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Application value of drainage technique in biological patch

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ABSTRACT

Objective The reliability and necessity of the drainage technique were discussed by comparing the application of drainage technique in the clinical application of acellular matrix material biological mesh. **Method** Forty-three patients with inguinal hernia were divided into two groups, all of whom were treated with Biodesign Surgisis（SIS） biological mesh for inguinal hernia repair. Twenty-one patients in the experimental group were treated with drainage technology, while 22 patients in the control group were not treated with drainage technology. The postoperative indicators and complications such as seroma, postoperative infection and chronic pain in the two groups were statistically analyzed. **Result** After statistical observation and comparison, there was a significant difference in postoperative seroma between patients with and without drainage devices (P<0.05).There was no significant difference in postoperative indicators, postoperative infection, postoperative chronic pain, postoperative foreign body sensation, postoperative recurrence, etc. (P>0.05).**Conclusion** The application of drainage device can reduce the occurrence of adverse events of seroma after the repair of inguinal hernia with acellular matrix material biological mesh.

Keywords: biological patch; Seroma; Tension-free herniorrhaphy; The drainage device

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1. INTRODUCTION

In recent years, with the development of materials science, decellularized tissue matrix material（ACTM） mesh has been gradually applied in hernia and abdominal wall surgery. This kind of mesh can be used to repair tissue defects through spatial induction and tissue replacement, and to strengthen the weak area with its own tissue cells, which has good histocompatibility. Because this kind of mesh is more in line with the principle of repair, and has the advantages of anti-infection and absorbability, it has gradually been widely used[1]. However, in the application process, it was also found that seroma and Surgery area effusion rate were higher[2,3,4,5,6,7]. This study focused on the relationship between the use of drainage technique and postoperative seroma formation. In order to reduce the above adverse reactions, guide clinical practice, improve the patient's rehabilitation process.

2. MATERIALS AND METHODS

2.1 general information

This study adopted a prospective group control study, and 43 patients were selected for observation, all from the department of basic surgery, affiliated hospital of hebei university, with a time span of 2017.9-2018.9.The random number table method was used to divide 43 patients into two groups. Patients using drainage technology were selected as the experimental group, and patients without indwelling drainage device during the same period were selected as the control group.

Patients were selected based on the criteria of adolescents or those with fertility requirements. There were 21 patients in the experimental group and 22 patients in the control group, all of whom were male. The experimental group ranged in age from 15 to 34 years, with an average age of 26 years. The control group was aged 16-35 years, with an average age of 27 years. There was no significant difference in age, hernia type and complications between the two groups (P>0.05), which was comparable. Both groups of patients had unilateral indirect inguinal hernia, and the SIS biological mesh was used to repair the inguinal hernia without tension. Patching material: Biodesign Surgisis (SIS) biological mesh, provided by COOK company, the specification is 6×13cm.

2.2 surgical methods

Operative points: Lichtenstein tension-free repair was used in all operative methods. The skin, fat, superficial fascia and aponeurosis of the external oblique were cut layer by layer. Free the spermatic cord, protect the nerve. Free the hernia sac to the neck of the hernia sac, the hernia sac was incorporated into the abdominal cavity, the SIS mesh was removed under sterile conditions and soaked in normal saline for 2 to 3 minutes. Trim the mesh and place it flat on the back of the inguinal canal. The upper and lower ends of the mesh were 2 ~ 3cm longer than the pubic tubercle and the inner ring orifice respectively, and the inner and lower sides were fixed with the pubic tubercle and inguinal ligament respectively, and the upper part was fixed with the combined tendon. After that, the experimental group placed 18# negative pressure drainage tube in the inguinal canal, which was extracted through the skin prick hole and the operative orifice was sutured layer by layer. The control group was sutured layer by layer.

