

Outcomes of Mesh Repair for inguinal hernias at a tertiary care hospital of Peshawar, Khyber Pakhtunkhwa

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ABSTRACT

Introduction: Inguinal hernia accounts for 75% cases, has a male preponderance, and causes complications in 27% men and 3% women. The best treatment option for inguinal hernia in pediatric age group is inguinal herniotomy while laparoscopic repair of inguinal hernia is commonly conducted in adults.

Objectives: To determine the outcomes and complications of Mesh repair for inguinal hernia and to associate outcomes with socio-demographic and clinical features of patients presenting to a tertiary care hospital of Peshawar, Khyber Pakhtunkhwa.

Materials & Methods: A cross-sectional descriptive study was conducted from January 1, 2019 to June 30, 2019, based on hospital records of two years (2017-2018) using random computer-generated sample of 100 Mesh repair cases obtained from the department of General Surgery at Rehman General Hospital, Peshawar. A structured Performa was used for data collection that included variables for demographic data, presenting complaints, laterality and type of hernia, mode of confirmation of diagnosis, co-morbidities, procedure performed, mesh material used, postoperative outcomes, and complications. Data were converted to an SPSS 22 file for descriptive analysis.

Results: Majority of patients (78 males, 06 females) did not develop any complications. Pain at surgical site was the most common complication of Mesh repair in older patients; urinary incontinence occurred in the age groups 71-80 and ≥ 91 years. No female developed any complications; 12 male patients developed pain at surgical site, 03 developed urinary incontinence, and 01 developed chronic pain. Seven patients of open Mesh repair developed pain at surgical site, 03 developed urinary incontinence, and 01 developed chronic pain; for laparoscopic Mesh repair, 05 patients developed pain at surgical site, while none of the patients developed urinary incontinence or chronic pain.

Conclusion: Pain at surgical site and urinary incontinence were the most common complications of mesh repair in male patients of older age groups. Moreover, the complications were more frequent after open mesh repair compared to laparoscopic mesh repair.

Keywords: Hernia; Hernia, Inguinal; Herniorrhaphy; Pain, Postoperative; Urinary Incontinence.

The authors declared no conflict of interest. All authors contributed substantially to the planning of research, data collection, data analysis, and write-up of the article, and agreed to be accountable for all aspects of the work.

INTRODUCTION

Hernia is the abnormal protrusion of abdominal viscera beyond their normal confines through a defect in the abdominal wall. Inguinal hernias present with swelling in the inguinal region that reduces either spontaneously i.e. when the patient is resting, or by light external mechanical force. Inguinal hernias may be direct when the hernial sac bulges directly through the posterior wall of the inguinal canal, or indirect when the hernial sac passes through the internal inguinal ring, alongside the spermatic cord, following the course of inguinal canal.¹

Most swellings cause mild to moderate tenderness aggravated by physical exertion; 33% patients booked for surgical operation have no pain, and extreme tenderness is not very common.¹ The prevalence of abdominal wall hernias is 1.7% for all ages and 4% for people above 45 years. Among the various types of abdominal wall hernias, inguinal hernia is to be the most common type, accounting for 75% cases and progress to complications in 27% men and 3% women.¹

According to Alvarez et al (2013),² a study on 77(52.4%) men and 70(47.6%) women, including 14(9.5%) patients of recurrent hernias (12 male and two female), femoral hernias were seen in 77 cases and inguinal hernias in 70 patients. Of all inguinal hernias, 53(75.7%) cases were indirect and 17(24.3%) were direct. Inguinal hernias were significantly more common in male patients, and femoral hernias more frequent in female patients. Inguinal and femoral hernias were more common on the right side in men and women, with a right-to-left ratio of 2:1 in both hernia types.²

Men, especially white and older adults, are more likely to have inguinal hernias as compared to women³ with male to female ratio being 7-9:1.⁴ According to a study conducted in India on children by Sinha et al in 2017,⁵ inguinal hernias occurred most commonly (49.3%) at ages 1-5 years, males were affected more (male to female ratio of 7.5:1), the incidence was higher on the right side (59.7%), followed by left side (26.9%), 9% were bilateral, and almost all the cases were of the indirect type.

