ORIGINAL ARTICLE

The Outcome of Mesh Hernioplasty in Patients with Ventral Hernias

HUMERA SADAF BUGTI, KHAWAJA FAROOQ QASIM, IRSHAD AHMAD, *MUHAMMAD AZAM MENGAL, ABDULLAH MAKKI*

ABSTRACT

Am: To determine the outcome of mesh hernioplasty in patients with ventral hernias.
Methods: This descriptive case series study was carried out at Department of Surgery, Bolan Medical Complex, Quetta over a period of one year from 1st January 2014 to 31st December 2014. One hundred and eight patients between ages 35-65 years of either gender having ventral hernia of more than 3 months duration presenting to surgical department of BMCH Quetta were enrolled. History regarding the duration of condition, history of T2DM, HTN and smoking status was taken. Mesh hernioplasty performed. Drains placed were removed once output founds to be less than 20 ml per day and stitches were removed on 8th postoperative day. Patients were followed for one month and final outcome in terms of seroma. SSI and wound edge necrosis was noted.
Results: Mean age of the patients was 52.22±4.99 years. There were 60(55.60%) males and 48 (44.40%) females. Type 2 Diabetes mellitus was found in 78(72.70%) patients, 5 (48.10%) hypertensive and 42(38.90%) were smokers. Seroma was found in 22(20.40%), surgical site infection 18(16.70%) and wound edge necrosis 10(9.30%) patients.
Conclusion: The outcome of mesh hernioplasty shows that seroma was found in 22(20.40%), surgical site infection in 18(16.70%) and wound edge necrosis in 10(9.30%) with ventral hernias.
Keywords: Mesh hernioplasty, Ventral hernias, Surgical site infection, Wound edge necrosis

INTRODUCTION

Incisional (ventral) hernia is one of the common postoperative complications of abdominal surgery[1]. 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 laparotomy[2]. An incidence of 0.5-1.5% has been reported in laparoscopic surgery as well[3]. These are serious surgical problems owing to their propensity to enlarge and cause complications, association with common systematic disorders and the technical difficulties associated with their successful repair.

The phrase "if there are multiple ways of fixing a problem then there is not a one good way" holds very true in incisional hernia repairs[4]. Several methods of repair of incisional hernias have been proposed, each with its own merits and demerits. Mesh hernioplasty is the standard of care at present for repair of incisional hernias[5]. However; this technique has also been associated with recurrence rates of up to 32% on 10 year follow up[6]. Although prosthetic repair of incisional hernia is tension free and gives acceptable recurrence rates, despite this significant benefit, it is a foreign material and susceptible to infection, sinus formation, enteric fistulisation and possible xtrusion[7].

In a study the common complications encountered were seromain 12(22.2%) of patients, superficial surgical site infection in 9(16.7%) and wound edge necrosis in 5(9.3%) patients[8,9]. In another study seroma, SSI and wound edge necrosis were 4.4%, 6.6% and 0% respectively[10]. Al-hawaz[11] reported the complications of seroma, SSI and wound edge necrosis as 17.3%, 9.1% and 3.6% respectively.

There are differences in the outcome of mesh hernioplasty in patients with ventral hernias.[8-11] therefore the present study is designed to generate the present study is designed to generate local data and main clarity. Thereby strategies could be devised to minimize the complications.

PATIENTS AND METHODS

This descriptive case series study was carried out at Department of Surgery, Bolan Medical Complex, Quetta over a period of one year from 1st January 2014 to 31st December 2014.One hundred and eight patients between ages 35-65 years of either gender having ventral hernia of more than 3 months duration presenting to surgical department of BMCH Quetta were enrolled. The patients who are non consenting, the patients who have been operated upon and patients with ASA status ≥III were excluded from

Dept of General Surgery, Bolan Medical College Hospital, Quetta
Correspondence to Dr. Kh. Farooq Qasim
Email: k.farooqqasim@gmail.com

surgery. History regarding the duration of condition, history of T2DM, HTN and smoking status was taken. Height was measured on stadiometer, weight was measured on weighing machine and BMI was calculated as per formula (weight in kg/height in m^2). Surgery was performed by the consultant having post fellowship experience of more than 5 years. Drain placed was removed once output founds to be less than 20 ml per day and stitches were removed on 8^{th} postoperative day. Patients were followed for one month and final outcome in terms of seroma, SSI and wound edge necrosis was noted. SPSS version 17 was used for data entry and analysis. Age and duration of condition height, weight and BMI was calculated and presented as mean ± SD. Frequency and percentages was calculated and presented for gender of T2DM, HTN, smoking status, seroma, SSI and wound edge necrosis.

