

PROPHYLAXIS OF SURGICAL SITE INFECTION AFTER MESH REPAIR OF INGUINAL HERNIA.

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Objective: To compare the effectiveness of single dose intravenous antibiotics with placebo on patients undergoing inguinal hernia mesh repair in terms of surgical site infection.

Methods: This was a randomized control trial of one year duration and was conducted in surgical unit HMC, Peshawar. In this study 350 patients were randomly allocated in 2 groups by lottery method. Patients in group A were given a single dose of antibiotics i-e 1gm Cefazolin one hour before inguinal hernia mesh repair and patients in group B were not given any antibiotic i-e placebo before inguinal hernia mesh repair. All the data was entered and analyzed in SPSS 10 version. P value of 0.05 was considered significant.

Results: In this study 350 patients were included, 175 patients in group A, who received single prophylactic dose of 1 gm cefazolin 1 hour before induction of anesthesia and 175 patients in group B who received 5 ml of placebo. Surgical site infection was observed in 6 patients in Group A and in 10 patients in Group B which was statistically not significant ($p = 0.304$).

Conclusion: There is no significant difference in the rate of infection between the antibiotic prophylactic and placebo groups and there is no extra benefit of using antibiotics prophylactically in case of inguinal hernia mesh repair.

Key Words: mesh repair, inguinal hernia, surgical site infection.

INTRODUCTION

Hernia is protrusion of a viscous or a part of a viscous through an opening in the fascia of the abdominal wall. Hernias always contain a portion of peritoneal sac and may contain viscera, usually small bowel and omentum. The types of hernias are based on where they occur¹. Amongst all the external hernias, inguinal hernia is the commonest type i-e more than 80% and its repair accounts for 10-15% of all the operations in general surgery². Lichtenstein mesh repair is the most favored technique of inguinal hernia now a days. It is tension free repair of weakened inguinal wall using polypropylene mesh³.

Surgical site infection is the most commonly reported adverse event in otherwise clean cases of prosthetic hernia repair⁴. The possibility of mesh infection should be considered if patient develops fever of unknown origin or has local signs of infection postoperatively⁵. In clean elective surgery, the common pathogen causing infection is from skin and 1st generation cephalosporin gives excellent prophylaxis. Cefazolin is antibiotic of choice for clean surgery and is given in single dose⁶.

The role of antibiotic prophylaxis in case of inguinal hernia mesh repair is debatable and controversial.

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Few trials have been conducted to clarify this issue but still there are no clear guidelines. In 2003, a Cochrane meta-analysis concluded that "antibiotic prophylaxis for elective inguinal hernia repair cannot be firmly recommended or discarded" and "further studies are needed particularly on the use of mesh repair"⁷. In 2004 a multicenter double blind randomized controlled trial concluded that there is no difference between the antibiotic prophylaxis or placebo group (p value=0.57)⁸. Contrary to these, another meta-analysis was published in 2007 which was compiled after reviewing six RCTs which showed 50% decrease in surgical site infection in antibiotic prophylaxis group as compared to placebo group⁹. A very recent case control study once again showed no significant difference in the number of wound infection in both groups (p value=0.240). The infection rate in this study was 4% (96% effectiveness) in antibiotic group while 11% (89% effectiveness) in placebo group⁶.

The main arguments against routine use of antibiotics prophylaxis in Lichtenstein hernia repair are that even infection occurs in the presence of antibiotics, overuse of antibiotics causes development of resistance, since large no of patients undergoes mesh repair so it has a huge cost on health budget, there are unknown chances of allergic reactions which may be fatal sometimes and if infection develops at all it can easily be treated. Conversely if infection occurs after mesh repair then it has four-fold increase in recurrence rate and may need drainage and even mesh removal. So one can say that the presence of mesh does not

increase the chances of infection but when infected then the consequences are severe¹⁰.