2.3 Postoperative management and recording

Patients in the two groups could get out of bed by themselves after 1 day in bed，Postoperative prophylactic use of oral antibiotics was generally 3d.The amount of drainage fluid was observed and recorded routinely in the experimental group, and the drainage tube was removed according to the drainage condition of the drainage tube. Postoperative seratoma, postoperative pain, postoperative body temperature, postoperative hospitalization days, preoperative and 24h postoperative laboratory examination indexes of the two groups were recorded.

2.4 Postoperative follow-up

After the patients left the hospital, they came to the outpatient department for reexamination 1, 3 and 6 months after the surgery. Reexamination included: ultrasound, postoperative recurrence, wound infection, chronic wound pain, local foreign body sensation and other postoperative complications. Patients in both groups were followed up for 6 months, and no case was terminated.

2.5 Statistical analysis

SPSS19.0 software was used to process the data, $\bar{x} \pm S$ was used to conduct statistical measurement data. T test was used to conduct statistical analysis of the data between the two groups of independent samples, and Fisher's exact probability test of the data in the four-grid table was performed on the counting data. P<0.05 was considered as significant difference.

3. RESULT

3.1 Postoperative drainage of drainage devices

The postoperative drainage fluid of the patients in the experimental group was yellowish-red hemorrhagic fluid. The drainage fluid gradually decreased 5 to 7 days after the surgery, and the drainage device was removed after there was no active drainage fluid. Among them, the maximum drainage fluid was 20ml on the second day after surgery, and the minimum was 2-5ml. Among the 21 patients, the average drainage fluid was 16ml/d within 3 days after surgery. Drainage fluid was significantly reduced in all patients after 3 days.

3.2 Postoperative seroma

All the 21 patients in the experimental group complete removal of the drainage device after the surgery, and were observed and followed up for 6 months after the surgery. One patient was re-hospitalized 18 days after discharge with intraoperative seratoma, which was improved by dressing change and drainage, and no abnormalities were found in the rest. In the control group, 22 patients recovered successfully after surgery and were discharged from the hospital. Among

them, 7 patients were re-hospitalized or outpatient for seroma (no special diet or exercise outside the hospital) on 7, 10, 15, 17, 18, 19 and 22 days after discharge. Conservative treatment such as dressing change and drainage improved. The patients in the control group were followed up for 6 months. By Fisher's exact probability test of the data in the four-grid table, P<0.05 (P=0.046), the difference between the two groups was significant and had clinical significance （Table 1.

Table 1

group	The number of samples	Postoperative seroma
experimental group	21	1
control group	22	7
P	-	0.046

3.3 Postoperative body temperature

Experimental group postoperative body temperature fluctuations in 36.6 ~ 38.9 ℃.The control group of postoperative body temperature fluctuations in 36.4 ~ 38.8 ℃.Before discharge, the temperature of patients in both groups was in the normal range. Through T test, P>0.05, the difference was not significant（Table 2).

Table 2

group	The number of samples	postoperative body temperature
experimental group	21	37.3±0.7℃
control group	22	37.4±0.8℃
P	-	0.641

3.4 Preoperative/postoperative laboratory examination

The blood routine WBC count (*10^9/L) and neutrophil percentage (%) of the two groups before（B） and 24 hours after the operation（A） were compared. The date is expressed as $\bar{x} \pm S$. By t test, p<0.05 was considered statistically significant and the clinical difference was significant. The statistical results showed that there was no significant difference between the two groups in preoperative/postoperative laboratory tests（Table 3).

Table 3

group	B WBC	A WBC	B N%	A N%
experimental group	7.26± 0.83	13.12± 0.95	66.7± 1.53	83.0± 3.86
control group	7.31± 0.76	13.01± 0.92	67.3± 1.63	82.2± 3.91
P	0.830	0.697	0.208	0.497

2.5 Postoperative hospitalization days

Postoperative days of hospitalization in the experimental group ranged from 5 to 7 days. Postoperative days of hospitalization in the control group ranged from 4 to 7 days. After t test, P>0.05 (P=0.251) ，showed no significant difference between the two groups（Table 4).

