

A Prospective Observational Study Of Postoperative Complications Following Ventral Open Mesh Hernioplasty

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ABSTRACT

INTRODUCTION: Complications following open mesh hernioplasty are very common. Detailed analysis of etiology, incidence and post operative complications is very important. **AIM:** To study the short-term postoperative complications following open ventral mesh hernioplasty. **OBJECTIVE** To determine the association of postoperative complications with various risk factor following open ventral mesh hernioplasty. **MATERIALS AND METHOD:** Pre operative risk factors were evaluated and complications after open mesh hernioplasty analysed during the post operative stay in hospital. **STUDY DESIGN:** 65 cases of ventral hernia presented to this institute during 2021 – 2022 were included in this study. an association of complications with various risk factors was explored using chi-square test and odds ratio with 95% confidence interval. **RESULTS:** 14 patients developed complication, out of which most common being seroma formation with 6% incidence rate. And the most common risk factor associated was COPD and diabetes mellitus. **CONCLUSION:** Good preoperative evaluation and preparation; sound anatomical knowledge and meticulous attention to surgical detail are the most important factors for prevention of post- operative complication and recurrence of hernia.

Keywords: ventral open mesh hernioplasty, risk factors, postoperative complications.

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I. INTRODUCTION:

The fascial defects in anterior abdominal wall presenting with abnormal protrusion of intra abdominal contents are termed as Ventral Hernia, which may be primary like epigastric, umbilical, para-umbilical, spigelian, lumbar or Secondary/acquired following trauma or surgery (incisional)¹. The increasing incidents of ventral hernia among actively working young people of society puts a large burden of resource and cost on the health care system, as more than 386000 ventral hernia repair are noted annually even in much advanced country like America, among these 75% are primary ventral (non-incisional) hernias^{2,3,4}. In addition, there is also no consensus on surgical site occurrence (SSO), known as complications and hernia recurrence as the most important end points in the repair of ventral hernia⁵. And in this regard, many studies report that the surgical site occurrence like seroma, hematoma, surgical site infections (SSI), skin dehiscence, skin necrosis, cellulitis and suture granuloma or abscess are abysmal risk factors associated with increased preponderance of recurrence of ventral hernia with or without mesh repair^{5,6}. Out of the several ventral hernia's, incisional hernia is the most common⁷. Despite the advances in the understanding of the anatomy and physiology of the abdominal wall, the choice of suture materials and the knowledge of closure techniques, the incidence of incisional hernias continues to be 2–11% after laparotomy⁸. An incidence of 0.5–1.5% has been reported in laparoscopic surgery as well⁹. These are serious surgical problems owing to their propensity to enlarge and cause complications, association with common systemic disorders and the technical difficulties associated with their successful repair. Further, co morbidities like chronic use of corticosteroids, smoking, coronary artery disease, chronic artery disease, chronic obstructive pulmonary disease, diabetes, malnutrition, immunosuppression, low serum albumin, obesity and old age may convey at least four folds infection risk post operatively as have been analysed by National Surgical Quality Improvement Program (NSQIP)¹⁰⁻¹⁴. The relationship between hernia types primary (congenital) or acquired (incisional) and profound SSO/complications resulting morbidity and additional sequelae are not yet precisely delineated in available literature¹⁵⁻¹⁶. In this study, the short-term complications following repair of ventral hernia using mesh done in our hospital during 2021-2023 will be studied and the results will be compared to the literature standards.

II. MATERIALS AND METHOD

All patients underwent thorough clinical examination and a detailed history of earlier operation was asked. All patients were evaluated for any systemic disease or any precipitating cause. Patients who had associated hypertension, diabetes mellitus or cough was controlled and monitored preoperatively. Routine investigations like Hb, TC, DC, BT, CT, urine analysis and blood grouping and cross matching was analysed. All cases underwent ECG, Blood Sugar (Fasting and Postprandial), blood urea and serum creatinine, HIV/ HbsAg investigations. Chest X-ray and USG was done in all cases. Pre-operative fitness was obtained. All cases admitted prior to surgery to permit pre-operative investigations and preparation. Pre operative size of defect and history of previous surgery and general and local examination was done thoroughly. Patients in whom prosthetic mesh repair was done with onlay technique were evaluated post operatively. In post operative period vitals were monitored along with post operative complication were noted. Suction drain was removed once drainage was below 25cc, for 24 hours. Antibiotics was continued till the removal of sutures. Post operatively deep breathing exercises and movement of limbs in bed was advised as soon as patient recovered from anaesthesia. Early limited ambulation was done once patient was able to bear pain. IV fluids were continued till passage of flatus, there after patient received liquid diet and later soft diet. Skin sutures was removed on 8thday or 10thday and patient discharged on same day or next day. At discharge, patients were advised to restrict their activities for first six months. Obese patients were advised to shed weight. These cases will then be analysed and results was compared with existing literature. An extensive review of literature was also be carried out. Statistical analysis was made with Chi- square and Fischer Exact test to find the significance of proportion of incidence of post operative complications in association with risk factors following ventral mesh hernioplasty A note of predisposing risk factors in patients with ventral hernia, post operative complications, Factors affecting the occurrence of post operative complications after mesh hernioplasty for ventral hernia. A pre-tested and pre-designed proforma was used to collect the data among the study population. The proforma included socio-demographic factors like age, gender, residence etc. On admission to hospital patient's name, age, sex, address, registration number and date and time of admission patient's presenting complaint, detail history was recorded. The study will include cases of ventral hernia admitted to department of general surgery, SMS hospital Jaipur and evaluation on the basis of inclusion and exclusion criteria.

