Mesorectal Excision for Rectal Cancer: a 5-year Experience

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Tel/fax: 370-5 2614625, e-mail: narimantsam@takas.lt The aim of the study was to describe the principles of approach to mesorectal excision and to evaluate personal experience with this technique over a five-year period.

Materials and methods. Over a period of 5 years, June 1997 to June 2002, 32 mesorectal excisions have been performed by one surgeon. Sixteen patients were male and 16 female, age ranged from 25 to 78 years (mean, 58 years).

A total of 37 colorectal cancers have been diagnosed. Five (15.6%) patients had simultaneous cancers: two simultaneous rectal cancers, one in the sigmoid and two in the descending colon. Eight cancers were in the lower, 9 in the middle and 17 in the upper third of the rectum. One patient had stage I A colorectal cancer, 15 – stage II, 12 – stage III, and 4 – stage IV. Out of 32 operations, 18 were total mesorectal excisions and 14 partial (for upper third cancer of the rectum), removing 5 cm of mesorectum below the lower spread of the tumor. Colonic J pouch was used in 9 cases and ileal J pouch in one case. Preventive ileostomy was made in all cases with pouch–anal anstomosis plus in 4 patients after partial mesorectal excision with straight sigmorectal anastomosis, when anastomotic conditions were evaluated as suboptimal. Only 3 of 32 patients underwent total mesorectal excision with abdominoperineal excision and permanent colostomy.

Each patient was included in a follow-up program consisting of yearly abdominal ultrasonography an proctoscopy for a 5-year period.

Results. There were no postoperative deaths. Complications occurred in a total of 10 (31.25%) patients. Three (10.3%) patients from 29 operations with preserved bowel continuity developed suture insufficiency. From 32 operated on, one (3.1%) patient developed intraabdominal abscess, one (3.1%) patient had wound infection, one (3.1%) bowel insufficiency. There were two (6.25%) patients with urinary infection, one (3.1%) with voiding disturbance and one (3.1%) with urethral stricture.

So far, 2 (6.25%) local recurrences have been detected, both in patients with Duke C rectal cancer, one in the suture line and one in perirectal tissue.

Conclusion. Mesorectal excision was a safe and effective technique of pelvic dissestion for rectal cancer. Further follow-up is needed to detect the number of local reccurences and survival rate. This is the first report on this technique used in Lithuania.

Key words: rectal cancer, total mesorectal excision, surgery, complications, colonic pouch

INTRODUCTION

From the surgeons' point of view, the rectum begins where the two antemesenteric taenia of the sigmoid colon fuse together. This is as a rule at the sacral promontory which means that the average length of the rectum is 15 centimeters. Rectal can-

cer was first reported by Lisfranc in 1826 (1). In the 19th century operations in the human body cavities were still feared, so rectal cancer was mostly untreated and fatal. General anesthesia was just at its birth, rational visions on malignant cell growth and meachanisms of metastatic spread of malignant tumours were missing. From favoured perineal ap-

proach (fear of infection) to transabdominal, from abdominoperineal resection to sphincter-saving resections, especially with addition of stapling techniques - that brought rectal cancer surgery of the second half of the 20th century to what was called 'conventional' surgery. It included a blunt dissection in the depths of the pelvis, usually by hand, and quite a rough division of what was called 'lateral ligaments'. Despite any progress which may be mentioned, a very high incidence of local recurrences remained – between 15 and 45% (2-4). The first report of R. J. Heald et al. in 1982 (5) proposed a completely new concept of rectal cancer surgery, which at first was evaluated as rather uncertain, as it suggested a possibility of decreasing the local recurrencerate by a few percent. This technique, called total mesorectal excision, extremely widely spread throughout Europe in the last decade of the 20th century, making it a necessary technique to be used for removing every rectal cancer today.

The aim of this study was to present a personal experience in mesorectal excision over the period of 5 years.

