AUDIT ARTICLE

Incidence of surgical site infection following open hernioplasty and comparison of infection rate among ventral and groin hernia repairs at a THQ hospital Lahore: a single surgeon experience

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Abstract

Objective: To determine the incidence of surgical site infection following open hernioplasty, and to compare the infection rate among ventral and groin hernia repairs.

Method: The retrospective study was conducted from April 2 to November 30, 2021, at the Government Tehsil Headquarter Hospital Sabzazar, Lahore, Pakistan, and comprised data form June 2018 to December 2020 of patients with ventral abdominal and groin hernia. All patients underwent hernioplasty by a single consultant surgeon and were discharged within 2 days of surgery. Surgical-site infections were recorded on follow-up visits up to 30 days of operation, and were compared between ventral and groin hernia cases. Data was analysed using SPSS 22.

Results: Of the 218 patients with mean age 37.07±4.94 years, 117(53.67%) were males, 108(49.54%) smokers and 127(58.25%) hypertensive, while 110(50.45%) had ventral abdominal hernia and 108(49.54%) had groin hernias. Mean operative time and mean hospital stay were 56.53±6.20 minutes and 3.06±1.31days, respectively. Mean wound drainage in abdominal hernia cases was 8.99±2.02 days. Surgical site infection incidence following open hernioplasty was 2(0.91%). Infection rate among ventral abdominal and groin hernioplasty were 1(0.90%) and 1(0.92%) (p=0.50).

Conclusion: Incidence of surgical site infection following open hernioplasty showed no significant difference between ventral abdominal and groin hernia repairs.

Key Words: Surgical site infection, Hernioplasty, Groin hernia.

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Introduction

Hernia repair is a recognised surgical procedure worldwide.[1,2] In every country, either developed, developing or underdeveloped, this procedure is well-known in the general population and risk of its wound infection is always debatable among surgeons.[3,4] Approximately, 31% of all hospital-acquired infections (HAIs) are surgical-site infections (SSIs).[5-9] Prolonged morbidity and mortality are the consequences of SSIs. Stated mortality rate due to SSI is 3%.[10-14] SSI is an escapable wound complication that is why it is critical to determine the incidence and to identify the causative agents to avoid this dreadful complication.[15,16]

Repair of hernia is one of the clean surgical procedures and is commonly used as a reference to appraise operation room (OR) quality of any medical setup, and a surgeon`s operative technique by assessing the rate of SSI.[17] Several techniques of hernia repair and mesh varieties are in practice these days. Repairing hernia with non-absorbable mesh in open surgery is the familiar technique. Use of mesh in hernia repair significantly shrinks the risk of hernia recurrence, and this is the main reason that patients and surgeons show preference for it. However, the associated SSI risk with the mesh is every surgeon's nightmare.[18,19]

Studies have reported varying SSI incidence following hernioplasty, ranging from 0.45% to 14.5%.[20,21-23]

The current study was planned to determine SSI incidence following open hernioplasty, and to compare the infection rate among ventral and groin hernia repairs.

Patients and Methods

The retrospective study was conducted from April 2 to November 30, 2021, at the Government Tehsil Headquarter (THQ) Hospital Sabzazar, Lahore, Pakistan, and comprised data form June 2018 to December 2020. After approval from the institutional ethics review

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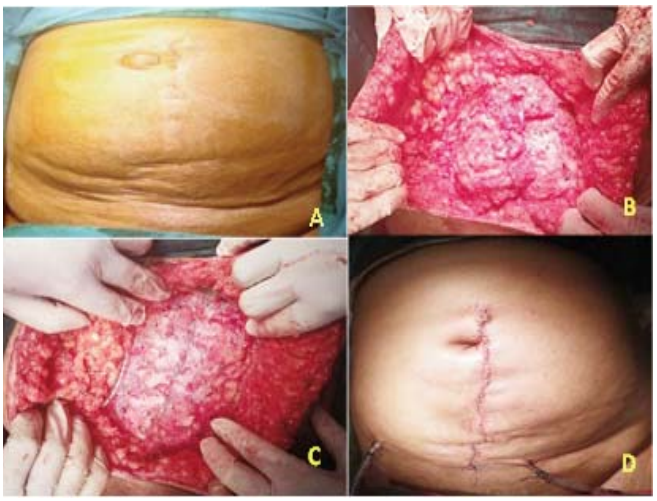

Figure-1: Open hernioplasty for incisional hernia (Midline), A: Midline incisional hernia, B: Multiple hernial sacs, C: Mesh fixation, D: Closed wound with drainage.

