



Case Series - Onlay Mesh Repair of Large Ventral Hernia: A Perspective Study in Rural Setup

KEYWORDS

abdominal surgery, incisional hernia, surgical mesh repair

Dr. Arif E. Kaderi

Associate Professor, Dept. of General Surgery A.C.P.M. Medical College, Dhule

Dr. Sachin Jain

Associate Professor, Dept. of General Surgery A.C.P.M. Medical College, Dhule

Dr. Pravin Wamanrao Nikhade

3rd year resident, Dept. of General Surgery, A.C.P.M. Medical College, Dhule

* Dr. Aditya A. Manekar

1st year resident, Dept. of General Surgery, A.C.P.M. Medical College, Dhule
* Corresponding author

ABSTRACT *Objective: Large ventral hernias especially recurrent incisional hernia carries a significant post-operative morbidity and complications. This retrospective study is done to determine the outcomes of large ventral hernia repair in rural setup in developing country.*

Methodology: This case series included 26 patients, operated from 2011 to 2014 for large ventral hernia at our institute with follow up of at least 12 months. The variables studied consisted of age, sex, BMI, Type of hernia, Type of incision in previous surgery in case of incisional hernia, risk factors, duration for onset of incisional hernia after previous surgery, and hospital stay post surgery. But particular attention was given to surgery by onlay mesh repair and complications in perioperative period.

Results: Total 26 patients of large ventral hernia found to be eligible were included in the study. Mean age of patients was 46.2 + 9.4 yrs with clear female preponderance (male to female ratio is 1:2.7). Most common type of hernia was incisional (77%) and previous abdominal surgery (77%) was the major risk factor followed by obesity (53.8%). Lower midline incision was the most common incision (45%) predisposing to development of incisional hernia. 26.9% patients developed complications in the form of Surgical Site Infection (SSI), seroma formation and recurrence. With a mean follow up of 18+9 months 7.7% patients had recurrence of hernia in this study.

Conclusions: Repair of large ventral hernia with onlay mesh repair has shown promising results with reasonably good outcome, acceptable rates of recurrence and lesser technical difficulties.

Introduction

Abdominal wall hernias are one of the most common surgically treated medical conditions worldwide. A ventral hernia is defined by a protrusion through the anterior abdominal wall fascia. These defects can be categorized as spontaneous or acquired or by their location on the abdominal wall.[1] Various types are epigastric, paraumbilical, umbilical, spigelian, lumbar but most common nowadays is incisional hernia.

Based on national operative statistics, incisional hernias accounts for 15% to 20% of all abdominal wall hernias; umbilical and epigastric hernias constitute 10% of hernias. Incisional hernias are twice as common in women as in men. [1] Ventral incisional hernias (VIH) develop in 10-20% of patients after abdominal surgery.[2]

Various predisposing factors obesity (most important single factor), advanced age, Postoperative cough, malnutrition, emergency surgery, poor technique of surgery, wound infection etc. Most important clinical feature is bulge in the anterior abdominal wall. Presentation of incisional hernia with incarceration causing bowel obstruction is not uncommon which may lead to emergency surgery and subsequent complications and morbidity. According to the size of defect, European Hernia Society classifies incisional hernias as: a) Small: <5 cm in width or length. b) Medium: 5-10 cm in width or length. c) Large: >10 cm in width or length.[3]

Treatment of Ventral Hernia is operative repair and three general classes of operative repair have emerged in modern era. These techniques include primary repair, open repair of hernia with prosthetic mesh and laparoscopic incisional hernia repair. There are convincing data that placement of mesh to repair the hernia defect has decreased the high recurrence rate historically associated with primary suture repair.[4-5] Various procedures of primary anatomical closure are vertical double breasting, transverse double breasting (Mayo), Keel's procedure, Catell's procedure, Nutall's procedure, shoelace darn repair, etc.