RESULTS

Mean age of the patients was 52.22±4.99 years. Most of the patients 72(66.7%) were presented with >45 years of age. There were 60(55.6%) males and 48 (44.4%) females. Mean weight and height of the patients were 60.44±7.97kg and 1.54±0.061 meters respectively. Mean BMI of the patients was 27.30±5.06 Kg/m^2.There were 58(53.70%) obese patients. Mean duration of disease was 5.45±0.94 months. Most the patients 67(62%) had duration of disease of >5 months. Type 2 Diabetes mellitus was found in 78(72.70%) patients, 52(48.10%) hypertensive and 42(38.90%) were smokers. Outcome of mesh hernioplasty in patients with ventral hernias shows that seroma was found in 22 (20.40%), surgical site infection 18(16.70%) and wound edge necrosis 10(9.30%) patients (Table 1).

Table 1: Descriptive statistics of the patients (n = 108)

Variable	n	%age
Age (years)		
35 – 45		
46 – 55	72	66.7
56 – 65		
Gender		
Males	60	55.6
Females	48	44.4
Obesity		
Yes	58	53.7
No	50	46.3
Duration of Disease (years)		
≤5	41	38.0
>5	67	62.0
Type 2 Diabetes Mellitus		
Yes	78	72.2
No	30	27.8
Hypertension		
Yes	52	48.1
No	56	51.9

DISCUSSION

In recent past, the use of meshes is considered as the standard procedure for hernia repair, all around the world. By using this technique, the chance of recurrence of hernia is recorded to be reduced by calculating an average of 30% recurrence rate.[12-14] A previous randomized clinical trial compared mesh repair with non-mesh repair and recorded 1% and 7% recurrence rate respectively.[15] Recent advances in biomedical material industry are producing comparatively inert and biocompatible surgical meshes.

On the other hand, clinical practice reveals various responses in the human body while implanting surgical meshes, it include inflammation (i.e. foreign body reaction), calcification, fibrosis, infection and thrombosis. Inflammation is referred to a process where proteins i.e. albumin and fibrinogen are found to be absorbed primarily through the polymer surface. Consequently, the physiochemical properties of each polymer result in the degradation of the absorbed proteins. This process causes the attraction and stimulation of macrophages, which react by releasing inflammatory substances and growth factors. Other inflammatory cells (polymorphonuclear cells, T-lymphocytes, plasma cells, fibroblasts and eosinophils,) are then involved to the polymer surface and leads to formation of granuloma. These granulomas are categorized through local higher turnover of cells and it may continue for several months after using of mesh. Inflammation (foreign body reaction) is also associated with the surface area of the mesh which is in contact with the host tissue.[16]

Foreign body reaction may cause seroma, migration of mesh, pain, adhesions, and rejection. Routinely, in our clinical practice common meshes are made of non-absorbable polymers. It includes polypropylene, polyester and expanded poly-tetrafluoroethylene. Absorbable polymers are having very few foreign body reactions. Combination of non-absorbable and absorbable polymers is adopted in new meshes[17,18].

