

Original papers

Total mesorectal excision (TME) in rectal cancer patients – experiences of the Lower Silesian Oncology Center in Wrocław

Marek Bębenek, Marek Pudełko and Karol Cisarz

Introduction. The prognosis in rectal cancer has improved significantly with the introduction of total mesorectal excision (TME). Therapeutic results have also improved in Poland, but the survival rates are still lower and the local recurrences more frequent when compared to western countries. The aim of this study was to show that, unless improperly performed, TME might significantly improve the results of oncological treatment throughout Poland.

Patients and methods. The clinical records of 370 rectal cancer patients treated surgically at Lower Silesian Oncology Center, Wrocław between April 1st, 1998 and May 6th, 2004 were subjected to retrospective analysis. The material was divided into two groups on the basis of the surgical procedure employed: 1) TME (n=260, 70%) and 2) another (undefined) technique (n=110, 30%). The following parameters were compared between both groups: 1) the percentage of one- and five-year observed survivals, 2) the average time of survival during the initial year after surgery (in months), 3) the average time of survival during five years following surgery (in years), 4) the percentage of five-year relative survivals, and 5) the percentage of isolated local recurrences demonstrated during five years following the surgery.

Results. The study has shown that both the average survival times during a five-year follow-up and the rates of five-year relative survival were significantly better in the series of TME-operated patients, as compared to those who underwent other type of rectal surgery. Fifty-seven patients who underwent TME had achieved five year survival, which corresponds to 63.3% and 81.6% of observed and relative survivals, respectively. In contrast, in the group operated by a non-TME technique, the percentages of observed and relative five-year survival amounted to 36.7% and 45.5%, respectively. Moreover, isolated local recurrence developed in 6.7% of the TME-treated patients only, which contrasted with 23% observed in the group in which the old approach was used.

Conclusion. Our study proves that TME is the most important and reliable determinant of survival in rectal cancer patients and the implementation of the technique as a national standard is strongly advisable in Poland.

Key words: rectal cancer, total mesorectal excision, survival, Lower Silesia

Introduction

Colorectal carcinoma is one of the major health problems in developed countries, and is the second most common cause of cancer death. About one-third of all colorectal cancers arise in the rectum. It is estimated that rectal cancer alone will affect more than 3,842 persons in Poland annually [1].

Surgery, alone or in combination with adjuvant or neo-adjuvant therapy, constitutes the main therapeutic approach in rectal cancer patients. That approach, without TME is, however, related to a high frequency of local recurrences and worse survival rates [2]. Before Miles introduced combined radical abdominoperineal excision (APE), the local recurrence rate after surgical removal of rectal cancer amounted up to 100% [3]. APE, or anterior resection (AR), without focusing on TME,

which was considered the “gold standard” in rectal surgery until the early 1980s, have been associated with a local recurrence rate ranging from 20% to 40%. This conventional procedure has usually been performed using blind and blunt dissection of the mesorectum, which, besides local recurrence (LR), resulted in a high incidence of sexual and urinary dysfunction [4-5].

The prognosis in rectal cancer has improved significantly with the introduction of total mesorectal excision (TME) [6]. The idea of TME is to remove the whole mesorectum without leaving a substantial circumferential and distal residue, which is performed in the inseparable approach in APE or AR of the rectum. Meticulous sharp dissection of the avascular plane should be performed under direct vision between the mesorectum and parietes up to the pelvic floor. Finally the mesorectum is excised intact, enveloped by the visceral pelvic fascia. The bowel margin might be reduced to 1-2 cm [7, 8].

The introduction of TME to routine clinical practice has significantly decreased the rate of local recurrences

and prolonged survival in rectal cancer patients [7-12]. Therapeutic results have improved throughout Poland as well, but the rates of five-year survivals are still 20% lower as compared to western countries and local recurrence ranges from 24% to 45%, depending on the clinic.

The idea of this study was to prove that, unless improperly performed, TME could significantly improve the results of oncological treatment in Poland. Consequently, we have compared the outcomes of rectal cancer patients treated by TME to the outcomes of another type of surgery in the Lower Silesian Oncology Center.