Figure-2: Open hernioplasty for incisional hernia (Lateral abdominal wall), A: Lateral (Right Lumbar) incisional hernia (Marked), B: Hernial sac containing gut, C: Repair of hernial defect, D: Mesh fixation.

committee, data of patients of either gender aged 18-80 years with ventral abdominal and groin hernia. Data of patient having American Society of Anesthesiologists (ASA) grade III and IV, body mass index (BMI) > 35kg/m^2 and obstructed ventral abdominal or groin hernias were excluded because the THQ hospital did not have facilities for high-risk patient management Patients' demographic and perioperative data was collected. All patients underwent open hernioplasty for ventral and groin hernias with standard sized nonabsorbable polypropylene mesh (fixed with Prolene 3/0) (Figures 1-2) by a single consultant surgeon under general/spinal anaesthesia. In ventral abdominal hernias, mesh was positioned above the rectus sheath. The only technique for mesh placement was utilised because the approach is technically least challenging, and common amongst junior surgeons for the repair of ventral abdominal hernias. A subcutaneous suction drain (Redivac No. 18) was placed in all hernias except groin hernias. Patients after ventral abdominal hernia repair were discharged within 2 days of surgery with drain, and patients with groin hernia repair were discharged on the next day of surgery. Intravenous (IV) antibiotics (Augmentin 1.2gm STAT) were administered preoperatively to all patients. Clinical examination was done by the surgeon for localised pain or tenderness, localised swelling, erythema and purulent drainage in the operative wound with or without fever (>38°C) on follow-up visits up to 30 days of operation to keep track of SSIs.

Data was analysed using SPSS 22. Quantitative data was presented as means and standard deviations, while qualitative data was presented as frequencies and percentages. SSI incidence was compared between ventral abdominal and groin hernia cases using Fisher's exact test of independence. Mean values were compared using student's t-test. Data was stratified for age, gender, diabetes, hypertension, smoking, hepatitis C infection, hernia type and clinical presentation to address the effect modifier. P≤0.05 was considered statistically significant.

Results

Of the 218 patients with mean age 37.07±4.94 years, 117(53.67%) were males, and 108(49.54%) were smokers, while 110(50.45%) had ventral abdominal hernia and 108(49.54%) had groin hernias. The commonest presentation was inguinal hernia 104(47.7%), followed by paraumbilical hernia 64(29.3%), umbilical hernia 18(8.2%), epigastric hernia 17(7.7%), incisional hernia 11(5%), recurrent inguinal 3(1.3%) and femoral hernia 1(0.4%). There were 149(68.3%) patients with irreducible and 69(31.6%) with reducible hernias on clinical examination. Longer duration of symptoms (≥1 year) was recorded in 173(79.3%) patients. Majority of patients were hypertensive 127(58.2%), followed by diabetes 54(24.7%) and hepatitis C infection 42(19.2%). Mean BMI, TLC (Total Leukocyte Count) and (Blood Glucose Level) were 31.16±1.01kg/m2, 7.42±2.05×109/L and 119.07±8.79mg/dL, respectively. Mean operative time and mean hospital stay were 56.53±6.20 minutes and 3.06±1.31days, respectively. Mean wound drainage in abdominal hernia cases was 8.99±2.02 days. SSI incidence following open hernioplasty was 2(0.91%); 1(0.90%) in ventral abdominal and 1(0.92%) in groin hernioplasty (p=0.50). Abscess drainage or mesh removal was not required in any infected case (Table).

Table: Stratification of surgical-site infections(SSIs) in open herniolpasty (n=218).

Variables	Surgical site infection n (%)		P-value
	Ventral abdominal hernia (n=110)	Groin (n=108)	
Age (years)			
18-30	Nil	Nil	
31-60	1 (1.38%)	1 (1.53%)	
61-80	Nil	Nil	
Gender			
Male	Nil	1 (1.07%)	1.370**
Female	1 (1.16%)	Nil	
Diabetes mellitus			
Yes	1 (2.43%)	Nil	0.984**
No	Nil	1 (1.05%)	
Hypertension			
Yes	Nil	1 (2.78%)	2.547**
No	1 (1.09%)	Nil	
Hepatitis C infection			
Yes	1 (3.84%)	0 (0.0%)	0.538**
No	Nil	1 (1.08%)	
Smoker			
Yes	Nil	1 (1.21%)	0.393**
No	1 (1.19%)	Nil	
Hernia types			
Epigastric	Nil	-	0.109**
Umbilical	Nil	-	
Para-umbilical	1 (1.56%)	-	
Incisional	Nil	-	
Recurrent inguinal	-	Nil	0.364**
Inguinal	-	1 (0.96%)	
Femoral	-	Nil	
Clinical presentation			
Irreducible	1 (0.95%)	Nil	0.637**
Reducible	Nil	1 (1.56%)	
Mean operative time (min.)	50.97±9.68	39.01±10.51	3.696**
Duration of hospital stay (days)	2.95±1.99	1.02±0.20	1.043**
Wound drainage (days)	8.99±2.02	-	

