

Incisional Hernia: A Comprehensive Study on the Incidence and Management of Abdominal Incisional Hernia

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Abstract

Background and objectives: Incisional hernia is the one true iatrogenic hernia. The Incisional hernia occurs in less than 5-11% of patients subjected to abdominal operation. Incisional hernia usually starts within few months after surgery, as a result of failure of the lines of closure of the abdominal wall following laparotomy. If left unattended they tend to attain large size and cause discomfort to the patient. This study has been undertaken to assess the magnitude of this problem, various factors leading to development of this condition and the different modalities of treatment practiced in our set up. **Methodology:** The present study was conducted at the Department of General Surgery; AMC MET Medical college and Seth L. G. Hospital Ahmedabad, in which 60 patients of incisional hernia were treated during June 2018 to April 2020. **Interpretation and Conclusion:** Successful repair relies on knowledge of the dynamics of the abdominal wall, thorough technical execution, appropriate selection of synthetic or bioprosthetic material, and constitution of surgical team. Though laparoscopic repair has been demonstrated to be safe and a more resilient repair than open repair, open mesh repair remains a suitable alternative.

Keywords : Anatomic Closure, Incisional hernia, Laparoscopic Repair, Meshplasty

Introduction:

The Incisional hernia has followed abdominal surgery like a shadow for more than a century now. Incisional hernia is the one true iatrogenic hernia. Ian Aird⁽¹⁾ defines incisional hernia as a diffuse bulging out of peritoneum and abdominal contents through a weak scar of an operation or accidental wound. The Incisional hernia occurs in less than 5-11% of patients subjected to abdominal operation.⁽²⁾ Many factors influence the occurrence of incisional hernia like age, sex, obesity, chest infections, type of suture material used, and most important wound infection. Incisional hernia usually starts within few months after surgery, as a result of failure of the lines of closure of the abdominal wall following laparotomy.

If left unattended they tend to attain large size and cause discomfort to the patient or may lead to strangulation of abdominal contents. Furthermore, an incisional hernia can incarcerate, obstruct, perforate or can cause skin necrosis all of which markedly increase the risk to patient's life. With the advent of aseptic techniques, antibiotics, and greater understanding of anatomy, the scientific approach to hernia treatment has been advanced. Currently by the judicious use of the above-mentioned concepts, incisional hernia is repaired with least morbidity, mortality, and recurrence rates.

The Laparoscopic technique of hernia repair has revolutionized the treatment of incisional hernia repair since the first laparoscopic ventral hernia repair done by LeBlanc and Booth,⁽³⁾ in 1993 and since then is being increasingly getting popular worldwide. This study has been undertaken to assess the magnitude of this problem, various factors leading to development of this condition and the

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different modalities of treatment practiced in our set up.

Methods:

The present study has been carried out in the Dept. of General Surgery AMC MET Medical College and L. G. Hospital Ahmedabad during the period of June 2018 to April 2020. A total number of 60 cases were studied and the follow up period was 6 months.

Inclusion criteria:

All patients of incisional hernia admitted with:

- Age 20-80 years
- Defect size: up-to 20 cm

Exclusion criteria:

All patients of incisional hernia with:

- Recurrent incisional hernia
- Incisional hernias associated with other abdominal wall hernias
- Pregnancy with incisional hernia
- Age <20 years and >80 years
- Defect size >20cm

Procedure

A detailed history of all patients was taken and a thorough clinical examination was done as a very important step to determine the type and cause of hernia. All patients were analyzed in various aspects like age, sex, risk factors, mode of presentation, previous operation and site of previous scar. Patients were also evaluated for other risk factors like obesity, hypertension, diabetes mellitus, smoking, chronic cough, constipation, heavy weight lifting and wound dehiscence/infection. Routine investigations like Blood, Urine, CXR, and ECG were done. All the cases were operated and procedures done were recorded. The immediate post-operative

complications were evaluated. Complications like chronic infections, sinus tract formation and recurrence were also recorded.

