*Original Article*

# Oncologic Results of Transanal Local Excision for Clinically $T_{0-2}$-staged Distal Rectal Cancer

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***Purpose.*** To investigate the oncologic outcomes of transanal local excision for patients with clinically $T_{0-2}$-staged distal rectal cancer.

***Methods.*** Between October 2009 and January 2021, we recruited 25 consecutive patients with $T_{0-2}$-staged rectal adenocarcinoma based on clinical staging undergoing transanal local excision. We excluded patients with a history of colorectal cancer, anal cancer, or Paget's disease, or those who received pre-operative concurrent chemoradiotherapy (CCRT). We analyzed the clinic-pathologic characteristics of the patients, including demographics, tumor size and stage, surgical complications, 30-day mortality rates, cancer recurrence rates, and overall survival.

***Results.*** A total of 18 patients were analyzed, excluding the 7 ineligible patients. The mean age at diagnosis was $66.7 \pm 9.5$ years. The distance of the tumor location was $3.2 \pm 1.5$ cm above anal verge. The tumor diameter was $2.87 \pm 1.3$ cm. No surgical complications were found. The mean duration of follow-up was $42.7 \pm 27.3$ months, during which time 2 (11.1%) patients developed local tumor recurrence. The one had local recurrence with lung metastases after 3-year follow-up, and received salvage CCRT with radical surgery for resection. The other patient had peri-rectal lymphadenopathy recurrence after 4-year follow-up. The estimated 5-year overall survival was 100%. There were no cancer-related deaths during the follow-up period.

***Conclusions.*** This study showed it is feasible to treat patients with clinically $T_{0-2}$-staged distal rectal cancer using transanal local excision, which was associated with favorable oncological outcomes. Future randomized control trials with a longer duration of follow-up are required in order to conclusively establish the role of local tumor excision for the management of patients with distal rectal cancer.

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The current standard treatment for distal rectal cancer is total meso-rectal excision with sphincter-preserving operation or abdominal perineal resection with or without chemoradiotherapy.[1] However, radical resection is associated with high morbidity and mortality, the potential need for a stoma, and low anterior resection syndrome. These factors are associated with a poor quality of life and may delay post-operative adjuvant therapy.[2] Several reviews and studies have discussed the feasibility of transanal local ex-

cision for early-stage distal rectal cancer.[3-5] The rate of complications associated with transanal local excision, including bleeding, local sepsis, urinary infection or retention, fecal incontinence and recto-vaginal fistula, is significantly lower compared to that of conventional radical surgery.[6]

However, the limited extensiveness of this procedure may lead to a higher tumor recurrence rate due to occult meso-rectal lymph node metastases.[7] The risk of nodal involvement can exceed 30% if the tumor stage exceeds T3 stage. Therefore, meticulous patient selection for local excision instead of radical resection is crucial.[2] Currently, there have been no consensus on the role of local excision for the surgical treatment of distal rectal cancer, except that it is considered inappropriate for $T_{3-4}$-staged cancer or in the presence of positive lymph node metastasis. $T_{0-2}$-staged distal rectal cancer is defined as invasion of the tumor into the muscle layer with a location no further than 5 cm above the anal verge (AAV). This subgroup of patients may benefit from local excision in terms of adequate oncologic control and minimized long-term impact on quality of life.[8] In this study, we analyzed the oncological outcomes of patients with $T_{0-2}$-staged distal rectal cancer who underwent transanal local tumor excision.

# Material and Methods

## Patient selection

Between October 2009 and January 2021, we recruited patients with a clinical diagnosis of $T_{0-2}$ distal rectal adenocarcinoma who underwent transanal tumor excision. The inclusion criteria were 1. The tumor is located within 5 cm above anal verge; 2. The patient has strong motivation to undergo sphincter-preservation operation (SPO); 3. High risk patient for radical surgery (such as old age ≥ 85; poor physical status, poor liver or renal function, presence of other comorbidities and systemic diseases. We excluded patients with a history of cancer, anal cancer, or Paget's disease, CCRT before surgery, and above T2.

## Preoperative assessment

All our patients were assessed based on digital rectal examination, colofibroscopy in order to confirm the location and mobility of the tumor. They also undergo tumor staging examination, blood tests, routine electrocardiogram (EKG), and chest X-ray before surgery. We arranged pre-operative abdominal and pelvic computed tomography (CT) for complete tumor staging. Suspicious lesions were further examined by transrectal ultrasound and/or magnetic resonance imaging for precise staging.