* Fisher's exact test of independence

** Not Significant

Discussion

Most of the patients in the current study belonged to the middle age group 37.07±4.94 years, which is in line with earlier studies[20].

The male-to-female ratio in the study was 1.1:1, while male dominance has been reported in a study[20]. In the current study, male patients mostly showed up with inguinal hernia and were interested in getting their hernia fixed as soon as possible. The females came up with abdominal wall hernias and they had deliberately postponed their hernia surgery because of the fear of postoperative infertility.

The patients in the current study had BMI 31.16±1.01kg/m^2 which is much higher than 25.4±2.93kg/m^2 recorded earlier[20]. Hypertension, diabetes and hepatitis C infection were the major comorbidities, while the earlier study[20] reported hypertension, ischaemic heart disease and diabetes. There were 49.5% smokers compared to 25.9% reported earlier[20]. This may be because in Pakistan, 20% of adults smoke cigarettes.[24]

Mean duration of surgery was 56.53±6.20 minutes compared to >60 minutes in 55.7% cases reported earlier[20]. All patients in the study were given preoperative antibiotic prophylaxis compared to 80.7% of patients in a study[20].

SSI incidence following open hernioplasty was 0.9% in the study, which was much lower than 7.7% reported by Pardhan et al[20]. The infection rate among ventral abdominal hernia and groin hernia mesh repairs was almost equal; 0.90% and 0.92% (p=0.50), respectively. An earlier study reported SSI rate of 0.45% in groin hernia cases and 2.37% in ventral abdominal hernia repair.[22.] Sharma et al.[4] reported a higher incidence of SSI in groin hernia compared to ventral abdominal hernia (7.8% vs. 0.0%). Malik et al.[25] and Jawaid et al.[26] also reported higher SSI rates of 18% and 11.4% in inguinal hernia repair.

The current study found that the incidence of SSI for ventral abdominal hernioplasty was detected higher in females (1.1%), middle age group (1.3%), diabetics (2.4%), normotensive (1.0%), hepatitis C-infected (3.8%), non-smokers (1.1%), patients with paraumbilical hernia (1.5%), patients with longer duration of symptoms (1.1%) and patients with irreducible hernia (0.9%). However, the results were not statistically significant (p>0.05). Incidence of SSI for groin hernioplasty was found greater among males (1.0%), middle age group (1.5%), non-diabetics (1.0%), hypertensive (2.7%), smokers (1.2%), inguinal hernia (0.9%), patients with longer duration (≥1 year) of symptoms (1.1%) and patients with reducible groin hernias (1.5%). However, the results were not statistically significant (p>0.05). Pardhan et al.[20] found SSIs more in patients with irreducible hernia (63%), smokers (62%), diabetics (12.5%), asthmatics (12.5%) and patients with chronic liver disease (12.5%). Mean operative time, mean hospital stay and wound drainage showed no significant difference between ventral abdominal and groin hernias in the current study.

One explanation of low SSI rate in the study is that all surgeries were performed by a consultant surgeon, while in another study[20,23]% operations were performed by

residents and 77% by consultants. Other potential explanations of low SSI rate in our study are case selection (ASA I-II, BMI <35kg/m^2, elective procedures, normal TLC), optimisation of patient (control of blood sugar level) before surgery, preoperative antibiotics prophylaxis for all patients, mesh configuration according to hernial defect magnitude in ventral abdominal hernias, shorter duration of surgery (<60min.), postoperative IV antibiotics during hospital stay, adequate wound drainage (8.99±2.02 days) in ventral abdominal hernias and regular follow-ups.

The limitations of the current study include the fact that it was done at a single centre study and all surgeries were conducted by a single experienced surgeon.

Conclusion

SSI incidence following open hernioplasty was low and there was no significant difference of infection rates between cases of ventral abdominal and groin hernia mesh repairs.

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Conflict of Interest: None.

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