Results:

This study may not reflect all the aspects of incisional hernia, as the series is small and follow up has been for a short period in most of the cases. Out of 60 patients, 36 (60%) patients were female and 24 (40%) patients were male. The sex ratio of incisional hernia in the present study is 2:3(M: F). The maximum age incidence of incisional hernia in our study has been 30-50 years (38%). The youngest patient in our study was 20 years and the oldest was 76 years. In considering the risk factors promoting incisional hernias in our study, obesity and smoking accounted for 30% and 21.6% respectively. In our study, highest incidence of incisional hernia was

Table 1: Conditions related with incisional hernia

| Associated conditions | No. of Patients (%) |
|-----------------------------|---------------------|
| Obesity | 18 (30%) |
| Smoking | 13 (21.6%) |
| Constipation | 12 (20%) |
| Chronic Cough | 10 (16.6%) |
| Wound Infection/ Dehiscence | 9 (15%) |
| Heavy Weight Lifting | 6 (10%) |

Table 2: Details of previous surgery which lead to the incisional hernia

| Previous Surgery | No. of Patients (%) |
|---------------------------------|---------------------|
| Emergency Midline Laparotomy | 20 (33.3%) |
| Elective Midline Laparotomy | 9 (15%) |
| Umbilical Hernia | 9 (15%) |
| Lower Segment Cesearian Section | 6 (10%) |
| Abdominal Hysterectomy | 6 (10%) |
| Open Appendicectomy | 4 (6.6%) |
| Laparoscopic | 3 (5%) |
| Pyelolithotomy | 3 (5%) |

Table 3: Type of incisions used in previous surgery

| Previous Incision | No. of cases (%) |
|-------------------|------------------|
| Vertical Midline | 29(48.33%) |
| Transverse | 11(18.33%) |
| Pfannenstiel | 6(10%) |
| Lower Midline | 4(6.6%) |
| Mcburney | 4(6.6%) |
| Oblique Lumbar | 03(5%) |
| Elliptical | 03(5%) |

Table 4: Type of repair done in incisional hernia

| Type of Repair | No. of Patients (%) |
|----------------|---------------------|
| Anatomic | 8 (13.33%) |
| Onlay | 13 (21.66%) |
| Retrorectus | 10 (16.66%) |
| Underlay | 11 (18.33%) |
| Ipom | 7 (11.66%) |
| Laparoscopic | 11 (18.33%) |

Table 5: Post-Operative Complications of different surgeries of incisional hernia

| Type of Repair (Number) | Seroma | Hematoma | Wound Infection | Post op Ileus | Intraoperative Injuries | Recurrence |
|-------------------------|-----------|-----------|-----------------|---------------|-------------------------|------------|
| Anatomic (8) | 3 (37.5%) | 0 (0%) | 1 (12.5%) | 0 (0%) | 0 (0%) | 2 (25%) |
| Onlay (13) | 4 (30.7%) | 2 (15.3%) | 3 (23%) | 0 (0%) | 0 (0%) | 2 (15.3%) |
| Retrorectus (10) | 2 (20%) | 1 (10%) | 2 (20%) | 0 (0%) | 0 (0%) | 2 (20%) |
| Underlay (11) | 2 (18%) | 1 (9%) | 1 (9%) | 1 (9%) | 0 (0%) | 1 (9%) |
| IPOM (7) | 0 (0%) | 0 (0%) | 0 (0%) | 3 (27.2%) | 1 (14.2%) | 1 (14.2%) |
| Laparoscopic (11) | 0 (0%) | 0 (0%) | 0 (0%) | 4 (36.3%) | 2 (18%) | 1 (9%) |

found in previous Emergency midline laparotomy (33.3%) and elective midline laparotomy (15%). Over 20% of cases occurred following gynecological procedures (Hysterectomy, Caesarean sections).

In our study, 48.33% and 18.33% incisional hernia occurred in vertical midline and transverse incision respectively. 26.6% of the incisional hernia occurred in infra-umbilical incisions. During the clinical examination in our study 4 patients (6.66%) had width of hernial defect less than 4cm, 49 patients (81%) had defects between 4-10 cms and 7 (11.66%) patients had defects more than 10cms. In our study polypropylene mesh and the suture material of the same type were used to repair the incisional hernias in open techniques (except anatomic and IPOM) and composite mesh was used in open IPOM and laparoscopic technique. Out of 60 patients 8(13.33%) were treated with Anatomic defect closure and the rest were reinforced with mesh. High

Table 6: Average Post-Operative Hospital Stay (Days)

| Type of Repair | Average Post-Op Hospital Stay (Days) |
|----------------|--------------------------------------|
| Anatomic | 6 |
| Onlay | 5 |
| Sublay | 5 |
| Underlay | 5 |
| IPOM | 7 |
| Laprosopic | 4 |

incidence of seroma (37.5%), Wound infection (12.5%) and Recurrence (25%) occurred in anatomic repair, Hematoma (15.3%) in onlay meshplasty, Post operative ileus (36.3%) and Intra operative injury (18%) in laparoscopic repair. Patients undergoing laparoscopic hernia repair were discharged earlier (around 4 days) as compared to patients undergoing other procedures (5-7 days).