Patients and methods

The clinical records of 370 rectal cancer patients operated curatively at the Lower Silesian Oncology Center, Wrocław between April 1st, 1998 and May 6th, 2004 were subjected to retrospective analysis. The material was divided into two groups on the basis of surgical procedure employed: 1) TME (n=260, 70%) and 2) another (undefined) technique (n=110, 30%).

The stage distribution was the same in both the evaluated groups. Preoperative staging procedures included in all cases, besides the standard examination, endoscopic ultrasound.

Short preoperative radiotherapy (5 x 5 Gy) was performed in all stage II or III patients from both the groups. When the tumor was fixed (T4), surgery was preceded with long-course radiotherapy combined with 5-fluorouracil chemotherapy. Preoperative neoadjuvant therapy was skipped in stage I patients only. Adjuvant therapy, if necessary, was the same in the TME and non-TME groups.

The following parameters were determined for both groups: 1) the percentage of one- and five-year observed survivals, 2) the average time of survival during the initial year after surgery (in months), 3) the average time of survival during five years following surgery (in years), 4) the percentage of five-year relative survivals, and 5) the percentage of isolated local recurrences demonstrated during five years following surgery.

The outcomes of the analyzed patients was verified during control visits; survival data were additionally obtained during the yearly controls of the PESEL database.

Statistical analysis has been performed with the Statistica 5, Version 97 (StatSoft®, Poland) statistical package. The rates of five-year relative survivals in the groups studied were compared using the Z-test ($p \leq 0.05$).

Results

Five hundred-eighteen surgical resections of large intestine malignancies were performed in the Lower Silesian Oncology Center in Wrocław between April 1st, 1998 and May 6th, 2004. Among them, 370 (71%) were related to rectal cancer, including 260 (70%) removed by means of TME (Table I).

The number of rectal cancers removed by means of TME increased significantly between 1998 and 2004. Ninety of the surgically-treated cases of rectal cancer were resected by that technique between 1998 and 2000, as compared to 170 cases in 2001-2004 (Table I).

The percentage of one-year survivals observed among the TME-treated patients amounted to 90% (n=232). The average survival time was 11.2 ± 2.8 months (median, 12 months). The average survival time among patients who had died during the first year after surgery was 4.1 ± 4.0 months (median, 3 months).

The percentage of 1-year survivals among the patients in whom rectal cancer was removed with the aid of a technique other than TME amounted to 86% (n=96). The average survival time was 10.9 ± 3.0 months (median, 12 months). The average survival time of patients who had died during the first year after surgery was 4.3 ± 3.4 months (median, 4 months).

A five-year follow-up was available for 90 patients operated by means of TME. The average survival time in that group amounted to 3.2 ± 1.9 years (median, 4 years). Fifty-seven patients survived five years, which corresponds to 63.3% and 81.6% of observed and relative survivals, respectively (Figure 1).

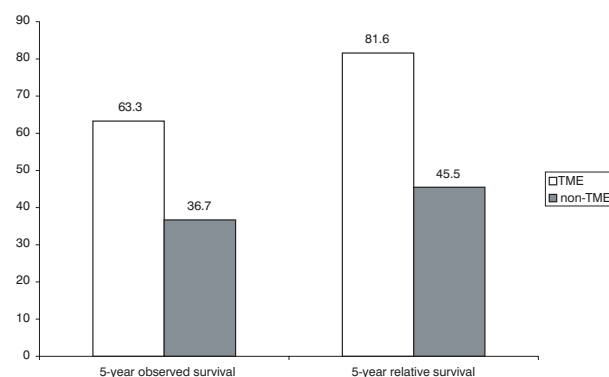


Figure 1. 5-year observed and relative survivals in the TME and non-TME patient groups

In the group operated radically for rectal cancer with a technique other than TME five-year follow-up was available for 30 patients. The average survival time amounted to 2.7 ± 1.9 years (median, 2 years) in this population. Eleven patients survived five years, which corresponds to 36.7% and 45.5% of observed and relative survival, respectively (Figure 1).

