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Clinical Curative Effect of Mesalt Combined with Mepilex Dressing in Postoperative Infection of Inguinal Hernia

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Statistical Analysis C
Data Interpretation D
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Background: Inguinal hernia is a common surgical disease. Tension-free hernioplasty is currently commonly used for its treatment, with multiple advantages such as simple surgical method, low recurrence rate, and ability to be performed in primary care hospitals, but the risk of incision infection still exists. Mild infection can be cured by local washing, dressing, and systemic antibiotics. If the infection is severe, the wound may not heal after removing the patch, and secondary suturing is needed.





Material/Methods: A total of 60 patients with postoperative infection after tension-free repair of inguinal hernia were randomly divided into control (n=30) and treatment (n=30) groups. Patients in the treatment group received Mesalt combined with Mepilex for dressing while the patients in the control group received conventional gauze for dressing. Pain degree, wound healing time, and dressing times were observed.

Results: The clinical therapeutic effect in the treatment group was significantly better than in the control group. The treatment group exhibited significantly less pain when patients receive dressing, shorter wounds healing time (15 ± 3.5 vs. 30 ± 5.0), and less dressing frequency (10 ± 2.1 vs. 20 ± 2.4).

Conclusions: Mesalt combined with Mepilex can effectively improve postoperative infection after inguinal hernia treatment, obviously reducing pain, shorting wound healing time, and decreasing dressing frequency. It can be widely used in clinical practice.

MeSH Keywords: **Acinetobacter Infections • Hernia, Inguinal**

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Background

Inguinal hernia is one of the more common surgical diseases. Traditional hernia repair was mostly applied for the treatment of inguinal hernia before 1997 in China. However, it is characterized by severe pain, slow postoperative recovery, and high recurrence rate [1]. Following the development of new patch materials, tension-free repair began to be widely used in China as a relatively new method since 1997 [2]. It is characterized by simpler surgical method, lower recurrence rate, and can be implemented in basic-level hospitals, but risk of incision infection remained a problem. Mild infection can be treated by local washing, frequent dressing, and systemic antibiotics, but severe infection may appear at the wound nonunion after removing the patch and need secondary suturing, which increase pain and economic burden [3–6]. We enrolled a total of 60 patients with postoperative infection after tension-free repair of inguinal hernia in our Department of General Surgery from June 2013 to July 2014 to compare the curative effect of Mesalt combined with Mepilex versus traditional oil gauze dressing on incision infection healing.

Material and Methods

Materials

Main materials

Traditional oil gauze dressing, size 10×10 cm was bought from the Coloplast Company (Denmark). Mepilex, size 10×10 cm, was purchased from Sweden Molnlycke Health Care Co., Ltd. Hypertonic Mesalt, size 10×10 cm was purchased from Sweden Molnlycke Health Care Co., Ltd.

Experimental specimens

Sixty patients in our hospital treated from January 2013 to January 2014 with postoperative infection after tension-free repair of inguinal hernia were randomly and equally divided into control and treatment groups. There were 15 males and 15 females in the treatment group with average age 40 ± 3.5 years, and 18 males and 12 females in the control group with average age 41 ± 4.2 years. Age, sex, infection area, and infection severity between the 2 groups showed no significant differences. No patients presented smoking history or were overweight. All patients received laparoscopic tension-free repair of inguinal hernia through the preperitoneal space (a Holycon polypropylene mesh patch was used). Patients received skin preservation care from an experienced nurse before the operation, and intravenous second-generation cephalosporin class antibiotics were used to prevent infection on the day before surgery and 2 days after surgery. Lidocaine use was reduced. All patients received tension-free repair of inguinal hernia.

Patients with coronary atherosclerotic heart disease, hypertension, or diabetes were excluded. No drugs such as corticosteroids that may affect wound healing were used.

The study protocol was approved by the Research Ethics Committee of our hospital, and all patients gave their informed consent before study commencement.

Methods

Patients in the treatment group received Iodophor for local disinfection. Hypertonic Mesalt was used after sufficient drainage and the Mepilex was used to cover externally (dressing daily). When the necrotic tissue and purulent secretion had been eliminated and the granulation became red, the dressing interval changed to 2 days. Adhesive plaster was applied to draw the wound to achieve final healing (without secondary suture) when the granulation tissue was close to the skin surface. All treatment group patients were treated by experienced doctors.

Patients in control group received Iodophor for local disinfection; the wound was covered by medical Vaseline oil gauze and fixed with sterile gauze and adhesive plaster after sufficient drainage (dressing daily).