Discussion:

The sex incidence of incisional hernia in the present study is 2:3(M:F) showing female preponderance. This is because of laxity of abdominal muscles due to multiple pregnancies and also an increased incidence of obesity in females. Ellis et al obtained an incidence of 64.6% female population in their study of 383 patients. J.B. Shah⁽⁴⁾ studies and Goel and Dubey⁽⁵⁾ series have male to female ratio 1:1.17 and 1:1.25 (M:F) ratios respectively. The maximum age incidence of incisional hernia in our study has been 30-50 years (38%). Ellis et al in their study noticed a mean age of 49.4 years. As age advances the tone of abdominal muscle decreases and laxity due to fat deposition increases, leading to higher incidence of incisional hernia. In considering the risk factors, obesity and smoking accounted for 30% and 21.6% respectively. This is comparable with that of Bose et al⁽⁶⁾ studies in which obesity (33/110-30%), chronic cough (23/110 – 20.90%) and constipation (10/110 – 9.09%). Increased abdominal pressure, as seen in obesity, particularly in the individuals with large amount of central adiposity, is associated with a predisposition to umbilical and incisional hernias. Moreover, fat deposition between abdominal fascial layers does not allow sutures to be adequately tight, resulting in early incisional hernia. In our study, highest incidence of incisional hernia was found in previous Emergency midline laparotomy (33.3%) and elective midline laparotomy (15%). Bucknall TE et al⁽⁷⁾ in their study encountered around 38% incidence in midline laparotomy incisions and 25% in transverse incisions. High incidence in vertical midline incisions can be due to being Most common incision in emergency conditions - hemorrhage, trauma, sepsis, to access abdominal and retroperitoneal viscus and As it is most commonly used in reopening previous laparotomy wounds, perhaps already a site of incisional hernia.

Thomas A. Santora et al.⁽⁸⁾ believes that the size of the fascial defect and the appearance of the fascia

should dictate the selection of the most appropriate method of hernia repair. In our study 26.6% of the incisional hernia occurred in infra-umbilical incisions. This may be because of the following features: Intraabdominal hydrostatic pressure is higher in lower abdomen compared to upper abdomen in erect position i.e., 20 cm of water and 8 cm of water respectively. Absence of posterior rectus sheath below arcuate line. This is lesser compared to A.B. Thakore et al⁽⁹⁾ studies (67.1%) and Goel and Dubey⁽⁵⁾ studies (44.6%) probably owing to limited sample size and follow up period. Out of 60 patients 13.33% were treated with Anatomic defect closure and the rest were reinforced with mesh. There is sufficient evidence to support the superiority of mesh repair over suture repair in terms of recurrences as observed in studies of Burger JW et al⁽¹⁰⁾ and Luijendijk RW et al.⁽¹¹⁾ In the present study patients undergoing anatomic repair showed higher incidence of seroma and recurrence rate. Among patients undergoing onlay repair, there was higher incidence of seroma, and wound infection. These high incidences correspond to similar results in the study of comparison of suture repair with mesh repair of midline abdominal hernia by Luijendijk RW et al.⁽¹¹⁾ Among patients undergoing retro-rectus repair and underlay repair, there was moderate incidence of seroma, hematoma, wound infection and recurrence.

