

POST OPERATIVE WOUND INFECTION; PREVENTION “THE ROLE OF ANTIBIOTIC PROPHYLAXIS IN LICHTENSTEIN

DR. AAMIR IJAZ

FCPS (Surgery)
Registrar SU II,
Allied Hospital, Faisalabad

DR. M. SUHAIL AMER

FCPS (Surgery)
Assistant Professor
Madina Teaching Hospital
Faisalabad.

Article Citation:

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):174-179.

ABSTRACT... Background: The use of antibiotic prophylaxis during Lichtenstein inguinal hernia surgery is controversial, and no definitive guidelines are available in literature. **Objective:** To determine effects of prophylactic antibiotics in reducing the frequency of postoperative wound infection in Lichtenstein hernia repair. **Study Design:** Case control study. **Setting:** Surgical Unit II, Allied Hospital, Faisalabad. **Duration:** One year, between January 2007 and December 2007. **Methods:** Patients undergoing unilateral, primary inguinal hernia repair electively with the Lichtenstein technique using polypropylene mesh were randomized to receive 1.0 g intravenous Cefazolin before the incision or an equal volume of placebo. Wound infection was defined according to the criteria of Centers for Disease Control and recorded. Results were assessed using chi-square test. **Results:** 100 patients were included in the study. Minimum age of patients in this study was 20 and maximum 75 years with a mean of 44.06 in group A and 44.84 in group B. The total number of wound infections was 7 (7%); 2 (4%) in the antibiotic prophylaxis group and 5 (10%) in the placebo group. Statistical analysis showed no significant difference in the number of wound infections in both groups (p value=0.240). **Conclusions:** We conclude that in Lichtenstein inguinal hernia repair routine use of prophylactic antibiotics is not needed, as it does not significantly reduce the postoperative wound infection rates.

Key words: Inguinal Hernia, Lichtenstein's Repair, Postoperative Wound Infection, Antibiotic Prophylaxis

INTRODUCTION

Antibiotic prophylaxis refers to a very brief course of an antimicrobial agent initiated just before an operation begins¹. Intravenous route is the mode of prophylactic antibiotic delivery used most often in modern surgical practice². The causes of wound infection in elective clean operations are the bacteria that arrive from patient's skin and first generation cephalosporins give good prophylaxis against them. In particular, cefazolin is widely used and generally viewed as the prophylactic antibiotic of choice for clean operations³. Effective prophylaxis can almost always be achieved with a single dose of antibiotic⁴.

The use of antibiotic prophylaxis for clean surgical procedures is controversial. A good example of clean operation is classic inguinal hernia surgery where reported rates of postoperative wound infection vary from

0% to 9%⁵. The low rate of wound infection and the straightforward treatment if they occur at all are the main arguments against routine antibiotic coverage during inguinal hernia surgery. However infection in a hernia wound has been reported to be associated with a four-fold increase in the recurrence rate⁶.

Lichtenstein hernia repair is now considered the most successful technique for inguinal hernia repair all over the world⁷.

The presence of mesh does not increase the incidence of wound infection but the consequences of wound infection

Article received on: 29/07/2009
Accepted for publication: 25/11/2009
Received after proof reading: 02/04/2010
Correspondence Address:
Dr. Aamir Ijaz, FCPS (Surgery)
Registrar SU II,
Allied Hospital, Faisalabad
aamir_pmc@hotmail.com

infection may be severe.

Few clinical trials have addressed the controversial issue of role of prophylactic antibiotics in hernia repair. One trial showed a significant (10-fold) decrease in wound infection with intravenous antibiotic prophylaxis in mesh repair⁸; two others did not^{9,10}. A Cochrane meta-analysis in 2003 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”¹¹.

In an effort to clarify the effectiveness of antibiotic prophylaxis the present prospective, randomized, controlled trial was carried out to document the effect of pre-operative antibiotics in the prevention of wound infection after Lichtenstein hernia repair.

OBJECTIVE

The objective of the study was to: To determine effects of prophylactic antibiotics in reducing the frequency of Post-operative wound infection in Lichtenstein hernia repair.

MATERIAL AND METHODS

This was a randomized controlled trial done in Surgical Unit II, Allied Hospital Faisalabad, for a total duration of one year from January 2007 to December 2007. 100 Patients were included in the study and equally divided in two groups (50 for trial and 50 for control). Simple random sampling technique was applied. All patients of inguinal hernia above the age of 20 years, admitted in the Surgical Unit II for elective Lichtenstein hernia repair were included in the study.

