

Postoperative morbidity and recurrence after local excision of rectal adenomas and rectal cancer by transanal endoscopic microsurgery

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Abstract

Objective Tumours in the middle and upper part of the rectum are not easy accessible to local excision. Transanal endoscopic microsurgery (TEM) has been recommended for excision of sessile adenomas in the middle and upper part of the rectum, and for small cancers in patients not fit for major surgery. The purpose of this study was to evaluate postoperative morbidity and local recurrence after TEM.

Material and methods Seventy-nine patients were treated by TEM in the period 1994–2001. The median age was 74 years. The indications for TEM were rectal adenoma in 72 patients and rectal cancer in 7 patients. The tumours were located within 18 cm from the dentate line, median 10 cm. There were performed 69 transmural and 10 mucosal excisions. Mean follow up was 24 months (range 1–95 months). Twenty (25%) patients died during the follow up period, two because of metastases and 18 of other causes.

Results Seven patients had complications. Two (2.5%) patients had peroperative perforation in the intra-abdominal part of the rectum treated by laparotomy. Five (6%) patients had postoperative cardiopulmonary or surgical complications. Eight patients with benign pre-operative histopathological examination had cancer. The local recurrence rate (13%) was similar for adenomas and for carcinomas.

Conclusion TEM is a safe technique well tolerated also by high-risk patients, and should be the preferred method in patients with benign tumours in the middle and upper part of the rectum, and in selected cases of early rectal cancer. Benign pre-operative histology does not preclude malignancy and some patients may need further treatment for unexpected malignancy.

Keywords Rectal cancer, rectal adenoma, TEM

Introduction

Tumours in the middle and upper part of the rectum are not easy accessible to local excision, and traditionally even benign tumours have been treated by extensive surgical procedures. As an alternative to major surgery, the technique of Transanal Endoscopic Microsurgery (TEM) was developed in 1983 for local excision of rectal neoplasms [1], and the outcome following TEM has been promising according to morbidity and mortality [2–5]. However TEM has been advocated for low-risk T1 tumours [6–9], and in a recent study there were similar results using pre-operative radiation and TEM as those achieved by conventional surgery in the treatment of T2

rectal cancer [10]. The aim of the present study was to evaluate the outcome of TEM when used for adenomas and for rectal cancer if the patient was not fit for major surgery.

Materials and methods

This study includes all 79 patients with rectal tumours treated by TEM in our department between January 1994 and November 2001. All information was retrieved by standardized examinations of the records. The indications for TEM were sessile adenomas in 72 patients and rectal cancer in seven cases. The patients with pre-operative verified malignant tumours underwent TEM as they were considered not fit for major surgery because of additional cardiopulmonary disease. One patient with malignant tumour had pre-operative radiotherapy. None of the patients with malignant tumour had chemotherapy.

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Pre-operative assessment included proctoscopy with biopsy, colonoscopy and endoluminal ultrasound for tumours that could be reached by the sonographic probe.

Median age was 74 years and 32 (41%) patients were classified as ASA 3 and 4 (Table 1). The median distance from the dentate line to the lower border of the tumour was 10 cm (1–18), and 63 (80%) patients had tumour more than 5 cm above the dentate line. Median tumour diameter was 3 cm (1–7.5). There were 69 transmural and 10 mucosal excisions, and the tumours were resected by means of TEM described by Buess [1].

The follow-up regimen included rectoscopy after three, six and 12 months, and after this once a year until five years. Mean follow-up was 24 months (1–95). Due to severe comorbidity, some of the patients did at some point not continue the follow-up program. Twenty (25%) of the patients died in the period of follow-up, and the median interval between the operation and death was 29 months. Two patients died of metastatic disease and 18 patients died because of other diseases.

Results

The median operation time was 110 min (range 45–240 min), and the median postoperative stay was 4 days

(range 1–25 days). Two (2.5%) patients had perioperative complications, i.e. perforation in the intra-abdominal part of the rectum, and the defect could not be closed primarily via the TEM operative rectoscope. One of these patients was treated with anterior resection (AR), and the other by laparotomy and excision of the polyp. Five (6%) patients had postoperative complications (myocardial infarction, haematoma in the suture line, pulmonary embolism, rectal stenosis). Five (6%) patients had fecal soiling more than one year after TEM, and one patient who had gas incontinence before the procedure became incontinent for faeces after the operation.