IPOM repair showed higher incidence of Intraoperative injuries like enterotomy, serosal bowel injury and bladder perforation leading to postoperative ileus. Around 14% intraoperative injuries were encountered in open IPOM repair which is comparable to the study by Hasan H. Eker et al.⁽¹²⁾ (18% in laparoscopic vs 14% in open group). Hernia recurrence was found to be in 9% of patients undergoing laparoscopic ventral incisional repair vs 15-20% occurring in other methods of open meshplasty. These results are comparable to the study results of Thomas DS et al.⁽¹²⁾ showing low

incidence of hernia recurrence in range of 0-11%. Usher⁽¹³⁾ reported zero percent recurrence in 48 patients who were treated by polypropylene mesh repair. Jacobus W.A. et al.⁽¹⁴⁾ reported a 10 year cumulative rate of recurrence of 63% in anatomical repair and 32% in mesh repair. Patients undergoing laparoscopic hernia repair were discharged earlier as compared to patients undergoing other procedures. Several studies like that of Olmi S et al.⁽¹⁵⁾ and Misra MC et al.⁽¹⁶⁾ have shown a shorter length of hospital stay after laparoscopic incisional hernia repair (2 vs 4 days) owing to early mobilization and faster recovery.

Conclusion:

With the advances in the understanding of the anatomy and physiology of the abdominal wall, the choice of suture materials, the knowledge of closure techniques, and the development of prosthetic materials the management of incisional hernia continues to evolve. Successful repair relies on knowledge of the dynamics of the abdominal wall, thorough technical execution, appropriate selection of synthetic or bioprosthetic material, and constitution of surgical team. The technique used and the proficiency of using that technique is of paramount importance in the repair of incisional ventral hernia. Though laparoscopic repair has been demonstrated to be safe and a more resilient repair than open repair, open mesh repair remains a suitable alternative.

References:

- Jenna P, Satya Srinivas P. A clinical study management of incisional hernia. *J.Evid. Based Med. Healthc.* 2017; 4(66),3948-3952. DOI:10.18410/jebmh/2017/789
- Zhang L. Incidence of abdominal incisional hernia in developing country: a retrospective cohort study. *Int J Clin Exp Med.* 2015;8(8):13649-13652. Published 2015 Aug 15.
- Leblanc KA, Booth WV. Laparoscopic repair of incisional abdominal hernias using expanded polytetrafluoroethylene: preliminary findings. *Surg Laparosc Endosc.* 1993;3:39-41.
- Shah JB. Incisional hernia- A study of 50 cases. *Indian Journal of Surgery* 1977; 39:353-56
- Goel TC, Dubey PC. Abdominal incisional hernia-Anatomical technique of repair. *Indian Journal Of Surgery* 1981;43:324-27
- Bose SM, Lal Roshan, Kalra Manju, Wig JD, Khanna SK. Ventral hernia – A review of 175 cases. *Indian Journal Of Surgery* 1999; 61(3):180-84
- Bucknall TE, Cox PJ, Ellis H. Burst abdomen and incisional hernia: a prospective study of 1129 major laparotomies. *Br med J.* 1982;284:931
- Santora A Thomas, Goel. Incisional hernia. *Surgical Clinics Of North America*; 73(3):557-68
- Parekh JN, Shah DB, Thakore AB. Incisional hernia- A study of 76 cases. *Indian Journal Of Surgery* 1988; 50:49-53
- Burger JW, Luijendijk RW, Hop WC, Halm JA, Verdaasdonk EG, Jeekel J. Long-term follow-up of a randomized controlled trial of suture versus mesh repair of incisional hernia. *Ann Surg.* 2004
- Luijendijk RW, Hop WC, van den Tol MP, et al. A comparison of suture repair with mesh repair for incisional hernia. *N Engl J*
- Eker HH, Hansson BME, Buunen M, et al. Laparoscopic vs Open Incisional Hernia Repair: A Randomized Clinical Trial. *JAMA Surg.* 2013; 148(3):259–263. doi:10.1001/jamasurg.2013.1466
- Thomas DS, Phillips ES. Current status of laparoscopic ventral hernia repair. *surg endosc.* 2002;16:939
- Usher FC, Oschner J, Tuttle LLD Jr. Use of marlex mesh in the repair of incisional hernia. *Am J Surg* 1958; 24:969
- Jacobus WA et al. Long term follow-up of a randomized controlled trial of suture versus mesh repair of incisional hernia. *Annals of Surgery* 2004; 240(4):578
- Olmi S, Scaini A, Cesana GC, Erba L, Croce E. Laparoscopic versus open incisional hernia repair: an open randomized controlled study. *Surg Endosc.* 2007
- Misra MC, Bansal VK, Kulkarni MP, Pawar DK. Comparison of laparoscopic and open repair of incisional and primary ventral hernia: results of a prospective randomized study. *Surg Endosc.* 2006; 20(12)