

Original Article

## Purse-string Stoma Closure: A Case Series Study

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### Key Words

Purse-string;  
Stoma;  
Wound infection

**Purpose.** The present study aimed to assess the wound infection rate and complication rate of our technique for purse-string stoma closure.

**Materials and Methods.** We retrospectively analyzed patients who underwent purse-string stoma closure at China University Hospital between August 2015 and August 2016. We evaluated the surgical-site infection rate, operation time, postoperative admission duration, complications, and wound healing time.

**Results.** Twenty-four patients underwent purse-string stoma closure. The mean operation time was  $82.2 \pm 27.7$  min, and the postoperative admission duration was  $4.5 \pm 2.3$  days. Three cases had postoperative ileus. There was no leakage, wound dehiscence, or surgical-site infection. The mean wound healing time was  $27.96 \pm 7$  days.

**Conclusions.** Purse-string stoma closure is a feasible and easy approach to prevent surgical-site infection.

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Stoma reversal surgery is usually performed after recovery of the patient's general health condition and healing of anastomosis. Although stoma reversal surgery is a simple procedure, it may cause morbidities, such as surgical-site infection (SSI), anastomosis leakage, bowel obstruction, and ileus.<sup>1-5,10,17</sup> The most common complication after stoma reversal is SSI, with reported rates varying from 0% to 40%.<sup>1-5,17</sup>

Previously, the conventional method for stoma wound management was conventional primary closure (CPC), which has been shown to be associated with high wound infection rates.<sup>1,5,10,17</sup> To prevent this complication, various surgical approaches have been used, such as subcutaneous drainage, wound irrigation with iodine, and delayed wound primary suture.<sup>1,5,7</sup> Banerjee first described a closure method for stoma skin, which is termed purse-string stoma closure (PSC).<sup>7</sup>

This involves a compromise between CPC and delayed primary suture and provides a small opening for drainage of wound discharge fluid. This method has all the advantages of the traditional stoma surgical technique, and several studies have shown that PSC decreased the rate of SSI after stoma reversal.<sup>6-15,17</sup> The present study aimed to present our technique for PSC and the surgical results of our technique for PSC, including the SSI rate, operative time, and length of hospital stay.

### Materials and Methods

We performed a retrospective study of our technique for PSC at China Medical University Hospital between August 2015 and August 2016.

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## Measured outcomes

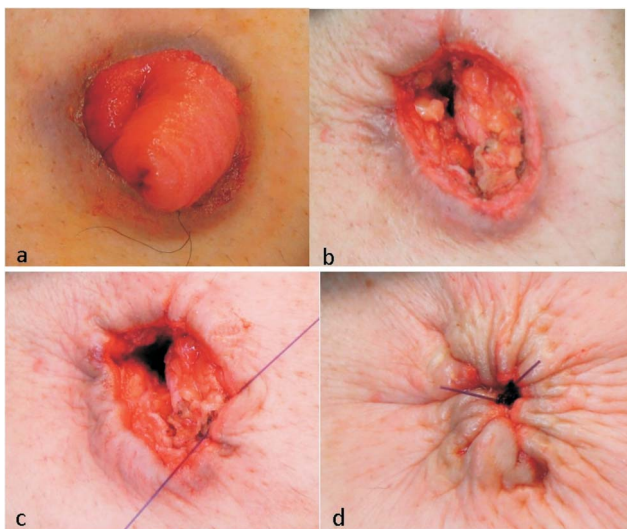
The primary end-point was SSI of the stoma wound 30 days after surgery. The secondary end-points were operation time, length of hospital stay, and wound healing time. SSI was defined according to the criteria presented by the Centers for Disease Control and Prevention.<sup>18</sup> Wound healing was defined as no more requirement of wound dressing or removal of the stitches.

## Operative technique

The PSC technique was performed as follows. After stoma closure, the fascia was closed using a traditional linear suture involving 1-0 polyglactin interrupted suture. After closure of the fascia and irrigation of the subcutaneous wound with iodine, subcuticular purse-string suture was performed with 2-0 polypropylene, and the interval of each suture was about 0.5 cm. After purse-string suture, the edge of the wound was approximated and an opening of about 0.5 mm diameter was maintained at the center (Fig. 1).

## Wound surveillance and follow-up

The numbers of SSIs were recorded during hospi-



**Fig. 1.** The stoma site before the operation (a) and after stoma closure and wound irrigation with iodine (b). Purse-string closure is performed with 2-0 polypropylene (c). Finally, an opening of about 0.5 mm diameter is maintained at the center (d).

talization and at the outpatient clinic. The patients were asked to return to the outpatient clinic until the wound healed well.

Surgical incisions were evaluated for SSI daily by a surgeon during hospitalization. Before discharge, patients were provided instructions on wound care, and home wound care assistance was arranged if necessary. Patients were asked to return to the clinic at 7-10 days and 2-4 weeks after hospital discharge (Fig. 2). Patients unable to change their dressings at home or those with SSI were seen more frequently at the outpatient clinic. All incisions were assessed by the attending surgeon or an experienced nurse practitioner at each outpatient visit. All SSIs were confirmed by the attending surgeon.