Postoperative histological examination of the excised specimens revealed 64 adenomas, of which 51 specimens had a free margin in the line of resection, in nine specimens the margin was uncertain, and four specimens had tumour involvement of the resection margin.

There were 15 (19%) malignant tumours. Eight of these had pre-operative benign histology, i.e. 11% of the tumours judged benign pre-operatively were in fact a cancer, although at an early stage. The characteristics of the patients with malignant histology are summarized in Table 2. Of the seven patients with known rectal cancer pre-operatively, five patients had free resection margins in the specimens.

After the TEM procedure three patients with postoperatively verified malignant tumour were further operated. One patient was operated with AR because of uncertain margin, and two patients with APR because of high-risk tumour characteristics and uncertain margin. None of these patients had remnants of the primary tumour in the specimen after major surgery, but those with high-risk tumours had glandular metastasis.

All T1 tumours in this series were completely excised and there have not been recurrences in this group of patients. Four of five T2 tumours were radically excised and have not recurred. One patient with a T2 tumour and involved margin developed local recurrence.

Treatment of T3 tumours by TEM is a palliative procedure. The two patients with T3 tumours had not a complete resection. One of these was an 84 years old patient who did not want further treatment and he developed a local recurrence. The other one had liver metastasis at the time of the TEM procedure and died three months later.

In the follow up period there were a total of 10 (13%) local recurrences. Median time to local recurrence was 13 months (range 4–72 months). There were 8 (13%) recurrences after treatment of adenomas and 2 (13%) recurrences after treatment of carcinomas, one T2 and one T3 tumour. (Table 3). In the group of patients with free histological margin after TEM for adenomas there were 2 (3%) recurrences. None of the 12 patients with

Table 1 Characteristics of 79 patients treated by TEM.

	<i>n</i>	%
Age (median (range))	74	(36–90)
Gender		
Female	34	43
Male	45	57
ASA		
I	12	15
II	35	44
III	30	38
IV	2	3
Excision		
Transmural	69	87
Mucosal	10	13
Lower border (cm) (median (range))	10	(1–18)
1–5	16	20
6–10	40	51
11–15	19	24
16–20	4	5
Tumour size (diameter,cm) (median (range))	3	(1–7.5)
Adenomas		
Pre-operative	72	91
Postoperative	64	81
Carcinomas		
Pre-operative	7	9
Postoperative	15	19

Table 2 Characteristics of 15 patients with rectal cancer treated by TEM.

	Pre-operative malignant <i>n</i>	Postoperative malignant <i>n</i>	Total <i>n</i>
Patients	7	8	15
Age (median (range))	82 (74–89)	76 (44–87)	74 (44–89)
Staging			
T1	2	6	8
T2	4	1	5
T3	1	1	2
Stage I	6	7	13
Stage II	0	1	1
Stage III	0	0	0
Stage IV	1	0	0
Pre-operative radiation	1		1
Tumour characteristics			
Low-risk*	7	6	13
High-risk*	0	2	2
ASA-group			
I	0	0	0
II	2	4	6
III	4	4	8
IV	1	0	1
Free resection margin			
Yes	5	7	12
No	2	1	3
Further surgery			
AR	0	1	1
APR	0	2	2

Low-risk*: High to moderate differentiated tumour without microscopically lymphovascular infiltration. High-risk*: Low differentiated tumour with microscopically lymphovascular infiltration.

Table 3 Local recurrence after TEM.

	No. of patients	No. of recurrences	%
Adenoma	64	8	13
Carcinoma	15	2	13
T1	8	0	
T2	5	1	
T3	2	1	

free histological margin after TEM for cancer had local recurrence.

Five of eight patients with recurrent adenoma were successfully treated with transanal excision (1), a new TEM procedure (2), laser (1) and snare (1). Two patients with primary adenoma had recurrence with malignant

histology. One of these patients was treated with an abdominoperineal resection (APR), the other died because of a synchronous lymphoma.

Discussion

TEM is an endoscopic sphincter preserving procedure with good exposure of rectal tumours in the middle and upper part of the rectum. The technique was initially developed for local excision of benign rectal tumours, however, it may be an alternative treatment for early rectal cancer in patients not fit for major surgery.