The incidence of direct inguinal hernias in pediatric age group was very low; only 0.5% of the children presented with direct inguinal hernia.⁵

Strenuous physical activity is one of the risk factors for inguinal hernias.³ Other studies suggest the association of varicose veins, hemorrhoids,⁶ smoking⁷ and hiatal hernia⁸ with inguinal hernia. According to a study conducted by Burcharth et al, the occurrence of inguinal hernia is associated with a strong family history and these individuals are prone to recurrence of inguinal hernias⁴

The dreaded complication of inguinal hernia is irreducibility or incarceration, which ultimately leads to strangulation and obstruction.⁹ These complications cause significant mortality and morbidity as concluded in a study by Alvarez et al in 2003,² in which morbidity rate in men was 41.5% while in females it was 9.6%, and overall mortality rate was 3.4%.

The recurrence rate of inguinal hernia after inguinal hernia repair is 13%, due to certain risk factors such as poor surgical techniques, anesthesia complications, defects in mesh fixation techniques, poor mesh fixation techniques, and patient related factors i.e. the type of hernia, family history, connective tissue disorders and smoking etc.¹⁰

In general surgery, inguinal hernia repair is the one of the most common operations at the rate of 10 per 100,000 people of United Kingdom and 28 per 100,000 people in the United States of America.¹ The best treatment option of inguinal hernia in pediatrics age group is inguinal herniotomy while laparoscopic repair of inguinal hernia is commonly conducted in adults.⁵ According to a study conducted by Ashrafi et al in 2018, open inguinal herniorrhaphy remains one of the most common surgical operation in spite of the advent of laparoscopic repair.¹¹

Emergency surgical interventions may be required in 10% of all hernias.

Ever since the use of mesh materials for hernial repair, the recurrence of inguinal hernias has been reduced significantly i.e. between 50 and 75%. The types of mesh used in inguinal hernia repair include flat mesh, plug and mesh, and preperitoneal mesh. The mesh material may be absorbable, partially absorbable, unabsorbable, lightweight, heavy weight, porous or non-porous. Some of the advantages of mesh repair include quicker recovery and less pain after surgery, good tensile strength to bear abdominal pressures, ability to withstand external mechanical forces, inert behavior, flexibility and less recurrence after surgery.¹²

Inguinal Hernia is a common condition which occurs in males especially, yet not many research studies have been conducted in Pakistan, hence the prospective data on the outcomes of mesh repair of inguinal hernias in the general population of Pakistan is undoubtedly very scanty. This research study intends to contribute towards identifying the outcomes of mesh repair in inguinal hernias. Further, it is expected to encourage further research to determine the cause of such outcomes or complications and also to come up with ways to prevent complications of mesh repair in inguinal hernia.

The objectives of the study are to determine the different outcomes and complications of mesh repair in patients with inguinal hernia, and to identify possible associations between outcomes of mesh repair and sociodemographic and clinical features of patients, as well as the preferred mode of surgical repair.

MATERIALS & METHODS

This cross sectional descriptive study was conducted from January 1, 2019 to June 30, 2019 on retrospective data of all patients operated for mesh repair of inguinal hernia, admitted to General Surgery department of Rehman General Hospital, Hayatabad, Peshawar during the years 2017-2018.

Patients were enrolled by random computer-generated sampling to include 100 cases from all cases of mesh repair during the years 2017-2018, after obtaining ethical approval from the Rehman Medical Institute Research Ethics Committee. A structured Performa was used for data collection. Data obtained from hospital records was converted to an SPSS 22 file for entry and analysis. The variables extracted from the data included: demographic data, presenting complaints, laterality and type of hernia, mode of confirmation of the diagnosis, co-morbidities, and procedure performed, mesh material used, postoperative outcomes and complications.

Data analysis was done by SPSS Version 22 for descriptive statistics. Comparisons of gender, laterality, types of hernia, type of procedure, mesh material used, and outcomes and complication groups were done by the Chi Square and Student's T Test, as indicated, keeping $p \leq 0.05$ significant.

RESULTS

Distribution of inguinal hernias by age groups, gender, and type of hernias is shown in Table 1. Age groups 21-40 and 51-80 years are more affected by hernias, as are males; unilateral hernias were more common, and among them, the direct type prevailed in more cases.

Table 1: Distribution of inguinal hernias in subjects (n=100).

| Variables | Frequency of Inguinal Hernia |
|-----------------------|------------------------------|
| Ages (years) | |
| 1-10 | 07 |
| 11-20 | 07 |
| 21-30 | 18 |
| 31-40 | 10 |
| 41-50 | 07 |
| 51-60 | 14 |
| 61-70 | 17 |
| 71-80 | 14 |
| 81-90 | 04 |
| 91-100 | 02 |
| Gender | |
| Males | 94 |
| Females | 06 |
| Type of Hernia | |
| Unilateral direct | 57 |
| Unilateral indirect | 36 |
| Bilateral direct | 04 |
| Bilateral indirect | 03 |

Figure 1 shows that 84% of the patients did not develop any complications after mesh repair of inguinal hernia. Pain at surgical site was the most common complaint of the patients after

the surgical procedure (12%), while 3 patients developed urinary incontinence and 1 patient had chronic pain.