Observation index

Pain degree: Visual analogue scale (VAS) method [7] was used to evaluate the pain degree: a 100-mm line with 0 points and 10 points as the 2 ends was used to record patients' feeling of pain degree. Infectious wound healing time was defined as the time from the first dressing to wound healing with no secretion. Dressing frequency was defined as the time from the first dressing to wound healing with no secretion.

Statistical analysis

Numerical data are presented as means and standard deviation (\pm SD). All statistical analyses were performed using SPSS17.0 software (Chicago, IL). Differences between means were analyzed using Student's t test. P-values <0.05 were considered statistically significant.

Results

Pain degree score comparison: the mean VAS score in the control group was 5.32 ± 0.65 , which was significantly higher than in the treatment group (1.98 ± 0.78) ($P<0.05$) (Table 1).

Wound healing time comparison: the wound healing time in the control group was 30 ± 5.0 , which was significantly longer than in the treatment group (15 ± 3.5) ($P<0.05$) (Table 2).

Table 1. Pain degree score comparison in two groups.

Group	Cases	Mean VAS score
Control group	30	5.32±0.65
Treatment group	30	1.98±0.78

Mean VAS score in treatment group was lower than in control group, P<0.05.

Dressing frequency comparison: the dressing frequency in the control group was 20±2.4, which was obviously higher than in the treatment group (10±2.1) (P<0.05) (Table 3). Image contrast before and after treatment in the treatment group is shown in Figure 1 and image contrast before and after treatment in the control group is shown in Figure 2.

Discussion

Inguinal hernia surgery incision infection can be divided into deep and shallow infection. Infection that occurs under the aponeurosis of the obliquus externus abdominis is called deep infection, while infection that occurs above the aponeurosis of the obliquus externus abdominis is called shallow infection [8–10]. Shallow infection without involving the patch can be cured by simple local dressing. However, such an infection often affects the inferior aponeurosis obliquus externus

Table 2. Wound healing time comparison in two groups.

Group	Cases	Wound healing time
Control group	30	30±5.0
Treatment group	30	15±3.5

Wound healing time in treatment group was shorter than in control group, P<0.05.

Table 3. Dressing frequency comparison in two groups.

Group	Cases	Dressing frequency
Control group	30	20±2.4
Treatment group	30	10±2.1

Dressing frequency in treatment group was fewer than in control group, P<0.05.

abdominis if treatment is not timely or is incomplete, and which has evolved into deep infection. Deep infection is quite serious for it can form a fistula if the treatment is not complete, leading to protracted infection. Thus, treatment of inguinal hernia surgery incision infection is receiving increasing clinical attention.

Local absorbent gauze external application is traditionally used for inguinal hernia incision infection treatment. However,



Figure 1. Treatment in treatment group. (A) Pretreatment; (B) after 2nd dressing; (C) after 5th dressing; (D) after 7th dressing; (E) after 8th dressing; (F) after 10th dressing.

