Prophylactic antibiotic usage in patients undergoing inguinal mesh hernioplasty – A clinical study

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Received: 22 November 2009 / Accepted: 3 February 2010
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Abstract

Background There is ambiguity about the use of antibiotic prophylaxis in inguinal mesh hernioplasty. We have tried to assess the efficacy of antibiotic prophylaxis in this procedure.

Materials and methods A randomized double blind placebo controlled study was conducted which included 55 patients who underwent an inguinal mesh hernioplasty over a 2 year period. The patients were evaluated for the status of the suture line as well as the presence of wound infection.

Results Out of 55 patients 29 were randomized to the antibiotic arm and 26 to the placebo group. The groups were well matched for all variables studied excluding wound infections, which occurred at a rate of 10.34% ($n = 3$) in the antibiotic group and 15.38% ($n = 4$) in the placebo arm, ($p > 0.01$).

Conclusion This study did not document any statistically significant difference observed between those who received antibiotics and those receiving placebo in terms of any of the prognostic end points evaluated for Lichtenstein mesh hernioplasty.

Keywords Mesh henioplasty · Prophylactic antibiotic · Wound infection

Introduction

Inguinal hernia repair is a common surgical procedure. The Lichtenstein hernia repair with a flat mesh to reinforce the inguinal wall is a common technique used [1]. The incidence of infection after inguinal mesh hernioplasty has been reported to vary between 0.4–1.3% [2]. Insertion of any prosthetic implants can have a detrimental effect on the patients host defense, thus the risk of infection is increased [3]. Prophylactic administration of antibiotic may inhibit the growth of contaminating bacteria and their adherence to implants thus decreasing the risk of infection [4].

Despite paucity of evidence supporting the use of antibiotics for this procedure, many surgeons routinely administer them [5]. A review of world literature does conclusively determine whether antibiotic prophylaxis in inguinal hernia repair using prosthetic mesh is of advantage to patients in terms of preventing morbidity. This study was undertaken to assess the usefulness of antibiotic prophylaxis in inguinal mesh hernioplasty in a tertiary care Indian hospital.

Materials and methods

All adult patients, undergoing unilateral or bilateral elective inguinal hernia repair with Lichtenstein technique using propylene mesh were included in the study. Patients with femoral, strangulated or obstructed hernia, patients on steroids or chemotherapy or those who had received antibiotics in the past 48 hours and patients with valvular heart disease or prosthetic heart valves or joints were

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excluded. Randomization was accomplished by block randomization. The drug used was either a single dose of cefuroxime sodium 1.5 g or an equal volume of normal saline as placebo by IV bolus 30 minutes before the induction of anesthesia. Routine preoperative investigations were done for all patients. The skin was shaved just prior to surgery and prepared using 10% povidone iodine.

Surgical Procedure

Skin was incised and sac dealt with. A standard mesh hernioplasty was carried out, mono filament polypropylene mesh (Centinel™) was anchored with interrupted polypropylene suture 1–0 suture to conjoint tendon, pubic tubercle, inguinal ligament and fascia transversalis beyond deep ring, ligature used were 3–0 polyglactin 910 or silk. Skin was closed using 3–0 nylon or 3–0 poliglecaprone 25 subcuticular sutures.

Follow up

All patients were followed up by the investigators initially daily till discharge, then at 1 week and 1 month following discharge from the hospital. Wounds were evaluated to look for any superficial or deep seated surgical site infection. In the event of a postoperative wound infection, wound swab for culture and sensitivity was done.

Results

All patients were males. After examination the patients were randomized in two groups. The first group received the antibiotic and the second group received the placebo.

72.4% patients in the antibiotic group and 80.7% in the placebo group did not have any significant co-morbidities. 79.3% (n = 23) of patients in the antibiotic group had the total duration of surgery >1 hour as compared to 92.3% (n = 24) in the placebo group. 10.3% (n = 3) patients in the antibiotic group and 3.8% (n = 1) patients in the placebo group were hospitalized for a duration of more than 1 week. There was no statistically significant difference with respect to duration of hospital stay between the 2 groups.

Wound infections were categorized as superficial and deep surgical site infection according to standard definitions [6].