III. OBSERVATION AND RESULT

The study showed that out of 65 patients, 48(74%) were male and 17(20%) were females. Since majority of patients who underwent emergency laparotomy at our hospital were male, thereby percentage of male patients were more in this study.

The study revealed that the incidence of ventral hernia is more in the 31–40-year age group as well as in females it is common in age group of 51–70-year age grp and males it is common in age group 31-40. Propensity of trauma cases presenting at our hospital and hence number of emergency laparotomy and hence ventral hernia, this makes young males dominant group in our study. Out of 65 patients included in this study, incidence of incisional hernia cases was maximum (55 cases, 84%) followed by Infraumbilical, Paraumbilical, Umbilical hernia with (3 cases,4.6%) and Epigastric hernia (1 case, 1.5%). Nearly all patients with ventral hernia presented with complaint of swelling, 15 patients had complaint of pain while 4 came with complaint of vomiting and 7 with irreducibility.

In this study maximum number of patients presented with post op complication of seroma 6%, followed by wound infection 5% and skin necrosis 3% and rest others with 2% complication;

TYPES OF POST OPERATIVE COMPLICATIONS

POSTOPERATIVE COMPLICATIONS	NUMBER	PERCENTAGE
Seroma	4	6%
Hematoma	1	2%
Wound infection	3	5%
Skin necrosis	2	3%
Wound dehiscence	1	2%
Sinus formation	1	2%
Pulmonary complications	1	2%
GI complications	1	2%
None	51	78%

Table 1.

In this study 12 patients had history of wound infection in the previous surgery followed by burst abdomen 8 cases, wound dehiscence 3 cases, paralytic ileus 3 cases, cough 7 cases and combined cough and wound infection 3 cases. Table 2.

COMPLICATIONS i	NUMBER OF CASES
WOUND INFECTION	12
WOUND DEHISCENCE	3
BURST ABDOMEN	8
PARALYTIC ILEUS	3
COUGH	7
COMBINED	3
NONE	29

Table 2

Most common risk factor associated was copd with 16 cases and obesity with 13 cases followed by diabetes mellitus 8 cases, bph 6 cases and hypertension with 5 cases table3, fig. 1.

RISK FACTORS PREDISPOSING TO POSTOPERATIVE COMPLICATIONS	
RISK FACTORS	NO. OF PATIENTS
OBESITY	13
DM	8
BPH	6
HYPERTENSION	5
CONSTIPATION	2
COPD	16
NONE	15