MATERIALS AND METHODS

Details of surgical technique. After laparotomy, peritoneal incision lateral and medial to the sigmoid colon and rectum was made. The 'low tie' of the superior rectal artery was routinely used at the level of promotory. Only in cases of suspected lymphnode metastatic spread along the trunk of the inferior mesenteric artery or other conditions, left hemicolectomy and 'high tie' of the inferior mesenteric artery 1 cm from the aorta was made. The early division of the sigmoid colon was carried out, allowing stretching of the rectum and facilitating further mesorectal dissection considerably. The avascular areolar tissue plane around the mesorectum was identified, and the plane was opened by electrodissection. The inferior hypogastric nerves were indentified and followed in all cases (Fig. 1). The areolar tissue behind the rectum is identified (Fig. 2). The posterior surface of the mesorectum was created similar to bilobed lipoma or to a 'pair of buttocks' (Fig. 3). The dissection was extended downwards around the curve of the sacrum in the midline, passing the coccygis and forwarding to anococcygeal raphe. A St. Marks retractor was used, helping the dissection markedly. Then the plane of dissection was extended forwards from the posterior midline around the side walls of the pelvis. At this stage, a gentle care of the most dangerous area at 10 to 2 oclock anterolaterall behind the seminal vesicles was taken (Fig. 4), where erigent nerves join the presacral nerves and form the neurovascular bunch of



Fig. 1. A view on hypogastric nerves

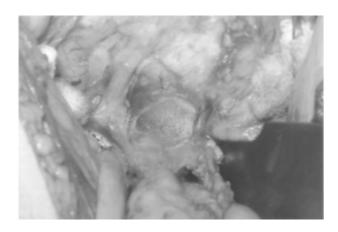


Fig. 2. Areolar tissue behind the rectum – a true mark of the 'holy plane'

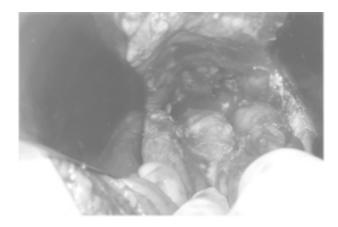


Fig. 3. 'Pair of buttocks' - the stage of correct posterior rectal dissection for rectal cancer

Walsh. In male, a transverse incision is made through the peritoneum about 1 cm anterior to the peritoneal reflection in the pelvis, to descend straight to the superior aspect of the seminal vessels. In the midline, the plane of dissection downwards immediately in the front of Denonvilliers fascia is deve-



Fig. 4. The most satisfying dissection of the rectum: the seminal vesicles are identified



Fig. 6. TME specimen: back

loped and extended, taking care of neurovascular bundle, to meet the lateral dissection. The Denonvilliers fascia is divided to reach the anterior wall of the lowest centimeters of the rectum only after reaching the lowest edge of the tumor. In cases of the lower and middle third rectal cancer (up to 11 cm from the dentate line), total mesorectal excision was carried out: division of the rectum was made 2 cm below to the lowest edge of the tumor, at the level of the pelvic floor. If the tumor was localized between 11 to 15 cm from the dentate line, in the upper third of the rectum, a partial mesorectal excision was performed, and dissection of the mesorectum was made 5 cm below the lowest edge of the tumor. Operative specimen was macroscopically inspected in all cases (Figs. 5, 6). The rectal stump was closed with a rectal clamp or linear stapler, and a washout with chlorhexidine solution was performed. Anastomosis was done preferably by a double stapling technique, or single stapling technique, or handsewn single layer anastomosis with vicryl 3.0 interrupted suture. After total meso-

rectal excision, reconstruction of the rectal ampulla from the sigmoid, descending or transverse colon with a 6 cm long J colonic pouch was preferred (Fig. 7). After J pouch anal anastomosis, preventive Turnbull ileostomy was performed in all cases (Fig. 8). If the straight colorectal anastomosis after partial mesorectal eixesion was considered to be su-

