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Original Article

Comparison of the effect of different ostomies on patients with Bartholin's cyst

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Abstract: Objective: To compare conventional ostomy and marsupialization ostomy in intraoperative blood loss, pain, and clinical symptom scores in patients with Bartholin's cyst. Methods: A total of 136 patients with Bartholin's cyst admitted to our hospital were enrolled and assigned to a control group (Con group, n=62) and a research group (Res group, n=74). The former group was treated with conventional ostomy, while the later group was treated with marsupialization ostomy. The two groups were compared in clinical pain score, changes in clinical indexes after surgery, visual analog scale (VAS) score before and after surgery, recurrence rate, recovery of glandular function, and incidence of complications after surgery, efficacy, and treatment satisfaction. Results: The Res group showed a more obvious alleviation in clinical symptoms than the Con group after surgery, suffered less intraoperative blood loss, experienced shorter operation time and hospital stay than the Con group (All $P < 0.05$). Additionally, after surgery, both groups showed a decrease in VAS score, and the decrease in the Res group was more notable (both $P < 0.05$). Moreover, compared with the Con group, the Res group showed a lower recurrence rate (P=0.045), better recovery of glandular function (P=0.035), a lower incidence of complications (P=0.023), a notably higher total effective rate (P=0.012), and notably higher treatment satisfaction (P=0.017). Conclusion: Marsupialization ostomy can better alleviate the intraoperative blood loss and pain of patients with Bartholin's cyst and more effectively reduce their clinical symptoms score than the conventional ostomy.

Keywords: Marsupialization ostomy, Bartholin's cyst, clinic

Introduction

Greater vestibular gland cyst, also known as Bartholin's cyst [1], is caused by chronic inflammation, congenital gonad stenosis and injury causing stenosis of glandular duct of greater vestibular gland and accumulation of secretions in the gland cavity [2]. Bartholin's cyst is a highly infectious disease in the gynecology department, which can easily give rise to malignant cyst [3]. Generally, small cysts show no clinical symptoms, while large cysts are characterized by vulvar distension and accompanied by intense pain, which can take its toll on patients' walking ability in severe cases [4]. Bartholin's cyst is common in women of childbearing age and those before menopause [5]. According to statistics, people face a higher risk of suffering from the disease as they grow older before menopause, but a lower risk of getting the disease after menopause [6]. As the society develops, adolescent girls mature earlier, which increases the incidence rate getting the Bartholin's cyst and thus affects the daily life and psychological burden [7]. Currently, early Bartholin's cyst is mostly treated by antibiotics due to its signs of infection, and regular reexamination is recommended [8]. However, most patients with the disease have no obvious symptoms at the early phase, so they are prone to ignore its development. Patients whose Bartholin's cyst recurred at the time of diagnose and mayrequire surgical treatment [9]. The safety and effectiveness of surgery is of great significance for patients with Bartholin's cyst, especially for women of childbearing age.

Conventional ostomy is a routine treatment for Bartholin's cyst [10], with simple operation, little damage and no influence on glandular function [11]. Yoshida H et al. [12] have pointed out the favorable effect of conventional ostomy on

Bartholin's cyst. As medical technology progresses continuously, marsupialization ostomy is increasingly applied in the treatment of Bartholin's cyst [13]. One study has revealed that marsupialization ostomy is beneficial for alleviating the inflammatory reaction of patients, and its convenient operation steps are beneficial for patients [14]. Conventional ostomy and marsupialization ostomy have been compared in related studies, but the comparison data are not unified. For determining a better and more effective surgical treatment for Bartholin's cyst, this study compared and analyzed conventional ostomy and marsupialization ostomy in intraoperative blood loss, pain, and clinical symptom scores in patients with Bartholin's cyst.

Materials and methods

General data of patients

A total of 136 patients with Bartholin's cyst admitted to West China Second Hospital, Sichuan University between 2018 and December 2019 were enrolled and assigned to a control group (Con group, n=62) and a research group (Res group, n=74). The former group was treated with conventional ostomy, while the later group was treated with marsupialization ostomy. This experiment was approved by the Ethical Committee of West China Second Hospital, Sichuan University.