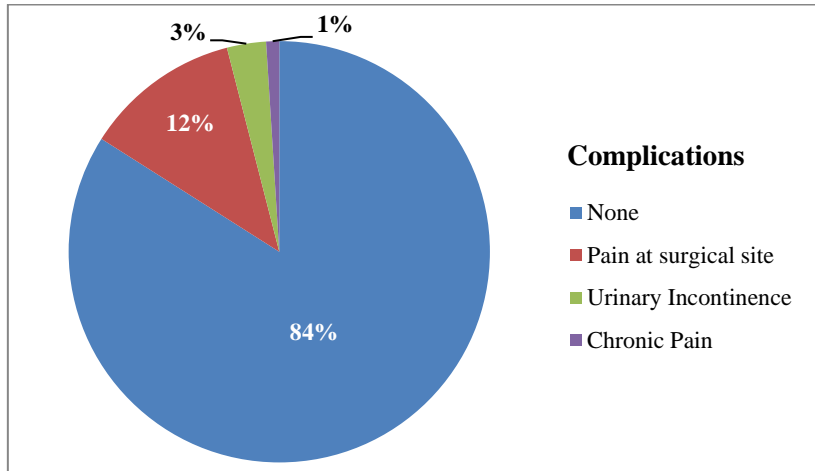


Figure1: Frequency of complications in patients (n=100).

Figure 2 shows that majority of the patients of all the age groups did not develop any complications. Pain at surgical site was the most common outcome of mesh repair in patients of age group

41-50 and 61-70. Urinary incontinence occurred in the age group 71-80 and 91-00. While only one patient in the age group 71-80 developed chronic pain.

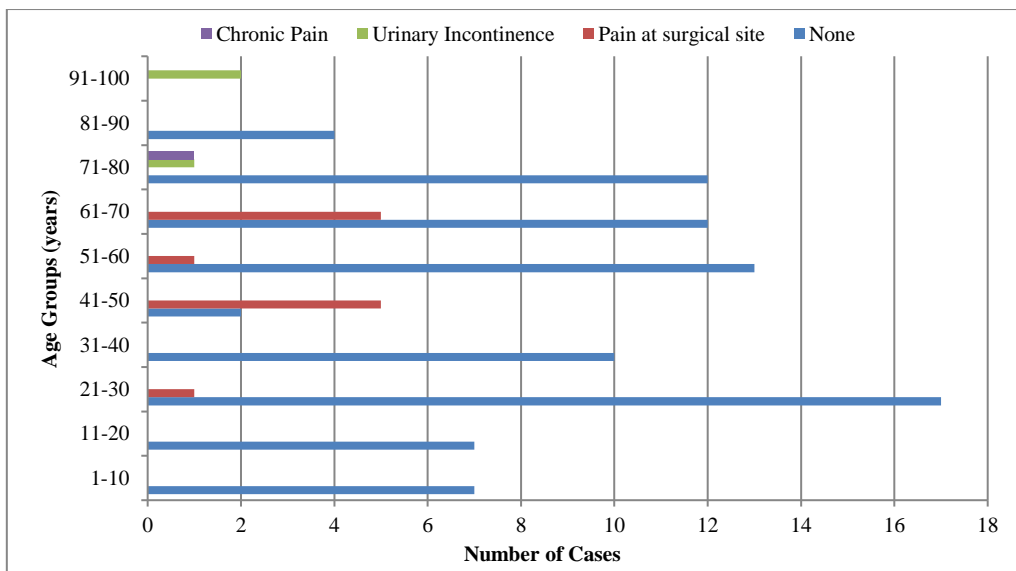


Figure 2: Outcomes of mesh repair based on age range

Gender comparison showed that 78 male and 6 female patients did not develop any complications after mesh repair of inguinal hernia; 12 male patients developed pain at surgical site while no female complained of such pain. Similarly, 3 male patients developed urinary incontinence while no female developed

urinary incontinence post-operatively, and 1 male patient developed chronic pain while no female developed chronic pain post-operatively. Hence, males appear more prone to developing complications after mesh repair of inguinal hernia, though the difference is not statistically significant (Table 2).