EXCLUSION CRITERIA

Patients with obstructed, strangulated or recurrent hernias, patients with immunosuppressive disease (diabetes mellitus, malignancy, HIV etc) or on medication (steroids) and patients with a debilitating disease like chronic liver, renal or cardiac impairment were excluded from the study. Also patients allergic to the given antibiotic or taking some antibiotic seven days prior to surgery for any reason were not included.

The patients were guided and explained about the nature of the study. Risks and benefits of the prophylactic antibiotics were discussed and informed consent to be included was taken. Those not giving consent were also excluded.

All included patients were randomized into two groups A and B and prepared for surgery. Group A patients (trial group) were given 1 g Cefazolin in 10 ml distilled water, intravenously half an hour before surgery in the recovery room. Group B patients (control) were given 10ml distilled water as placebo at the same time. Both groups underwent Lichtenstein hernia repair under same kind of anesthesia (spinal), strict aseptic conditions and by senior registrars to minimize the discrepancy of surgical expertise.

POSTOPERATIVE CARE

Patients were discharged on second post operative day. Wounds were inspected at the time of discharge and the first dressing changed. They were then called in the outdoor department for follow up at 7 days (time of stitch removal), where wounds were again inspected and any signs of infection if present were noted. Any discharge from the wound aspirated and sent for culture and sensitivity. Second follow up was arranged at 14 days and third follow up at one month. Wound infections were noted and treated with oral antibiotics. Patients having frank pus in the wounds were re-admitted, wounds washed and left open and treated with intravenous antibiotics according to culture and sensitivity.

DATA ANALYSIS PROCEDURE

Patient's data was analyzed by the statistical software SPSS version 10. Number of patients having postoperative wound infection was recorded in both groups. Percentages were calculated and compared using Chi-square test. P value < 0.05 was considered significant.

RESULTS

Randomization was successful; there were no significant differences with respect to median age, frequencies of different hernia types and the experience levels of the

principal surgeons performing the operations. None of the patients developed any adverse reactions related to the antibiotics.

Out of a total of 100 patients only one was female. 60 patients had right sided and 40 patients had left sided hernias operated. No patient underwent operation on

both sides at the same time in this study. Minimum age of patients in this study was 20 years and maximum 75 years with a mean of 44.06 in group A and 44.84 in group B. Percentages of wound infections in different age groups were almost similar; 28.6% in under 30 years, 46 to 60 years, above 60 years and 14.3 % in 31 to 45 years groups as shown in Table-II.

Table-I. Postoperative Wound Infection in Both Groups.

		Post op Wound Infection			Total
		NO	Yes		
Patient's group	A	Count	48	2	50
		% Within Patient's group	96.0%	4.0%	100.0%
	B	Count	45	5	50
		% Within Patient's group	90.0%	10.0%	100.0%
Total		Count	93	7	100
		% Within Patient's group	93.0%	7.0%	100.0%

Table-II. Post operative Wound Infection in Different Age Groups.

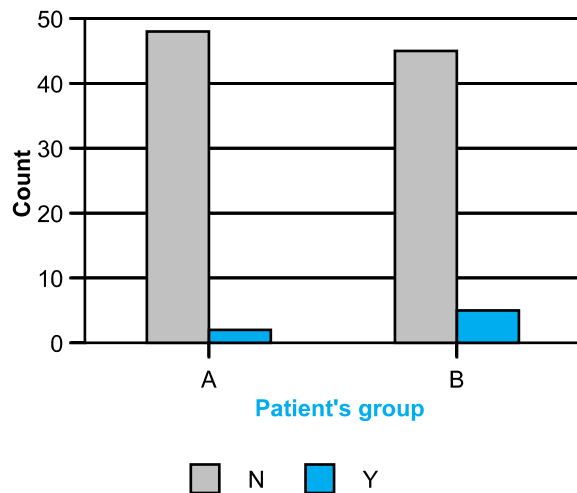
		Age _ Group				Total	
		<= 30	31 - 45	46 - 60	61+		
Post op wound infection	No	Count	30	19	25	19	93
		% Within post op wound infection	32.3%	20.4%	26.9%	20.4%	100.0%
	Yes	Count	2	1	2	2	7
		% Within post op wound infection	28.6%	14.3%	28.6%	28.6%	100.0%
Total		Count	32	20	27	21	100
		% Within post op wound infection	32.0%	20.0%	27.0%	21.0%	100.0%

(Infect = Infection, Post op = Postoperative, N = No, Y = Yes)

The total number of wound infections was 7 (7%); 2 (4%) in the antibiotic prophylaxis group and 5 (10%) in the placebo group, as shown in Table-I. Statistical analysis showed no significant difference in the number of wound

infections in both groups (p value= 0.240). All the infections developed after the patients were discharged from the hospital. The mean age of these patients was 47.7 years (range: 20–65 years).

