

Transanal Endoscopic Microsurgery (TEM) – Alternative or a Method of Choice in Treating Tumors of the Rectum with Appropriately Selected Patients?

Dordano Bačić¹, Iva Durut¹, Nado Bukvić² and Ivica Čepić¹

¹ Department of Digestive Surgery, University hospital Rijeka, Rijeka, Croatia

² Department of Pediatric Surgery, University Hospital of Rijeka, Rijeka, Croatia

ABSTRACT

TEM is an endoscopic method of operating tumors up to 18 cm of the anal verge. It enables procedures from a simple mucosectomy to en-block excisions of the whole thickness of the rectal wall. We present a study in which we evaluated surgical morbidity, mortality and recurrence rate of rectal tumors in patients treated with TEM from July 2007, up to the end of March 2014. In our Department 129 patients were treated by TEM and 123 of them (74 men and 49 women) had rectal tumors: 55 adenomas, 36 cancers in situ (Tis), 15 T1, 9 T2, 4 T3 (3 palliative, and 1 underwent salvage operation) and 4 T4 (all palliative) rectal cancers. 6/123 patients were treated with TEM after the finding of metachronic recurrences that emerged after previously performing major surgery. In 3/123 cases (2.44%) the resection margins were positive. The overall local recurrence rate was 19(15.45%) – adenoma 6/55 (10.91%), Tis 4/36(11.11%), T1 0/15(0%), T2 4/9(44.44%), T3 1/4(25%), T4 4/4(100%), respectively. In 2 patients the illness was subsequently disseminated, and in 7 patients it was widespread at the time of surgery. Nine (7.31%) patients died during follow-up due to disease dissemination. Minor complications occurred in 24 patients (19.51%) whereas we had no major complications and no early postoperative mortality. The average postoperative hospital stay is 2.3 days. TEM is a safe and appropriate surgical treatment option for benign rectal tumors and for early-stage rectal carcinomas. TEM is also good as a palliative method, and it's useful for elderly and unfit patients.

Key words: transanal endoscopic microsurgery (TEM), adenoma, cancer in situ (Tis), rectal cancer, recurrence

Introduction

TEM is an endoscopic procedure and a successful method of operating tumors up to 18 cm of the anal verge. Although the indications are narrow in relation to the transabdominal approach, with this method we can avoid major surgery^{1–4}. The technique during its beginnings of application was limited primarily to the excision of large polyps but thanks to the great upsurge of, in the first place neoadjuvant, but also adjuvant chemoradiation the indication have expanded on early rectal cancer pT1” low risk” (G1 and G2). Studies have been made on a larger number of patients with pT2 (G1 and G2), pT3, including even pT4 rectal cancer which have shown that some patients (good responders) after neoadjuvant chemoradiation and after reaching a lower tumor stage, while being N0 and M0, can

be treated with the TEM technique. The results with this procedure are not very different then with the transabdominal approach which includes a low anterior resection (LAR) and total mesorectal excision (TME) or an abdominoperineal resection (APR)^{5–9}. TEM is not the only recognized technique for local tumor excision. Small and large polyps can be removed colonoscopically. This technique is reserved only for adenomas and Tis. In that case either mucosectomy or loop electroresection is made. The advantages are good visualization and the possibility of resection in the whole length of the colon and rectum. The disadvantages are insufficiency of endoscopic instruments and also there is a greater possibility of perforation and uncontrolled bleeding^{10,11}. Although the classical transanal resection does enable full thickness resection, due to poor visualization it's restricted only to tumors not larger

than 3 cm and not deeper than 8 cm of the anal verge^{12,13}. Comparing TEM with other techniques of local excision of tumors, the advantages are excellent visualization and specially angled hand instruments for precise maneuvering within the rectoscope tubes which enables to perform procedures from a simple mucosectomy to en-block excision of the whole thickness of the rectal wall with the resection of the pertaining fat tissue. Compared to other local resection techniques it has been proven that the number of recurrences is significantly lower after TEM^{14,15}.

Although this technique dates from the year 1983., it took some time for TEM to rightfully take its place among classical tumor resection surgeries. Partially because it has a very slow learning curve, and partially, because of the unwarrantable fear of insufficient radicality of the technique. Thanks to the development of magnetic resonance, endoscopic ultrasonography, PET CT and better understanding of the behavior of the tumor depending on its differentiation, penetration, molecular and genetic characteristic, today we are able to determine more exact indications and selection of patients which can be operated with the TEM technique with results which will not differentiate from the results of classical operations^{16–18}.

