# Local Surgical Treatment with Curative Intent in Rectal Cancer

**C.S. Mirea[1], I.D. Vilcea[1], I. Vasile[1], A. Mita[2]**

[1]Surgical Department II, University of Medicine and Pharmacy of Craiova, Romania
[2]Medical Department II, Emergency Country Hospital of Craiova, Romania

**Rezumat**

**Tratamentul chirurgical local cu intenție curativă în cancerul de rect**

Tratamentul cancerului de rect este complex şi include pe lângă tehnicile chirurgicale de rezecţie radicală şi tehnici chirurgicale de excizie locală. Tehnicile chirurgicale prin care se realizează o rezecţie radicală continuă să rămână standardul de aur în terapia cancerului de rect, dar mortalitatea şi morbiditatea crescută postoperatorie a făcut necesară descoperirea unor tehnici chirurgicale mai puţin traumatizante şi cu rezultate satisfăcătoare în anumite cazuri bine selecţionate. Rata recurenţelor locoregionale mai crescută după excizia locală comparativ cu rezecţia radicală certificată de majoritatea studiilor indică necesitatea instituirii unor protocoale care să stabilească foarte clar indicaţia de excizie locală. Au fost luate în discuţie atât caracteristicile anatomopatologice ale tumorilor rectale, diferitele tipuri de tehnici chirurgicale de excizie locală cât şi necesitatea instituirii unui tratament oncologic adjuvant şi neoadjuvant, dar rezultatele diferite în cadrul multor studii fac ca această problemă de mare actualitate să fie încă mult dezbătută.

**Cuvinte cheie:** cancer rectal, excizie locală, rată de recurenţă, microchirurgie endoscopică transanală

*Corresponding author:*     I.D. Vilcea, MD
                            Dr. Papillian Victor Street No. 56, G8-1-1
                            Craiova, Dolj County, Romania
                            Zip code: 200753
                            E-mail: id.vilcea@yahoo.com

**Abstract**

The surgical treatment of rectal cancer includes radical resection techniques and local excision procedures. Radical resection techniques are still the golden standard in the management of rectal cancer, but the increased postoperative morbidity and mortality led to the idea that less traumatizing procedures of local excision may have the same oncologic results, in selected cases. Yet, the significantly higher local recurrence rate after local excision in comparison to radical resection has been certified by most studies; that points out the need of clearly defined guidelines for local excision. In the present review the following aspects were taken into consideration, when considering local surgical excision as a radical procedure for rectal cancer: the clinico-pathological features of the tumours, the various types of surgical techniques used in local excision, the need for an adjuvant or neoadjuvant oncological treatment, the variety of results obtained in a large number of studies, making this particular issue a topic that is currently subject to debate.

**Key words:** rectal cancer, local curative excision, recurrence rates, transanal endoscopic microsurgery

## Introduction

The local treatment of rectal cancer is one of the most debated topics in medical literature nowadays; local treatment procedures are those methods by which the primary rectal tumour is removed using a surgical excision or any other destruction methods, without the possibility of removing the lymphatic vessels that drain the tumoral area

(this representing the main disadvantage of the method) (1).

Most often, local treatment is done surgically, either using conventional surgery or transanal endoscopic microsurgery; the aim of these methods is to remove the rectal tumour with at least 1-2 cm of macroscopically healthy peritumoral tissue. Thus, a satisfactory tissue sample is obtained for pathological evaluation, which can be used afterwards to decide whether or not local therapy may be curative; in order to consolidate the surgical outcome, adjuvant or neoadjuvant oncological treatment may be considered.

Other methods that can achieve destruction of the primary tumour (cryosurgery, laser, electrofulguration or radiation) cannot provide a proper sample for pathological evaluation and therefore these techniques are used only as palliative methods in selected cases (1,2).

The local excision of rectal cancer is recommended for its lower postoperative morbidity compared to radical rectal resection, but the main problem is the increased incidence of locoregional recurrence, due to the insufficient local excision, but especially due to the remaining peritumoral lymphatics, that may be colonized with malignant cells (3).

When recommending the local excision, a good preoperative diagnostic evaluation is mandatory (clinical and also imaging studies), followed by a detailed pathological examination which, in some circumstances, may lead to the cancelling of the local surgery as a curative procedure.