Inclusion and exclusion criteria

The inclusion criteria of the study: Patients who were diagnosed as Bartholin's cyst via laboratory examination in our hospital and required surgical treatment (conventional ostomy or marsupialization ostomy), patients at 18 years old or older, and patients who and whose family members signed informed consent forms after being confirmed of the study.

The exclusion criteria of the study: Patients in an acute inflammation of greater vestibular gland who had no formed abscess or cyst, patients with surgery contraindication, patients with abnormal liver or kidney function or coagulation, patients without self-management ability and those with low compliance.

Surgical methods

For the Con group: After local anesthesia, the labia minora of each patient was turned out, and a vertical incision (0.5-1 cm) was cut at the junction of the skin and mucous membrane outside the root of the hymen from the weak part of cyst protrusion point. Then the mucosa and cyst wall were cut off to exclude pus, followed by repeated washing and intermittent suture with a 2-0 chromic catgut or 4-0 silk thread, so that the opened cyst wall completely covered the wound edge of vaginal vestibular mucosa, and a new gland tube was formed at the center of stoma. Gauze strips were adopted to pack the sac or pus cavity for drainage. The gauze strips for drainage were replaced each day after surgery.

For the Res group: After local anesthesia, a 0.2-0.3 cm incision was cut to the cyst cavity of each patient. Then the pus was excluded, followed by repeated washing of the glandular cavity. A prepared latex strip was made to pass through the incision and to be off the cyst cavity, and then knotted and fixed outside the cyst. The patient was given routine anti-infection treatment after surgery, and required to take sitz bath with 1/5000 potassium permanganate solution, and the latex strip was taken out 10 days after surgery. Finally, the patient's wound healing was evaluated.

Outcome measures

The clinical symptoms (pain, perineal swelling, walking difficulty, secretions increase, and perineal discomfort) of the two groups were scored. More serious symptoms were scored higher. Additionally, the two groups were compared in changes in clinical indexes after surgery, visual analog scale (VAS) score before and after surgery, recurrence rate, recovery of glandular function, and incidence of complications after surgery, efficacy, and treatment satisfaction.

Statistical analyses

This study adopted SPSS24.0 (Yuchuang Network Technology Co., Ltd., Shanghai, CN) to statistically analyze all experimental results. Enumeration data, expressed as the (%), were compared between groups via the chi-square test, and measurement data, expressed as the mean ± SD, were compared between groups and among groups using the t test and one-way anova, respectively. Additionally, the LSD test was adopted for back testing. Data at multiple times were compared via the repeated mea-

Table 1. General data [n (%)]

	The research group (n=74)	The control group (n=62)	t or X^2	*P*-value
Age (Y)	23.7±3.2	24.6±3.4	1.588	0.115
BMI (KG/cm^2)	23.12±3.23	23.46±3.71	0.571	0.569
Course of disease (d)	5.64±2.63	5.72±2.55	0.179	0.858
Residential environment			0.113	0.737
Urban area	53 (71.62)	46 (74.19)		
Rural area	21 (28.38)	16 (25.81)		
Exercise habit			0.117	0.731
Yes	36 (48.65)	32 (51.61)		
No	38 (51.35)	30 (48.39)		
Excessive smoking history			0.040	0.842
Yes	19 (25.68)	15 (24.19)		
No	55 (74.32)	47 (75.81)		
Excessive drinking history			0.355	0.551
Yes	25 (33.78)	24 (38.71)		
No	49 (66.22)	38 (61.29)		
Dietary habit			0.295	0.587
Regular	30 (40.54)	28 (45.16)		
Irregular	44 (59.46)	34 (54.84)		
Affected site			0.113	0.737
Unilateral	53 (71.62)	46 (74.19)		
Bilateral	21 (28.38)	16 (25.81)		
Nationality			0.204	0.652
Han nationality	53 (88.33)	50 (90.91)		
Minority nationality	7 (11.67)	5 (9.09)		

sures analysis of variance and bonferroni post hoc test. $P < 0.05$ implies a significant difference.

Results

Comparison of baseline data

There was no significant difference between the two groups in age, body mass index (BMI). course of disease, residential environment, exercise habits, excessive smoking history, excessive drinking history, eating habits, affected site, and ethnic group (all $P > 0.05$) (**Table 1**).