## Surgical technique

Patient were admitted 1 day before operation and received 2 L oral polyethylene glycol for colorectal cleansing. All patients received surgery under general anesthesia following an overnight fast. The patients were put in a prone jack-knife position. We used Hill-Ferguson and other retractors to expose the lesion. Traction was applied by suture or instrument distal to the lesion to improve mobility and visualization. A 1 cm margin is typically employed, while full-thickness excision was performed along the inter-sphincteric dissection plane via electrocautery and ligation. After full-thickness excision, the specimen was oriented and sent for pathological assessment. After irrigation, the defect was closed using absorbable sutures.

## Post-operative patient care

Patient resumed an oral diet after surgery and were discharged on post-operative day 1. The wound was cared by sitz bath. The most common post-operative complications included urinary retention, urinary tract infection, delayed hemorrhage, and fecal impaction.

## Adjuvant therapy and follow-up

After surgery, patients received standardized follow-up, including clinical examination, regular blood tests, and serum carcinoembryonic antigen (CEA) quantification, which were performed monthly during the first 3 months, and every 3 months thereafter. The

patients also received abdominal and pelvic CT and colofibroscopy every 12 months after surgery. Some patients received standard intravenous chemotherapy including oxaliplatin. Most of our patients received oral chemotherapy including Capecitabine or UFUR for at least one year if there were no significant side-effects.

## Statistics analysis

SPSS software ver. 26 (IBM, Armonk, NY, USA) was used for statistical analyses. We analyzed the characteristics of the patients, including age, sex, family history, tumor size and stage, tumor distance from anal verge, tumor histology and grade, complications, 30-day mortality rates, recurrence rates, and overall survival. The recurrence-free survival outcomes were assessed using Kaplan-Meier survival curve analysis.

# Results

During the 12-year study period, 18 patients with distal rectal adenocarcinoma underwent transanal local tumor excision were identified. The recruitment algorithm used to select suitable patients is presented in Fig. 1, and the patient characteristics are summarized in Table 1.

Of the 18 patients, seven (38.9%) were male. The mean age at diagnosis of rectal cancer was $66.7 \pm 9.5$ years. The mean distance from the anus to the tumor location was $3.2 \pm 1.5$ cm. The average tumor diameter was $2.87 \pm 1.3$ cm. The most common pathological tumor stages were T1-2, with only one patient being diagnosed as T3 stage after operation. Pathological testing showed that three patients had lymphovascular invasion. Histology revealed that one patient had mucinous adenocarcinoma. All our patients had well to moderately differentiated tumors. CEA levels were
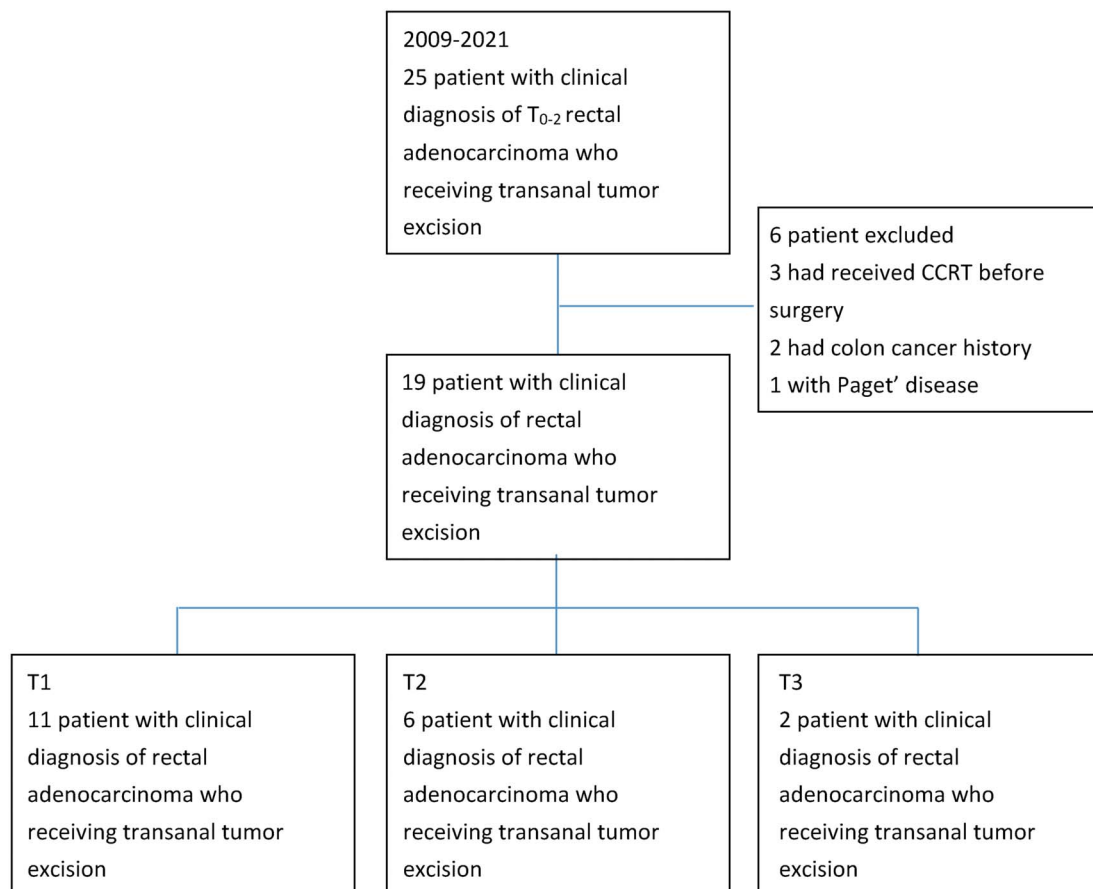