Some guidelines exist with basic indications regarding the techniques to be adopted. When enough healthy tissue is available, an autologous open suture repair (approximation of the muscular wall edges – primary suture of the anterior rectus abdominis fascia or Da Silva technique) should be preferred for its simplicity compared to the other techniques.[6] The Component Separation Technique (CST) partially overcome the limitations for the autologous repair as it repairs defects up to 20 cm wide by producing greater amount of muscular tissues. However, the technical difficulty and the considerable morbidity are still limiting its widespread use.[7,8]

Recurrence, surgical site infection (SSI), mesh infection, wound dehiscence and seroma are common complications of incisional hernia repair reported in literature.[9] The incidence of SSI after open and laparoscopic repair has been reported in up to 27.7% and 10.5%, respectively.[10]

Material and Methods

This study included adult patients of large (hernia defect >10cm) ventral abdominal wall hernia from 2011 to 2014 at Annasaheb Chudaman Patil Memorial Medical College, Dhule.

The factors studied consisted of age, sex, BMI, risk factors, duration for onset of incisional hernia after previous surgery, previous history of surgery, chemo/radiotherapy or incisional hernia repair and surgical details of hernia repair, complications and hospital stay and followup.

Particular attention was given to management by onlay mesh repair, complications in perioperative period and factors affecting recurrence.

All patients after complete investigations were taken for surgery in the form of primary closure with onlay mesh repair except in some emergency situations where chances of contamination are high.



Fig 2 – Mesh Repair done



Fig 1 – Large ventral hernia



Fig 3 – Post operative photograph



Results

Total 26 patients of large ventral hernia found to be eligible to be included in this study were reviewed. Mean age of patients was 46.2 +/- 9.4 years with female preponderance (male to female ratio is 1:2.7). Most of the patients were obese with 14 (53.8%) patients having BMI more than 30 kg/m². Most common type of hernia was incisional (77.0%) with a small number of patients of paraumbilical and epigastric hernia (11.5% each). Previous abdominal surgery (77.0%) was the major risk factor followed by obesity (53.8%), multiparity (30.8%). 1 patient had history of chemotherapy. Lower midline incision was the most common incision (45%) predisposing to development of incisional hernia. Presentation of incisional hernia within 1 year of previous surgeries was seen in 73.1% of patients. (Table 1)

In majority of patients, surgery was done electively with primary closure with local flaps of rectus sheath with onlay placement of mesh fixed with non-absorbable sutures.

Vacuum drainage applied to all the cases. Mesh was not placed in 2 patients in view of contaminated surgery.

Complications were observed in 7 (26.92%) patients, of which SSI was the most common complication found in 5 (19.3%) patient of whom 2 patients being operated in emergency setting. 2(7.7%) patient had seroma formation. There was no mortality in this series.

With a mean follow up of 18 months, 1 patient had recurrence within 1 years of surgery, which had past history of chemotherapy. Other patient had recurrence after 1 year of surgery and had emergency contaminated surgery. Mean duration of hospital stay was 6.8 + 3.2 days.

Discussion

There are various risk factors implicated as cause of ventral hernia or incisional hernia or recurrence of hernia. Which include advanced age, malnutrition, diabetes mellitus, smoking, obesity, previous chemoradiation, but wound infection is believed to be one of the most important risk factor for development of an incisional hernia.[11,12] Emergency surgery is also known to increase the risk of incisional hernia formation. In our study, 53.8% of patients had obesity, 30.8% had multiparity an 19.9% had Diabetes and 1 patient had history of chemotherapy. Rios et al[13] also had 19.9% cases with diabetes in his study. Hence, these multiple risk factors might be a reason for causation or recurrence of hernia, as among 20 patients with incisional hernia, 6 were operated twice and 2 were operated thrice.

Large recurrent incisional hernias continue to pose a difficult challenge for the surgeon. Various repairs have been advocated as local tissue flaps, pedicled flaps, various suture techniques and insertion of synthetic mesh. Nowadays repair with prosthetic mesh became the standard procedure for incisional hernias, the subsequent rate of recurrence has been lowered to 8-24% from 33 to 44%, but it has not been eliminated.[14,15] At present, onlay mesh repair and sublay mesh repair with or without component separation technique are good options for ventral hernia repair.