Fig-1. Number of postoperative wound infections in both groups



The pus samples taken from all seven patients with wound infections were cultured and showed growth of *Staphylococcus aureus* in five patients and *Staphylococcus epidermidis* in two patients. Although not included in the study some other post-operative complications were observed in the study population. Two patients developed scrotal hematomas, two developed wound seromas and three had urinary retention in the immediate post operative period.

DISCUSSION

Inguinal hernia repair is the most frequent procedure in general surgery accounting for 10–15% of all operations¹². Several surgical techniques have been described, with access to anterior or posterior spermatic cord, by the open or laparoscopic approaches, and with or without prosthetic materials. 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 it may necessitate removal of mesh, which causes more morbidity to the patient. So many surgeons routinely use antibiotics for a long time postoperatively to prevent postoperative mesh infection. The purpose of this study was to document the effectiveness of prophylactic antibiotics in preventing wound infection following Lichtenstein inguinal

hernioplasty.

Wound infection is the most common complication secondary to mesh hernia repair. Main objectives of antibiotic prophylaxis are to reach high serum levels of antibiotic at the surgical site to avoid colonization by skin microorganisms and secondary infection.

The role of antibiotic prophylaxis in selected clean surgical procedures such as joint arthroplasty and cardiac surgery is now well established^{13,14}. In mesh hernia repair, however, the use of antibiotics remains controversial because of a relatively low rate of infection—possibly underestimated as a result of the early discharge of patients from hospital and relatively straightforward treatment of superficial infections should they arise¹⁵. If infections are easy to treat, the financial cost of antibiotic prophylaxis may exceed the benefits. Wound infections may, however, cause significant morbidity with up to a fourfold increase in hernia recurrence⁶. Establishing whether prophylaxis is indicated requires an estimation of the likelihood of infection without antibiotics.

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 studies¹⁶. Khan et al and Tarar et al reported incidence of wound sepsis was 1.2% and 7.5% respectively in patients who underwent Lichtenstein's repair^{17,18}. Another study conducted by the Anfenacker and his colleagues reported 1.7% of wound infection after Lichtenstein open mesh repair and there is no significant difference between antibiotic prophylaxis and placebo group¹⁹. A study done in the Department of Surgery, Fauji Foundation hospital, Rawalpindi showed a wound infection rate of three percent following Lichtenstein hernioplasty and concluded that Lichtenstein' repair is an easy procedure with less complication rate even without antibiotic prophylaxis²⁰. Contrasting this, Yerdel et al. observed a major advantage with prophylactic antibiotic use in open prosthetic inguinal hernia repair. They reported a 10-fold lower wound infection rate in the antibiotic group,

indicating a highly significant clinical benefit with this strategy⁸. 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 mesh¹¹.

The wound infections rate in our study was 7%; 4% (2/50) in the antibiotic prophylaxis group and 10% (5/50) in the placebo group. Statistical analysis showed no significant difference in the number of wound infections in both groups (p value=. 240).

All the infections developed after the patients were discharged from the hospital. As all the patients were discharged on second postoperative day, and infection usually develops after the fourth or fifth postoperative day so strict follow up was necessary to record those infections. The pus samples taken from all seven patients with wound infection were cultured and showed growth of *Staphylococcus aureus* in five patients and *Staphylococcus epidermidis* in two patients. Two patients were treated with intravenous antibiotics and surgical drainage after re-admission and recovered completely. Five other patients were treated with a course of oral antibiotics and drainage of the wound.

Antibiotic treatment was administered according to drug sensitivity testing in these cases. No recurrence was noted of course because of the short follow up of the study.

Minimum age of patients in this study was 20 years and maximum 75 years. The mean age was 44.06 in group A and 44.84 in group B. Most fell in the under 30 year's range (32%). Percentages of wound infections in different age groups were similar; 28.6% in under 30 years, 46 to 60 years and above 60 years. The mean age of patients having postoperative wound infection was 47.7 years (range: 20–65 years).

The shortcoming of our study was a small sample size; perhaps a larger sample size could give us more thorough insight into the problem. Another subject that must be

assessed in antibiotic prophylaxis is cost-effectiveness. As can be seen, wound infection rate could be as low as 1% in some centers. In these cases, the costs of antibiotic administration must be carefully evaluated against the potentials benefits.

CONCLUSION

There is no benefit in the use of antibiotic prophylaxis for inguinal hernia repair in low-risk patients. Because of an unknown impact on bacterial resistance, the use of routine antibiotic prophylaxis in primary inguinal hernia repair should be discouraged. The cost benefit for a single patient is relatively limited however, because of the large number of inguinal hernia repairs performed in low-risk patients (estimated 70% of all hernias), discarding the use of antibiotic prophylaxis will reduce the overall financial costs of the hospitals.