**Fig. 1.** The patient recruitment algorithm.

**Table 1.** Summary of clinical and histo-pathological characteristics of patients

| Patient characteristics | Mean ± SD / percentage (n) |
|---|---|
| Age (years), mean (SD) | 66.7 ± 9.5 |
| Male, % (n) | 38.9% (7) |
| Family history present, % (n) | 22.2% (4) |
| Distance from anal verge (cm), mean (SD) | 3.2 ± 1.5 |
| Abnormal CEA level before operation, % (n) | 11.1% (2) |
| Tumor size (cm), mean (SD) | 2.87 ± 1.3 |
| Clinical T stage | |
|     T0 or Tis, % (n) | 16.67% (3) |
|     T1, % (n) | 27.78% (5) |
|     T2, % (n) | 55.56% (10) |
| Pathological T stage | |
|     T1, % (n) | 61.10% (11) |
|     T2, % (n) | 33.30% (6) |
|     T3, % (n) | 5.60% (1) |
| Post-operative management | |
|     Observe, % (n) | 16.70% (3) |
|     Oral chemotherapy (UFUR or XELODA), % (n) | 61.10% (11) |
|     IV chemotherapy (Oxaliplatin based), % (n) | 22.20% (4) |
| High risk pathological characteristic | |
|     Mucinous adenocarcinoma, % (n) | 5.60% (1) |
|     Poorly differentiated, % (n) | 0% (0) |
|     Lymphovascular invasion, % (n) | 16.7% (3) |
| Operation time (minutes), mean (SD) | 52.3 ± 30.7 |
| Hospital stay (days), mean (SD) | 3.9 ± 1.5 |
| Complications | |
|     ≤ Grade II complication, % (n) | 5.60% (1) |
|     > Grade II complication, % (n) | 0% (0) |

abnormal in two patients prior to surgery. The mean hospital stay was 3.9 ± 1.5 days. Only one patient had vaginal wall injury as a complication, and direct repair was performed immediately during surgery.

Table 2 summarizes the oncologic outcomes during the 1-5 year follow-up period. Two patients experienced recurrence within 5 years after surgery. One patient had local recurrence with lung metastases 3 years after surgery and received salvage CCRT with radical resection. The CT performed 3 months after surgery revealed no evidence of recurrence. The other patient had recurrence with perirectal lymphadenopathy in the fourth year of follow up. He then received CCRT, after which restaging CT showed a favorable response to treatment and later salvage radical resection was performed.

The estimated 5-year overall survival rate in our patient was 100%. Two patients had recurrence within 5 years after surgery, with an overall recurrence rate was 11.1%.