In our study, in majority of patients, surgery was done electively with onlay mesh repair. In 2 patients, mesh was not placed in view of contaminated surgery. 1 patient had undergone component separation technique with onlay mesh repair. The Ventral Hernia Working Group also noted that underlay mesh placement may be preferred because of the theoretical advantages of this technique. However, there is no literature stating the use of one technique over another.[16] Recurrence rate in our study was 7.7%. The result was lower when compared to past studies, but comparable with some recent studies. Many factors may be attributed to low recurrence rate in our study. Some of them are mean duration of follow up, better technical expertise and patient care, less number of patients of recurrent incisional hernia and large mesh placement.

Mean follow-up period in our patients (18 + 9 months) was shorter than similar studies done in past. Poor economic and educational background may be the main reason for that. Nowadays better surgical expertise and improvement in post-operative patient care and education may reduce recurrence rate. In our study 6 (23.1%) and 2 (7.7%) patients had recurrent and re-recurrent incisional hernia which was less than other similar studies. It is well documented in literature that, there is increase in recurrence rate with

each incisional hernia repairs.[17] We had put a large polypropylene mesh with prolene suturing at borders of mesh and few intermittent sutures in between mesh. Study done by Venclaukas et al had reported 10.5% recurrence rate in their study.[18] while study by Memon AA et al had reported 6.6% recurrence rate in their study.[19]

Ventral hernia repair has many complications like wound infection, seroma, hematoma, wound dehiscence/ compartment syndrome, mesh infection and the formation of enterocutaneous fistulae.[16] Each of these complications conveys additional morbidity and the risk for recurrence of hernia. Most common complication following the repair of incisional hernia in our study was surgical site infection (19.3%). This is consistent with literature, that surgical site infection is the most common complication following incisional hernia repair.[20,21] Various risk factors predisposing to SSI in our study was diabetes mellitus and emergency surgery. Wound infection is the most significant factor that predispose to hernia recurrence.[22] Apart from SSI, 2(7.7%) patients had seroma formation as complication.(Table 2)

Among two patients with recurrence in study, one had contaminated emergency surgery, which proves the role of SSI in recurrence of hernia. Another patient with recurrence had history of chemotherapy, which is also an important causative factor of hernia recurrence. Two patients had contaminated emergency surgery among which one had recurrence of hernia showing the incidence of recurrence in contaminated wound (50%) against in clean wound as (4.2%). This furthermore demonstrate a role of antibiotic prophylaxis to lower the rate of infection following incisional hernia repair.[23]

Hospital stay is another important factor which should be considered during choice of surgery performed. In our study mean hospital stay was 6.8 + 3.2 days. Hernia other than incisional hernia like paraumbilical and epigastric hernia had significantly lower hospital stay. SSI significantly increases the hospital stay of patient, similarly it also increase financial burden over patient. So in era of minimally invasive surgery, laparoscopic hernia repair is gaining widespread acceptance due to advantages of laparoscopic over open repair (lesser hospital stay, lower pain and complications). In various studies Laparoscopic ventral hernia repair has been reported to have complications in upto 16% and recurrence in up to 2.5% of patients.[24-28]

Conclusion

Large abdominal ventral hernia has clear female preponderance with incisional hernia is the most common type among all. Previous major abdominal surgery and obesity are the most important risk factors for abdominal ventral hernia. Onlay mesh repair with prosthetic non-absorbable mesh has shown some promising results for rural setup with reasonably good outcome, acceptable rates of recurrence and lesser technical difficulties. Surgical Site Infection is the most common complication following repair of large ventral hernias.

Conflict of interest

None to mention.

Table 1: Showing various characteristics of patients studied (n= 26).

