

# EVALUATING THE RESULT OF SPHINCTERIC-PRESERVING SURGERY (PARKS PROCEDURE) FOR LOW RECTAL CANCER

Trinh Le Huy✉, Ngo Van Ty

Hanoi Medical University

*Sphincter-preserving surgery for low rectal cancer improved the quality of life while maintaining the oncologic outcomes. A retrospective, descriptive study was conducted with 45 patients who underwent sphincter-preserving surgery for low rectal cancer at the National Cancer Hospital and Hanoi Medical University Hospital between January 2016 and April 2020. The mean age was 55.6 years old. Male: female ratio = 0.7:1. Nearly all patients presented with hematochezia (95.6%). 75.6% of the tumors are located within 4-6 cm from the anal verge. The anastomotic leak rate was 4.4%. All patients had a normal postoperative urinary function. The sexual dysfunction rate was low (15.8%) and reversible. None had erectile or ejaculation dysfunction. 97.8% satisfied with sphincter function after one year. Tumors located > 4 cm and the anastomosis sites located > 2 cm from the anal verge were good prognostic factors for the recovery of sphincter function ( $p < 0.05$ ). The Parks procedure had optimistic postoperative outcomes with a low complication rate, minimal sexual dysfunction, and good sphincter function in long-term follow-up.*

**Keywords:** Low rectal cancer, sphincter-preserving surgery, Parks procedure.

## I. INTRODUCTION

According to GLOBOCAN 2020, colorectal cancer is the second most common cancer and the second leading cause of cancer-related death worldwide.<sup>1</sup> This disease is the fifth common cancer, with an age-standardized rate of 14.1 per 100,000 people in Vietnam. Of these cases, approximately 30% originate in the rectum.<sup>1</sup> In all sites of colorectal cancer, low rectal cancer (i.e., tumors located  $\leq 6$ cm from the anal verge on rigid rectoscope) has the highest recurrence rate due to its difficulty to be reached by surgery alone.<sup>2</sup> However, over the last few decades, significant strides have been made in treating low rectal cancer, from surgery with or without adjuvant chemotherapy in early-stage disease to multimodality approach with

neoadjuvant concurrent chemoradiotherapy followed by total mesorectal excision in locally advanced mid or low rectal cancer.<sup>2</sup> In other words, newer approaches have improved the oncologic outcomes significantly for this disease. However still, surgery remains the cornerstone in management for the majority of primary rectal cancers.<sup>2</sup> One type of surgery for this disease is abdominoperineal resection, which has been the traditional approach for a long time. However, it sharply deteriorates the patients' quality of life with a permanent colostomy.<sup>3</sup> Recently, advances in surgical technique and other treatment modalities have led to a marked increase in the rate of sphincter-preserving operations to maintain the quality of life while not affecting the oncologic outcomes.<sup>2,4</sup> Parks first described this procedure in 1972, then further modified by Malafosse in 1987.<sup>4</sup> The stages of this technique include: transection of submesenteric vessels; operation of perineal intestine; towed distal intestinal tube;

Corresponding author: Trinh Le Huy

Hanoi Medical University

Email: [trinhlehuy@hmu.edu.vn](mailto:trinhlehuy@hmu.edu.vn)

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colon and anus anastomosis; intraabdominal intestinal tube after anastomosis; perineal intestine indwelling anal canal after operation.

In Vietnam, sphincter-preserving surgery has been performed for a long time and achieved initial optimistic results, yet few studies have been reported.<sup>5</sup> Furthermore, whether the sphincter function and other functions are good enough after surgery remains controversial. Therefore, we conducted the study "*Evaluating the results of sphincter-preserving surgery (Parks procedure) in low rectal cancer*" with two objectives: to describe clinicopathology characteristics of low rectal cancer patients who underwent sphincter-preserving surgery at National Cancer Hospital and Hanoi Medical University from January 2016 to April 2020 and to evaluate the treatment results after surgery.

## II. METHODS

### 1. Patients

Forty-five low rectal cancer patients underwent sphincter-preserving surgery at National Cancer Hospital and Hanoi Medical University from January 2016 to April 2020.

#### **Inclusion criteria:**

- Patients diagnosed with low rectal cancer by rigid rectoscopy (tumor located  $\leq$  6 cm from the anal verge).
- Histopathology was adenocarcinoma.
- Patients underwent sphincter-preserving surgery.
- Patients had detailed intraoperative and postoperative information in the medical record.
- Patients were reevaluated within one year after surgery to assess changes in any function (urinary, sexual, or sphincter function).
- Patients could receive upfront surgery or concurrent chemoradiotherapy before surgery

if they were eligible for sphincter preserving surgery after neoadjuvant treatment.