Table 2 and Fig. 2 present the results for recur-

**Table 2.** Patient oncological outcomes during follow-up

| Oncological outcomes | Mean ± SD / percentage (n) |
|---|---|
| 30-day mortality rate | 0% (0) |
| Estimated 5-year survival | 100% (18) |
| Loss to follow-up or follow-up < 5 years | 55.6% (10) |
| Recurrence | |
|     Local regional lymph node recurrence | 5.6% (1) |
|     Distant metastasis | 5.6% (1) |
| Follow-up time (month) | 42.7 ± 27.3 |
| Follow-up period > 5 year | 44.4% (8) |

rence-free survival during patient follow-up. Some patients did not receive regular follow-up in our outpatient clinic due to personal reasons. There were no cancer-related deaths during the period of follow-up, but 10 patients losing follow-up within 5 years. 1 patient received follow up shorter than 1 year. In total, eight patients (44.4%) received regular blood examination, abdominal-pelvic CT and annual colofibroscopy at our clinic over 5 years. The mean follow-up period was 42.7 ± 27.3 months.
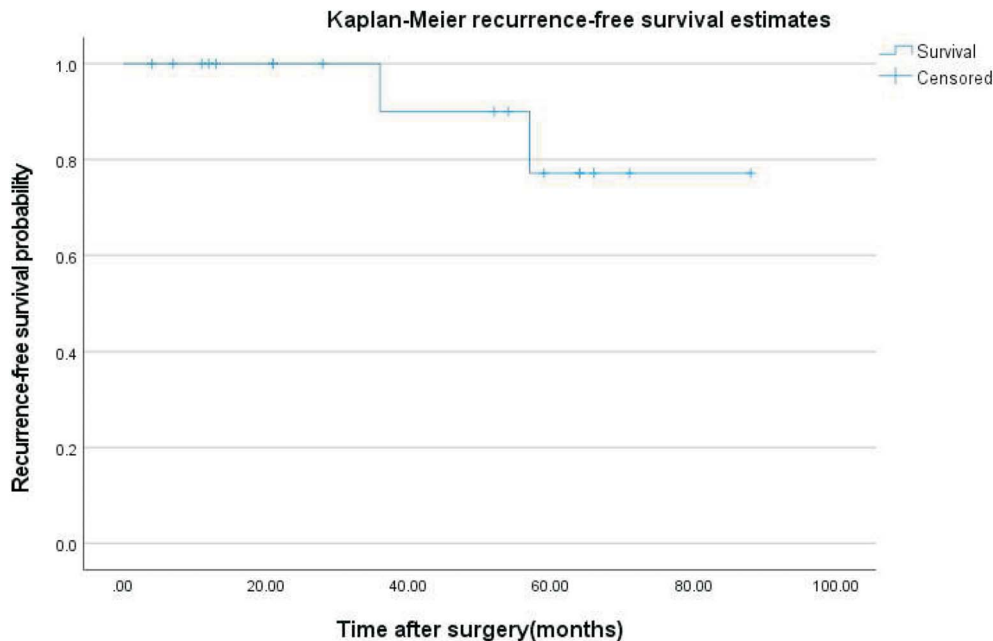
**Fig. 2.** Kaplan-Meier survival curve analysis for recurrence-free survival rates in patients.

## Discussion

The current standard for treatment of rectal cancer is radical resection with or without chemotherapy or radiation therapy. However, due to high morbidity and the development of complications such as fecal incontinence, urinary and sexual dysfunction related to radical surgery, the application of transanal local tumor excision has emerged as a potential alternative for patients with early-stage distal rectal cancer. At least one previous study found higher local recurrence rates in patients who underwent transanal tumor excision group compared to those who underwent radical resection, although long-term survival outcomes were similar between the two groups.[6] Patient selection is an important factor when considering transanal tumor excision. The latest National Comprehensive Cancer Network guidelines suggests that the optimal candidates for transanal tumor excision are patients with T1 tumors under 3 cm and without lymph node metastasis, small tumor size (< 3 cm), as well as well-to-moderately differentiated tumors that are within 8 cm above the anal verge and limited to < 30% of the rectal circumference.[9] Full thickness excision with negative margins should be feasible.