Table 4

group	The number of samples	**Postoperative hospitalization days**
experimental group	21	6.05± 0.87
control group	22	5.73± 0.935
P	-	0.251

3.6 Postoperative complications

All patients in both groups were followed up for 6 months after surgery, and no incision infection or postoperative chronic pain was found. In the reexamination 6 months after surgery, 3 patients in the experimental group still had local foreign body sensation in the surgical range, while 5 patients in the control group had local foreign body sensation. X^2 test showed that P>0.05 (P=0.698), and no significant difference was found between the two groups.

4 DISCUSSIONS

SIS mesh materials were obtained from the submucosal tissue of the small intestine of pigs. It is a widely used biological mesh. With the increase of its use, seroma and hydrops are gradually observed to be an important postoperative complication compared with other biological patches [7,8,9]. Ansaloni et al[4] applied SIS mesh to 45 patients with inguinal hernia, and short-term postoperative local and systemic complications such as seroma and fever occurred, which all recovered by themselves. During 2 years of postoperative follow-up, some patients had mild foreign body sensation without swelling or recurrence. Gupta A[7] conducted A retrospective study on 74 patients with abdominal hernia who were repaired with biological mesh. Among them, 41 patients were treated with SIS mesh and 33 patients with human dermal biological mesh. Among them, 11 patients were treated with unperforated SIS mesh, 10 patients had obvious seroma formation, and 3 of 30 patients were seroma with perforated SIS mesh. Two of the patients treated with the latter had seroma formation. All these clinical practices indicated that postoperative seroma and hydrops were common complications in the use of SIS mesh.

In this study, 21 patients in the experimental group were hospitalized after surgery and were followed up for 6 months,1 patients were found to have seroma. During the follow-up of 22 patients in the control group, 7 patients were found to have seroma. X^2 test showed that P<0.05 (P=0.046), indicating a significant difference. Postoperative seratoma complications directly affect the wound healing and the discomfort of the operative area. There was no significant difference in postoperative body temperature, laboratory examination, number of days in hospital and follow-up of chronic pain in the operative area (P>0.05).

At present, the mechanism of seroma is believed to be as follows: 1. Seroma is caused by lymphatic fistula caused by cutting off a large number of lymphatic vessels during surgery.2. The internal surface of SIS mesh is not fully chimeric with human fascia tissue.3. Foreign antigen reaction may be involved in its production mechanism.4. Infectious factors.

Franklin[5] applied SIS mesh to 53 hernia patients with contamination and infection. The patients were followed up for an average of 19 months.Ueno[6] reported the incidence of early postoperative complications in 20 patients with contaminated or infected abdominal wall defect repaired with SIS mesh, which was 50%, including 2 cases of seroma, 1 case of intestinal obstruction, 8 cases of wound infection and 1 case of necrotizing fasciitis. The mean follow-up was 15.7 months, 6 patients had recurrence, and the recurrence rate was 30%.

In this study, no intraoperative infection or recurrence occurred in the experimental group and the control group during the 6-month follow-up after surgery, and there was no significant difference between the two groups (P<0.05).

The following points should be noted in the application of SIS mesh: 1. Sterility should be strictly carried out for skin preparation in the operative area. 2. Disinfectant should be permeable, such as iodine alcohol disinfection surgery area. 3. Apply surgical film according to the situation. 4. Antibiotics are not routinely used for the time being，and relevant studies have shown that antibiotic prophylaxis can reduce intraoperative infection by more than 50% [10]. 5. Try to electrocoagulate and stop blood flow. Absorbable suture should be selected for ligation of the great veins to reduce foreign body reaction at the thread head.6. It is recommended to apply monofilament slow absorption suture to fix the mesh.7. The drainage device should be removed 5 to 7 days after surgery.

In conclusion, for SIS mesh, drainage devices should be routinely placed to reduce the incidence of secondary hospitalization due to seroma or incision infection and poor healing after surgery, So that patients can really benefit.

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