The biological and mechanical characteristics of meshes are correlated with the type of tissue structure and the type of fibre used[19]. Safety and tolerability of meshes is also associated with the pore size of mesh[20]. In our study, seroma was found in 22(20.40%), surgical site infection 18(16.70%) and wound edge necrosis 10(9.30%) patients. Somewhat similar results were found in other studies a well. In a study the common complications encountered were seomain 12(22.2%) of patients, superficial surgical site infection in 9(16.7%) and wound edge necrosis in 5 (9.3%) patients[8]. In another study seroma, SSI and

wound edge necrosis were 4.4%, 6.6% and 0% respectively.[9]

Al-Hawaz[11] reported the complications of seroma, SSI and wound edge necrosis as 17.3%, 9.1% and 3.6% respectively. Leber et al[30] found seroma and SSI only in 3.5% and 9% patients respectively. Mesh-associated infections after surgery are found comparatively less frequently with other device-associated infections. It is worthwhile not only for the surgeons and patients but also for medical specialists. Controversy still exists regarding use of mesh repairs keeping in view the rate of infection after hernia repair. Recent trials compared umbilical hernia repair with or without use of mesh, they recorded no significant difference regarding the rate of infection in both groups.[21-24] Similar findings were recorded in a meta-analysis involving 20 trials between open mesh and non-mesh repair for groin hernia repair[25].

Another randomized trial compared simple or complex hernias using suture repair, mesh repair or skin graft were recorded with lower rate of infectious complication who underwent suture repair as compared to other two techniques. Additionally, implantation of mesh led to higher frequency of infection undergoing repair of simple and complex hernias.[26-28.]Cobb WS and others[29] revealed higher rate of wound complications in cases of ventral hernia or >10cm size of hernia defect using mesh for hernia repair.

Other co-morbidities like obesity, immunosuppression and diabetes mellitus have considerable influenced on the rate of infection. It is of great concern whether precise technique used or type of prosthetic material for hernia repair may influence the frequency of mesh infection. In some other recent studies, difference in rate of complication following different surgical techniques and meshes were compared. However, no study focussed typically on mesh-associated infection rate.\

Leber and others[30] in a retrospective cohort analysis compared prosthetic material with open repair of abdominal incisional hernias, the object was to record the rate of long-term complications associated with surgical technique. They concluded that precise surgical approach has no significant influential effect of long-term complications i.e. mesh infection. Although various authors suggested are of the view that hernia repair with laparoscopic approach has less post-operative issues as compared to those with open repair, but no specific or clear data is found.[31-33] Recent data reveals that the frequency of mesh-related infections is equivalent for 'clean' surgical procedures and for the patients where significant contaminated surgical technique, including appendectomy, enterectomy or cholocystectomy, are done at the same time for incisional hernia repair.[34-35\

Another study investigated the association of mesh type with the rate of infection and concluded that higher incidence of small bowel obstruction, formation of enterocutaneous fistula and infection as compared to other types of mesh including polytetrafluoroethylene or woven polypropylene and knitted monofilament polypropylene[30].

Some-other experimental animals studies are of the view that microporous mesh is correlated with an elevated rates of development of seromas and/or infection, while macroporous mesh is found to be associated with a greater incidence of erosive and adhesive events. Microporous mesh is having a pore diameter of 10 lm resultantly bacteria may penetrate the mesh, but polymorphonuclear leukocytes (with a diameter of 75ml) cannot. It shows that the bacteria is protected from immunological defence mechanisms in mesh[36,37,38]. Previous data shows interval between hernia repair and the manifestation of a mesh infection ranges from 2 weeks to 39 months.[39] These cases usually present with the symptoms of local acute inflammation. Additionally, systemic manifestations including malaise, fever, chills or rigors may be recorded.

Sometimes, a mesh-related infection manifest with an intraabdominal abscess or discharging fistula. Very few cases are reported with osteomyelitis after inguinal hernia repair with the use of polypropylene mesh.[40] Mesh hernioplasty is the standard of care at present for repair of incisional hernias.[5] However; this technique has also been associated with recurrence rates of up to 32% on 10 year follow up.[6] Although prosthetic repair of incisional hernia is tension free and gives acceptable recurrence rates, despite this significant benefit, it is a foreign material and susceptible to infection, sinus formation, enteric fistulisation and possible extrusion.[7]

CONCLUSION

The outcome of mesh hernioplasty shows that seroma was found in 22(20.40%), surgical site infection 18(16.70%) and wound edge necrosis 10(9.30%) patients with ventral hernias.

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