Variables	Value
Age (Mean in years)	46.2 + 9.4
Sex (male : female)	1:2.7

BMI (kg/m ²)		28.2 + 6.3
Type of ventral hernia	Incisional	20 (77%)
	Paraumbilical	3 (11.5%)
	Epiagastric	3 (11.5%)
Type of incision in previous surgery	Lower midline	9 (45%)
	Upper midline	5 (25%)
	Pfennestiel	3 (15%)
	Other	3 (15%)
Duration since previous surgery	< 6 months	11 (42.3%)
	6-12 months	8 (30.8%)
	>1 year	7 (26.9%)
Risk factors	Past abd surgery	20 (76.9%)
	Obesity	14 (53.8%)
	Multiparity	8 (30.8%)
	Diabetes	5 (19.2%)
	Chronic cough	3 (11.5)
	Previous chemotherapy	1 (3.8%)
Type of surgery	Elective	24 (92.3%)
	Emergency	2 (7.7%)
Follow up period		18+9 months
Mean hospital stay		6.8 + 3.2 days

Table 2: Comparison of complications occurs in various other studies

Complications	Venclaukas et al (2007) ^[18]	Memon AA et al (2010) ^[19]	Present study(%) (2015)
Minor wound infection	16.1%	21.6%	5 (19.3%)
Seroma	13%	1.67%	2 (7.7%)
Dehiscence/ Burst abdomen	0	0	0
Mesh infection	0	3.3%	0
Recurrence	10.5%	6.6%	2 (7.7%)

Table 3: Comparison of recurrence rate in various other studies

Various studies	de Vries Reilingh et al(2004) ^[29]	Venclaukas et al (2007) ^[18]	Memon AA et al (2010) ^[19]	Present study (2015)
Sample size	53	31	60	26
Mean follow up period (months)	24	30	20	20
Recurrence(%)	28%	10.5%	6.6%	7.7%

References

- Courtney M Townsend, R Daniel Beauchamp, B Mark Evers et al., Sabiston Textbook of Surgery, 19th edition, Volume 2, Philadelphia, Saunders, 2011; 7: 1136-1138
- Cassar K, Munro A. Surgical treatment of incisional hernia. Br J Surg 2002 May;89(5):534e45.
- Korenkov M, Paul A, Sauerland S, Neugebauer E, Arndt M, Chevrel JP, et al. Classification and surgical treatment of incisional hernia. Results of an experts' meeting. Langenbecks Arch Surg 2001 Feb;386(1):65e73.
- Millikan KW, Baptisa M, Amin B, et al. Intraoperative underlay ventral hernia repair utilizing bilayer ePTFE and Polypropylene mesh. Am Surg 2003;69:258.
- McLanahan D, King LT, Weems C, et al. Retrorectus Prosthetic mesh repair of midline abdominal hernia. Am J Surg 1997;173:445.
- DA SILVA AL. Surgical correction of longitudinal median or paramedian incisional hernia. Surg Gynecol Obstet 1979; 148: 579-583.
- SHESTAK KC, EDINGTON HJ, JOHNSON RR. The separation of anatomic components technique for the reconstruction of massive midline abdominal wall defects: anatomy, surgical technique, applications, and limitations revisited. Plast Reconstr Surg 2000; 105: 731-738; quiz 9.
- RAMIREZ OM, RUAS E, DELLON AL. "Components separation" method for closure of abdominal-wall defects: an anatomic and clinical study. Plast Reconstr Surg 1990; 86: 519-526.