### Issues in the preoperative diagnostic evaluation

The main goal of the preoperative diagnostic evaluation is the selection of cases in which local excision can be applied with minimal oncological risks.

In order to respect this goal, several criteria are required to be met preoperatively: setting or highly suspecting the correct diagnosis, tumours must be reached by transanal route, small size of the tumour and a low degree of the transmural tumoral penetration, favorable histological structure and the degree of differentiation, and especially the exclusion of the lymph node dissemination at the time of the surgical intervention. Out of these, the most difficult to define are, as expected, the preoperative histological criteria, even if a tumoral biopsy was performed (4).

The refusal of radical resections by the patient or the presence of severe biological disturbances may represent other indications for local excision of the rectal cancer.

Another point of debate in small tumours located 5-10 cm from the anal verge is that in such cases, a radical excision is followed by a low/ultralow anastomosis, which is mandatory to be protected by an ileostomy. The morbidity of the ileostomy and its reversal must be taken into consideration when comparing the results between the local excision and the radical resection (5).

However, the decision for local surgery must be done in a full knowledge of its indications and contraindications; it is mandatory for a simple excisional biopsy not to be thought of as "local excision", the biopsy having a very high risk of incomplete resection (4).

Clinical and imaging assessment is the first step in establishing the indication for local excision, but it must always be completed with histological examination data; in this regard, preoperative endoscopic biopsy can be extremely useful, if not mandatory, although a well-performed rectal endoscopy can recognize with very good accuracy the risk of malignancy of the lesion (6).

Clinical examination and imaging diagnosis focuses on topography (height at which the tumour is located from the anus), the tumour size, the degree of the transmural penetration and the exclusion of the involvement of the perirectal lymph nodes.

For tumours that can be excised locally (located within 10 cm from the anus, with a size not exceeding 3-4 cm or that does not exceed 40% of the rectal circumference) the digital rectal examination, combined with rectoscopic examination may be sufficient, but these two methods are insufficient to assess the depth of the rectal wall invasion or the degree of the lymph nodes involvement.

For these parameters, preoperative endorectal ultrasound and/or magnetic resonance imaging (MRI) are used, preferably as a complementary test, in order to increase the sensitivity and specificity of the examination. Using computed tomography to assess the intraparietal extension and lymph node status is not advisable in cases in which the local surgical treatment is intended, the accuracy of this method being much lower: 54-66% for the intraparietal invasion assessment and 60% for the lymph node invasion assessment (7).

Endorectal ultrasound is essential in determining the intraparietal invasion of rectal cancer with an accuracy ranging between 70 and 93%, with an overall assessment of the stage ranging between 9% and 16% and with 3-14% understaging (8,9,10); 3D-endorectal ultrasound can assess $T_1$ stage with an accuracy of 60-100% and 75-92% for $T_2$ respectively (8,9,10). The limits of the endorectal ultrasound are determined by the reduced possibility of the lymph node invasion assessment, with a predictability of 48-73% in determining the nodal status in $T_1$ tumours and 67% in the case of a $T_2$ tumour, with a specificity of 67% in $T_1$ and 75% in $T_2$ (8). The overall accuracy of staging for pelvic lymph nodes varies between 70-73%, with a specificity of 70% and a sensitivity of 77% (8,10). For this reason, establishing the indication of the local treatment only on the echoendoscopic examination is risky, a large number of cases presenting residual disease, especially in the lymph nodes (8).

Magnetic resonance imaging examination has similar accuracy with endorectal ultrasound in tumour and lymph node invasion status, with an accuracy of 79.2% in the assessment of the T stage and 58.5-63.6% in detecting the lymph node invasion (11,12).

Consequently, the limitations of the clinical and the imaging methods lead to an increased risk of residual nodal disease, which accounts for a significant percentage of the therapeutic failures (locoregional recurrences). Preoperative diagnosis provides guidance only in establishing a recommen-

dation for local curative treatment, the pathological examination of the resection specimen having the role to accurately assess the quality of the local excision and its therapeutic possibility.