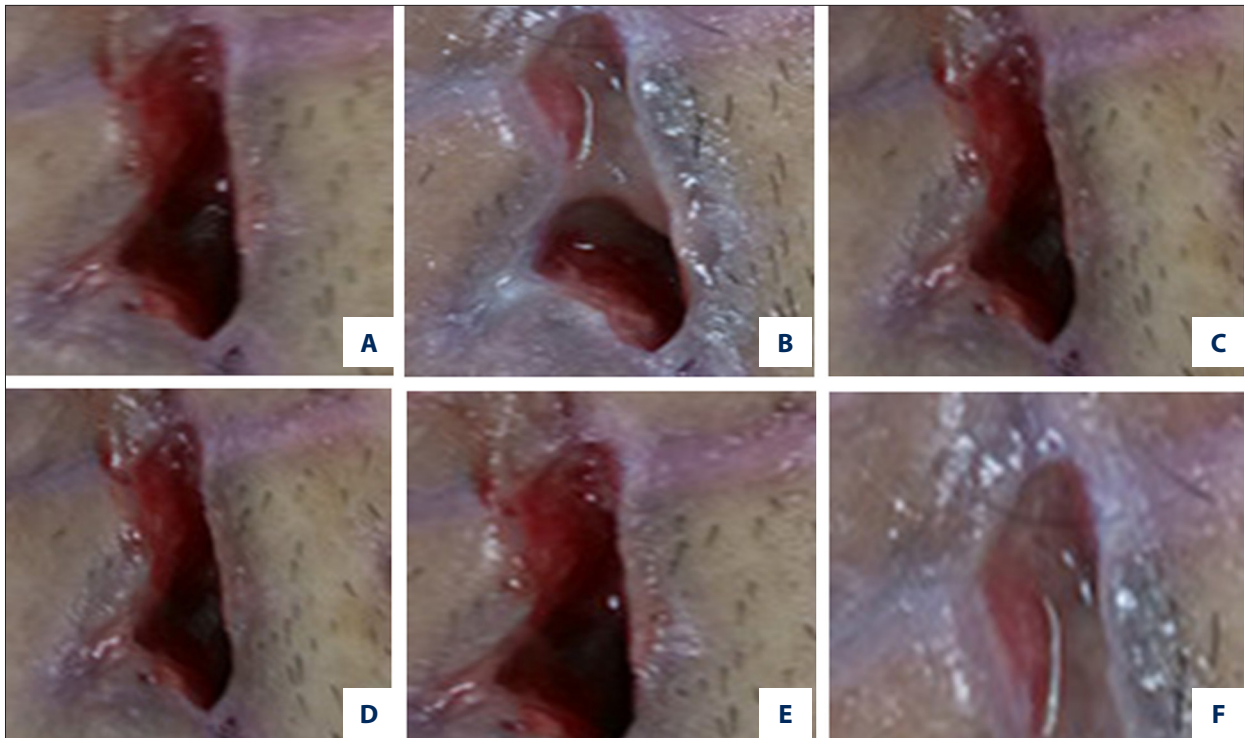


Figure 2. Treatment in control group. (A) Pretreatment; (B) after 2nd dressing; (C) after 5th dressing; (D) after 7th dressing; (E) after 8th dressing; (F) after 10th dressing.

because the wound skin damage may cause secretion, and the absorbent gauze may quickly harden after absorbing the secretion, gauze accessories may adhere to the wound tissue, resulting in bleeding and pain during dressing changes. This can lead to increased dressing frequency and risk of festering wound infection [11–14]. The latest international trend in wound infection treatment is wet healing. In clinical treatment, multiple active dressings can soften and dissolve necrotic tissue, and eventually remove the necrotic tissue. They can keep the environment around the wound wet, which promotes epithelial tissue hyperplasia and promotes faster wound healing [15,16].

Mepilex is composed of a wound contact layer that is in direct contact with the infected surface, a polyurethane foam layer that can absorb the secretion, and a waterproof, breathable external film layer [17]. The wound contact layer contains a soft silicone component that is very soft and does not produce adhesion when contacting the wound. It caused no pain when removing dressings, even from dry wound surfaces, which avoids secondary damage to the wound. The polyurethane foam layer is composed of flexible polyurethane foam that can absorb wound secretions, thereby keeping the wound in a humid environment for a long time to promote epithelial cell proliferation. It can also seal the wound edge, thus preventing secretions from leaking to normal tissue, which can improve comfort. The external film layer is waterproof, breathable, and flexible. The dressing shape can be changed according to the wound

size. Mepilex application has achieved good effects in burns, diabetes, and bed sore wound infection compared with traditional dressing [18–20].

Hypertonic Mesalt mainly contains of 2 components: 28% sodium chloride and absorbant polyester fiber [21]. Hypertonic sodium chloride can provide a hypertonic environment for wound, which can absorb a large amount of secretion, leaving the wound drainage unobstructed. Furthermore, reduced secretion can prevent wound adhesion. Necrotic material removed from the wound can make the bacteria lose growth their carrier and avoid granulation tissue edema, which promote wound debridement. Mesalt can be replaced fast and conveniently with no residue. It does not generally adhere to the wound, so the dressing procedure does not easily cause wound bleeding. Studies have reported that some patients feel pain when using Mesalt, but only about 1% of patients had sustained pain for more than 5 hours, which may be related to the hypertonic sodium chloride component that stimulates the wound [22–26], thereby limiting its use in clinical wound treatment. Our study did not find pain increase after Mesalt use; this may be related to the decreased adverse effects by combined Mepilex usage.

We compared the curative effect of Mesalt combined with Mepilex versus traditional oil gauze dressing on incision infection healing, and found that Mesalt combined with Mepilex

can effectively reduce pain, shorten wound healing time, and decrease dressing frequency. Thus, it can reduce the patients' pain and economic burden, and can be widely used in clinical practice.

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Conclusions

Hypertonic Mesalt combined with Mepilex can effectively improve postoperative infection after inguinal hernia treatment, obviously reducing pain, shorting wound healing time, and decreasing dressing frequency. It can be widely used in clinical practice.