



ORIGINAL ARTICLE

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



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## KEYWORDS

antibiotic  
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surgical mesh;  
ventral

**Summary** *Objective:* There are controversies about the benefits of prophylactic antibiotics in the prevention of postoperative surgical site infection (SSI) in mesh herniorrhaphy for a long time. This study aimed to evaluate the effectiveness and efficacy of systemic prophylactic cefazolin in prevention of wound infection in various types of hernia repair with mesh materials. *Methods:* This is a prospective randomized control study. We 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.

*Results:* 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 ( $p = 0.364$ ). The superficial infections were managed by drainage and irrigation. One patient from the study group developed deep SSI and was readmitted and subsequently received antibiotic therapy, drainage, and debridement.

*Conclusion:* Preoperative administration of single-dose cefazolin for prosthetic hernia repairs did not markedly decrease the risk of wound infection. Our results do not support the use of

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cefazolin as a prophylactic antibiotic for various kinds of abdominal wall hernia repair with mesh.

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## 1. Introduction

Abdominal wall hernia is defined as an abnormal protrusion of an organ through actual anatomic weaknesses or defects. The most commonly involved sites are the inguinal and femoral region (75%), umbilical and epigastric region (10%), and midline and sites of prior incisions (15–20%). The actual incidence of incisional hernia is unknown but 3–20% of laparotomies performed annually may result in ventral hernia.<sup>1</sup>

Inguinal hernia's lifetime risk is 27% and 3% in men and women, respectively. In the field of general surgery, hernia repair is one of the most common and important operations performed because of the significant lifetime incidence of hernia and availability of a variety of successful treatment procedures.<sup>1,2</sup> After the introduction of prosthetic material for hernia repair, because of its role in reduction of recurrence rate between 50% and 75% and simple performance,<sup>3–5</sup> mesh repair has been worldwide accepted as the gold standard in the elective management of inguinal hernia types.<sup>6</sup> Various mesh herniorrhaphy techniques include tension-free reconstruction of the posterior inguinal canal with anterior approach (Lichtenstein), anterior preperitoneal repairs through standard groin incision (Read-Rives) or through lower midline incision (Stoppa), and Rives procedure in which the prosthesis is placed between the rectus abdominis muscle and the posterior sheath.<sup>6</sup> Although the hernia repair operations are considered clean procedures, surgical site infections (SSIs) are common complications, leading to increases in length of hospitalization and costs. The incidence of SSI after these surgeries varies from 1.7% to 14% that can be influenced by the location of incision, elective or emergent condition, length of operation, surgical techniques including poor closure, tissue trauma, wound contamination, hemostasis, tissue damage, diabetes, chronic steroid use, smoking, malnutrition, obesity, prior hernia incision infections, foreign material in surgical site, chronic skin infections, and other site infections.<sup>5,7–10</sup>

The infection can produce pain and lead to poor wound healing and increases in hospital stay and costs. The risk of infection can be decreased using a proper operative technique, decreasing operative time, using a preoperative antiseptic skin cleaner, and by appropriate shaving.<sup>1,7–9</sup> Although several studies were performed to evaluate the benefits of different kinds of antibiotics in prevention of postoperative SSI after inguinal mesh herniorrhaphy, their role remains controversial.<sup>7,11–15</sup>

To our knowledge, only a few studies evaluated the role of prophylactic antibiotics in preventing postoperative SSI after repair of other types of abdominal wall hernia with mesh.<sup>16</sup> Thus, this study aimed to evaluate the

effectiveness and efficacy of systemic prophylactic cefazolin in the prevention of wound infection in various types of hernia repair with mesh materials.

## 2. Patients and methods

This is a prospective randomized control study, which was performed to evaluate the effectiveness and efficacy of systemic prophylactic cefazolin in the prevention of postoperative wound infection in various hernia repairs with mesh materials. Participants included 395 patients with various kinds of hernia (inguinal, femoral, bilateral, incisional, umbilical, and lumbar hernias) who were candidates for elective mesh repair in Imam Reza Hospital, Mashhad University of Medical Sciences, Mashhad, Iran from September 2007 to October 2011. We excluded the following: patients undergoing emergency operations; immunocompromised patients with underlying diseases such as renal failure, cirrhosis, diabetics, malignancy; corticosteroid and immunosuppressive drug users; patients with use of preoperative antibiotics for different reasons > 1 week prior to surgery; patients' allergy to antibiotics; and patients under the age of 18 years. All patients were recommended to take a bath the night prior to surgery.

Based on an alternate-day randomization system, 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. Cefazolin was chosen because of its bactericidal activity against the pathogenic organisms in skin wound infections. The half-life time of cefazolin is 1.5–2.5 hours, and therefore, it will have effective therapeutic levels during the course of the procedure. In the operating room, after shaving the surgical site and completion of skin preparation with povidone–iodine solution, we used a plastic sterile drape over the surgical site. All patients received general anesthesia. The following operation procedures were performed: Lichtenstein [in 58 (14.7%) patients], Read-Rives [in 52 (13.2%) patients], Stoppa [in 143 (36.2%) patients], and Rives [in 142 (35.9%) patients].

The mesh material was a monofilament polypropylene mesh (Promesh Light, Pe'ters Surgical, France) 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 below 40–50 cm<sup>3</sup>/d.

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