The percentage of five-year relative survivals recorded in the TME-operated group was demonstrated

Table I. Colorectal surgeries performed at the Lower Silesian Oncology Center between 1998 and 2004 in figures

Year	Colorectal	Colon	Rectum	TME	Non-TME
1998 (April 1 st) - 2000	206	68	138	90	48
2001-2004 (May 6 th)	312	80	232	170	62
Total	518	148	370	260	110

Table II. Comparison of 5-year relative survival in the TME and non-TME group (p=0.05)

Group	5-year relative survival [%]	Standard error [%]	Z value	p
TME	81.6	6.5	2.846	0.002
Non-TME	45.5	10.9		

to be significantly higher than in those rectal patients who underwent another type of surgery (p=0.002, Table II).

Moreover, only 6/90 cases (6.7%) of isolated local recurrence were recorded during a five-year follow-up of patients operated by means of TME.

In contrast, among 30 patients operated on using the blunt approach, seven (23%) developed isolated local recurrence.

Discussion

The present study has revealed that both the average survival times during five-year follow-up or the rates of five-year relative survival were significantly better in the series of TME-operated patients, as compared to those underwent another type of radical rectal surgery. Moreover, isolated local recurrence developed only in 6.7% of the TME-treated patients, as compared to 23% from the non-TME group. It should be noted, that in both the groups all the treated patients were presented with similar clinical stage of disease and therefore the impact of the latter on the survival rates might be excluded. In fact, the skills and choice of the surgeon were the only criteria qualifying patients for TME or non-TME surgery.

Survival and local recurrence data are consonant with the results of other studies on TME efficiency. Five-year cumulative risk of local recurrence and five-year overall corrected survival amounted to 2.7% and 87.5%, respectively for the first series of 122 TME-treated cases [8]. These results were matched by another series of 246 curable Dukes stage B and C patients, of which only 18 developed local recurrence, and the actuarial cancer specific five-year survival was 74.2% [9]. A significant reduction in the local recurrence rate and an increase in crude survival were demonstrated at four years in another TME-operated group compared with patients who had anterior resection or abdominoperineal excision [10]. Finally, in a series of 85 patients who had had curative TME the local recurrence rate was 4% only, with an overall five-year survival of 65% and a cancer specific survival of 85% [11].

Apart from the beneficial effect on local recurrence and survival, TME is also associated with a higher incidence of sphincter preservation and of pelvic autonomic nerve preservation. Consequently, the quality of patient life increases due to avoiding both colostomy and impotence [12].

Moreover, further improvement of survival and reduction in local recurrence rates might be achieved if

TME was combined with short-term preoperative radiotherapy [13].

Interestingly, the comparison of outcomes in TME and non-TME treated patients from our series has shown that although the type of operation is an important predictor for long-term survival, it does not affect short-time prognosis. Both the rates of one-year survival and the average survival times during the one-year follow-up were similar in patients operated on with either of the techniques studied. Characteristically, most of the patients who did not survive one year after surgery had died during the initial three-four months after the operation. Consequently, this time period seems to be critical for short-term prognosis in rectal cancer patients.

The average survival times in TME-treated patients exhibited relatively high standard deviations in the series studied. Accordingly, apart from the type of surgery, some other factors seem to be related to the prognosis. Indeed, literature lists at least some of them, including patient age, the clinical stage of the tumor, and the skills and experience of the surgeon [14-16]. Since particularly the latter two – along with the surgical technique – are of major importance in achieving local control, standardization and quality control with respect to surgery is still necessary for the improvement of TME efficiency. It should be kept in mind that the results obtained in our series of rectal cancer patients, operated on by means of TME at a reference center, are much better than the population survival rates for Lower Silesia and Poland [17, 18].