Clinical symptom scores

The changes in scores of clinical symptoms including pain, perineal swelling, walking difficulty, secretions increase, and perineal discomfort of the two groups before and after surgery were evaluated. As the results showed, before surgery, there was no significant difference between the two groups in clinical symptom scores (all $P > 0.05$), while after surgery, the scores of the Res group declined more notably than the Con group ($P < 0.05$). Additionally, VAS was adopted to evaluate the pain of the two groups before and after surgery. As the results showed, before surgery, there was no significant difference in VAS score between the two groups ($P > 0.05$), while after surgery, the VAS score of both groups decreased, and the score of the Res group was lower than that of the Con group ($P < 0.05$) (**Figure 1**).

Changes of clinical indexes in the two groups after operation

The changes of clinical indexes after operation between the two groups were compared, and the results showed that the Res group suffered greatly less intraoperative blood loss and experienced significantly shorter operation time and hospital stay than the Con group (6.62±2.23 *vs.* 13.54±3.26; 4.67±2.11 *vs.* 10.27±2.56; 3.45±1.26 *vs.* 6.36±2.13, all $P < 0.05$, **Figure 2**).

Recurrence rate after surgery, recovery of glandular function, and incidence of complications

Comparison between the two groups in recurrence rate after surgery, recovery of glandular function, and incidence of complications showed that compared with the Con group, the Res group showed a significantly lower recurrence rate (P=0.045), significantly better recovery of glandular function (P=0.035), and a significantly lower incidence of complications (P=0.023) (**Table 2**).

Efficacy

According to comparison of efficacy between the two groups, the Res group showed a total