### Perioperative diagnostic and techniques of local excision

Intraoperative clinical examination under anaesthesia, continuing and completing the preoperative examination, assesses the reliability of local excision as a curative method; this decision must be taken from the beginning and not after an excisional biopsy of the tumour, removal of at least 1-2 cm of the surrounding healthy tissue being mandatory. Considering this factor, the assessment of the tumour size is particularly important for local excision; for the tumour to have an indication of local excision, its maximum diameter must not exceed 3-4 cm or must not be extended to more than 40% of the rectal wall circumference.

Some studies results have demonstrated that a larger tumour size is associated with the risk of incomplete excision, as well as with the association with a large defect in the rectal wall, which is difficult to treat (1).

The surgical possibilities of local excision are transanal resection, Masson transsphincteric or Kraske's transsacral approach, but the maximum tumour height at which the indication for these procedures may be offered to the patient is 10 cm (lower and medium rectum). Using transanal endoscopic surgery allows extending this limit to 15-20 cm (upper rectum).

Conventional transanal excision is preferred by most of the surgeons due to the lower rate of postoperative complications, the promising results and the technical easiness; the percentage of the postoperative complications varies between 0 to 22%, represented mostly by bleeding, local sepsis, faecal incontinence, rectovaginal fistula, bladder infection or urinary retention (13). Also, for tumours located at a higher level, a complication of the technique is considered to be the excision with positive resection margins (particularly in the upper side of the tumour, but also for tumours located in the anterior rectal wall in men, where there is a high risk of residual neoplastic tissue in the rectal wall due to the surgeon's fear of intra-operatively damaging the prostate, the urethra or the bladder). (*Fig. 1*)

Transanal endoscopic surgery (TES) combines the advantages of local excision with the advantages of the endoscopic approach, by increasing the number of patients in which curative local excision may be used; thus, the indications for local excision may be extended to tumours located 15 cm from the anus, in anterior and lateral rectal wall topography, and 20 cm in the case of tumours located on the posterior rectal wall. A reduction in the percentage of cases with positive resection margins can be achieved, but also a decrease in postoperative morbidity and mortality.

After transanal endoscopic microsurgery, the patients are at higher risk of developing anal incontinence caused by the size of the endoscope and the duration of the procedure,



**Figure 1.** *A specimen of a low rectal tumour locally excised*

however the results tend to improve 6 months after the surgery (14)

The main disadvantages of this technique are represented by the large initial financial investment and the learning curve, but the benefits compensate for the initial expenditure, especially since the method can also be used in some larger tumours, with palliative intent.

In terms of oncology, both techniques have the same advantages and disadvantages, pertaining to the absence of lymph node approach, potentially invaded by tumoral tissue; therefore, aggressive postoperative follow-up is highly recommended for an early detection of the recurrence.

Tarantino et al, have described a method in which local excision of the primary $T_1$ tumour was continued by the mesorectal resection through posterior endoscopy, but with a lower number of sampled lymph nodes compared to classical resections (15).

If a local recurrence is detected, or in cases in which pathology shows poor tumoral prognostic features, the local excision should be rapidly followed by a major rectal resection (preferably within the first 30 days after the procedure) (16).

### Postoperative evaluation of the resected specimen. The feasibility of local excision as a curative method

The result of the pathological examination has a paramount importance, as it indicates whether the local excision can be maintained as a curative method or if a radical resection is necessary.

The histopathological examination provides a series of tumoral parameters associated with an increased risk of local recurrence after local excision (so-called high-risk cases); the resection margin status, tumour penetration through the rectal wall, the degree of cell differentiation, vascular invasion, and lymphatic and perineural invasion.

The positive resection margins and the depth of invasion

are important risk factors for recurrence, in spite of the adjuvant methods that can be used (postoperative radiotherapy, chemotherapy). In case of positive resection margins (circumferentially but also radially) radical resection must be taken into consideration, or at least enrolling the patient in a rigorous postoperative follow-up program; if this is not possible, it is preferable to perform the radical rectal resection from the beginning.