Table 2: Gender based distribution of complications after mesh repair (n=100).

| Complications and outcomes of procedure done | Gender | | Total | p value |
|--|--------|--------|-------|---------|
| | Male | Female | | |
| None | 78 | 06 | 84 | 0.749 |
| Pain at surgical site | 12 | 0 | 12 | |
| Urinary incontinence | 03 | 0 | 03 | |
| Chronic pain | 01 | 0 | 01 | |
| Total | 94 | 06 | 100 | |

Figure 3 shows the distribution of complications based on the presenting complaints of patients; 4 patients presenting with swelling in right iliac fossa and pain and swelling in left iliac fossa respectively, developed pain at surgical site; 1 patient with swelling in LIF developed pain at surgical site. 1 patient with pain

and swelling in right iliac fossa developed chronic pain, and 1 patient presenting with swelling in right iliac fossa, pain and swelling in right iliac fossa, and swelling in left iliac fossa, respectively, developed urinary incontinence.

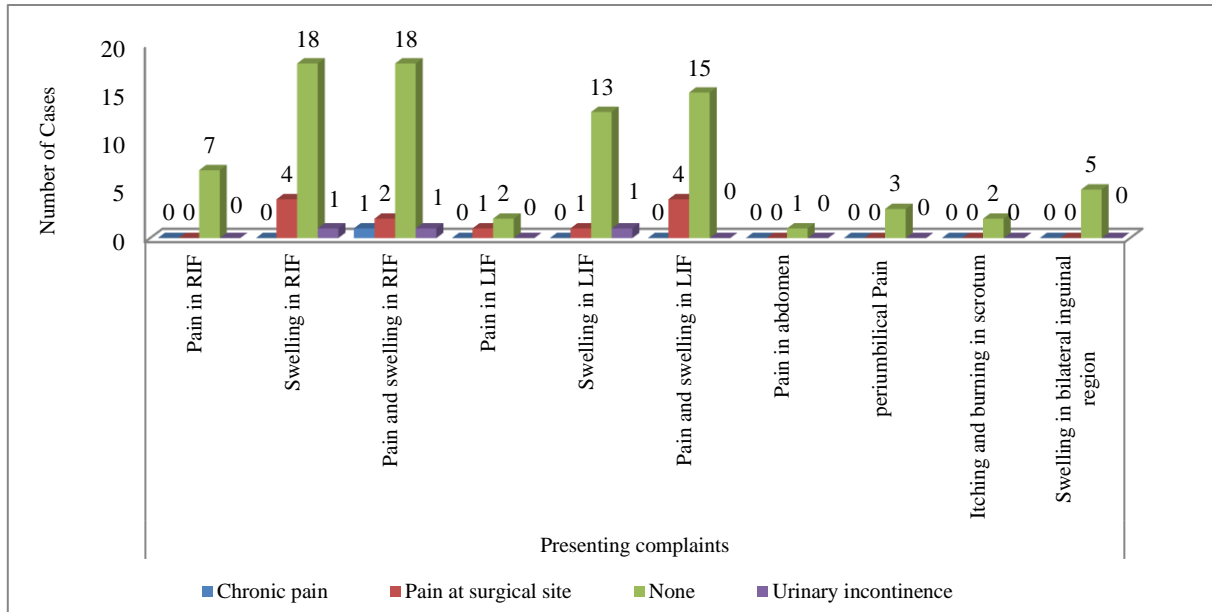


Figure 3: Complications after mesh repair based on presenting complaints of patients (n=100).

The distribution of complications with regard to laterality and type of hernia is shown in Table 3; 6 patients with unilateral direct hernia developed pain at surgical site, 5 patients with unilateral indirect hernia developed pain at surgical site, 2 patients with

unilateral indirect hernia developed urinary incontinence, while 1 patient with unilateral direct hernia developed urinary incontinence, and 1 patient with unilateral direct hernia developed chronic pain.

