



Surgical site infection and antibiotic prophylaxis in mesh repair open inguinal hernia

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ABSTRACT

To study surgical site infection and effect of antibiotic prophylaxis in mesh repair of inguinal hernia. Comparative study. Department of Surgery, Liaquat University of Medical and Health Sciences Hospital, Jamshoro/Hyderabad from March 2011 to July 2013. One hundred diagnosed cases of inguinal hernia were studied selected through non-probability purposive sampling according to inclusion and exclusion criteria. Patients were divided into two groups; Group I. mesh repair with antibiotic prophylaxis (n=50) and Group II. Mesh repair without antibiotic prophylaxis (n=50). Antibiotic prophylaxis was given 60 minutes before surgical procedure. Surgical procedure was conducted by a consultant general surgeon or senior registrar. The surgical site infection (SSI) was defined as wound infection that developed within thirty days of surgery. Data was analyzed on SPSS version 21.0. The continuous and categorical variables were analyzed by student's t-test and chi-square test respectively. The significant p-value was taken at ≤ 0.05 . The mean \pm S.D of study population of both groups was noted as 39 ± 10.4 and 41.5 ± 11.0 years ($p=0.09$). All the subjects were male with age range of 20-60 years. The frequency of surgical site infection (SSI) in group I (antibiotic prophylaxis) was 6% (n=3) compared to group II (without antibiotic prophylaxis) was 22% (n=11) with highly significant p-value ($p=0.001$). Statistically significant differences were noted for the complications like; serous discharge, seroma, erythema and stitch abscess. The surgical site infection in mesh repair open inguinal hernia was higher in present study than internationally reported incidence. The antibiotic prophylaxis reduces morbidity in mesh repair open inguinal hernia.

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Introduction

Approximately 20 million surgical operations for hernia are performed around the globe annually¹, making the hernia as most commonly performed elective surgical procedure.² The hernia repair accounts for 10-15% of all surgical operations.³ This indicates the burden of hernia and its impact on health delivery system and economy.⁴ Inguinal hernia accounts for approximately 75% of abdominal wall hernias and is 25 times common in male,⁵ which makes it leading cause of work loss and disability and negative impact on economy.⁶ Most popular surgical procedure for inguinal hernias is the mesh repair techniques, of which Lichtenstein procedure is frequently employed.⁷ The Lichtenstein is tension free repair of inguinal floor with polypropylene mesh.⁶

One of the frequent complications of any surgical procedure is the surgical site infection (SSI) which is also problematic with inguinal hernia repair procedures.⁶ The SSI is reportedly frequent complication of inguinal hernia operation. The reported data shows 0-9% SSI in inguinal hernia repair and 1-3% with antibiotic prophylaxis.⁷⁻⁹ The SSI results in prolonged hospital stay, increased costs and reduced quality of life (QoL).⁷

The antibiotic prophylaxis with mesh hernioplasty was over emphasized previously, as mesh was thought foreign body facilitating SSI. It is worth noting that mesh may aggravate SSI.¹⁰ The inguinal hernia repair is popular as clean operation, yet many surgeons use prophylactic antibiotics in mesh repair procedures.¹¹ Many studies have reported effectiveness of antibiotic compared to placebo.⁶⁻¹³ The ideal timing for optimal

drug concentration in blood is considered 30-60 minutes before procedure.¹²

Since to date, only a few studies are available on analysis of mesh infection, this causes difficulties in institution of antibiotic prophylaxis and optimal control of SSI in hernia mesh repair procedure. The surgeons of low income countries⁶ like Pakistan are at more difficulty, where mesh repair is a recent practiced procedure, and data on antibiotic prophylaxis is seriously lacking.⁶

The rationale of present study was to determine the frequency of SSI following inguinal hernia mesh repair with or without antibiotic prophylaxis and observing the occurrence of infection rate in this context at our tertiary care hospital.

Ethodology

One hundred diagnosed cases of inguinal hernia were studied in a descriptive study at Department of Surgery, Liaquat University of Medical and Health Sciences Hospital, Jamshoro/Hyderabad from March 2011 to July 2013. Diagnosed cases of unilateral open inguinal hernia repair with mesh that were scheduled for elective surgical repair, were entered in study protocol. Patients were selected through non-probability convenient sampling according to inclusion and exclusion criteria. Age >20 but <60 years, male gender without any systemic illness with unilateral inguinal hernia were included. Age <20 or >60 , recurrent, incarcerated, or strangulated inguinal hernia with systemic illness like diabetes mellitus, chronic obstructive pulmonary disease, etc were excluded from the study protocol. Patients were divided into two groups;

Group I. Inguinal hernia mesh repair with antibiotic prophylaxis (n=50) and;

Group II. Inguinal hernia mesh repair without antibiotic prophylaxis (n=50)

Antibiotic prophylaxis was injected 60 minutes before surgical mesh repair procedure.¹² Injection amoxi-clav 1.2 grams was given intravenously after test dose as per instructions.¹² Shaving of concerned part of groin was advised in the night, and patients were asked take shower/bath in the morning of surgery.