- Sukkar SM, Dumanian GA, Szczerba SM, Tellez MG. Challenging abdominal wall defects. Am J Surg 2001 Feb;181(2):115e21.
- Mathes SJ, Steinwald PM, Foster RD, Hoffman WY, Anthony JP. Complex abdominal wall reconstruction: a comparison of flap and mesh closure. Ann Surg 2000 Oct;232(4):586e96.
- Bucknall TE, Cox P J, Ellis H, Burst abdomen and incisional hernia, a prospective study of 1129 major laparotomies. Br Med J 1982;284:931.
- Gys T, Hubens A. A prospective comparative clinical study between monofilament absorbable and non absorbable sutures for abdominal wall closure. Acta Chir Belg 1989;89:265
- Rios A, Rodriguez JM, Munitz V, Alcaraz P et al. Antibiotic prophylaxis in incisional hernia repair using a prosthesis. The World journal of hernia and abdominal wall surgery. 2001 Sep;5(3):148-52.
- Cobb WS, Harris JB, Lokey JS, McGill ES, Klove KL. Incisional herniorrhaphy with intraperitoneal composite mesh: a report of 95 cases. Am Surg 2003 Sep;69(9):784-7.
- Cobb WS, Kercher KW, Matthews BD, Burns JM, Tinkham NH, Sing RF, et al. Laparoscopic ventral hernia repair: a single center experience. Hernia 2006 Jun;10(3):236-42.
- Breuing K, Butler CE, Ferzoco S, Franz M, Hultman CS, Kilbridge JF, et al. Incisional Ventral hernias: review of the literature and recommendations regarding the grading and technique of repair. Surgery
- Matapurkar BG, Gupta AK, Agarwal AK. A new technique of "Marlex-peritoneal sandwich" in the repair of large incisional hernias. World J Surg 1991 Nov-Dec;15(6):768e70.
- Venclauskas L, Silanskaite J, Kanisaukaite J, Kiudelis M. Long-term results of incisional hernia treatment. Medicina (Kaunas). 2007;43(11):855-60. PubMed PMID: 18084142.
- Memon AA, Khan A, Zafar H, Murtaza G, Zaidi M. Repair of large and giant incisional hernia with onlay mesh: perspective of a tertiary care hospital of a developing country. Int J Surg. 2013;11(1):41-5. doi: 10.1016/j.ijsu.2012.11.006. Epub 2012 Nov 20. PubMed PMID: 23178155.
- Cassar K, Munro A. Surgical treatment of incisional hernia. Br J Surg 2002 May;89(5):534-45.
- Kurzer M, Kark A, Selouk S, Belsham P. Open mesh repair of incisional hernia using a sublay technique: long-term follow-up. World J Surg 2008 Jan;32(1): 31-6. discussion 7
- Iqbal CW, Pham TH, Joseph A, Mai J, Thompson GB, Sarr MG. Long-term outcome of 254 complex incisional hernia repairs using the modified Rives-toppa technique. World J Surg 2007 Dec;31(12):2398e404.
- Kaafarani HM, Kaufman D, Reda D, Itani KM. Predictors of surgical site infection in laparoscopic and open ventral incisional herniorrhaphy. J Surg Res Oct 2010;163(2):229-34.
- Moreno-Egea A, Bustos JAC, Girela E, Aguayo-Albasini JL. Long-term results of laparoscopic repair of incisional hernias using an intraperitoneal composite mesh. Surg Endoscopy 2010;24(2):359-65.
- Nardi MJ, Millo P, Brachet Contul R, Fabozzi M, Persico F, Roveroni M, et al. Laparoscopic incisional and ventral hernia repair (LIVHR) with PARIETEXâ, Composite mesh. Minimally Invasive Ther Allied Technologies 2012;21(3):173-80.
- Olmi S, Erba L, Magnone S, Bertolini A, Croce E. Prospective clinical study of laparoscopic treatment of incisional and ventral hernia using a composite mesh: indications, complications and results. Hernia 2006;10(3):243-7.
- Parker 3rd HH, Nottingham JM, Bynoe RP, Yost MJ. Laparoscopic repair of large incisional hernias. Am Surgeon 2002;68(6):530.
- Qadri SJF, Khan M, Wani SN, Nazir SS, Rather A. Laparoscopic and open incisional hernia repair using polypropylene mesh-A comparative single centre study. Int J Surg 010;8(6):479-83.
- de Vries Reilingh TS, van Geldere D, Langenhorst B, de Jong D, van der Wilt GJ, van Goor H, et al. Repair of large midline incisional hernias with polypropylene mesh: comparison of three operative techniques. Hernia 2004 Feb;8(1):56e9.