

Prophylactic antibiotics versus post-operative antibiotics in herniorrhaphy

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Abstract

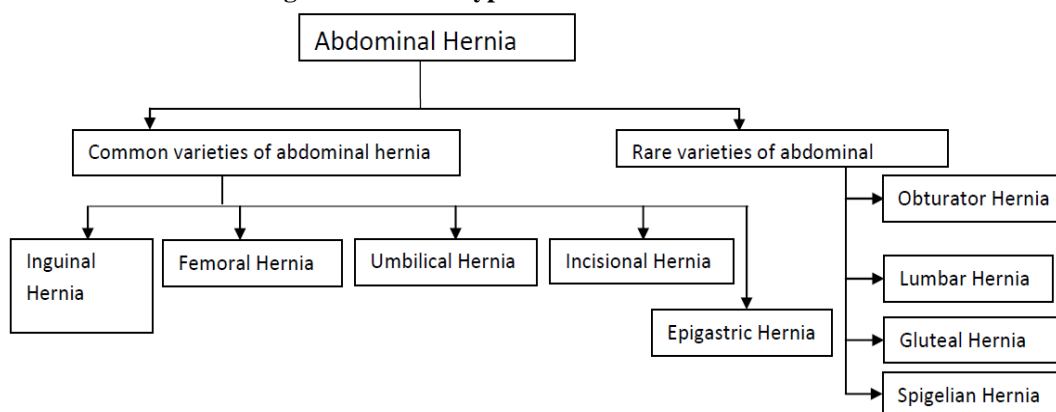
Postoperative surgical site infections are a major source of illness. Infection results in longer hospital stay and higher costs. Uses of preoperative antibiotics have been standardized and are being used routinely in most clinical surgeries and include controversial areas like breast surgery and herniorrhaphy. Objective of the study is to find out the benefit of prophylactic use of antibiotics in the management of herniorrhaphy. This project was carried out in a multispeciality tertiary care teaching hospital from 1st-30th April in 2002. Group 1 patients were treated prophylactically half an hour before surgery with single dose of I.V. antibiotics (injection. Ampicillin 1gm + injection. Gentamicin 80mg). Group 2 patients were treated post surgery with capsule. Ampicillin 500mg 4 times a day for 7 days and injection. Gentamicin twice a day for first 4 days. In case of group 1 patients only one out of 20 patients (5%) was infected. Whereas in group 2 patients 5 out of 20 patients (25%) were infected. The cost of prophylactic antibiotic treatment was Rs. 25.56 per patient. The postoperative antibiotic treatment cost was Rs. 220.4 per patient. That means postoperative treatment is around 8.62 times costlier than prophylactic treatment. From this study it is evident that prophylactic (preoperative) treatment is better than postoperative treatment with antibiotics.

Keywords: Prophylactic antibiotics, post operative antibiotics, Herniorrhaphy, pharmacoeconomics and antibiotics

1. Introduction

Hernia is defined as protrusion of whole or a part of viscus through the wall that contains it. The term can be applied to protrusion of a muscle through its fascial covering or of brain through fracture of skull or through foramen magnum (the hole at the bottom of the skull where the brain is joined to the spinal cord) into the spinal canal. But by far the commonest variety of hernia is protrusion of a viscus or a part of it through the abdominal wall will be discussed here.

Figure 1: Various types of abdominal hernias



Inguinal hernia comes out through the superficial ring indirect or oblique inguinal hernia comes out of the abdominal cavity through the deep inguinal ring, traverses all along the inguinal canal and ultimately becomes superficial through the superficial inguinal ring.

1.2 Indirect inguinal hernias

A defect in the abdominal wall that is present at birth causes an indirect inguinal hernia. During the development of the fetus in the womb, the lining of the abdominal cavity forms and extends into the inguinal canal. In males, the spermatic cord and testicles descend out from inside the abdomen and through the abdominal lining to the scrotum through the inguinal canal. Next, the abdominal lining usually closes off the entrance to the inguinal canal a few weeks before or after birth. In females, the ovaries do not descend out from inside the abdomen, and the abdominal lining usually closes a couple of months before birth [1].

Sometimes the lining of the abdomen does not close as it should, leave an opening in the abdominal wall at the upper part of the inguinal canal. Fat or part of the small intestine may slide into the inguinal canal through this opening, causing a hernia. In females, the ovaries may also slide into the inguinal canal and cause a hernia. Indirect hernias are the most common type of inguinal hernia [2]. Indirect inguinal hernias may appear in 2 to 3 percent of male children; however, they are much less common in female children, occurring in less than 1 percent [3].