Subjects and Methods:

TEM was introduced in the workmanship of the Department of Digestive Surgery at the Clinical Hospital Centre of Rijeka at the end of the year 2007. All patients have the same preoperative treatment. The day before surgery they are given lighter meals with lots of fluids. The night before surgery an enema is admitted to the patient as is in the morning of the surgery. All patients preoperatively get antibiotic prophylaxis – Metronidazole 500 mg i.v. and Cefazoline 1.0 g i.v., except patients with Cephalosporins and/or Penicillin allergy who get 160 mg Garamycin i.v. All patients undergo general anaesthesia. Immediately after surgery they begin oral intake of liquids and light food and are mobilized.

Up to the end of March of 2014, 129 patients were operated with this technique (76 men and 53 women). 123 patients had tumor of the rectum (74 men and 49 women). Average age range is 65.38±11.58. Of the total tumor number, 55 were adenomas with all degrees of dysplasia, 36 Tis, 15 T1, 9 T2, 4 T3 (3 palliative, and 1, after the pathohistological report, underwent salvage LAR with TME) and 4 T4 (all palliative) rectal cancers. From 123 patients with rectal tumors 6 patients were subjected to TEM because of metachronic recurrences that have emerged after previously performing major surgery for treating colon and rectal cancer. Other TEM operations have dealt with 3 inflammatory stenosis, 2 stenosis of the anastomosis and 1 extraction of a foreign object.

Patients that underwent surgery due to adenoma, Tis and T1 tumor grade require only regular surgical follow-up. Patients with tumors graded T2–T4, except surgical, also have an oncological follow-up. Regarding oncological treatment, 5 of 17 T2–T4 patients were not treated with

chemoradiation due to patient comorbidity, general poor condition or old age. Three of them, whose preoperative staging showed T2,N0,M0 rectal cancer, were treated with high dose neoadjuvant radiation and chemotherapy and underwent TEM 8–10 weeks after the final dose of radiation treatment. The remaining 9 patients were subdued to adjuvant chemoradiation.

Data analysis

Tabular presentation, data entry and processing was done in Microsoft Office Excel 2007 (Microsoft)

Results

One hundred and twenty three patients were treated by TEM for tumor diseases. In 3 cases (2.44%) the resection margins were positive (1T3, 1T2, 1Tis). Two patients had repeated TEM for biopsy (Tis and T2), and one patient with T3 underwent LAR with TME. Including all operations the recurrence rate was 21 (17.07%). We were presented with 19(15.45%) local recurrences: adenoma with all types of dysplasia 6/55 (10.91%), Tis 4/36 (11.11%), T1 0/15 (0%), T2 4/9 (44.44%), T3 1/4 (25%), T4 4/4 (100%), respectively. In the group of patients where TEM was performed after previous major surgery the recurrence rate was 2/6 (33.33%) – they both were distant metastasis which we tend to correlate with primary tumor dissemination because the local findings were all adenomas. Recurrences from the adenoma and Tis group were all resolved with repeated TEM procedure. In the T2 group repeated TEM was indicated in 2 patients, while LAR with TME was indicated in one patient and in one patient APR was done. In one patient preoperative staging showed that we were dealing with T1N0M0 carcinoma but the final pathohistological result was a pT3 tumor so he underwent salvage surgery in which classical LAR with TME was done. He didn't present any recurrences after surgery. In the T3 and T4 group we did 7 palliative procedures because of liver metastasis which we didn't count as recurrences. One T3 group patient and all T4 group patients presented asymptomatic local recurrences in the terminal phase of the illness and the decision was not to operate further. Considering all patients up till today, 9/123 (7.32%) has died due to the consequence of disease dissemination. Taking into account the fact that these were patients with T2–T4 cancers, the real percentage is 9/23 (39.13%). These concerns the patients in whom the illness was disseminated before the procedure and 2 cases from the group of patients with disseminated disease that previously underwent major surgery due to colorectal malignancy. The total survival rate is 92.68%, and the survival rate in the T2–T4 group is 60.87%. The follow-up median of all patients is 42 months (1–71 months) (Table 1). In these seven years of experience with TEM we had no early postoperative mortality and the number of complications was minimal. We had 2 suture disruptions that did not require further intervention, 11 patients had high