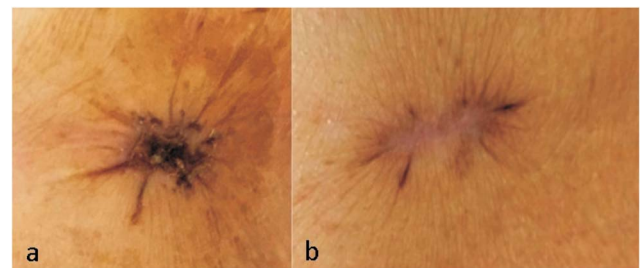
## Results

In the study period, 195 patients underwent stoma closure surgery. Additionally, 24 patients underwent PSC, and the basic data are shown in Table 1. The mean operation time was  $82.2 \pm 27.7$  min, and the postoperative admission duration was  $4.5 \pm 2.3$  days. Three cases had postoperative ileus, and no anastomotic leakage or wound dehiscence was found (Table 1).

There was no case of SSI during admission and during follow-up in the outpatient clinic. The mean wound healing time was  $27.96 \pm 7$  days (Table 2).

## Discussion

According to many retrospective reviews and randomized controlled trials, wound infection is a major



**Fig. 2.** Follow-up of the wound at the outpatient clinic. Postoperative day 10 (a) and day 21 (b).

**Table 1.** Basic data of patients who underwent purse-string stoma closure

Variable	Purse-string stoma closure (n = 24)
Age (years)	63.67 ± 17.6
Sex (M/F)	16/8
BMI (kg/m <sup>2</sup> )	23.65 ± 5.4
Previous diagnosis, n (%)	
T-colon cancer s/p RH with diverting ileostomy	1 (4%)
S-colon cancer s/p AR with leakage s/p diverting ileostomy	1 (4%)
RSJ colon cancer s/p LAR with diverting ileostomy	1 (4%)
Upper third rectal cancer s/p LAR with diverting ileostomy	6 (25%)
Middle or lower third rectal cancer s/p CCRT, s/p TME, and diverting ileostomy	11 (45.8%)
Middle or lower third rectal cancer s/p TME and diverting ileostomy	4 (16.6%)
ASA score, n (%)	
I	0
II	17 (70%)
III	7 (30%)
Diabetes mellitus, n (%)	5 (20%)
Hypertension, n (%)	8 (32%)
Chronic renal insufficiency, n (%)	2 (8%)
Cirrhosis, n	0
Coronary heart disease, n (%)	2 (8%)
Smoking, n (%)	5 (20%)

**Table 2.** Outcomes of patients who underwent purse-string stoma closure

Variable	Purse-string stoma closure (n = 24)
Operation time (min)	82.2 ± 27.7
Hospital stay (days)	4.5 ± 2.3
Infection, n (%)	0 (0%)
Ileus, n (%)	3 (12%)
Leakage, n (%)	0 (0%)
Wound dehiscence, n (%)	0 (0%)
Wound healing time (days)	27.96 ± 7

issue after stoma closure.<sup>1-5</sup> The infection rate after stoma closure with the conventional method has been shown to range from 15% to 36.6%.<sup>1-4</sup> Since the description of PSC by Banerjee, the reported SSI rate after PSC has been shown to be about 2%-6.7%.<sup>9,11-15</sup> In the current study, there was no SSI among the 24 study patients, and this maybe associated with the small sample size of the patients. However, this study showed a trend that SSI and other wound complications were less likely with PSC when compared to the findings in previous studies on conventional wound closure techniques.

The healing time is a concern of PSC. Usually, delayed wound healing is defined as an open wound requiring dressing for > 30 days.<sup>7</sup> In the study by Camacho-Mauries et al.,<sup>13</sup> the healing time of PSC was about

3.8 weeks. In the randomized controlled study by Lee et al.,<sup>16</sup> the healing time was longer for PSC than for CPC (35 days vs. 24 days). However, there was no difference in the healing time between PSC and CPC when wound infection occurred.<sup>16</sup> We assessed that extensive SSI of stoma closure may increase the wound healing time. In our study, the mean wound healing time was 27.96 ± 7 days, which is close to the finding in the study by Camacho-Mauries et al., and their study also reported no SSI among 61 patients.<sup>13</sup>

In conclusion, our technique for PSC is feasible and easy to perform, and it may be associated with decreased SSI.

### Limitations

The present study has some limitations. This was a single-center retrospective study with a small sample size, and it did not include a comparative group. Thus, there might have been bias.

### Conclusions

This study showed that PSC may decrease wound

infection, and the technique of closure was relatively simple.

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原 著

## 荷包口縫合術用於腸造口關閉：病例報告

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**目的** 觀察及追蹤荷包口縫合術用於造口關閉病人之傷口感染機率及併發症發生機率

**材料及方法** 我們以回溯性分析之方式，於中國醫藥大學附設醫院收集自 2015 年 8 月至 2016 年 8 月採用荷包口縫合術處理造口關閉之所有病人。統計資料包括傷口感染、手術時間、術後住院天數、術後併發症、及傷口癒合天數。

**結果** 共收得 24 位病人接受荷包口縫合關閉造口。平均手術時間長度為  $82.2 \pm 27.7$  分鐘；術後平均住院天數為  $4.5 \pm 2.3$  天；其中有 3 位病人術後有發生腸阻塞之情形。所有病人均無發生接口滲漏、傷口裂開、傷口感染等問題。平均傷口癒合天數為  $27.96 \pm 7$  天。

**結論** 荷包口縫合術用於降低關閉造口之傷口感染機率為一種可行、簡易的方式。

**關鍵詞** 荷包口縫合術、造口關閉、傷口感染。