#### **Exclusion criteria:**

- Anal cancer.
- Middle and high rectal cancer (tumor located more than > 6cm from the anal verge).
- Stage IV rectal cancer patients.

### 2.2. Methods:

- *Methods:* Descriptive, retrospective study.
- *Sample size:* Convenient sample.
- *Data collection:*
  - + Clinicopathological characteristics: presenting symptoms, tumor site, pathology, grade, and stage of the tumor. (AJCC 8<sup>th</sup> was used in this study).
  - + Postoperative complications: anastomosis leak, bowel obstruction, bladder dysfunction.
  - + Long-term outcomes, including urinary function, sexual function, and sphincter function, were assessed by the Wexner Score at the points of 1 month, 3 months and 12 months after surgery.
- Data analyses were performed with the use of SPSS 16.0.
- There is no institutional review board (IRB) at National Cancer Hospital (NCH) and Hanoi Medical University Hospital (HMHU). Therefore, the research was approved and supported by the Managing Council of NCH and HMHU.

## III. RESULTS

### 1. Clinicopathological characteristics

The mean age was 55.6 (range: 25 - 78). Most patients were older than 40 (91.1%). Patients in the 55 - 65 age group accounted for the highest percentage (31.1%). Male:female ratio = 0.7:1. Nearly all patients presented with hematochezia (95.6%), followed by tenesmus (42.2%) and abdominal pain (37.8%) (Table 1).

**Table 1. Presenting symptoms**

Presenting symptoms	Number of patients	Rate (%)
Hematochezia	43	95.6
Tenesmus	19	42.2
Abdominal pain	17	37.8
Lose weight	13	28.9
Diarrhea	3	6.7
Constipation	2	4.4
Change in stool shape	1	2.3

Using rectoscope, 75.6% of all tumors were within 4 - 6 cm from the anal verge. On pelvic MRI images, 86.7% of all patients had T2 tumors. The rest (6 patients) had T3 or T4 tumors and then received neoadjuvant concurrent chemoradiotherapy before surgery. No patients had regional lymph nodes. 93.3% had adenocarcinoma. Most tumors were in grade 2 (77.7%) (Table 2).

**Table 2. Pretreatment clinicopathological characteristics**

Clinicopathology characteristics	Number of patients	Rate (%)
<b>Distance from the anal verge</b>		
≤ 4 cm	11	24.4
> 4 - 6 cm	34	75.6
<b>Tumor on Pelvic MRI</b>		
T2	39	86.7
T3	5	11.1
T4	1	2.2
<b>Pathology</b>		
Adenocarcinoma	42	93.3
Mucinous adenocarcinoma	3	6.7
<b>Grade</b>		
I	7	15.6
II	35	77.7
III	3	6.7
<b>Total</b>	<b>45</b>	<b>100</b>

## 2. Treatment results

Most patients were satisfied with defecation after surgery (86.7%). Only two patients had mild

anastomosis leak (4.4%) and did not require reoperation. One patient had bowel obstruction solved with internal treatment. Five patients had mild bladder dysfunction (11.1%) (Table 3).

**Table 3. Early results after surgical treatment**

Early results	Number	Rate (%)
<b>Postoperative complication</b>		
Anastomosis leak (treated with internal medicine)	2	4.4
Anastomosis leak (required reoperation)	0	0
Bowel obstruction	1	2.2
Bladder dysfunction	5	11.1
No complication	36	80
<b>Total</b>	<b>45</b>	<b>100</b>

Three months after surgery, all patients returned to normal bladder function. Most male patients had normal postoperative sexual function (84.2%). The rest had an initial decrease in sexual function after surgery but were able to recover. None had erectile or ejaculation dysfunction. One year after surgery, the average Wexner Score was  $9.27 \pm 3.79$ . Most patients (97.8%) had good sphincter function (64.4%) or intermediate sphincter function (33.3%) (Table 4).