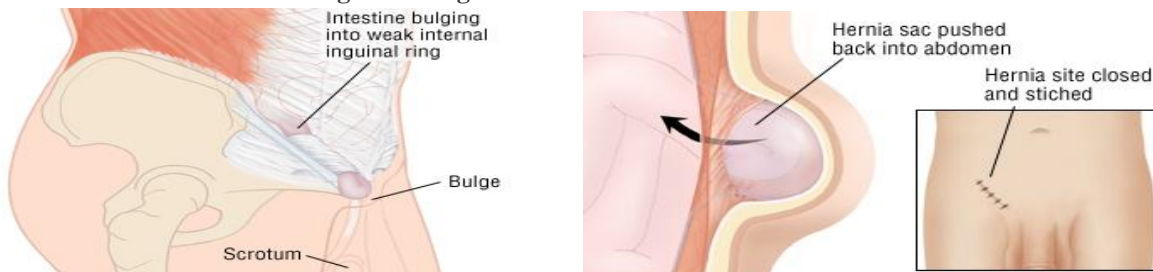
Direct inguinal hernia enters the inguinal canal through the medial half of its weak posterior wall and becomes superficial through the same superficial ring. Inguinal hernia is said to be complete when the contents have reached the bottom of the scrotum. Otherwise the hernia is incomplete.

1.3 Direct inguinal hernias

Direct inguinal hernias usually occur only in male adults as aging and stress or strain weakens the abdominal muscles around the inguinal canal. Previous surgery in the lower abdomen can also weaken the abdominal muscles. Females rarely form this type of inguinal hernia. In females, the broad ligament of the uterus acts as an additional barrier behind the muscle layer of the lower abdominal wall. The broad ligament of the uterus is a sheet of tissue that supports the uterus and other reproductive organs.

About 25 percent of males and about 2 percent of females will develop an inguinal hernia in their lifetimes. People with a family history of inguinal hernias are more likely to develop inguinal hernias. Studies also suggest that people who smoke have an increased risk of inguinal hernias [4].

Figure 2: Inguinal Hernia and its site closed and stitched.



1.4 Etiology [5]:

1. Age: indirect inguinal hernia- young individuals.

Direct inguinal hernia – older subjects.

2. Occupations: strenuous work is responsible for development of hernia. It is associated underlying weakness of the abdominal muscles or persistence of processus vaginalis (congenital hernia).

3. Trauma

4. Previous surgery (causes of internal hernia)

5. Predisposing factors

Difficulty in micturation, constipation, chronic cough, chronic vomiting.

1.5 Diagnosis

- a medical and family history
- a physical exam
- imaging tests, including x rays

1.6 Signs and symptoms of an inguinal hernia [6]:

The first sign of an inguinal hernia is a small bulge on one or, rarely, on both sides of the groin—the area just above the groin crease between the lower abdomen and the thigh. The bulge may increase in size over time and usually disappears when lying down.

Other signs and symptoms can include

- discomfort or pain in the groin—especially when straining, lifting, coughing, or exercising—that improves when resting

- feelings such as weakness, heaviness, burning, or aching in the groin
- a swollen or an enlarged scrotum in men or boys

Indirect and direct inguinal hernias may slide in and out of the abdomen into the inguinal canal.

1.7 Treatment

Repair of an inguinal hernia via surgery is the only treatment for inguinal hernias and can prevent incarceration and strangulation. There are two basic types of hernia repair: open surgery or laparoscopic surgery. Both usually are done on an outpatient basis and take about one hour to complete [7].

1.8 Prevention

People cannot prevent the weakness in the abdominal wall that causes indirect inguinal hernias. However, people may be able to prevent direct inguinal hernias by maintaining a healthy weight and not smoking [8].

People can keep inguinal hernias from getting worse or keep inguinal hernias from recurring after surgery by

- avoiding heavy lifting
- using the legs, not the back, when lifting objects
- preventing constipation and straining during bowel movements
- maintaining a healthy weight
- not smoking

Postoperative surgical site infections are a major source of illness. Infection results in longer hospital stay and higher costs. Proper antibiotic prophylaxis will result in reduced hospital stay and less cost [9]. Use of parental antibiotics in surgical prophylaxis have been standardized and are being used routinely in most clinical surgeries and includes controversial areas like breast surgery and herniorrhaphy [10]. An effort has been made in the present study to find the benefit, if any, in the prophylactic use of antibiotics in the area of clinical surgery of herniorrhaphy.

The objective of this study is to compare the efficacy and pharmacoeconomics of therapeutic management of herniorrhaphy with antibiotics administered before surgery (pre-operative) and after surgery (post-operative).

2. Methodology

This work was carried out in surgery department in a multispeciality tertiary care teaching hospital for the period of a month. Forty cases of uncomplicated inguinal hernia patients both male and female were studied. The patients were randomly divided into two equal groups based on mode of antibiotic administration (Pre-herniorrhaphy and post-herniorrhaphy).

The choice of antibiotic regimen was selected depend upon the predominant pathogens associated with that procedure. However it is unnecessary to cover all possible bacteria that could be associated with infection [11-12].