In this study eight of the 72 (11%) patients with pre-operative presumed adenomas had malignant histology. Biopsies of all these tumours had been taken and showed moderate to severe dysplasia. Seven of these eight patients had undergone endoluminal ultrasound before the operation. It may be difficult to differentiate between noninfiltrative tumour growth and T1 tumours using endoluminal ultrasound, and the probe cannot reach all rectal tumours because of their location. Furthermore, the interpretations of the findings during endoluminal ultrasound may be difficult in the lower rectum towards the sphincter and after earlier taken biopsies of the tumour [11,12]. Larger adenomas may have small malignant foci and multiple biopsies are required, and it is advisable to do a transmural excision when this is possible.

Many of the adenomas in this material would not be accessible for transanal excision because of the distance from the anal verge, and the recurrence rate after transanal excision of rectal adenomas is 30% in some reports [13]. The alternatives for local treatment of tumours in the middle and upper part of the rectum are trans-sphincteric (Mason) or trans-sacral (Kraske) procedures. These are more complex procedures with high rates of complications and morbidity [14,15]. The rate of complications in this material is lower, 9%, than after alternative procedures such as Mason/Kraske and major surgery (APR, AR), 42% and 22%, respectively [15–17]. Furthermore the median hospital stay is short after TEM in this study, only four days.

Six percent of the patients in this study had postoperative mild incontinence (soiling) persisting 12 months after the TEM procedure. One patient with a weak sphincter pre-operatively had fecal incontinence. None of the patients wanted further treatment. These results are similar to other studies where incontinence after TEM is a moderate problem, and studies including continence scores have not implied change of treatment strategy [18,19]. The length of operation time is correlated to the postoperative functional result of the sphincter, however, the functional results following TEM seems superior

compared to the AR and the APR procedure. Although pre-operative anal manometry has been performed to identify patients with a weak sphincter it has not implied any change in treatment strategy.

The resection margins in the excised specimen after TEM may be difficult to evaluate because of trauma after the use of diathermy, lack of orientation and shrinking of the specimen after fixation. It is essential that the excised specimen is orientated by the operator and pinned onto a cork plate before fixation. To achieve local radical excision and to avoid uncertain margins in the final histology, the margin of clearance should be 5 mm in the case of adenomas and 10 mm in carcinomas [3]. Intra-operative frozen section of the tumour margins has not been a part of the routine in this study. According to Lezoche [10] six biopsies in macroscopically normal mucosa at a distance of 5 mm from the tumour margin before radiation, and biopsies from the margin of the tumour to verify completeness of the tumour excision intraoperatively is recommended as a part of the TEM routine in treatment of T2 tumours.

Based on the knowledge that larger adenomas may include parts with malignancy there were 87% transmural excisions in this series. However, tumours in the lower part of the rectum, close to the sphincter or on the anterior side against vagina and the prostate, were treated with mucosal excision.

Concerning the patients with an unexpected malignancy following TEM, the indication for further treatment is to be discussed. Although the risk is small, even patients with a low-risk T1 tumour and free margin may have lymph node metastasis [20–22]. If the histopathological assessment of a rectal cancer treated by TEM shows a high-risk tumour or the excision is incomplete, the patient should be treated with more radical procedures if possible. In the present study none of the patients treated with radical surgery after a TEM procedure for unexpected cancer had local recurrence during the follow up period. In contrast, other studies have shown that long-term results after APR or AR salvage procedures for recurrent rectal cancer first treated by local excision are poor [4,23,24], and appropriate selection of patients before early rectal cancer is treated by TEM is therefore important.

Although patients with T2 and T3 tumours have a considerable risk of lymph node involvement, 20–40% in most series [21,22,25], due to comorbidity none of these patients in the present study were offered adjuvant therapy. However, when using local treatment for early rectal cancer, it should be a part of a multimodal approach of which the treatment strategy can be tailored according to patient and tumour characteristics [26].

Conclusion

In conclusion, TEM was developed for, and should be routine treatment for sessile adenomas in the middle and upper part of the rectum. It is a safe technique, well tolerated also by high-risk patients, and there is a low rate of complications. However, a substantial number of patients with benign pre-operative histology may have malignant disease, indicating a need for improved pre-operative staging.

To avoid remnant tumour tissue after TEM, frozen sections of the margins should be examined during the procedure. T1 tumours may be safely treated by TEM. T2 tumours should be given neoadjuvant or adjuvant therapy, and the use of TEM for T3 tumours may be an option in a palliative setting.

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