Table 3

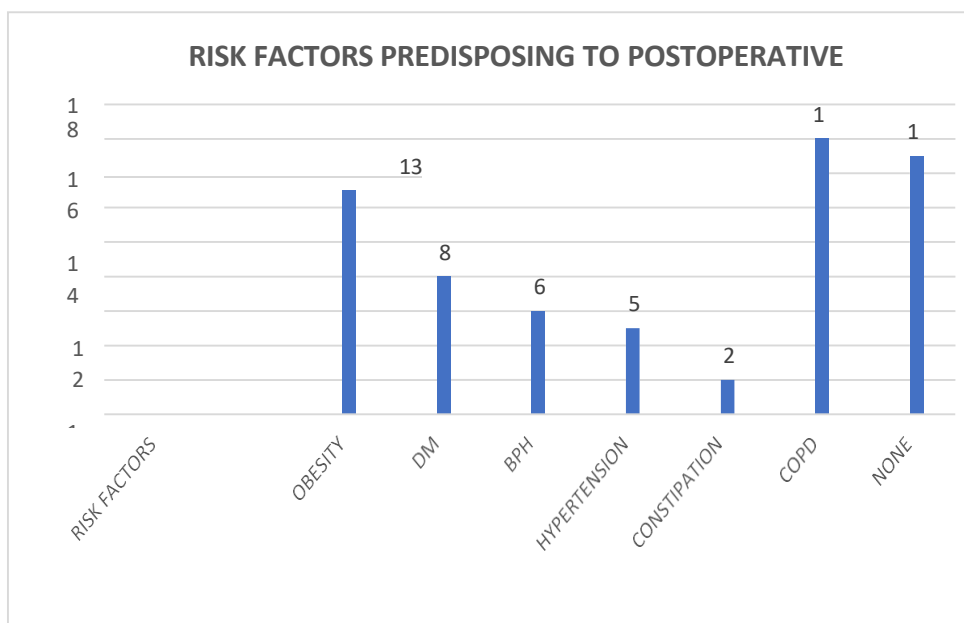
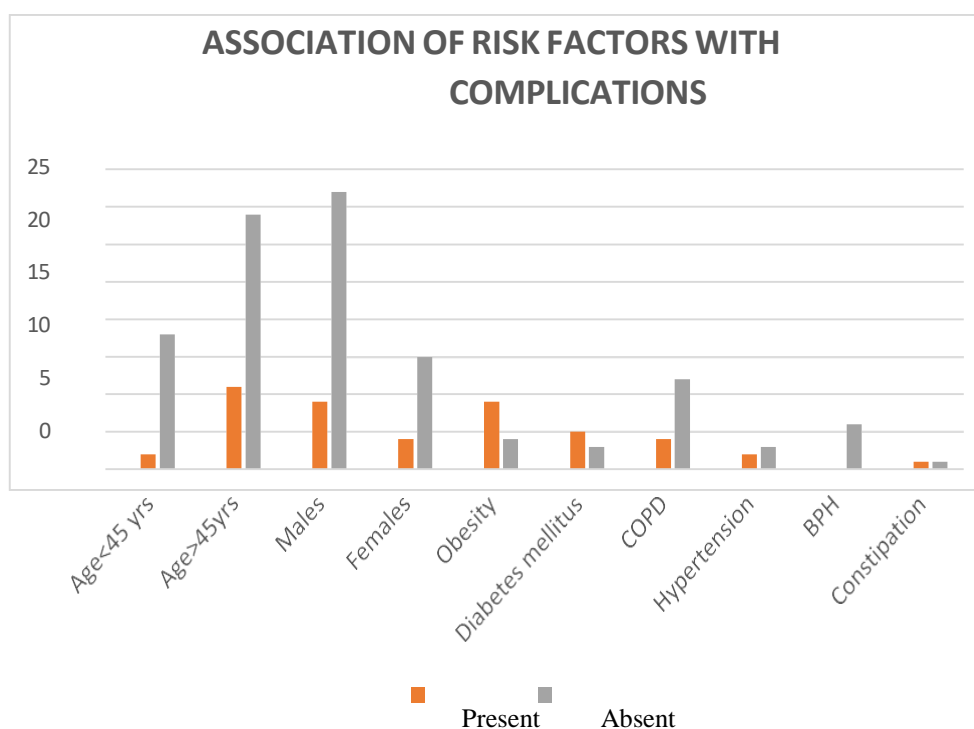


Fig. 1
Association of risk factors with complications

Risk factors	PRESENT	ABSENT	TOTAL
Age<45 yrs	2	18	23
Age>45yrs	11	34	42
Males	9	37	46
Females	4	15	19
Obesity	9	4	13
Diabetes mellitus	5	3	8
COPD	4	12	16
Hypertension	2	3	5
BPH	0	6	6
Constipation	1	1	2



IV. DISCUSSION

Most common ventral hernia is incisional hernia. Incisional hernia occurs due to biomechanical failure of acute fascial wound early in the healing period, when wound tensile strength is low or absent¹⁷. It is the most common complication by 2:1 ratio over bowel obstruction, and is the most common indication for reoperation by a 3:1 ratio over adhesive small bowel obstruction. In a study done by Shell DH et al, open repair of ventral incisional hernia was 13% at 5 years, occurring during the first 24 months in 80% of the cases. A majority of these hernias occur within the first year of the abdominal surgery.¹⁸

The method of hernia repair has long been a method of debate, with the advent of various types of mesh adding to the search of ideal method having minimal complications, minimal morbidity and least recurrence. Use of synthetic meshes easily replaced previous method suture repair as recurrence was always a major concern for the surgeons with simple repair. Burger et al. had reported that the 10 year cumulative recurrence rate with suture repair was 63%. Also Syed Kashif Ali Shah et al. did study on 70 patients on patients with pre-existing comorbid conditions, among them 38 patients having mesh repair 03(8%) had recurrence; and from 32 patients having simple suture repair 06(18.7) had recurrence after a follow up of 2 years. This eventually led to the widespread use of mesh since 1959, when Usher FC introduced the polyamide mesh as a prosthetic graft. Later in 1963, he only introduced the knitted polypropylene meshes. However due to such long follow up required for recurrence rates, evaluation of recurrence rate was not undertaken in this study.