Each group comprised of Group 1 patients were treated prophylactically with a single dose of I.V. antibiotics (ampicillin 1gm + gentamicin 80mg) administered half an hour before surgery.

Group 2 patients were treated post surgery with 500mg of ampicillin capsules administered orally four times a day for 7 days and 80mg gentamicin injection administered intravenously two times a day for 4 days.

Inclusion criteria: All the cases presented with uncomplicated inguinal hernia

Exclusion criteria: Recurrent hernia, Diabetic and other immune compromised patients.

3. Results and discussion

Forty cases (both male (34) and female (6)) of uncomplicated inguinal hernia patients were studied. Results of the present study in presented in table -1.

In case of group-1 patients (treated prophylactically with single I.V. dose of ampicilin 1gm and gentamicin 80mg).Out of 20 patients, only 1 patient (5%) was infected.

Whereas in group-2 patients treated post surgery with injection gentamicin 80mg twice a day for first four days and ampicilin capsules 500mg four times a day for seven days, five (25%) out of twenty patients were infected, these infected patients were treated further with change of antibiotics.

Table-1: Rate of infection and pharmacoeconomics of Pre- operative and Post-operative herniorrhaphy treated patients.

Group	No. of patients	Type of Antibiotics	% Infected	Cost in Rupees (INR) per patient
1.	20	Preoperative	5 % (1)	25.56
2.	20	Postoperative	25% (5)	220.40

Figure 3: Pharmacoeconomics of antibiotics

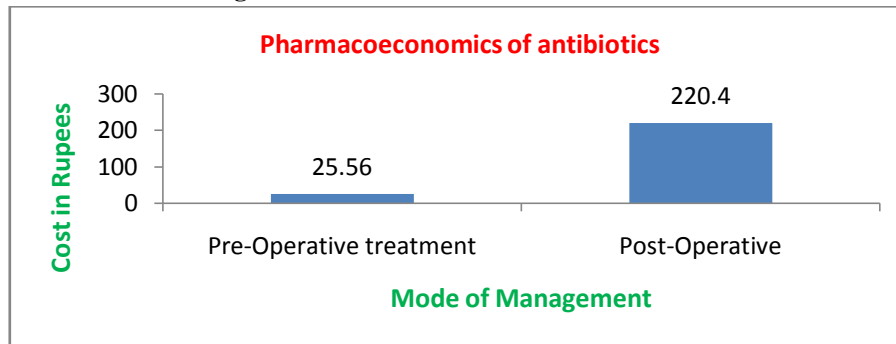
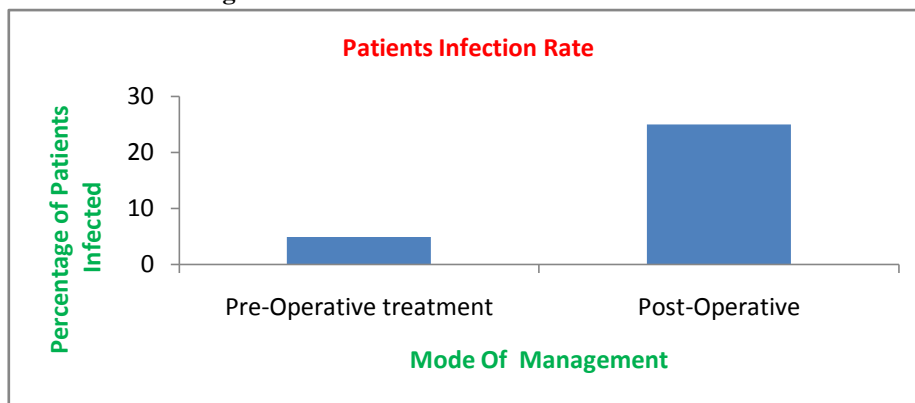


Figure 4: Patients infection rate after treatment



The cost of prophylactic antibiotic treatment was Rs. 25.56 per patient. The postoperative antibiotics treatment cost was 220.40 per patient. That means post-operative treatment cost was 220.40 per patient. That means post-operative treatment is 8.62 times costlier than prophylactic treatment. In our observation we found that the post operative patients stayed more number of days in hospital as compared to prophylactic antibiotic treatment and also patient was away from his normal duties for a longer period as compared to prophylactic antibiotic treatment. Use of Prophylactic antibiotics will decrease the infection rate, cost of management and increases the quality of life which will decrease the financial burden to the patients as compared to post-operative antibiotic treatment [13-14].

4. Conclusion

From this study it is evident that Prophylactic (Pre-operative) treatment is better than postoperative treatment with antibiotics on the following aspects.

- a) Reduction of post-operative infection rate.
- b) Prevention of drug resistance.
- c) Minimization of adverse drug reaction.
- d) Decrease in length of stay in hospital.
- e) Reduction in the cost of therapy.
- f) Saving hospital resources.

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