All the patients underwent open mesh repair of inguinal hernia by a consultant general surgeon or senior registrar under spinal anesthesia as per hospital protocol. The surgical site infection (SSI) was defined as wound infection that developed within thirty days of surgery and involved skin and/or subcutaneous tissue as per criteria of Centers for Disease Control. Surgical site was evaluated on third post-operative day and on successive follow ups over a period of 30 days.

Informed written consent was sought from the participants. Study was approved by the ethics committee of the institute. The data was recorded on a pre-structured proforma.

Data was analyzed on SPSS version 21.0. The continuous and categorical variables were analyzed by student's t-test and chi-square test respectively. The results were presented as mean±S.D and frequency (%) respectively. The significant p-value was taken at ≤ 0.05 .

Results

The mean \pm S.D of study population of both groups was noted as 39 \pm 10.4 and 41.5 \pm 11.0 years without significant p-value (table I.) ($p=0.09$). Thus, there was no age difference between two groups. All the subjects were male with age range of 20-60 years. The frequency of surgical site infection (SSI) in group I with antibiotic prophylaxis was only 6% (n=3) compared to group II without antibiotic prophylaxis was 22% (n=11) with statistically significant difference (table II) ($p=0.001$).

The differences noted for complications like; serous discharge, seroma, erythema and stitch abscess were found statistically significant between both groups as shown in table III.

Table. I. Age distribution of study population (n=100)

	Mean	S.D	p-value
Group I. (n=50)	39.6	10.4	0.09
Group II. (n=50)	41.5	11.0	

Table. II. Frequency of surgical site infection in study population (n=100)

	No.	%	p-value
Group I. (n=50)	3	6	0.001
Group II. (n=50)	11	22	

Table. III. Frequency of patterns of wound infection

	Group I. (n=50)	Group II. (n=50)	p-value
Serous discharge	1 (%)	2 (%)	0.04
Seroma	1 (%)	3 (%)	0.01
Erythema	1 (%)	3 (%)	0.01
Stitch abscess	None	3 (6%)	0.001
Total	3 (6%)	11 (22%)	-

Discussion

Inguinal hernia is the most common surgical indication in adults as mentioned above.¹⁻² Patients remain asymptomatic, but

most complaint of local symptoms and hernia itself carries risk of incarceration, strangulation and intestinal obstruction.⁴

Of the available surgical treatment, herniorrhaphy is the gold standard as it carries lowest morbidity and excellent success rates. But, herniorrhaphy with foreign bodies like proline mesh is a risk factor for increased chances of surgical site infection (SSI). If mesh material is infected, then it is difficult to treat and eradicate the infection completely, and then only option remains behind is mesh removal.¹⁴ A number of studies have investigated frequency of SSI with antibiotic prophylaxis in inguinal hernia mesh repair and reported SSI varies between 4.2%-9%.¹⁴⁻¹⁷ Other studies on antibiotic prophylaxis in relation to SSI reported SSI rates in mesh repair of 3.3%-14%,¹⁸⁻²⁰ however, other randomized trials have reported conflicting results.²⁰⁻²²

In present study, SSI was observed in both the groups with and without antibiotic prophylaxis with significant differences; 6% vs. 22% ($p=0.001$). Frequency of 22% SSI in patients without antibiotic prophylaxis is higher than aforementioned studies. The reason is most probably the lack of strict sterilization protocol due to huge burden of patients, insufficient budget, and sanitary issues. Pardhan, et al.⁸ reported a retrospective study from Aga Khan University Hospital, Karachi with SSI of 12.5%, the results are previous studies,²⁰⁻²¹ and also the present findings. However, antibiotic prophylaxis was not used and comparison was not performed. Hence comparison with present study cannot be justified.

Yerdel et al.²¹ used antibiotic prophylaxis in his study using single-dose 1.5g ampicillin sulbactam (136) and placebo group (n=133), and reported a major advantage with prophylactic antibiotic. Yerdel, et al.²¹ reported a 10-fold reduction in SSI in antibiotic prophylaxis patients. The findings are in parallel to present study as lower SSI rate in the antibiotic group were observed in present study too. The results of present study shows that a single shot of 1.2 gram amoxi-clav reduced SSI significantly.

Sandhya, et al.⁶ recently reported a randomized trial on antibiotic prophylaxis in mesh repair of inguinal hernia. The reported SSI is very low; 4% vs., 6%, these results are not comparable to present and aforementioned previous studies. However, patient who received antibiotic prophylaxis showed least frequency of SSI and this finding is comparable to present study.

Morales et al.²² found no significant differences in SSI rates related to antibiotic prophylaxis where the incidence rates in the control and antibiotic groups were both very low (2% and 1.68%, respectively), these results are contrary to present and previous studies.²⁰⁻²¹

Lazorthes, et al.²³ reported 10 times less chances of SSI in open inguinal hernia repair with antibiotic prophylaxis. The results are in parallel to present study. The limitation of present is that the bacterial culture and sensitivity was not done and patients with surgical site infection responded well with empirical antibiotic therapy.

Conclusion

The surgical site infection in mesh repaired open inguinal hernia was higher in present study than internationally reported incidence. The present study emphasizes the need of antibiotic prophylaxis in open inguinal hernia with foreign body repair because it reduces wound complications and morbidity.

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