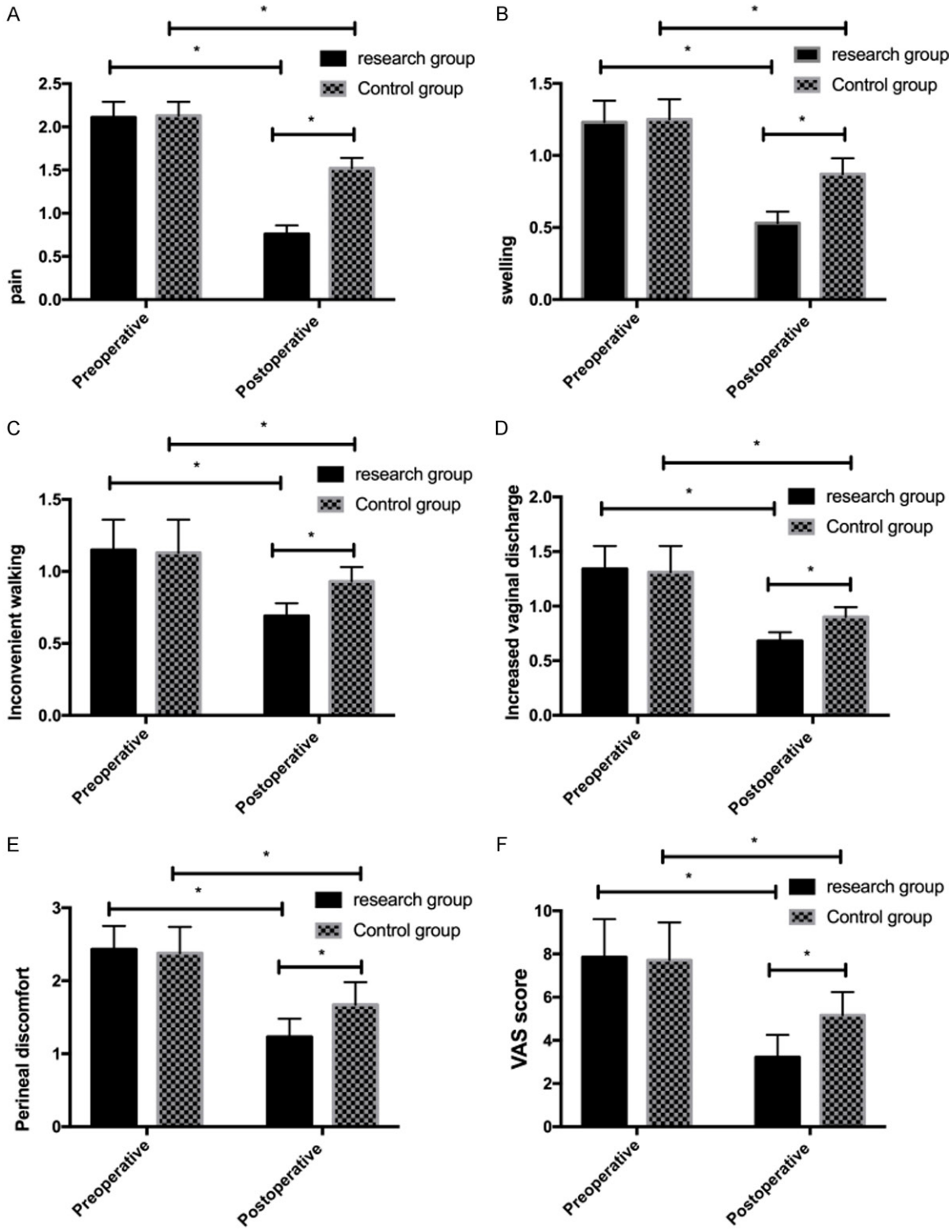

Figure 1. Clinical symptom scores of the two groups. A. Changes in pain score of the two groups. B. Changes in swelling score of the two groups. C. Changes in walking score of the two groups. D. Changes in vaginal secretion score of the two groups. E. Changes in perineal discomfort score of the two groups. F. Preoperative and postoperative VAS scores of the two groups. Note: *indicates $P < 0.05$.

effective rate of 97.30%, including markedly effective rate, effective rate, and ineffective rate of 66.22%, 31.08%, and 2.70%, respectively, while the Con group showed a total effec-

