Original Research Article

The role of prophylactic cefazolin in the prevention of infection after various types of abdominal wall hernia repair with mesh

T. Uma Maheswara Rao*

Associate Professor, Department of Surgery, Konaseema Institute of Medical Sciences and Research Foundation, Amalapuram, Andhra Pradesh, India
*Corresponding author email: **tumrao18@gmail.com**

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Abstract

Aim: This study aimed to evaluate the role of cefazolin in prevention of various infections after abdominal wall repair by mesh.

Materials and methods: This is a prospective study consisted of 300 patients with various kinds of hernia (inguinal, femoral, bilateral, incisional, umbilical and lumbar hernias who were treated for elective mesh repair in from September 2010 to October 2014.

Results: In the present study, 300 patients with different kinds of hernia were selected for elective surgery. Of them 200 patients (66.6%) were males and 100 patients (33.4%) were females with mean age of 50-55 years. Patients were assigned into study group and control group. 180 patients (60%) received prophylactic cefazolin, this group was named as study group and 120 patients (40%) were named as control group and did not receive any prophylactic antibiotics. The mean age of patients in control group was 51.5±13.45 years and that in study group was 53.0±15.75 years which was not significantly different. (p =0.05). 22 patients (18.3%) of 120 control group patients had epigastric hernia, 18 patients (15%) had incisional hernia, 46 patients (38.3) had inguinal hernia, 34 patients (28.3%) had umbilical hernia and all these patients were not given any prophylactic antibiotics. 44 patients (24.4%) of 180 study patients had epigastric hernia, 31 patients (17.2%) had incisional hernia, 85 patients (47.2%) had inguinal hernia and 20 patients (11.1) had umbilical and all these patients were given prophylactic antibiotic. One patient who received rives repair in the study group developed deep surgical site infection which necessitated readmission and partial debridement of the mesh without complete excision.

Conclusion: This study results did not support the use of cephazolin as a prophylactic for various kinds of abdominal wall hernia repair with mesh.

Key words

Cefazolin, Hernia repair, Prophylactic antibiotic.

Introduction

An abdominal wall hernia is a protrusion of the intestine through an opening or area of weakness in the abdominal wall. Abdominal wall hernias include umbilical hernias, epigastric hernias, Spigelian hernias, and incisional (ventral) hernias. Umbilical hernias (protrusions through the umbilical ring) are mostly congenital, but some are acquired in adulthood secondary to obesity, ascites, pregnancy, or chronic peritoneal dialysis. Epigastric hernias occur through the linea alba. Spigelian hernias occur through defects in the transversus abdominis muscle lateral to the rectus sheath, usually below the level of the umbilicus. Incisional hernias occur through an incision from previous abdominal surgery. The symptoms of abdominal hernia are most patients complain only of a visible bulge, which may cause vague discomfort or be asymptomatic. Most hernias, even large ones, can be manually reduced with persistent gentle pressure; placing the patient in the Trendelenburg position may help. An incarcerated hernia cannot be reduced and can be the cause of a bowel obstruction. A strangulated hernia causes steady, gradually increasing pain, typically with nausea and vomiting. The hernia itself is tender, and the overlying skin may be erythematous; peritonitis may develop depending on location, with diffuse tenderness, guarding, and rebound. Diagnosis of abdominal hernias is clinical. Because the hernia may be apparent only when abdominal pressure is increased, the patient should be examined in a standing position. If no hernia is palpable, the patient should cough or perform a Valsalva manoeuvre as the examiner palpates the abdominal wall. Examination focuses on the umbilicus, the inguinal area (with a finger in the inguinal canal in males), the femoral triangle, and any incisions that are present. Inguinal masses that resemble hernias may be the result of adenopathy (infectious or malignant), an ectopic testis, or lipoma. These masses are solid and are not reducible. A scrotal mass may be a varicocele, hydrocele, or testicular tumour. Ultrasound may be done if physical examination is equivocal. Treatment is by surgical repair. Groin hernias typically should be repaired electively because of the risk of strangulation, which results in higher morbidity (and possible mortality in elderly patients). Asymptomatic inguinal hernias in men can be observed; if symptoms develop, they can be repaired electively. Repair may be through a standard incision or laparoscopically. An incarcerated or strangulated hernia of any kind requires urgent surgical repair. Surgical Site Infections (SSI's) are common complications, although the hernia operations are considered clean procedures, leading to increase in length of hospitalisation and costs. The incidence of SSI after these surgeries varies from 1.7 to 14% that can be influenced by location of incision, elective or emergent condition, length of operation, surgical techniques. The infection can produce pain and lead to poor wound healing and increases in hospital stay and costs. Only a few studies evaluated the role of antibiotics in preventing postoperative SSI after repair of abdominal hernia with mesh. Thus, this study aims to evaluate the role of cefazolin in prevention of various infections after abdominal wall repair by mesh.