TABLE 1
OUR RESULTS IN 123 PATIENTS WITH TUMOROUS DISEASE TREATED WITH TEM

	No. of patients	Chemotherapy or radiochemo-radiation	Local recurrence	Distant metastasis (after TEM)	Treatment of local recurrence	Survival (disease specific)	Follow-up month (median)
adenoma	49		6(12.24%)		TEM	100%	
Metachronic or synchronic adenoma After major surgery (T2–T4)	6	Adjuvant after major surgery	0	2(33.33%)		33.33%	48
Σ adenomas	55		6(10.91%)	2(3.64%)		96.36%	48
Tis	36		4(11.11%)	0	TEM	100%	32
T1	15		0	0		100%	33
T2N0M0	3	Neoadjuvant	0	0	1 LAR,1APR	100%	47
	4	Adjuvant	2(50%)	0	TEM		
	2	without	2(100%)	0			
Σ T2N0M0	9		4(44.44%)	0		100%	47
T3 N0 M0	1	adjuvant	0	0	LAR	100%	
T3NxM1-pal	1	Adjuvant	1(50%)	(3 M1)*		0%	19
	2	without					
Σ T3	4		1(25%)	(3 M1)*		25%	19
T4 Nx M1-pal	2	Adjuvant	4(100%)	(4 M1)*		0%	15
	2	Without					
Σ	123		19(15.45%)	2(1.63%)		92.68%	42
Σ T2–T4	23		9(39.13%)	2(8.70%)		60.87%	40

TEM – transanal endoscopic microsurgery; LAR – low anterior resection; APR – abdominoperineal resection; pal – palliative surgery; * – patients with distant metastasis before TEM

TABLE 2
COMPLICATIONS

	n
Fever (first two post surgery days)	11
Fever (6 post surgery days)	1
Bleeding	0
Suture disruption	2
Mortality	0
Dysuric difficulties	7
Transitory fecal incontinence	3
Total complications	24 (19.51%)

fever in the first 2 postoperative days, one patient had fever during 6 days after surgery. Seven patients had dysuric difficulties and three had transitory fecal incontinence (Table 2). Over 80% of patients did not have any demands regarding analgesia. None of the patients received blood transfusion. The average postoperative hospital stay is 2.3 days.

Discussion and Conclusion

With adequately nominated indications, TEM is a method of choice for treating large adenomas, carcinomas in situ, but also cancer pT1. There are controversy regarding the indications for TEM in pT2 cancers. It has been proven that with pre-procedural downstaging of rectal carcinoma there are higher survival rates and fewer recurrences. If these tumors are larger than 3.5 centimeters or „high risk” (poorly or undifferentiated adenocarcinoma with lymphatic invasion), the recommendation is to submit the patient to open or laparoscopic resection^{4–8}. TEM is also good as a palliative method, or in patients that have high operational risk. Postoperative course is in general without pain, the hospital stay is short, and expenses (excluding the initial investment) are low. In the end, the results of treating patients with good indications with TEM are in accordance with the results of treating the disease with classical surgery, but they are better than the results of treating them with methods of transanal excision or endoscopic mucosal resection¹⁴.

Thanks to the better understanding of the pathophysiology of tumors, new achievements and acquisitions in oncological treatment and exceeding improvements in di-

agnostics, TEM, as a minimally invasive technique with a small number of complications, is flaring up. We can now perform more adequate preoperative staging and subsequent follow up of patients which lead to an expansion of indications for the treatment. It is encouraging that the

results in TEM treated patients are in comparison with classical treatment results^{4,16–18}. Although this technique has its limitations, TEM is finally taking its earned place in the surgical treatment of rectal tumors.