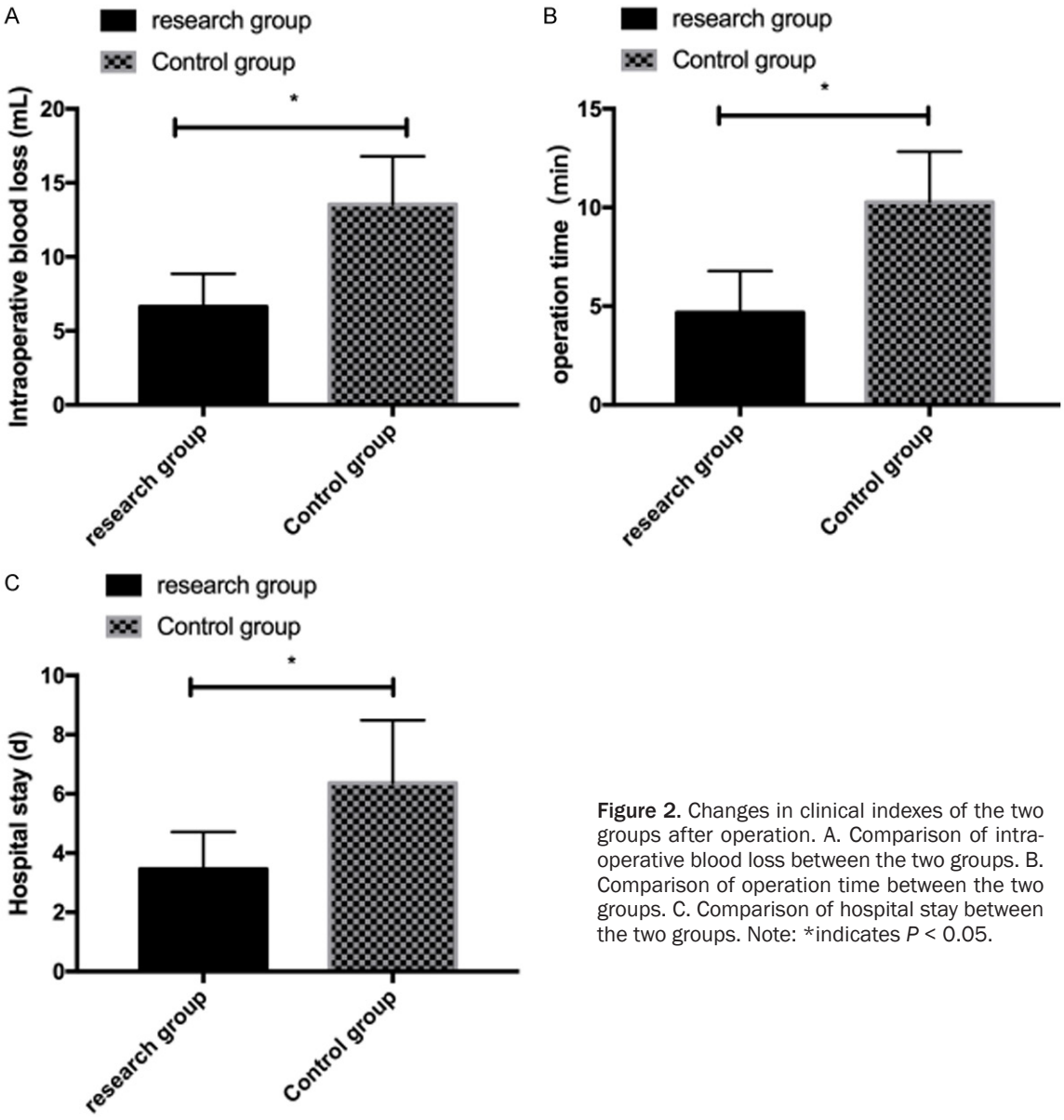

Figure 2. Changes in clinical indexes of the two groups after operation. A. Comparison of intraoperative blood loss between the two groups. B. Comparison of operation time between the two groups. C. Comparison of hospital stay between the two groups. Note: *indicates $P < 0.05$.

tive rate of 85.48%, including markedly effective rate, effective rate, and ineffective rate of 40.32%, 45.16%, and 13.43%, respectively. Therefore, the Res group showed a significantly higher total effective rate than the Con group (P=0.012) (**Table 3**).

Treatment satisfaction

According to evaluation of the satisfaction of the two groups after treatment, the Res group showed an overall satisfaction of 95.95%, with 62.16% patients expressing high satisfaction, 33.78% patients expressing satisfaction, and 4.05% patients expressing dissatisfaction, while the Con group showed an overall satisfaction of 83.87%, with 33.87%% patients expressing high satisfaction, 50.00% patients expressing satisfaction, and 16.13% patients expressing dissatisfaction, so the overall satisfaction of the Res group was notably higher than that of the Con group (P=0.017, **Table 4**).

Discussion

Bartholin's cyst is the obstruction of greater vestibular gland duct, which may result in retention because secretion cannot be effectively discharged [15]. It is prone to cause infection, walking pain and limited daily activities [16].

Table 2. Comparison of recurrence rate after surgery, recovery of glandular function, and incidence of complications between the two groups

	The research group (n=74)	The control group (n=62)	X^2	*P*-value
Recurrence rate (%)	2 (2.70)	6 (11.29)	4.026	0.045*
Recovery of glandular function	67 (90.54)	48 (77.42)	4.448	0.035*
Incidence of complications (%)	2 (2.70)	8 (12.90)	5.153	0.023*

(Note: *indicates $P < 0.05$).

Table 3. Efficacy on the two groups

	The research group (n=74)	The control group (n=62)	X^2	*P*-value
Markedly effective	49 (66.22)	25 (40.32)		
Effective	23 (31.08)	28 (45.16)		
Ineffective	2 (2.70)	9 (13.43)		
The total correction efficiency (%)	72 (97.30)	53 (85.48)	6.333	0.012*

(Note: *indicates $P < 0.05$).

Table 4. Comparison of treatment satisfaction between the two groups

	The research group (n=74)	The control group (n=62)	X^2	*P*-value
High satisfaction	46 (62.16)	21 (33.87)		
Satisfaction	25 (33.78)	31 (50.00)		
Dissatisfaction	3 (4.05)	10 (16.13)		
Total satisfaction (%)	71 (95.95)	45 (83.87)	5.690	0.017*

(Note: *indicates $P < 0.05$).

Moreover, the disease is prone to repeated attacks, which will eventually cause pathological changes [17]. One previous study has pointed out that Bartholin gland cyst or abscess is common among women aged 15-50 years, and its incidence is higher among those at 40 years old or younger, and shows a downward trend among those above 40 years old [18]. Ostomy is a common clinical treatment for Bartholin's cyst, but it is still controversial [19]. This study analyzed the impact of conventional ostomy and marsupialization ostomy on patients with Bartholin's cyst, aiming to improve the efficacy on the disease and to accelerate patients' recovery.

