have reported the incidence of incisional hernia between 7.4% and 11%<sup>3-6</sup>.

**MATERIAL AND METHODS**

All patients with proven incisional hernia, on USG / CECT abdomen will be conducted in the study. These will undergo through clinical, general, systematic examinations and the required investigational procedures. Only those patients who have no obvious neurological impairment, coagulopathy or hematological disorder and fit for surgery will be included in the study.

**Inclusion Criteria:**

- 1) All patients with diagnosis of incisional hernia.
- 2) Patients with ASA grade- I & II.

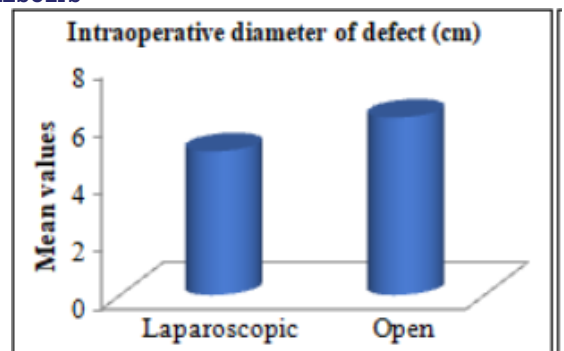
**Exclusion Criteria:**

- 1) Recurrent incisional Hernia.
- 2) Obstructed and Strangulated incisional Hernia.
- 3) Patients having a stoma.
- 4) Patients having active infection, sinus or fistula at hernia site related to previous surgery.

**Study Will Consider Of Two Arms.**

In arm one, patients undergoing open incisional hernia repair will be taken, Patients will be operated under general anesthesia/regional anesthesia. In this second arm patient undergoing laparoscopic repair of incisional hernia will be taken. All findings will be recorded in a performed performa.

**RESULTS**



**Chart 1:** Mean Intraoperative Diameter Of Defect

The p value came out to be 0.072 which means that there was no significant difference in distribution of patients in two study groups with respect to intraoperative size of defect.

**Intra Operative Bleed**

Mean intraoperative blood loss in laparoscopic meshplasty group was 26 ml with standard deviation of 10.46 and 90.77 ml in open meshplasty group with standard deviation of 22.08.

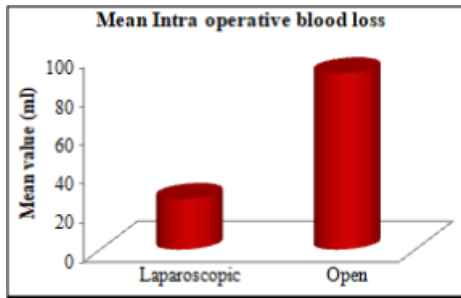


Chart 2: Mean Intraoperative Blood Loss

**Intraoperative Complications**

Forty five (97.83%) cases were completed without any intraoperative complications. One (2.17%) patient who underwent open meshplasty suffered from serosal tear of bowel. No other intraoperative complication was detected.

The p value came out to be 1.0 which means that there was no significant difference between two study groups with respect to intraoperative complications.

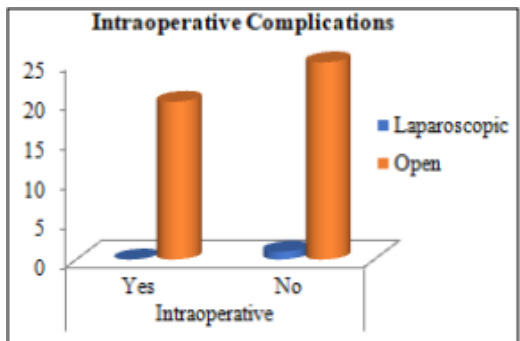


Chart 3: Intraoperative Complications

The p value came out to be <0.0005 which means that there was significant difference in mean intraoperative blood loss in two study groups. Intraoperative blood loss was significantly less in laparoscopic group.

**Postoperative Pain**

Mean pain on day of surgery in laparoscopic meshplasty group was 5.35 with standard deviation of 0.75 and 7.08 in open meshplasty group with standard deviation of 0.69.

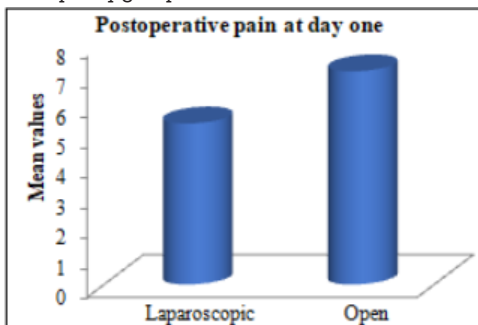


Chart 4: Postoperative Pain

The p value came out to be <0.0005 which means that there was significant difference in mean postoperative pain at day of surgery in two study groups. Mean postoperative pain at day of surgery was significantly less in laparoscopic group.