Table 3: Distribution of complications by laterality and types of inguinal hernia (n=100).

| Complications and outcomes of procedure done | Laterality and Types of inguinal hernia | | | | Total | p value |
|--|---|---------------------|------------------|--------------------|-------|---------|
| | Unilateral direct | Unilateral indirect | Bilateral direct | Bilateral indirect | | |
| Chronic pain | 01 | 0 | 0 | 0 | 01 | 0.899 |
| Pain at surgical site | 06 | 05 | 0 | 01 | 12 | |
| None | 49 | 29 | 04 | 02 | 84 | |
| Urinary incontinence | 01 | 02 | 0 | 0 | 03 | |
| Total | 57 | 36 | 04 | 03 | 100 | |

Figure 4 compares the complications in relation to type of surgical procedure done; 7 patients who underwent open mesh repair developed pain at surgical site while 5 patients who underwent laparoscopic mesh repair developed pain at surgical site. Similarly, 3 patients who underwent open mesh repair

developed urinary incontinence post-operatively while no patient treated laparoscopically developed urinary incontinence; 1 patient who underwent open mesh repair developed chronic pain post-operatively while none of the patients developed chronic pain after laparoscopic mesh repair.

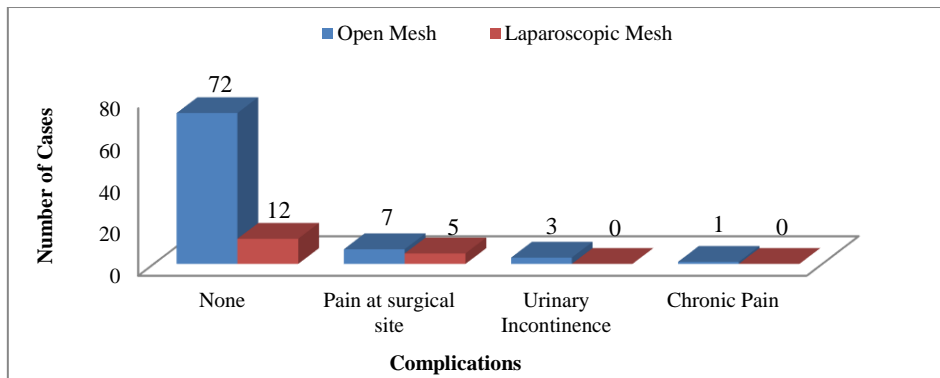


Figure 4: Outcomes of mesh repair based on type of procedure performed (n=100).

DISCUSSION

In this study, inguinal hernia was more common in the age group of 21-30 years (18 patients), followed by age group 61-70 years (17 patients); 14 patients in the age group 51-60 years and 71-80 years presented with inguinal hernia.

According to a study conducted by Ksia et al,¹³ the incidence of inguinal hernia was more in the young age group (43.7%). In a study conducted by Sinha et al,⁵ the maximum incidence of inguinal hernia was in 1-5 years of age (49.3%).

According to our study inguinal hernias are more common in males (94%) while it is uncommon in females (6%). According to a study conducted by Ksia et al,¹³ the incidence of inguinal hernia was more in the males than the females with males to female ratio of 5:1. According to another study conducted by Georgiou et al,¹⁴ 94.40% patients were males whereas 5.60% were females. In a study conducted by Sinha et al,⁵ the ratio of males to females was 7.5:1.

According to our study, 57% of the patients had unilateral direct hernia, making it the most common type of inguinal hernia, 36% patients had unilateral indirect hernia. Both bilateral direct and indirect are significantly uncommon with only 4% and 3% patients respectively. According to another study conducted by Georgiou et al,¹⁴ the most common site was right (43.42%). Direct hernia was present in 10.08% patients while indirect hernia was present in 42.86% patients.

According to our study, 84% of the patients did not develop any complications after mesh repair of inguinal hernia. Pain at surgical site was the most common complaint of the patients after the surgical procedure i.e. 12% patients reported pain at surgical site, while 3% patients developed urinary incontinence and 1% patient had chronic pain.

According to another study conducted by Georgiou et al,¹⁴ inguinal pain was characterized as mild by 76.2% patients, moderate by 16.90% and severe by 6.9% individuals. The most common short term post-operative complication was discomfort that was reported by 15.9% patients.

A cohort study conducted by Liu Y et al¹⁵ in 2017 in China reported 6 cases of seromas of inguinal region in the observation group while 8 cases of seromas of inguinal region was observed in the control group. Chronic pain was reported by 8 cases in the control group only; 1 case of the observation group reported foreign body sensation while 9 cases of control group experienced a foreign body sensation.

No studies have been conducted previously to compare the outcomes of mesh repair of inguinal hernia with age range. According to our study, majority (84%) of patients of all age groups did not develop any complications. Pain at surgical site was the most common outcome of mesh repair in patients of age group 41-50 and 61-70. Urinary incontinence occurred in the age group 71-80 and 91-00. While only one patient in the age group 71-80 developed chronic pain. A strong association of ages with complications of mesh repair of inguinal hernia was observed ($p < 0.001$) indicating a very significant result.