Nevertheless, our study has proved that TME, if performed by a skilled and experienced surgeon, is the most important and reliable determinant of survival in rectal cancer patients, and that the implementation of this particular technique as a national standard is strongly advisable in Poland. The results of a recent epidemiological analysis in Sweden, a country which had adopted TME along with preoperative radiotherapy back in 1985, indicates continuous improvement in the survival of rectal cancer patients [19].

Marek Bębenek MD, PhD
Lower Silesian Oncology Center
pl. Hirszfelda 12
53-413 Wrocław, Poland
e-mail: bebm@dc.com.pl

References

1. Parkin DM, Whelan SL, Ferlay J et al (eds). *Cancer Incidence in Five Continents*. Vol. VIII. Lyon: IARC Scientific Publication No.155, 2002.
2. Wiggers T, Mannaerts GH, Marinelli AW et al. Surgery for locally recurrent rectal cancer. *Colorectal Dis* 2003; 5: 504-7.
3. Miles E. *Cancer of the rectum*. The Lettsomian Lectures. London: Harrison & Sons, 1923.
4. McDermott FT, Hughes ES, Pihl E, Johnson WR, Price AB. Local recurrence after potentially curative resection for rectal cancer in a series of 1008 patients. *Br J Surg* 1985; 72: 34-7.
5. Nymann T, Jess P, Christiansen J. Rate and treatment of pelvic recurrence after abdominoperineal resection and low anterior resection for rectal cancer. *Dis Colon Rectum* 1995; 38: 799-802.
6. Heald RJ. A new approach to rectal cancer. *Br J Hosp Med* 1979; 22: 277-81.
7. MacFarlane JK, Ryall RD, Heald RJ. Mesorectal excision for rectal cancer. *Lancet* 1993; 341: 457-60.
8. Heald RJ, Ryall RD. Recurrence and survival after total mesorectal excision for rectal cancer. *Lancet* 1986; 1: 1479-82.
9. Enker WE, Thaler HT, Cranor ML et al. Total mesorectal excision in the operative treatment of carcinoma of the rectum. *J Am Coll Surg* 1995; 181: 335-46.
10. Arbman G, Nilsson E, Hallbook O et al. Local recurrence following total mesorectal excision for rectal cancer. *Br J Surg* 1996; 83: 375-9.
11. Bjerkeset T, Edna TH. Rectal cancer: the influence of type of operation on local recurrence and survival. *Eur J Surg* 1996; 162: 643-8.
12. Heald RJ, Moran BJ, Ryall RD et al. Rectal cancer: the Basingstoke experience of total mesorectal excision, 1978-1997. *Arch Surg* 1998; 133: 894-9.
13. Peeters KC, Kapiteijn E, van de Velde CJ, Dutch ColoRectal Cancer Group. Managing rectal cancer: the Dutch experience. *Colorectal Dis* 2003; 5: 423-6.
14. Mahteme H, Pahlman L. Good colorectal cancer surgery. *Tech Coloproctol* 2005; 9: 1-7.
15. Martling A, Cedermark B, Johansson H et al. The surgeon as a prognostic factor after the introduction of total mesorectal excision in the treatment of rectal cancer. *Br J Surg* 2002; 89: 1008-13.
16. Hermanek P, Wiebelt H, Staimmer D et al. Prognostic factors of rectum carcinoma – experience of the German Multicentre Study SGCRC. German Study Group Colo-Rectal Carcinoma. *Tumori* 1995; 81 (Suppl. 3): 60-4.
17. Błaszczuk J, Pudelko M, Cisarż K. *Nowotwory złośliwe w woj. dolnośląskim w roku 2003*. Wrocław: Dolnośląski Rejestr Nowotworów, 2005.
18. Wojciechowska U, Didkowska J, Tarkowski et al. *Nowotwory złośliwe w Polsce w 2002 roku*. Warszawa: Centrum Onkologii – Instytut im. M. Skłodowskiej-Curie, 2003.
19. Birgisson H, Tälback M, Gunnarsson U et al. Improved survival in cancer of the colon and rectum in Sweden. *Eur J Surg Oncol* 2005; 31: 845-53.

Paper received: 4 January 2006

Accepted: 4 February 2006