The T stage is a very important parameter for determining the indication for local excision as a curative method for rectal cancer, correlated both with likelihood of positive resection margins and also with lymph node invasion; for this reason, local excision of the tumour is now accepted for $T_{is}$, low-risk $T_1$ tumours and, in selected cases, for the low risk $T_2$ tumours. On the other hand, more and more studies bring into question the use of local surgery for $T_3$ tumours with favourable response to neoadjuvant therapy and favourable pathological prognostic factors.

There are numerous studies showing an increased risk of lymph node invasion proportional to the degree of transmural penetration of the tumor; thus, lymph node involvement ranges from 5.7% - 14.3% for $pT_1$ tumours up to 18.4-19.6% for $pT_2$ (17,18,19,20).

Among the factors that induce these differences are poor degree of the tumour differentiation (G3) and invasion of lymph and blood vessels, considered as predictive factors for the presence of lymph node metastases (17,18,19,20).

The percentage of lymphatic metastasis seems also to be significantly higher in patients younger than 45 years old, reaching 30% for $pT_1$ cases. Consequently, only $pT_1$ tumours in patients over 45 years old were considered to present a low risk of lymphatic dissemination and therefore an indication for local surgery (18).

Once the high-risk factors for lymphatic dissemination of the rectal cancer were identified, local excision is followed by radical excision, or at least an adjuvant radiochemotherapy protocol, which is able to consolidate the results and prevent locoregional recurrences. In these cases, that we call local excision, it becomes actually an excisional biopsy (4).

### The long-term results. Recommendations for adjuvant therapy after curative local rectal excision

The value of local excision in rectal cancer treatment cannot be acknowledged unless the oncological outcomes (locoregional recurrence, long-term survival rates) and the quality of life after surgery are comparable or better than those after standard resections.

There are studies that show a trend of increased incidence in the use of these procedures in recent years (21). However, a topic that remains in question is establishing the recommendation for local procedures as a curative method in young patients, while local surgery can be the best option for patients who have a contraindication to major surgery, in patients with reduced life expectancy or those who refuse permanent colostomy.

Most studies show a high rate of recurrence in those with

Most studies show a high rate of recurrence in those with local excision compared to those with radical excision, regardless of the tumour penetration through the rectal wall (22,23,24). A disturbing fact is that some studies have shown a lower rate of long-distance survival in cases proposed for radical surgery after a local recurrence following the local excision (25,26).

Locoregional recurrence rate after the local excision in $T_1$ tumours ranges from 4% to 29%, 2-5 times higher than after radical rectal excision (13,27).

An improvement of local surgery results can be obtained by applying an adjuvant chemoradiotherapy protocol, especially for patients with $T_1$ and $T_2$ tumours with adverse pathological features, with no local recurrence in 100% of cases at 89 months after surgery, compared to 76% in cases which did not receive adjuvant therapy (28,29).

Using a neoadjuvant radiochemotherapy protocol can extend the recommendation for local excision in the management of $cT_2$ and $cT_3$ tumours, the most powerful prognostic parameter being complete pathologic response to neoadjuvant treatment ($ypT_0$ or $ypT_1$) after excising the tumour (30,31,32).

Considering the aforementioned issues, local excision preceded or followed by chemoradiotherapy reduces the risk of local recurrence, but may cause many functional disorders, such as anal incontinence and sexual and urinary dysfunctions (due to the sphincter irradiation or pelvic nerve lesions), so long-term functional outcome may prove not as good as previously thought, thus affecting some of the benefits of the procedure (32).

## Conclusions

Having discussed the merits and drawbacks of each method we can conclude that, at least for the moment, there are no significant studies to prove that local excision is a safe procedure in oncologic terms (similar rates of local recurrence or a similar survival rate in comparison with total radical resection for the same stage of the disease).

The presurgical selection of cases that may benefit from this type of treatment is difficult, especially due to the lack of imaging techniques that would accurately determine the stage of the primary tumour and the lymph node status in particular.

The real benefit of local excision is in case of $T_{is}$ or $T_1$ rectal tumours, with no adverse pathologic features, located in the lower part of the rectum, which do not allow an anastomosis to be made following a classical rectal resection.

The risk of recurrence after local excision is higher than after radical surgery and it appears to influence long term survival rates; as a result, in cases in which the guidelines for local excision and postoperative outcome are not strictly followed, local approach may prove to be a therapeutic failure.

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