It is a false belief of surgeons especially in our setup that antibiotics prophylaxis is necessary in every case in order to reduce the rate of post opt wound infection. So they give at least 4-5 doses of i/v antibiotics in every surgery even in clean cases routine use of which may lead to development of multi-drug resistant strains of bacteria in our populations. Surprisingly there is less work done on antibiotic prophylaxis in cases of mesh repair so that antibiotic prophylaxis could not be recommended nor discarded. The rationale of my study is to determine the effectiveness of routine use of antibiotic in prophylaxis against surgical site infection and if proved it will be routinely recommended for prophylaxis against SSI after mesh repair and will share the results of this study with other health professionals as well and if in our population we could not prove the role of antibiotics in prophylaxis against SSI then it will be strongly discouraged to use in routine clean cases of surgery for mesh repair.

MATERIAL AND METHODS

This study was conducted in surgical unit Hayatabad Medical Complex, Peshawar from 1st March 2012 to 28th February 2013.

Sample size: Sample size is 175 in each group. Using 4% proportion of infection in antibiotic group¹⁰, 11% proportion in placebo group¹⁰, 95% confidence interval and 80% margin of error under WHO software for sample size determination.

Sample technique: Consecutive sampling (non probability).

Inclusion criteria: All patients presenting with primary unilateral inguinal hernia in surgical OPD of HMC.

Exclusion Criteria:

1. Children and adolescents less than 20 years of age.
2. Patients with obstructed/strangulated or recurrent hernia.
3. Immunocompromised patients. (Diabetes, malignancy, HIV).
4. Patients on steroid.
5. Patients with debilitating diseases like chronic liver, renal or cardiac impairment.
6. Patients allergic to given antibiotics.

DATA COLLECTION PROCEDURE

Approval of the study was taken from the Ethical Committee of the hospital. All patients presenting with

inguinal hernia were admitted in Surgical unit through OPD. Patients were examined clinically. The procedure of the study was explained to the patients and a written informed consent was obtained. After admission necessary baseline investigation and investigations for general anesthesia fitness were carried out and the patients were prepared for surgery. Patient were selected randomly through lottery method for the both the groups. The rate of operative site infection was recorded. The exclusion criteria was strictly followed to control confounding variables and exclude bias in the study results.

Patients demographics like age gender and post-operative site infection on follow up were recorded in standardized proforma.

RESULTS

Surgical site infection was observed in 8 patients (4.5%) in Group A and in 11 patients (6.2%) in Group B which was statistically not significant ($p = 0.2711$) as shown in Table 1.

DISCUSSION

Inguinal hernia is the commonest problem

Table 1: Surgical site infection

	Group A N (%)	Group B N (%)	Total N (%)
Yes	8 (4.5)	11 (6.2)	19 (5.4)
No	167 (95.5)	164 (93.8)	331 (94.5)
Total	175 (100)	175 (100)	350 (100)

P value. 0.271

Table 2: Age distribution of patients

Age range	Group A N (%)	Group B N (%)	Total N (%)
15-20	20 (11.4)	15 (8.5)	35(10)
21-30	95 (54.3)	85 (48.5)	170(48.5)
31-40	30 (17.1)	35 (20)	65(18.5)
41-50	30 (17.1)	40 (22.8)	70(20)
TOTAL	175 (100)	175 (100)	350(100)

P value: 0.101

Table 3: Gender Distribution

	Group A N (%)	Group B N (%)	Total N (%)
Male	170 (97.1)	168 (96)	338 (96.5)
Female	5 (2.9)	07(4)	12 (3.5)
Total	175 (100)	175 (100)	350 (100)

P value: 0.814

Table 4: Marital status

	Group A N (%)	Group B N (%)	Total N (%)
Married	110 (62.8)	115 (65)	225 (64.2)
Unmarried	65 (37.2)	60 (35)	125 (45.8)
Total	175 (100)	175 (100)	350 (100)

P value: 0.907

Table 5: Socioeconomic status

	Group A N (%)	Group B N (%)	Total N (%)
Satisfactory	85(48.5)	73 (41.7)	158(45.1)
Unsatisfactory	90 (51.4)	102 (59.2)	192(44.9)
Total	175 (100)	175 (100)	350 (100)

