

## ORIGINAL ARTICLE

## COMPARATIVE STUDY ON SURGICAL TECHNIQUES OF INCISIONAL HERNIA REPAIR

Prakash V. Chauhan<sup>1</sup>, Hitendra K. Desai<sup>2</sup>

**Author's Affiliations:** <sup>1</sup>Consultant at Global hospital, Ahmedabad; <sup>2</sup>Assistant Professor, Dept. of Surgery, B. J. Medical College, Ahmedabad, Gujarat

**Correspondence:** Dr Prakash V. Chauhan E-mail: prakash.bjmc@gmail.com

## ABSTRACT

**Objective:** 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.

**Methodology:** 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 complain, past history, family history, personal history, obstetric and menstrual history (in case of female patient), physical examination, nutritional assesment, local examination, past surgical history, investigations and management.

**Results:** Mean age of study group is 56.5 years. 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. 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:** 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. 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, Onlay repair, Preperitoneal repair, Mesh repair

## INTRODUCTION

Occurrence of chronic wound dehiscence with the formation of a hernial sac and canal months to years after surgery which is known as incisional hernia.<sup>2</sup> Incisional hernia is receiving greater attention in the medical community than in previous years, due to the increasing use of ultrasonography as part of follow-up after abdominal surgery, increased long term survival even after oncological surgery, and demographic developments which permit longer follow up. Incisional hernia is now routinely considered as a long-term consequence of abdominal surgery.<sup>2</sup> Unlike other abdominal wall hernias, which occur through anatomical points of weakness, incisional hernias occur through a weakness at the site of abdominal wall closure and for the repair of incisional hernias several problems need to be overcome: a multilayered wall structure of different tissue properties in constant motion has to be sutured.<sup>3</sup>

Various procedures for repair of abdominal incisional hernias have been developed. Among them, reinforcement with a prosthesis is favourable and it may be very effective.<sup>15,16</sup> Finally, laparoscopic hernioplasty has also been developed and its use is increasing.<sup>1,9</sup> Prolene has emerged as a most ideal and inert material to be used as a prosthesis. Prolene mesh has become the gold standard in any hernia repair requiring reinforcement.<sup>18</sup> Laparoscopy has proved to be a safe, effective, efficient, and less painful technique for many types of surgery.<sup>4</sup> Laparoscopic incisional hernia repair is a widely used and accepted operative technique, assuming general advances of laparoscopy are also valid for this group.<sup>4</sup> Recent studies have shown that in the short term laparoscopic repair is superior to open repair in terms of less blood loss, fewer perioperative complications, and shorter hospital stay.<sup>4</sup> The current study was carried out to compare the various techniques of incisional hernia repair in terms of advantages and disadvantages and to find out best repair according to individual patient criteria.

**METHODOLOGY**

The study was conducted in 50 patients of incisional hernia admitted in surgical wards of government civil hospital, Ahmedabad. 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. Permission for the study was taken from ethical committee of General surgery department, B. J. Medical College, Civil hospital, Ahmedabad. Informed and Written consent of every patient included in study was taken. 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 complain, 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.

Shoelace Repair is only Anatomical repair-no mesh kept<sup>10</sup>, Onlay Meshplasty is done by Mesh placement on the sheath after closing defect, Pre Peritoneal Meshplasty is done by Mesh placement in the preperitoneal space, Laparoscopic Intraperitoneal Meshplasty is done by Mesh placement in the peritoneal space, Prolene mesh of adequate size was used to reinforce the abdominal wall at hernia site.<sup>12,17</sup>

**RESULTS**

Wound infection is more common with onlay meshplasty as compared with other three methods with laparoscopic method wound infection is almost nil. Mesh infection occurred in only one patient operated by onlay meshplasty method.

**Table 1: Wound Infection**

Operative Method	Wound Infection	Mesh Infection
Laparoscopic Hernia Repair	0	0
Onlay Hernioplasty	40.91%	4.55%
Pre Peritoneal	11.11%	0
Shoelace Repair - Anatomical repair-No Mesh	20%	N.A.
Total	24%	2.22%

Shoelace repair is associated with significant incidence of chronic pain. While chronic pain at operative site is

less common after laparoscopic type of repair. Recurrence most common after laparoscopic method followed by onlay meshplasty.

**Table 2: Postoperative Chronic pain**

Operative Method	Chronic Pain	Recurrence
Laparoscopic Hernia Repair	20%	20%
Onlay Hernioplasty	22.73%	4.54%
Pre Peritoneal	5.56%	0%
Shoelace Repair	40%	0%
Total	14%	4%

It is less common in another two methods. Seroma formation rate in postoperative period is 50% and 40% with onlay meshplasty and shoelace repair respectively.<sup>14</sup> It is less common with preperitoneal technique and almost nil in laparoscopic repair.

**DISCUSSION**

In the present 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. Mean age of study group is 56.5 yrs. In my study group number of female patients having incisional hernia were more as compared to number of males. This may be due to particular surgeries like LSCS and TL. Weakness of abdominal wall due to pregnancy is also a confounding factor.<sup>5</sup> Most of the patients who were having medium size defect swelling as a chief complaint. Although patients with larger defects were presented with swelling and pain both, patients with small defect were having significant pain. Incisional hernia were more common in midline abdominal incisions and lower abdomen. 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.<sup>8</sup> Although mesh infection is relatively less common with all methods owing to sterile precautions and highly effective antibiotics, 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, while Alaa Elsesy, et al found 6.3% mesh infection rate.<sup>11</sup> Chi-square value of this comparison is 1.2987. An expected value is < 5. So it is statistically significant. 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<sup>6</sup> and in shoelace repair incidence of same complication is 9% in a study done by the Roland<sup>7</sup> and his colleague. 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. In a study by Olmi in 2007 recurrence rate in laparoscopic method is 2.35%. High rate of recurrence in our study with laparoscopic repair is due to lack of good quality instruments and less experience and exposure with this newer technique.<sup>13</sup> Recurrence rate with onlay technique is 4.54% which is comparable to 3.1% rate of study by AlaaElsesy, et al., mostly due to local complications like wound infection and seroma formation.<sup>11</sup> 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.