**Table 4. Long term alteration of function after surgery**

Criteria	Number	Rate (%)
<b>Bladder function after three months (n = 45)</b>		
Normal	45	100
Urinary incontinence	0	0
Urinary retention	0	0
<b>Sexual dysfunction in Male after three months (n = 19)</b>		
Normal	16	84.2
Recovery after an initial reduction	3	15.8
Erectile dysfunction	0	0
Ejaculation dysfunction	0	0
<b>Sphincter function (Wexner score) (n = 45)</b>		
Good ( $\leq 9$ points)	29	64.4
Intermediate (10 - 16 points)	15	33.3
Poor ( $> 16$ points)	1	2.2

Regarding the sphincter function after surgery, the group of patients with tumors located within 4 - 6 cm from the anal verge had significantly better function than the group of patients

with lower tumor ( $p = 0.032$ ). Likewise, anastomosis sites  $> 2\text{cm}$  from the anal verge were excellent prognoses for sphincter function ( $p = 0.001$ ). No patient with neoadjuvant treatment had good sphincter function, while 29 out of 39 patients (74.3%) with upfront surgery maintained this function. This difference was statistically significant ( $p = 0.001$ ) (Table 5).

**Table 5. Affect of some factors on sphincter function after surgery**

Factors	Number of patients		p
	Sphincter function		
	Good	Poor to Intermediate	
<b>Age</b>			
$\leq 65$	21	14	0.244
$> 65$	8	2	
<b>Neoadjuvant treatment</b>			
Yes	0	6	0.001
No	29	10	
<b>Tumor</b>			
T2	25	14	0.330
T3 – T4	4	2	
<b>Distance from tumor to the anal verge</b>			
$\leq 4\text{cm}$	4	7	0.032
$> 4\text{cm}$	25	9	
<b>Distance from anastomosis to the anal verge</b>			
$\leq 2\text{cm}$	3	9	0.001
$> 2\text{cm}$	26	7	

#### IV. DISCUSSION

In our study, the mean age was 55.6 (range: 25 - 78). Patients in the 55 - 65 age group accounted for the highest percentage (31.1%). This finding was quite similar to those of other authors.<sup>6</sup> Most patients presented with hematochezia (95.6%). Likewise, studies of Quoc Dat Pham (2011) and Cam Phuong Pham (2021) also had this high rate (93.4% and 90.9%, respectively).<sup>6,7</sup>

More than 75% of all patients had tumors

located  $> 4\text{cm}$  from the anal verge. The distance ( $> 4\text{cm}$ ) was also ideal for sphincter sparing surgery to obtain a minimum 2cm distal resection margin.<sup>8</sup> Thus, the indication for sphincter-preserving surgery in our study was suitable and similar to other studies worldwide, such as Rahman (2013) and Han F (2010).<sup>9,10</sup> Indeed, tumor located  $> 4\text{cm}$  and the anastomosis site located  $> 2\text{cm}$  from the anal verge were good prognostic factors for the

recovery of sphincter function in our study ( $p < 0.05$ ).

In all 45 patients, there were only two patients with anastomosis leak after surgery (4.4%). However, this complication was mild with local leakage and healed with internal management eventually. This rate was slightly lower than rates in other studies, such as studies of Quoc Dat Pham (7.7%) and Duc Trong Nguyen (4.8%).<sup>6,11</sup>

In our study, urinary function satisfaction was considered to be unchanged by all patients after three months. In terms of sexual function in males after surgery, most of them had normal postoperative sexual function (84.2%). The rest had an initial decrease but could recover after three months entirely. None of all patients had erectile or ejaculation dysfunction. These criteria were also evaluated in the following studies. Pocard (2002) showed that 31% of all participants had erectile dysfunction after three months, but they returned to their preoperative sexual functional status after one year of following up.<sup>12</sup> Similarly, another study in Vietnam also had about 7 - 8% of patients with erectile dysfunction after surgery.<sup>13</sup> Thus, our results were better than those of previous studies, which may be attributable to the high volume of our centers, especially in the experience of avoiding inferior hypogastric plexus intraoperatively.

One year after surgery, the average Wexner Score was  $9.27 \pm 3.79$ . Most patients reported good sphincter function (64.4%) or intermediate sphincter function (33.3%). They also reported good quality of life and were able to return to their normal schedule. This result was similar to those of other studies accessing the Wexner Score (10 in Masaaki (2009) and 8.1 in Koyama (2014)).<sup>14,15</sup>

## V. CONCLUSION

Low rectal cancer was most frequently encountered in middle-aged patients. The most common presenting symptom was hematochezia. The Parks procedure had optimistic postoperative outcomes with a low complication rate, minimal sexual dysfunction, and good sphincter function in long-term follow-up. Thus, eligible patients for sphincter preserving surgery, after carefully selecting, should be encouraged to undergo this procedure to improve their quality of life.

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