P value: 0.533

Table 6: Educational status

	Group A N (%)	Group B N (%)	Total N (%)
Educated	90 (51.4)	102 (58.2)	192 (54.2)
Illiterate	85 (49.6)	73 (41.8)	158 (45.1)
Total	175(100)	175 (100)	350 (100)

P value: 0.813

amongst all external hernias and inguinal hernia repair is one of the frequent procedure in general surgery accounting for 10-15% of all operations^{1,2}. The age incidence is distributed in all decades of life. Also inguinal hernia frequency is race related and it is considered to be thrice common in black Africans than white population³. About 80-90% of repairs are done in males and right side is the most common where the reason being unknown⁴. Due to this much burdening the health system hernia is one of the mostly researched field and much more is going on⁵.

In case of hernia repair surgeons were of different opinions regarding various techniques and materials as all had some of the common complications like recurrence, post-operative pain and wound infection⁶. With the introduction of inert ethicon mesh repair all these complications were markedly reduced. The reason being low tension on suture line, strong nature and inability to harbor infection⁷. also it is not subjected to rejection or deterioration or it cannot be felt by patients or surgeons postoperatively⁸⁻¹⁰.

Surgical site infections are a major source of postoperative illness, accounting for approximately a quarter of all nosocomial infections. They are, along with urinary tract infections, pneumonia and blood borne infections, ranked as the second or third most common

type of hospital acquired infections^{11,12}. National studies have defined the patients at highest risk for infection in general and in many specific operative procedures¹³. The use of antibiotic prophylaxis before surgery has evolved greatly in the last 20 years. Improvements in the timing of initial administration, the appropriate choice of antibiotic agents, and shorter durations of administration have defined more clearly the value of this technique in reducing postoperative wound infection¹⁴.

Historically Tantalum mesh was introduced by Douglas and Koontz in 1948. Lichtenstein introduced the prosthesis repair of inguinal hernia in 1964¹⁵. Marlex mesh was first used by Usher¹⁶. Use of prosthetic material was criticized by some surgeons that being as a foreign material, it may increase the incidence of infection. This infection is difficult to treat and may necessitate removal of mesh and hence increase morbidity and mortality¹⁷. So many surgeons routinely use antibiotics for a long time postoperatively to prevent postoperative infection of mesh. The purpose of this study was to document number of cases of groin sepsis following Lichtenstein inguinal hernioplasty without antibiotics prophylaxis and their outcome.

The true incidence of mesh infection is not known because it varies from center to center. It has been reported between 0.7% to 15% at different centers at different time in different studies^{16,17}. In my study 4.5% patients developed wound infection in antibiotic prophylaxis group and 6% in placebo group which is in consistent with the different studies reported in literature at different times both internationally and in our country as well. Statistical analysis showed no significant difference in the number of wound infection in both the groups. Oflio¹⁸ reported an infection rate 4.5% after repair under local anesthesia and 6.8% after general anesthesia. Zafar et al¹⁹ and Sattar et al reported incidence of wound sepsis and was 1.9% and 7.5% respectively in patients who underwent lichtenstein's mesh repair. Nordin et al²⁰ reported an infection rate of 4% after Lichtenstein hernia repair in his study. Another study conducted by Aufenacker and his colleague reported 1.7% of wound infection after mesh repair and there was no significant difference between antibiotic prophylaxis and placebo group. According to Aufenacker et al²¹ there remains no indication for routine antibiotic prophylaxis in inguinal hernia mesh repair. For other abdominal wall hernias recommendations await further studies. So all of these mentioned studies concluded that antibiotic prophylaxis is not indicated in Lichtenstein mesh repair of inguinal hernia.

CONCLUSION

There is no significant difference in the rate of in-

fection between the antibiotic prophylactic and placebo groups and there is no extra benefit of using antibiotics prophylactically in case of inguinal hernia mesh repair.