Materials and methods

This was a prospective study which aimed to evaluate the role of cefazolin in prevention of various infections after abdominal wall repair by mesh. This study consisted of 300 patients with various kinds of hernia (inguinal, femoral, bilateral, incisional, umbilical and lumbar

hernias) who were treated for elective mesh repair from September 2010 to October 2014.

Exclusion criteria

The patients undergoing emergency operations, immunocompromised patients with underlying diseases like renal failures, cirrhosis, diabetes, malignancy, corticosteroid and immunosuppressive drug users, patients under 18 years were excluded.

After anesthesia administration prior to the incision, the study group received 50 mL sterile saline with 1 g intravenous cefazolin. The control group did not receive any antibiotics.

All patients received general anesthesia. Stoppa and Rives procedures were followed. The mesh material was a monofilament polypropylene mesh whose size varied from 6 cm - 11 cm to 30 cm - 30 cm. Based on the size of the hernia, at least 10 cm overlap of the mesh with margins of abdominal wall defect was considered. The closed suction drains were used in all Stoppa and Rives procedures. In addition, the wound closure was performed with running subcuticular suture. If there was no event in the postoperative period, patients were discharged from the hospital according to the surgeon's discretion. Drains were removed when the 24 hour drainage decreased. All patients were followed for the 1st postoperative month. The patients were followed on Day 10, Day 30, and months after the operation for signs of infection, recurrence edema, and hematoma. The patients were visited and the data were collected by a surgeon who was not involved surgery. Infection was described when the incision became erythematous and tender or had purulent discharge up to year. In these situations the stitches were removed, wound was irrigated with saline, and the depth of infection and mesh involvement was determined. In cases of reinfection (mesh infection), the wound was opened, and that was irrigated. After mesh debridement, a delayed closure was planned. Post-operative complications follow-up period was for at least 2 years after the surgery.

Results

In the present study, 300 patients with different kinds of hernia were selected for elective surgery. Of them 200 patients (66.6%) were males and 100 patients (33.4%) were females with mean age of 50-55 years. Patients were assigned into study group and control group. 180 patients (60%) received prophylactic cefazolin, this group was named as study group and 120 patients (40%) were named as control group and did not receive any prophylactic antibiotics. The mean age of patients in control group was 51.5±13.45 years and that in study group was 53.0±15.75 years which was not significantly different. ($p = 0.05$). There was a significant difference between sex and use of prophylactic cefazolin ($p<0.001$) as per **Table - 1**.

Table - 1: Age and sex distribution and type of operation undergone.

	Control group	**Study group**	**P value**
Mean Age ± SD	51.5±13.45 years	53.0±15.75 years	0.05
Sex: Males	90 (45)	110 (55)	
Females	30 (30)	70 (70)	<0.001
Type of operation			
Lichtenstein	30 (10)	32 (10.6)	
Rives	20 (6.66)	30 (10)	
Read Rives	25 (8.3)	23 (7.6)	<0.001
Stoppa	50 (16.6)	90 (30)	

The operation procedure used were stoppa which was the most common type, other procedures were Lichenstein, Rives, Read Rives. 22 patients (18.3%) of 120 control group patients had epigastric hernia, 18 patients (15%) had incisional hernia, 46 patients (38.3) had inguinal hernia, 34 patients (28.3%) had umbilical hernia and all these patients were not given any prophylactic antibiotics. 44 patients (24.4%) of 180 study patients had epigastric hernia, 31 patients (17.2%) had incisional hernia, 85 patients (47.2%) had inguinal hernia and 20 patients (11.1) had umbilical and all these patients were given prophylactic antibiotic as per **Table - 2**.

One patient who received rives repair in the study group developed deep surgical site infection which necessitated readmission and partial debridement of the mesh without complete excision (**Table – 3**).

Table – 2: Distribution of type of hernia in each group (p<0.001).

Prophylactic antibiotic	Epigastric	Incisional	Inguinal	Umbilical	Total
No	22 (18.3)	18 (15)	46 (38.3)	34 (28.3)	120
Yes	44 (24.4)	31 (17.2)	85 (47.2)	20 (11.1)	180
Total	66 (22)	49 (16.3)	131 (43.6)	54 (18)	300

Table – 3: Post-operative complications in each group.