We have scored the clinical symptoms of the research and control groups, which include pain, perineal swelling, walking difficulty, secretions increase, and perineal discomfort, and compared the changes of the scores before and after surgery. There was no significantly difference in clinical symptom scores before surgery, while after surgery, the scores of the Res group declined more notably than the Con group. The marsupialization ostomy can effectively relieve local inflammation, change the tissue environment, and effectively relieve the pain, swelling, dysuria and other discomfort caused by Bartholin's cyst. In conventional ostomy, it is required to surgically open the cyst at the junction of mucous membrane and skin at the lower pole of cyst, conduct drainage, place drainage strips, and replace hemostatic gauze and change dressing each day [20]. In marsupialization ostomy, it is not likely to damage the adjacent organs, so a latex strip is adopted for fixation outside the cyst, and there is no need to place drainage strips, and replace hemostatic gauze and change dressing each day [21]. In our opinion, the relative fast alleviation of clinical symptoms in the Res group may be explained by the following fact: Marsupialization ostomy has both drainage function and can achieve stoma, can also retain the glandular function, with safe and convenient operation. So, it can effectively relieve the clinical symptoms, pain, and clinical reaction of the patients. Then we analyzed the changes of clinical indexes after surgery in the two groups, and found that the Res group treated with marsupialization ostomy showed less intraoperative blood loss and experienced shorter operation time and hospital stay than the Con group. The results further indicate the positive application value of marsupialization ostomy for Bartholin's cyst, and also support our observation and conclusion. We also evaluated the VSA scores of the two groups before and after surgery, and found no notable difference between them in VAS score before surgery, but found a decrease in the score in both groups and a more notable decrease in the Res

group. The results also showed that pain of patients can be relieved to a great extent after marsupialization ostomy. Marsupialization ostomy causes smaller wound and less bleeding, which may be the main cause of alleviating the pain of patients. In addition, in marsupialization ostomy, the drainage strip used was a soft and sterile latex strip [22], which can alleviate the discomfort of patients, and reduce local friction and local infection rate as much as possible, with no requirement of changing drainage strip every day, so the pain degree of patients in the Res group was greatly reduced. Moreover, we compared the recurrence rate after surgery, recovery of glandular function, and incidence of complications of the two groups, and found that compared with the Con group, the Res group showed a notably lower recurrence rate, notably better recovery of glandular function, a notably lower incidence of complications. Conventional ostomy is likely to damage the skin around the affected area due to the operation method, and the formation of a new duct opening will destroy the glandular function of the patient, which is not conducive to the recovery of the patient [23]. Therefore, conventional ostomy is more likely to bring about recurrence and more adverse reactions than the marsupialization ostomy. One study by Billingsley C et al. [24] has also pointed out the higher clinical efficacy of marsupialization ostomy on Bartholin's cyst. In this study, the Res group showed a notably higher total effective rate than the Con group (97.30% *vs.* 85.48%), which further verifies the above experimental results. Finally, we evaluated the satisfaction of the two groups after treatment, and found higher treatment satisfaction in the Res group (95.95%) than that in the Con group (83.87%). Marsupialization ostomy is an artificial sinus operation, which causes small incision, requires no suture, and brings about no formed local scare while retaining the gland function [25]. It might be the reason for our results about satisfaction. As the society develops continuously, people make high demands on beauty. The capability of marsupialization ostomy in curing disease while guaranteeing beauty is probably a crucial reason for patients' recognition of the ostomy.

Marsupialization ostomy can better alleviate the intraoperative blood loss and pain of patients with Bartholin's cyst and more effectively reduce their clinical symptom scores than the conventional ostomy. However, this study also has some limitations. The study spans a short time, without long-term follow-up investigation, and the subjects enrolled in the study are relatively less. Additionally, this study mainly focuses on two surgical methods with high application rate in diseases, and it is not excluded that there will be differences in comparison with other treatment methods. More complete and effective experimental analysis on the application of marsupialization ostomy will be conducted in Bartholin's cyst to provide more accurate clinical guidance.

Disclosure of conflict of interest

None.

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