No studies have been conducted previously to compare the outcomes of mesh repair of inguinal hernia with gender. According to our study, 78 male and 6 female patients did not develop any complications after mesh repair of inguinal hernia. 12 male patients developed pain at surgical site while no female complained of pain at surgical site after mesh repair. 3 male patients developed urinary incontinence while no female developed urinary incontinence post-operatively. 1 male patient developed chronic pain while none of the females developed chronic pain post-operatively. Hence, males are more prone to developing complications after mesh repair of inguinal hernia.

No studies have been conducted previously to compare the outcomes of mesh repair of inguinal hernia with presenting complaints of the patient. According to our study, 4 patients presenting with swelling in right iliac fossa and pain and swelling in left iliac fossa respectively, developed pain at surgical site. 1 patient with swelling in LIF developed pain at surgical site. 1 patient with pain and swelling in right iliac fossa developed chronic pain. 1 patient presenting with swelling in RIF, Pain in swelling in RIF, and swelling in LIF respectively developed urinary incontinence.

No studies have been conducted previously to compare the outcomes of mesh repair of inguinal hernia with laterality and types of inguinal hernia. According to our study, 6 patients with unilateral direct hernia developed pain at surgical site. 5 patients with unilateral indirect hernia developed pain at surgical site. 2 patients with unilateral indirect hernia developed urinary incontinence while 1 patient with unilateral direct hernia developed urinary incontinence. 1 patient with unilateral direct hernia developed chronic pain.

According to our study, 7 patients who underwent open mesh repair developed pain at surgical site while 5 patients who underwent laparoscopic mesh repair developed pain at surgical site. 3 patients who underwent open mesh repair developed urinary incontinence post-operatively while no patient treated laparoscopically, developed urinary incontinence. 1 patient who underwent open mesh repair developed chronic pain post-operatively while none of the patients developed chronic pain after laparoscopic mesh repair.

According to a study conducted by Junsheng Li et al¹⁶ in 2014 in China, those patients who underwent Laparoscopic mesh repair of inguinal hernia were subjected to less complications i.e. wound infections, as compared to open mesh repair of inguinal hernias.

Another study conducted by Xiang Zhu et al¹⁷ in 2014 in China, concluded that those patients who underwent laparoscopic mesh repair of inguinal hernia had low incidence of post-operation complications such as urinary incontinence along with additional benefits such as the duration of stay at hospital was less and patients returned to their normal daily life activities quicker as compared to those patients who underwent open mesh repair of inguinal hernia. Patients who underwent open mesh repair of inguinal hernia, however had one important advantage i.e. they developed less peritoneal tears.

The similarities between laparoscopic and open mesh repair of inguinal hernia include equal operative time, equal incidence of intra-operative complications, chronic pain, seromas, hematomas and testicular ischemia and necrosis.¹⁷

According to a study conducted by El-Komy et al¹⁸ in 2018 in Egypt, the group of patients in whom proline was used as mesh material, experienced a significant decrease in testicular volume after surgery. It was reported by the same study that, patients who had proline as mesh material developed hydrocele and varicocele post-operatively. No additional complications were seen in the current study in relation to the use of proline as mesh material.

CONCLUSION

Mesh repair for inguinal hernia is a safe procedure with few complications, particularly if performed as a Laparoscopic procedure. Male patients of older age groups are likely to experience local pain, and urinary incontinence as postoperative complications.

STRENGTH OF THE STUDY

The study highlights the association of complications of mesh repair of inguinal hernia with age range, gender, presenting

complaints, laterality, and types of inguinal hernia, whereas no such studies have been conducted before to determine such relationships.

LIMITATIONS

The study represents the patients of only one hospital in Peshawar, Pakistan. It does not represent the general population of Pakistan. Our study does not highlight the causes and risk factors for the occurrence of complications after laparoscopic and open mesh repair of inguinal hernia. Our study does not include the intra-operative complications of both laparoscopic and open mesh repair of inguinal hernia. Due to unavailability of complete data, we could not follow the patients who developed recurrent inguinal hernias after both laparoscopic and open mesh repair of inguinal hernia.

RECOMMENDATIONS

Further large scale research studies should be done to determine the risk factors for complications of mesh repair of inguinal hernia, and to determine intra-operative complications as well. Follow up is necessary to determine the incidence of recurrent inguinal hernias after both laparoscopic and open mesh repair of inguinal hernia.

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