So, we conclude that in Lichtenstein inguinal hernia repair routine use of prophylactic antibiotics is not needed, as it does not significantly reduce the postoperative wound infection rates.

Copyright © 25 Nov, 2009.

REFERENCES

1. Platt R. **Guidelines for perioperative antibiotic prophylaxis**. In: Abrutyn E, Goldmann DA, Scheckler WE. Saunders infection control reference service. Philadelphia: W.B. Saunders 1997;229–234.
2. Nichols RL. **Surgical antibiotic prophylaxis**. Med Clin North Am 1995;79:509–22.
3. Sanderson PJ. **Antimicrobial prophylaxis in surgery: microbiological factors**. J Antimicrob Chemother 1993; 31:1–9.
4. Barie PS. **Modern surgical antibiotic prophylaxis and therapy--less is more**. Surg Infect (Larchmt) 2000;1(1): 23-9.
5. Stephenson BM. **Complications of open groin hernia repairs**. Surg Clin North Am 2003 Oct;83(5):1255-78.
6. EU Hernia Trialists Collaboration. **Repair of groin hernia with synthetic mesh: meta-analysis of randomized controlled trials**. Ann Surg 2002;235:322-32.

7. Yerdel MA, Akin EB, Dolalan S, Turkcapar AG, Pehlivan M, Gecim IE, et al. **Effect of single-dose prophylactic ampicillin and sulbactam on wound infection after tension-free inguinal hernia repair with polypropylene mesh: the randomized, double-blind, prospective trial.** *Ann Surg* 2001;233:26-33.
8. Perez AR, Roxas MF, Hilvano SS. **A randomized, double-blind, placebo- controlled trial to determine effectiveness of antibiotic prophylaxis for tension-free mesh herniorrhaphy.** *J Am Coll Surg* 2005; 200: 393-7.
9. Sajjad AA, Saddique M, Waqar A. **Antibiotic prophylaxis in clean surgery.** *Biomedica* 2005;21:121-4.
10. Sanchez-Manuel FJ, Seco-Gil JL. **Antibiotic prophylaxis for hernia repair.** *Cochrane Database Syst Rev.* 2003; (2):CD003769.
11. Hair A, Duffy K, McLean J, Taylor S, Smith H, Walker A, MacIntyre IM, O'Dwyer PJ. **Groin hernia repair in Scotland.** *Br J Surg* 2000;87:1722-6.
12. Slobogean GP, Kennedy SA, Davidson D, O'Brien PJ. **Single- versus multiple dose antibiotic prophylaxis in the surgical treatment of closed fractures: a meta-analysis.** *J Orthop Trauma.* 2008; 22: 264-9.
13. Da Costa A, Kirkorian G, Cucherat M, Delahaye F, Chevalier P, Cerisier A, et al. **Antibiotic prophylaxis for permanent pacemaker implantation, a meta-analysis.** *Circulation.* 1998; 97: 1796-1801.
14. Brown RB, Bradley S, Opitz E, Cipriani D, Pieczarka R, Sands M. **Surgical wound infections documented after hospital discharge.** *Am J Infect Control* 1987;15:54-8.
15. Taylor EW, Duffy K, Lee K, Hill R, Noone A, Macintyre I, et al. **Surgical site infection after groin hernia repair.** *Br J Surg* 2004; 91:105-11.
16. Tarar NA, Hanif MS. **Management of inguinal hernias.** *Pak Armed Forces Med J* 2004;54:11-3.
17. Khan Z, Gardezi JR. **Lichtenstein tension-free Hernioplasty: an audit.** *Pak J Surg* 2004;20:16-9.
18. Aufenacker TJ, van Geldere D, van Mesdag T, Bossers AN, Dekker B, Scheijde E, et al. **The role of antibiotic prophylaxis in prevention of wound infection after Lichtenstein open mesh repair of primary inguinal hernia: A multicenter double blind randomized controlled trial.** *Ann Surg* 2005; 240(6):955-61.
19. Najamulhaq R, Chaudhry IA, Khan BA, Afzal M. **Groin sepsis following Lichtenstein inguinal hernioplasty without antibiotics prophylaxis: a review of 100 cases.** *Pak J Med Sci* 2006;22:416-9.

PREVIOUS RELATED STUDIES

G.R. Bajwa, Ahmad Hassan Khan. Wound infection; Frequency in clean surgical operations. (Original) *Prof. Med Jour* 16(3) 336-340 Jul, Aug, Sep, 2009.

*If u don't Ask,
U don't get*

Pravin Poojary