The invention of prosthetics has revolutionized ventral hernia repair, leading to a significant reduction in the recurrence rates, ranging as low as 1 % to 14% in some studies¹⁹. However, the need for an extensive dissection, which was associated with postoperative wound related complications, has driven surgeons to search for new techniques like laparoscopic surgery in hopes to decrease morbidity of open surgery, including wound complications, postoperative pain, hernia recurrence, and delayed return to normal function. But there is wide surgeon variability in preoperative selection of patients for an open vs laparoscopic repair. The most common method mesh hernioplasty used by most surgeons today is the onlay technique²⁰. In this technique, the placement of mesh is anterior to the the anterior sheath, with an overlap of 5 cm. Advantages of this technique;

- This avoids contact with the bowel and hence there is no chance of enterocutaneous fistula.
- Tension free method of repair.
- Multiple defects can be identified due to wide undermining done. Limitations of this method;
- Mesh placed in this method has very little support from the rest of the abdominal wall, hence can be displaced easily.

The weakest point of the repair that is most prone to recurrence is the mesh tissue interface.

Demographic profile of this study: 65 cases of ventral hernia were studied in this study. The incidence was incisional hernia 84%, epigastric hernia 1.5%, umbilical hernia, paraumbilical hernia and infraumbilical hernia as 4.6% each. This shows that the most common type of ventral hernia is incisional hernia which is comparable to existing literature. All patients of ventral hernia presented with swelling, 23% of patients presented with pain while 6.15% had vomiting. Only 2 patients presented with irreducibility. Although ventral hernia can produce different kind of symptoms, swelling is the one that compels the patient to seek medical advice. In this study, out of 84% patient of incisional hernia patients had undergone emergency primary surgery while patients had an elective primary operation. The incidence of incisional hernia seems to be higher in patients with emergency primary surgery. Previous series done by Karan Vir Sing et al and White et al noticed the post operative complication rate of 44.4% and 44% respectively, whereas in our study complication rate was much lower of 21.53%. Most common complication being seroma at 6% rate. Out of 14 patients with complications 9 were obese and 5 diabetic. It was found that obesity was significantly associated with the development of post operative complications. Obese patients being 2.25 times more at risk of developing post operative complications compared to non-obese patients. Turkcarpar et al. reported that obesity and wound sepsis are the two most important factors for the development of recurrent incisional hernia. Vidovic et al. also proved that obesity was associated with higher risk for complication in incisional hernia repair. In a study on risk factors affecting recurrence of incisional hernia, Mararuri et al. reported the most important factor was obesity^{20,21,22}. Likewise, diabetes also had a positive association with the development of post operative complications with p value of .001331. Although diabetes seems to be an associated risk factor for development of post operative complications but according to the previous studies done it only had short term effects on complications after open ventral mesh hernioplasty, not the long term effects²³. The presence of individual comorbidities may increase the risk for postoperative infection as much as 4- fold²⁴. Analyses of the National Surgical Quality Improvement Program (NSQIP) database have reported that corticosteroid use, smoking, coronary artery disease, chronic obstructive pulmonary disease, low preoperative serum albumin levels, prolonged operative time, and use of absorbable synthetic mesh(likely a surrogate for more complex procedures) were significant independent predictors of wound infection²⁵. In this study COPD with 16 cases followed by obesity 13 cases and rest diabetes mellitus 8 cases, BPH 6 cases and hypertension with 5 cases were the risk factors associated with post operative complications. Maximum patients with age grp >45yrs presented with complications and in age grp 45yrs was found to be significantly associated with post operative complications with p value of .00118. Although relation of advanced age with post operative complications has not been well established but Murariu et al. in reported old age as one of the factors that can increase the risk of complications and recurrence. In this study out of 65 patients who underwent mesh repair for ventral hernia, 14, 21.53% patients developed post operative complications. The most common complications being seroma 6%, wound infection 5% and wound dehiscence 2%, skin necrosis 3% and rest other with 2% complication rate. Previous studies reported that the incidences of skin necrosis, wound infection, hematoma and seroma to be 26%, 21%, 12%, 2% and 2% respectively²⁶.

V. CONCLUSION:

The surgical approach ventral hernia repair is more of an art than science, and it has evolved continuously and significantly. Current dogma strongly supports the use mesh reinforcement of any significant hernia repair to minimize recurrence. Results of this study was comparable to the previous studies. Hernia occurs in both men and women, but more frequently in men. Hernia does not get better over time. It will not go away by itself, and it will get bigger over time, surgery is the only way to fix a hernia. Amongst all the type of ventral hernia incisional hernia was found to be the most common type. Common risk factors associated in this study were COPD and obesity followed by diabetes associated with post operative complication. And the most common complication

noted was seroma formation. Occurrence of complications in the post operative period can be minimized by carefully assessing the patient and associated risk factors and try to modify them.

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