10.3% (n = 3) patients in the antibiotic group and 15.3% (n = 4) patients in the placebo group had wound infections. The antibiotic group had one deep surgical site infection and three superficial surgical site infections while all the three surgical site infections in the placebo group were superficial. Surgical treatment of the wound infection was needed in 2 patients in the antibiotic group and 3 patients in the placebo group. Culture proven (*Staphylococcus Aureus*)

infection was seen in one patient in the antibiotic group. While cultures in all the other patients in both groups were reported to be sterile.

Discussion

While it is well documented that prophylactic antibiotic administration in clean contaminated surgeries (colorectal resections) reduces the infectious complications significantly, the same cannot be said for clean surgeries such as hernia repairs.

The question whether open prosthetic mesh hernia repairs must be done under antibiotic coverage has been the subject of debate since the beginning of mesh hernioplasty in 1975 [7]. The low rate of wound infections and the straight forward treatment if they occur at all are the main arguments against routine antibiotic coverage during hernia surgery. However there is reasonable doubt as to the validity of these views [8].

Infection in a hernia wound has been reported to be associated with a fourfold increase in the recurrence rate. More importantly wound infection rates in inguinal hernia series are frequently underreported for several reasons. Since most hernias are either day care surgeries or discharged in a day or two, the actual follow up may not be completely done. Secondly the wound infections are not defined in most series allowing bias in interpretation. When these problems regarding the definition, diagnosis, and follow up of wound infection after inguinal hernia surgery are addressed, the actual rate of wound infection is much higher than the 1 to 2% rate previously accepted. In studies where strict surveillance after discharge was performed, the rate of wound infection after “clean” surgical procedures was between 5.3% and 5.6% [8].

Sanabria et al. (2007) in their Meta analysis on the prophylactic use of antibiotic in mesh hernia repair assessed six randomized controlled trials using the Cochrane inclusion criteria and concluded that antibiotic prophylaxis decreased the rate of surgical site infection almost by 50% [9]. On the other hand a Cochrane review conducted by Sanchez-Manuel and Seco-Gil 2006, included 8 RCTs in which 3 series used mesh and the remaining did not. Based on the results in 2,907 patients the authors concluded that there was no clear evidence suggesting routine use of antibiotics in elective hernia surgery [10].

The claims that prophylactic antibiotics can be beneficial in prosthesis were tested in a cooperative multicenter prospective study of 2,493 inguinal hernia repairs. This study was done to examine the effect of prophylactic antibiotics in primary and recurrent inguinal hernia repaired with synthetic biomaterials. More than 70% of wound infections occurred in patients 60 years of age or older. Removal of biomaterials from the infected wounds was not necessary and generally is not recommended. Recurrence had not occurred in any of the infected repairs. With or without prosthetic repair,

the treatment of infected inguinal hernia wounds was relatively simple, of reasonable cost and concluded with a good result. The expense incurred for routine prophylactic antibiotic treatment in inguinal hernia operation could not be reconciled by any benefits obtained [11]. In contrast to this retrospective data Yerdel et al. from Ankara, Turkey published a prospective randomized, double blind, placebo controlled trial assessing the effects of a single dose of prophylactic ampicillin sulbactam combination on wound infection after mesh hernioplasty. This study documented a statistically significant (10 fold) decrease in the overall wound infections when a single dose of antibiotic was used during Leichtenstein repair.

The trial by Platt et al. was the first effort that aimed to provide insight into the antibiotic controversy. In their randomized, double-blind study, they documented a 48% decrease in infectious complications when prophylactic intravenous cefonicid (1 g) was given compared with placebo. In the hernia part of that study, the wound infection rate dropped from 4.2%–2.3% with the use of prophylaxis. They assessed the findings of their trial retrospectively on another 4,000 patients who underwent similar “clean” surgical procedures, and this analysis also showed a 41% decrease in infectious complications when antibiotic prophylaxis was used [12]. Taylor et al., who conducted a randomized, multicenter, double-blind prospective trial to compare single-dose intravenous coamoxiclav with placebo in 619 patients undergoing open groin hernia repair. The rate of infection in both groups was almost 9%, and they concluded that antibiotic prophylaxis is of no benefit to patients undergoing open groin hernia repair [13].

On an average the wound infection rate in both our groups was 12.8%. Even though inadequately powered and with a small sample size, the results of our study did not show a clear benefit of antibiotic prophylaxis in patients undergoing mesh hernioplasty. We may need a larger sample size to validate our results.

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