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REVIEW

Local resection for small rectal cancer

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KEYWORDS
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Pathologic criteria

Summary Rectal resection with total mesorectal excision is the standard treatment for rectal cancers. Local excision represents an alternative with less post-operative mortality and morbidity and preservation of intestinal and bladder function. However, local excision cannot provide adequate nodal staging. Presently, endorectal ultrasound and magnetic resonance imaging are used to select the appropriate patients for local excision, those with limited T1 rectal tumors. There is general agreement that the ideal tumors for local excision are less or equal to 3 cm in diameter, superficial (usTis and/or usT1N0), infra-peritoneal, located below the middle rectal valve, and involving no more than 40% of the rectal circumference. Transanal tumor excision is suitable for distal tumors and transanal endoscopic microsurgery for mid and upper lesions. The principles of adequate resection margin, non-fragmentation, and full-thickness excision are similar to those for any cancer resection. Unfavorable pathologic criteria, as assessed on the fixed rectal specimen, include depth of tumor invasion (submucosal [T1sm3] or muscular [T2]), positive resection margins, vascular and/or lymphatic invasion, and poor differentiation. Further radical surgery is required in case of unfavorable criteria. Simple surveillance may be advised for superficial tumors (T1sm1) without any unfavorable criteria. Management of T1sm2 tumors without any unfavorable criteria should be discussed on a case-by-case basis.

Introduction

While rectal excision remains the mainstay treatment for rectal cancer, overall management has greatly improved in the last 25 years. The prognosis has changed radically as local recurrence has decreased from nearly 30% at the start of the 1990s to less than 10% today, thanks to progress in radiation therapy and then neoadjuvant radio-chemotherapy, associated with sweeping changes in surgical technique (i.e. total mesorectal excision) [1]. These developments have allowed surgeons to push back the limits of sphincter preservation for low-lying rectal tumors, avoiding permanent colostomy in this setting. Nonetheless, rectal excision is a radical surgical procedure with considerable morbidity and functional sequelae. In the well-known Dutch randomized study, mortality was 3.3%, anastomotic leakage was 16% (in the absence of protective stoma) [2], and 30% of patients had a permanent stoma. Twenty-five to 34% had genitourinary sequelae; nearly 60% had anal incontinence, and 30 to 40% had urgency and fragmentation of stools [3].

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Table 1 Sensitivity (Se) and specificity (Spe) of rectal endoscopic sonography and magnetic resonance imaging in preoperative work-up for rectal cancer. Results of recent meta-analyses.

Authors	Type of study	Endoscopic sonography				Magnetic resonance imaging			
		T Stage		N Stage		T Stage		N Stage	
		Se	Spe	Se	Spe	Se	Spe	Se	Spe
Bipat et al. [19]	Meta-analysis	94%	86%*	67%	78%	94%	69%*	66%	76%
Puli et al. [20]	Meta-analysis	T1: 87.8% T2: 80.5%	T1: 98.3% T2: 95.6%						
Puli et al. [21]	Meta-analysis			73.20%	75.80%				
Al Sukhni et al. [22]	Meta-analysis					87%	75%	77%	71%

Se: sensitivity; Spe: specificity.
* $P < 0.05$.

Therefore, some authors have proposed sphincter preserving strategies. Transanal local excision constitutes an attractive alternative, at least in theory, associating excellent operative results in terms of mortality (< 1%) and morbidity (10%) with the double advantage of preservation of the rectum (nearly no risk of digestive functional sequelae) and of the anal sphincter [4]. The main pitfall of this technique is that it cannot provide adequate nodal staging, a major risk factor for locoregional recurrence: the incidence of lymph node involvement in T1 rectal tumors ranges from 10 to 18% and increases to over 20% for T2 tumors [5—8].

There are few studies in the literature that have compared the oncological outcomes of transanal local excision versus rectal resection for T1 tumors, and most are retrospective. All of the series [8—14] report significantly higher local recurrence rates after local excision (7—18%) compared with rectal resection (0—3%). The Memorial-Sloan-Kettering series [11], with a median follow-up of 5.6 years, showed a significant reduction not only in disease-free survival but also in overall survival after local excision. Recently, several national registries have reported oncologic outcomes of large series of patients undergoing either local excision or rectal resection [15]. Once again, the risk of local recurrence was increased with local resection (5—13%) compared with proctectomy (1—7%). According to the American registry, local excision is an independent prognostic factor for local recurrence after exclusion of patients undergoing a R1 resection [16]. To date, no randomized trial comparing local excision versus rectal resection has been published.

These alarming results have led surgeons to revisit the indications for local excision and the need for better selection of patients. Effectively, when considering local excision for small rectal cancers, oncologic outcome should be comparable to that of proctectomy. Five-year results in the above-cited Dutch randomized trial showed that local recurrence for 244 Stage I patients undergoing proctectomy was less than 2% [17].

The goal of this update was to define the place of local excision for small rectal cancer, by answering the following questions:

- What is the optimal preoperative work-up?
- How should local excision be performed?
- What should be expected from the pathology report?
- What does the future hold?

What is the optimal preoperative work-up?

When faced with rectal cancer, it is essential to know: the localization of the tumor, its size, depth of invasion, mobility, the distance from the lower pole of the tumor to the upper margin of the sphincter, T stage (depth of invasion into the rectal wall, the mesorectum, and/or adjacent organs), N stage (presence or absence of metastatic lymph nodes), and M stage (distant metastases or not). Initial information can be obtained from digital rectal examination for tumors within reach of the examining finger, and from rigid proctoscopy for higher-located lesions, and total colonoscopy to rule out other synchronous lesions. Rigid proctoscopy is more reliable than flexible colonoscopy to evaluate the distance of the tumor from the anal verge. These two examinations also help evaluate the circumferential extension of the lesion. Local extension is evaluated with rectal endoscopic ultrasound (EU) and magnetic resonance imaging (MRI). Finally, thoraco-abdomino-pelvic CT scan can complete the evaluation for evidence of distant involvement [18].

Imaging, and in particular, EU and MRI, have acquired an essential place in the selection of patients for local resection, fundamental for preoperative selection of patients with superficial rectal cancer (tumor limited to the rectal wall without involvement of the muscular layer and absence of lymph node involvement [usTis and/or us T1N0]). The results of the latest meta-analyses of EU and MRI as diagnostic tools are found in Table 1. The 2004 meta-analysis of Bipat et al. compared the diagnostic performances of EU, MRI and CT scan for preoperative evaluation of rectal cancer [19]. The sensitivity of EU and MRI were identical in predicting muscular layer involvement, but the specificity of EU was superior to MRI ($P = 0.02$). As concerns lymph node involvement, the results of either of the investigations were similar. Puli et al. published two meta-analyses in 2009, both specifically focused on the diagnostic effectiveness of EU in detecting the depth of wall and lymph node involvement [20,21]. The sensitivity and specificity of EU for prediction of T1 and T2 stages were 87.8% and 98.3% respectively for T1 tumors and 80.5% and 95.6% for T2 tumors. These results dropped to 75% for evaluation of lymph node invasion. Last, the 2012 meta-analysis of Al-Sukhni et al. reported on the reliability of MRI [22]; sensitivity and specificity were 87% and 75% for the T stage and 77% and 71% for lymph node involvement. According to these results, MRI is less sensitive than ES for small tumors, particularly for distinguishing T1 from T2 tumors. Moreover, this classification can be refined to define sm1 to sm3 (sm corresponding to submucosal involvement), and can thus be used to evaluate the possibility of endoanal resection. However, caution is warranted in the interpretation of results because they are related not only to the expertise of the centers but also to