**Hospital Stay After Surgery**

Mean post-operative hospital stay in laparoscopic meshplasty group was 2.55 with standard deviation of 0.60 and 5.38 in open meshplasty group with standard deviation of 1.33.

The p value came out to be <0.0005 which means that there was significant difference in mean duration of hospital stay in two study groups. Mean duration of hospital stay was significantly less in laparoscopic group.

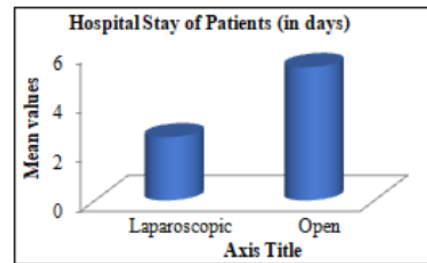


Chart 5: Mean Hospital Stay

**Return To Work**

Mean post operative day of return to work in laparoscopic meshplasty group was 8.05 with standard deviation of 1.85 and 13.67 in open meshplasty group with standard deviation of 3.66.

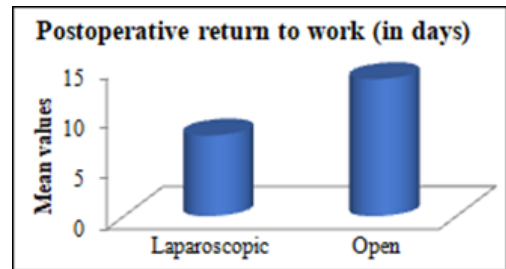


Chart 6: Mean Post Operative Day Of Return To Work

The p value came out to be <0.0005 which means that there was significant difference in mean post operative day of return to work in two study groups. Mean post operative day of return to work was significantly less in laparoscopic group.

**DISCUSSION**

Incisional hernia is an important complication of abdominal surgery and it is a common problem encountered by surgeons all over the world. Prospective studies have reported the incidence of incisional hernia between 7.4% and 11%<sup>3,6</sup>. Its repair has progressed from a primary suture repair to various mesh repairs and laparoscopic repair. Laparoscopic mesh repair is a promising alternative, and in the absence of consensus, needs prospective randomized controlled trials. In our study we wanted to see whether results of laparoscopic repair of incisional hernia will be comparable to that of open repair.

In this study, the suitable candidates for laparoscopic or open meshplasty were selected among the patients of incisional hernia, excluding those who had recurrent incisional hernia, obstructed or strangulated incisional hernia, patients with a stoma and patients who had active infection, sinus or fistula at hernia site related to previous surgery. Out of 46 candidates selected, 26 underwent open meshplasty and 20 underwent laparoscopic meshplasty for incisional hernia repair.

Mean age of the patients in laparoscopic group was 47.95 years and 49.73 years in open group and the age ranged from 32 years to 81 years with majority of patients being in the 4<sup>th</sup> and 5<sup>th</sup> decade of life. Females were more than the males in both the groups. Out of 46 patients, 56.52% were female and 43.48% were male, with male to female ratio 1:1.3. BMI of the patients ranged from 20.1 kg/m<sup>2</sup> to 28.7 kg/m<sup>2</sup> with mean BMI of 24.42 kg/m<sup>2</sup> in laparoscopic group and 24.76 kg/m<sup>2</sup> in open group. 36.96 % of the patients suffered from associated comorbidities such as hypertension, diabetes mellitus,

asthma and COPD. They were distributed evenly among the two groups. 17.39% of the patients were smokers with equal distribution among the two study groups. Mean defect size as per ultrasound was 4.52 cm in laparoscopic meshplasty group and 5.57 cm in open meshplasty group.

The two groups were comparable with respect to age, sex, body mass index, associated comorbidities, positive history of smoking, number of previous surgeries and size of defect as per ultrasound abdomen. Mean duration of surgery in laparoscopic group was 101.25 minutes and in open meshplasty group was 85.19 minutes. Duration of surgery was significantly less (p value 0.0005) for open meshplasty. Increased operating time is a potential criticism for laparoscopic procedure but it is likely that this will decrease with increasing operating experience.