REFERENCES

1. BUESS G, J R Coll Surg Edin, 38 (1993) 239. — 2. BUESS G, Surg Oncol Clin N Am, 10 (2001) 709. — 3. BURGHARDT J, BUESS G, Surg Technol Int, 14 (2005) 131. — 4. CATALDO PA, BUESS GF, Transanal Endoscopic Microsurgery (Springer, New York, 2009). DOI: 10.1007/978-0-387-76397-2. — 5. LEE W, LEE D, CHOI S, CHUN H, Surg Endosc, 17 (2003) 1283. DOI: 10.1007/s00464-002-8814-x. — 6. LEZOUCHE E, GUERRIERI M, PAGANINI AM, FELICIOTTI F, World J Surg, 26 (2002) 1170. DOI: 10.1007/s00268-002-6359-8. — 7. MORINO M, AL-LAIX ME, CALDART M, SCOZZARI G, AREZZO A, Surg Endosc, 25 (2011) 3683. DOI: 10.1007/s00464-011-1777-z. — 8. LEZOUCHE G, GUERRIERI M, BALDARELLI M, PAGANINI AM, D'AMBROSIO G, CAMPAGNACCI R, BARTOLACCI S, LEZOUCHE E, Surg Endosc, 25 (2011) 1222. DOI: 10.1007/s00464-010-1347-9. — 9. BORSCHITZ T, HEINTZ A, JUNGINGER T, Dis Colon Rectum, 50 (2007) 292. DOI: 10.1007/s10350-006-0816-7. — 10. HURLSTONE DP, CROSS SS, DREW K, ADAM I, SHORTHOUSE AJ, BROWN S, SANDERS DS, LOBO AJ, Endoscopy, 36 (2004) 491. DOI: 10.1055/s-2004-814397. — 11. BUCHNER AM, GUARNER-ARGENTE C, GINSBERG GG, Gastrointest Endosc, 76 (2012) 255. DOI: 10.1016/j.gie.2012.02.060. — 12. SAKAMOTO GD, MACK-EIGAN JM, SENAGORE AJ, Dis Colon Rectum, 34 (1991) 880. — 13. MELLGREN A, SIRIVONGS P, ROTHENBERGER DA, MADOFF RD, GARCÍA-AGUILAR J, Dis Colon Rectum, 43 (2000) 1064. — 14. DE GRAAF EJ, BURGER JW, VAN IJSSELDIJK AL, TETTERO GW, DAWSON I, HOP WC, Colorectal Dis, 13 (2011) 762. DOI: 10.1111/j.1463-1318.2010.02269.x. — 15. ATALLAH SB, LARACH S, DEBEUCHE-ADAMS TC, ALBERT MR, Dis Colon Rectum, 56 (2013) 301. DOI: 10.1097/DCR.0b013e318292ed7e. — 16. DE VARGAS MACCIUCCA M, CASALE A, MANGANARO L, FLORIANI I, FIORE F, MARCHETTI L, PANZIRONI G, Eur J Radiol, 73 (2010) 329. DOI: 10.1016/j.ejrad.2008.11.026. — 17. TAYLOR F G M, QUIRKE P, HEALD R J, MORAN B, BLOMQUIST L, SWIFT I, SEBAG MONTEFIORE D J, TEKKIS P, BROWN G, GRP M S, Ann surg, 253 (2011) 711. DOI: 10.1097/SLA.0b013e31820b8d52. — 18. PULI SR, BECHTOLD ML, REDDY JB, CHOUDHARY A, ANTILLON MR, BRUGGE WR, Ann Surg Oncol, 16 (2009) 254. DOI: 10.1245/s10434-008-0231-5.

Đ. Bačić

Department of Digestive Surgery, University hospital Rijeka, Krešimirova 42, 51 000 Rijeka, Croatia
e-mail: giordano-bacic@net.hr

TRANSANALNA ENDOSKOPSKA MIKROKIRURGIJA (TEM) – ALTERNATIVA ILI METODA IZBORA U LIJEČENJU TUMORA REKTUMA KOD DOBRO ODABRANIH BOLESNIKA?

SAŽETAK

TEM je endoskopska metoda kojom se mogu operirati rektalni tumori do 18 cm od anokutane granice, s mogućnostima, od jednostavne mukozektomije do ekscizije cijele debljine stijenke rektuma. Ovim radom predstavljamo studiju kojom ćemo evaluirati morbiditet, mortalitet te recidive kod bolesnika s tumorima rektuma koji su operirani TEM-om od srpnja 2007. do ožujka 2014. godine. Na našem Zavodu je TEM tehnikom operirano 129 bolesnika. Od toga 123 bolesnika (74 muškaraca i 49 žena) zbog tumora rektuma. Bilo je 55 adenoma, 36 karcinoma in situ (Tis), 15 T1, 9 T2, 4 T3 (3 palijacijska i 1 podvrgnut klasičnoj prednjoj resekciji rektuma po dobivenom patohistološkom nalazu) te 4 T4 (svi palijacijski) karcinoma rektuma. 6/123 bolesnika je imalo metakrone recidive u rektumu po ranije učinjenim klasičnim zahvatima. U 3/123 slučajeva (2,44%) resekcijski rubovi su bili pozitivni. Ukupan broj lokalnih recidiva je bio 19 (15,54%) – adenomi 6/55 (10,91%), Tis 4/36 (11,11%), pT1 0/15 (0%), pT2 4/9 (44,44%), pT3 1/4 (25%), pT4 4/4 (100%). U 2 bolesnika se bolest naknadno proširila, a kod 7 bolesnika je bolest već bila proširena. Devet (7,31%) bolesnika je umrlo tijekom dosadašnjeg praćenja zbog proširenja bolesti. Imali smo 24 bolesnika (19,51%) s manjim komplikacijama dok većih komplikacija nije bilo, kao niti rane poslijeoperacijske smrtnosti. Prosijek poslijeoperacijskog ležanja je bio 2,3 dana. Zahvati učinjeni TEM-om su sigurni i primjereni za liječenje dobroćudnih tumora rektuma, ali i ranog stadija karcinoma. TEM je također dobra metoda u palijacijskim zahvatima te kod starih i iznemoglih bolesnika.