## CONCLUSION

To conclude 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 was more following emergency surgery than planned surgery. 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.

## REFERENCES

- Hamilton Bailey; R J McNeill Love, A J Harding Rains, H. David Ritchie: Bailey And Love's Short Practice Of Surgery, 17<sup>th</sup> edition, London; Lewis Publishers; January 1988 Page 1188
- Volker Schumpelick, Karsten Junge, Uwe Klinge, Joachim Conze; Incisional Hernia: Pathogenesis, Presentation and Treatment; Germany; Dtsch Arztebl 2006; 103(39): A 2553-8; Available At <http://www.aerzteblatt.de/pdf/DI/103/39/a2553e.pdf>; Accessed On 30-11-2012.
- David L Sanders, Andrew N Kingsnorth; The modern management of incisional hernias - *BMJ* 2012 (British Medical Journal); Southeast Asia.; 2012; *BMJ* 2012;344:e2843; Available at <http://dx.doi.org/10.1136/bmj.e2843>; Accessed On 15-01-2013.
- Karl A. Leblanc; Laparoscopic Hernia Surgery, An Operative Guide; 1<sup>st</sup> edition New York; 2002; CRC press, Taylor and Francis group; Page 17-24.
- B.D. Chaurasia: Human Anatomy 4<sup>th</sup> Edition; New Delhi; CBC publishers; 2004; (194-206).
- William S. Cobb, Kent W. Kercher, B. Todd Heniford, Laparoscopic Repair of Incisional Hernias; *Surgical Clinics of North America*; March 2005; 85(1):91-103.
- Roland W. Luijendijk, Wim C.J. Hop, M. Petrousjka; A Comparison Of Suture Repair With Mesh Repair For Incisional Hernia; *The New England Journal Of Medicine*; 2000; vol 343:392-397.
- Michael Korenkov, Andreas Paul; Classification And Surgical Management Of Incisional Hernia; *Langenbeck's Archives of Surgery* (2001) 386:65-73;
- Roland W. Luijendijk; Margot H.M. Lemmen; Wim C.J. Hop, Incisional Hernia Recurrence Following Vertical Mayo Repair Of Primary Hernia Of The Midline. *World J. Surg.* 1977, Jan 21 62-5. Available at [repub.eur.nl/pub/57579/REPUB\\_57579.pdf](http://repub.eur.nl/pub/57579/REPUB_57579.pdf). Accessed on 12-12-2012.
- Michael Zinner; Harold Ellis; Seymour I Schwartz Maingot's Textbook. Abdominal operation, 10<sup>th</sup> edition; Stamford; McGraw-Hill Professional; 1996; chap. 11 page 396, 549-551.
- AlaaElsesy, M. Ashraf Balbaa, Mohammad Leithy Ahmed Badr, Mahmoud Abdel Latif.; Retromuscular Preperitoneal Versus Traditional Onlay Mesh Repair In Treatment of Incisional Hernias - *Menoufiya Medical Journal*; Vol.21 No .1 January 2008; 209-220.
- Müller-Riemenschneider F, Roll S, Friedrich M, Zieren J, Reinhold T, Graf Von Der Schulenburg M, Greiner W, Willich SN: Medical Effectiveness And Safety Of Conventional Compared To Laparoscopic Incisional Hernia Repair: A Systematic Review. *Surg Endosc* (2007) 21: 2127. Available at: 10.1007/s00464-007-9513-4. Accessed on 30-11-2012.
- Olmi S, Scaini GC, Erba L, Croce E: Laparoscopic Versus Open Incisional Hernia Repair. *Surg Endosc* (2007) 21: 555. Available at :10.1007/s00464-007-9229-5. Accessed on 30-11-2012.
- Den Hartog D, Dur AHM, Tuinebreijer WE, Kreis RW. Open Surgical Procedures For Incisional Hernias (Review); July 2008; (COCHRANE REVIEW) Available at 10.1002/14651858.CD006438. pub2; accessed on 25-11-2012.
- Dr. Haroon Javaid Majid, Dr. Muhammad Shafi; Professional Med J Apr-Jun 2011; 18(2): 228-232. Study Of Onlay Mesh Repair Versus Suture Repair In Ventral Hernia.; *Professional Med J Apr-Jun 2011*; 18(2): 228-232. Available at [http://applications.emro.who.int/imemrf/Professional\\_Med\\_J\\_Q/Professional\\_Med\\_J\\_Q\\_2011\\_18\\_2\\_228\\_232.pdf](http://applications.emro.who.int/imemrf/Professional_Med_J_Q/Professional_Med_J_Q_2011_18_2_228_232.pdf); Accessed on 26-11-2012.
- David C Sabiston; Courtney M Townsend; Sabiston Textbook Of Surgery, 18th Edition; Philadelphia; Saunders/Elsevier; 2008; Figure 44-9.
- Seymour Schwartz; Schwartz's Surgery 8<sup>th</sup> Edition; New York; McGraw-Hill Professional; 2006; Chapter 36, Figure 36-5.
- P.K. Amid; Amid P.K. Classification of biomaterials and their related complications in abdominal wall hernia surgery; *Hernia* 1997, 1:15-21; Available at 10.1007/BF02426382. Accessed on 25-11-20