Only one of the patient in open group had intra operative complication which was serosal tear of the bowel owing to dense adhesions and none of the patients had intra operative complication in laparoscopic group. Statistically the two groups were not significantly different (p value 1.0) with respect to intraoperative complications.

Mean diameter of defect (as measured intraoperatively) in laparoscopic meshplasty group was 4.97cm and 6.14 cm in open meshplasty group. The difference between two groups was not statistically significant (p value 0.072) with respect to intraoperative size of defect.

Mean intraoperative blood loss in laparoscopic meshplasty group (26 ml) was significantly less (p value 0.0005) than in open meshplasty group (90.77 ml). This result was conforming to results derived by Hasan H. Eker et al (2013)<sup>7</sup> and Ahonen-Siirtola M et al (2015)<sup>9</sup>.

Pain as per visual analogue scale was significantly low in laparoscopic meshplasty group at day 0 (p value <0.0005) and day 2 (p value <0.0005) of surgery. At day of surgery, 6 hours after surgery mean pain score in laparoscopic meshplasty group as per VAS was 5.35 and 7.08 in open meshplasty group. On post-operative day 2 mean pain score as per VAS was 2.5 in laparoscopic group and 4.12 in open group. Kamal M. F. Itani et al (2010)<sup>9</sup> reported that the mean worst pain score in the laparoscopic group was 15.2 mm lower on a visual analog scale at 52 weeks.

Mean day of discharge in laparoscopic group was 2.55 and in open group was 5.38. Mean day of resumption of daily activity in laparoscopic group was 2 and in open group was 3.38. Mean day of return to work in laparoscopic group was 8.05 and in open group 13.67. Postoperative hospital stay (p value 0.0005), time taken for resumption of daily activities (p value <0.0005) and time of returning back to work (p value <0.0005) were significantly less in laparoscopic group. Similar results were drawn in studies conducted by Sains PS et al. (2006)<sup>10</sup>, Olmi S et al. (2007)<sup>11</sup>, Forbes SS et al (2009)<sup>12</sup>, Kamal M. F. Itani et al (2010)<sup>9</sup>, Qadri SJ et al (2010)<sup>13</sup> and Ahonen-Siirtola M et al. (2015)<sup>9</sup>.

At follow up of one month in open meshplasty group one patient developed wound infection for which regular dressings were done and broad spectrum antibiotics administered. Another patient in open group developed mesh infection and hence the mesh was removed. Statistically these complications were not significant (p value 0.447). After three months a patient from open meshplasty group developed mesh infection for which also mesh was removed. This was the same patient who developed wound infection at 1 month postoperatively. Statistically at 3 months also there was no significant difference (p value 1.0) between open and laparoscopic meshplasty groups with respect to postoperative complication at three months.

One of the described benefits of laparoscopic surgery is reduced cost which is mainly due to shorter hospital stay. Our hospital is a multi specialty, public hospital where services are available free of cost to the patients, so this factor was not significant for our study.

## CONCLUSION

A study to compare the results of laparoscopic inlay mesh repair of incisional hernia with that of open onlay mesh repair. The study took into consideration various patient factors viz. age, sex, body mass index, number of previous surgery and size of defect along with intraoperative factors like intraoperative complications, blood loss and operative time. The outcome parameters used to compare the two techniques were post operative pain, duration of hospital stay, resumption of daily activities, return to work and postoperative complications. The two groups were comparable with respect to age, sex, body mass index, associated comorbidities, positive history of smoking, number of previous surgeries and size of defect. Laparoscopic inlay mesh repair is associated with less intra operative blood loss, less postoperative pain and shorter duration of hospital stay, quicker resumption of daily activities, early return to work and less postoperative complications. However, in our results we observed longer operative time in laparoscopic inlay mesh repair as compared to open onlay mesh repair. Our study had a few limitations. This was designed as a pilot study conducted over a short time period; hence our sample size was inadequate to extrapolate some of our findings. A larger sample size is required to validate our data. Due to short duration of follow-up of our study, long-term complications of the two groups could not be compared. An important long-term complication relevant to laparoscopic meshplasty for incisional hernia is adhesions of bowel with the mesh; assessment of which would help in deciding the best mesh. The best way to assess adhesions is repeat diagnostic laparoscopy but it was not performed due to ethical issue. No patient during the follow up period developed features of adhesive bowel obstruction. Also, recurrence which is the most important parameter to assess the strength of any hernia repair, cannot be assessed in the committed time frame of our study.

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