Although local excision for T1 rectal tumors is a generally acceptable treatment, its application in T2 rectal tumors remains still controversial.[10] The local recurrence rate after transanal excision for T1 rectal cancer is about 7-17%.[6] Compared to T1 lesions, local excision for T2 rectal tumors has a higher local recurrence rate of 13-30%, which might be attributed to the probably increased occult nodal metastasis. In contrast, the recurrence rate of radical resection for T2 rectal adenocarcinoma is as low as 7.2%.[7] However, the disease-free survival at 5 years is similar.[8]

The results of local treatment for rectal cancer are difficult to interpret, because most studies to date have been retrospective in nature and included heterogeneous patient groups. Some studies have suggested the careful selection of patients due to higher recurrence rates of local excision, although overall survival was similar to patients who underwent radical resection.[5] Even if local recurrence occurs, most patients can be treated with salvage surgery with favorable outcomes. In previous studies, the 5-year survival rate was 50-60% for patients who had local recurrence underwent salvage surgery.[9]

In our study, two patients experienced recurrence. The recurrence rate of 11.11% was compatible with a previous study.[6] One patient had local recurrence with lung metastases after 3-year follow-up, which was

treated with salvage CCRT and radical surgical resection. He also received video-assisted thoracoscopy for resection of a single lung metastasis. There was no evidence of recurrence after radical surgical resection over a 2-year follow-up period. The initial pathological diagnosis was mucinous rectal adenocarcinoma, which is associated with a worse prognosis.[11] It also has a higher T category at diagnosis, higher risk of metachronous metastases and lymphovascular invasion, and worse overall survival compared to non-mucinous rectal adenocarcinoma.[12] The other patient had perirectal lymph node recurrence after 4 years of follow-up. His final pathologic diagnosis reported was a T3 tumor, which may indicate a higher possibility of occult metastases. Though radical surgery was suggested, the patient refused for fear of sphincter damage after radical surgery. He received standard chemotherapy treatment after surgery and experienced recurrence at post-operative 4th year. In the review conducted by Piero et al., the risk of nodal involvement in T3 rectal tumors was 36-66%, while the local recurrence rate following local excision reached 38%.[2] The limitations of our study included a small sample size, heterogeneous examination of clinical characteristics, inconsistent follow-up, and personalized treatment. The survival rate was better in our study compared to previous study may be due to too small sample size and patient selection bias. Besides, there were 10 patients losing follow-up within 5 years, it may also affect the result of survival in our patient group.

## Conclusions

In summary, our study supports the feasibility of providing local excision to patients with clinically early-stage distal rectal cancer, particularly those with T1 tumors. The extension and application at T2 rectal cancer still needs careful patient selection due to higher nodal involvement and local recurrence rate. Indeed, we found a higher recurrence rate in patients with T2 tumors; however, fair survival was evident following salvage radical surgery and adjuvant chemoradiation therapy. In conclusion, further long-term follow-up studies and randomized controlled trials would be necessary to conclusively establish the role of local excision in the management of early rectal cancer.

## Financial Disclosure

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**原　　著**

# 經肛門腫瘤切除治療 $T_{0-2}$ 下段直腸癌結果與預後之探討

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**目的**　藉由本研究呈現經肛門局部腫瘤切除手術對 $T_{0-2}$ 下段直腸癌之治療成果。

**方法**　本研究回溯性蒐集於 2009 年 10 月至 2021 年 1 月間臨床診斷 $T_{0-2}$ 下段直腸腺癌接受經肛門局部腫瘤切除手術的病患。其中先前有其他癌症病史、合併有肛門癌、術前做過同步化學放射治療等病患予以排除，我們蒐集病患之臨床資 訊、腫瘤分期、大小、術後併發症、復發率及五年存活率等並加以分析。

**結果**　最後共計十八名病患被納入此篇研究，另外有七名病患被排除於此研究。十八名病患平均年齡為 66.7 歲 (標準差 9.5 年)，腫瘤距肛門口平均距離為 2.87 公分 (標準差 1.3 公分)，術後並沒有重大併發症，其中兩位病患在後續追蹤的五年內有復發情形，一人在追蹤第三年時出現局部復發及肺部轉移情形並接受同步化學放射治療及根除手術，另一人在追蹤第四年時出現直腸旁淋巴結復發並接受同步化學放射治療，推估五年存活率為 100%，復發率為 11.1%，在追蹤期間並無癌症相關死亡，平均追蹤時間為 42.7 個月 (標準差 27.3 個月)。

**結論**　本研究顯示經肛門局部腫瘤切除手術治療早期 $T_{0-2}$ 下段直腸腺癌是可行且其預後與復發率是可接受的，希望藉由現行研究，未來能夠做隨機對照試驗並長期追蹤以了解經肛門局部腫瘤切除手術對治療早期直腸腺癌的角色。

**關鍵詞**　直腸癌、經肛門腫瘤切除。