REFERENCES

1. Turnage RH, Richardson KA, Li BD, McDonald JC. Abdominal wall, umbilicus, peritoneum, mesenteries, omentum and retroperitoneum. In: Townsend CM, Beauchamp RD, Evers BM, Mattox KL. Sabiston Textbook of Surgery. 18th ed. Philadelphia, Pa: Saunders Elsevier; 2008. p. 43.
2. Haq RA, Chaudry IA, Khan BI, Afzal M. Groin sepsis following Lichtenstein inguinal herioplasty without antibiotics prophylaxis. J Med Sci Pak 2006; 22(4): 216-9.
3. Sajjad Ahmad, Tariq Saeed Mufti, Arshad Zaffar, Ismail Akbar. Conservative management of mesh site infection in ventral hernia repair. JAMC 2007; 19(4): 75-7.
4. Robinson TN, Clark JH, Schoen J, Walse MD. Major mesh related complication following hernia repair. Surg Endosc 2007; 19(12): 1556-60.
5. M. E. Falagas, S. K. Kasiakou. Mesh related infection after hernia surgery. Clin Mic infect 2007; 11: 3-8.
6. Ijaz A, Amer S. Post Operative wound infection; Prevention "the role of antibiotic prophylaxis in Lichtenstein hernia repair". Professional Med J Jun 2010; 17(2): 174-9.
7. Manuel FJ, Seco-Gil JL. Antibiotic prophylaxis for hernia repair (Cochrane Review). In: The Cochrane library, Issue 2. Oxford: Update software; 2008. p. 125-31.
8. Theo J, Aufenacker, Gelder D. The role of antibiotic prophylaxis in prevention of wound infection after Lichtenstein open mesh repair of primary inguinal hernia. Ann Surg 2007; 240: 955-61.
9. Sanabria A, Dominguez LC. Prophylactic antibiotics for mesh inguinal hernioplasty. Ann Surg 2007; 245: 392-6.
10. EU Hernia Trialist Collaboration. Repair of groin hernia with synthetic mesh: meta-analysis of randomized controlled trials. Ann Surg 2008; 235: 322-32.
11. Arthur F, II Dalley; Anne M. R. Agur. Grant's Atlas of Anatomy. Hagerstown, MD: Lippincott Williams & Wilkins. pp. 102.
12. Williams NS, Bulstrode CJK, O'Connel PR. The inguinal canal. Baileys and Love short practice of surgery. 25th ed. London: Arnold, 2008; 1204-16.
13. Dalley, Arthur F.; Moore, Keith L. (2006). Clinically oriented anatomy. Hagerstown, MD: Lippincott Williams & Wilkins. pp. 217.
14. Adam Mitchell; Drake, Richard; Gray, Henry David; W Liu CD, McFadden DW. Acute abdomen and appendix. In: Greenfield LJ, Mulholland MW eds. Surgery Scientific principles and practice. 2nd ed. Baltimore: Williams & Wilkins, 1997: 1246-61.
15. Ayne Vogl (2005). Gray's anatomy for students. Elsevier/Churchill Livingstone. pp. 260.
16. Williams NS, Bulstrode CJK, O'Connel PR. Surgical infection. Baileys and Love short practice of surgery. 25th ed. London: Arnold, 2008; 43.
17. Malik SA, Yaseen MA, Nasreen G. Single and simple antibiotic prophylaxis for elective cholecystectomy. J Coll Physicians Surg Pak 2009; 19: 154-7.
18. Oflio OP. A comparison of wound complication of inguinal hernia repair under local and general anesthesia. Trop Doct 1991; 21(1): 40.
19. Zafar. Lichtenstein repair. J surg PIMP 1993; 5: 18-21.
20. Nordin P, Bartelmess P, Jansson C. Randomized trial of Lichtenstein v/s shouldice hernia repair in general surgical practice. Br J Surg. 2002; 89: 45-4.
21. Aufenacker, Gelder D. The role of antibiotic prophylaxis in prevention of wound infection after Lichtenstein open mesh repair of primary inguinal hernia. Ann Surg. 2007; 240: 955-61.

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