Type of complications	Control	Study	P value
Pain: No/ Yes	111 (92.5)/ 9 (7.5)	160 (88.8)/ 20 (11.1)	0.851
Hematoma: No/ Yes	118 (98.3)/ 2 (1.6)	175 (97.2)/ 5 (2.7)	0.703
Seroma Formation: No/ Yes	115 (95.83)/ 5 (4.16)	170 (94.4)/ 10 (5.5)	0.174
Urinary Fistula: No/ Yes	120 (100.0)/ 0 (0.0)	179 (99.4)/ 1 (0.5)	0.318
Wound Infection: No/ Yes	118 (98.3)/ 2 (1.6)	166 (92.2)/ 14 (7.7)	0.379
DSSI	0	1	0.427
SSSI	1	4	

Discussion

Few studies have shown the role of cefazolin in prevention of infection after various types of abdominal wall hernia repair. In a study done by Mostafa Mehrabi Bahar, et al. [1], this is a prospective randomised study. This study evaluated wound infection rates in 395 patients with various kinds of hernia who underwent elective mesh repair using polypropylene mesh from 2007 to 2011. A total of 237 (60.0%) patients received prophylactic cefazolin (study group) and the remaining 158 (40.0%) patients did not receive any prophylactic antibiotics (control group). Patients were followed for infection at the following periods after the operation by an independent surgeon: 10 days, 30 days, 12 months, and then annually for at least 2 years. The results were eight (2.03%) patients had infection in the site of surgery {2 (1.27%) in the control group and 6 (2.53%) in the study group}. The distribution of infection was not significantly different between the two groups (p Z 0.364). The superficial infections were managed by drainage and irrigation. One patient from the study group developed deep SSI and was read- mitted and subsequently received antibiotic therapy, drainage, and debridement. This study concluded that preoperative administration of cefazolin in a single dose for prosthetic hernia repairs did not markedly decrease the risk of wound infection. This study results did not support the use of cephazolin as a prophylactic for various kinds of abdominal wall hernia repair with mesh. In a study conducted by

Muhammad Khan, et al. [2], it was a descriptive study which was conducted to determine the frequency of surgical site infection in mesh repair for inguinal hernias. It was conducted in Surgical Department, Peshawar institute of medical sciences Hayatabad Peshawar from July 2011 to March 2013. 100 male patients with primary and recurrent inguinal hernias were subjected to hernia repair with prolene mesh after taking written informed consent. They were followed up for any surgical site infection and if found then culture sent and data was collected and analyzed. The results were Majority 28% cases were in the age range of 51-60 years. The right sided hernia was found in 64% cases and in 61% cases indirect inguinal hernia recorded. The overall frequency of surgical site infection was 06% and culture reports showed that staphylococcus aureus was the commonest organism responsible for surgical site infection in 4% cases, staphylococcus epidermidis in 1% case and Escherichia coli in 1% case.

Another double-blind prospective randomized trial in 200 patients selected to receive elective inguinal hernia surgery with mesh repair demonstrated no significant difference between the cefazolin and placebo groups (7% in the study group and 5 % in the placebo group, p Z 0.38). They concluded that antibiotic prophylaxis has no benefit in the incidence of SSI in elective repair of inguinal hernias with mesh [3]. Similar results were documented by Jain, et al. [4], Tzovaras, et al. [5], which did not support the use of prophylactic antibiotics in low-risk patients with inguinal mesh hernioplasty. The nationwide Danish Hernia Database, which records > 10,000 inguinal and 400 femoral hernia repairs annually, suggests that routine prophylactic antibiotics are not indicated [4, 6]. The overall risk of infection was 2.03%, which was similar to other studies [7-9]. In some studies, deep SSI eventually led to graft loss [10, 11], but in our study the infected prosthesis was subjected to debridement without the need for graft removal. The European Hernia Society guideline for inguinal repair recommended antibiotic prophylaxis in the presence of wound infection risk factors such as recurrence, advanced age, immunosuppressive conditions and steroid use, emergency conditions, long operating duration, and use of drains; it is not recommended for low-risk patients < 5%) and in endoscopic hernia repair [12].

This study concluded that prolene mesh is a safe and better procedure with an acceptable complication like infection and is strongly recommended the first treatment option for patients with primary and recurrent inguinal hernias with good antibiotics cover preoperatively.

Conclusion

This study results did not support the use of cefazolin as a prophylactic for various kinds of abdominal wall hernia repair with mesh. Pre-operative administration of cefazolin in a single dose for prosthetic hernia repairs did not markedly decrease the risk of wound infection.

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