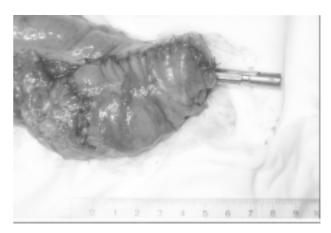


Fig. 7. A view on freshly created colonic pouch

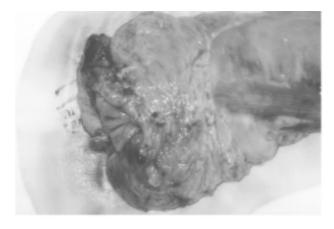


Fig. 5. TME specimen: front



Fig. 8. Turnbull ileostomy

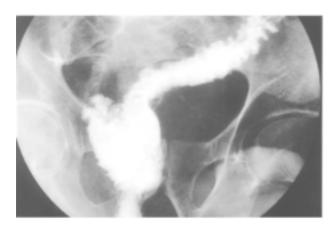


Fig. 9. A proctogram of colonic pouch prior to ileostomy closure

Table 2. Localization of 34 rectal cancers of 32 patients					
Localization of rectal cancer	Lower third	Middle third	Upper third		
Number of patients	8	9	17		

The lowest rectal cancer on which a sphinctersaving procedure was performed was 3.5 cm from the dentate line.

The exact type of mesorectal excision performed with reference to anastomotic technique is illustrated in Table 3.

In the PME group, in addition to mesorectal excision, one total colectomy (FAP patient with per-

boptimal (positive air leakage test or any other reason), preventive Turnbull ileostomy was performed too. Ileostomy closure was scheduled from 1.5 to 3 months after surgery, or as preferred by the patient. Prior to this event, a proctogram was performed (Fig. 9).

Over a period of 5 years (June 1997 to June 2002), 32 mesorectal excisions have been performed by one

surgeon. Of the patients, 16 were male and 16 female, age ranged from 25 to 78 years, mean 58 years.

A total of 37 colorectal cancers have been diagnosed. Five (15.6%) patients had simultaneous cancers: two simultaneous rectal cancers, one in the sigmoid and two in the descending colon.

Table 1. Stage of colorectal cancer in 32 patients according to TNM classification						
Stage I	Stage II	Stage III	Stage IV			
1	15	12	4			

The staging according to TNM classification is illustrated in Table 1.

Among 4 patients with metastatic disease, one had metastases in the liver, one had liver and lung metastases, one had paraaortic lymph node metastases and one metastases in the groin.

According to differentiation of the tumor, among the 36 invasive colorectal cancers (one was simultaneous with rectal cancer carcinoma in situ of the descending colon), 3 were G1, 31 were G2 and 2 were G3.

The exact localization of 34 rectal cancers in 32 operated on patients is delineated in Table 2

Table 3. Type of mesorectal excision in 32 patients					
Type of mesorectal excision	PME with straight colorectal anastomosis	TME with straight coloanal anastomosis	TME with J pouch anal anastomosis	TME with abdominoperineal excision	
Number of patients	14	5	10	3	

forated descending colon cancer) and two left hemicolectomies were performed: one due to concomitant polyps in the descending colon (one containing carcinoma *in situ*), and one due to palpable metastatic lymphnodes along the inferior mesenteric artery.

In the group of TME with J pouch anal anastomosis, three left hemicolectomies were additionally performed: one due to concomitant sigmoid cancer and multiple polyps, and two due to suspected metastatic lymphnodes along the inferior mesenteric artery.

In the group of TME with abdominoperineal excision, one patient underwent total proctocolectomy due to severe FAP with two simultaneous rectal cancers. In one abdominoperineal resection case, a high ligation was performed as well. From a total of 32 cases, one colectomy in PME group and one in TME group, plus a TME for a patient with ulcerative colitis and rectal cancer after subtotal colectomy. From the rest 29 cases, a high ligation was performed only in 6 (20.7%). In one case, a right lateral lymphnode dissection was performed due to palpable (and confirmed on histology) metastatic lymphnode.

Preventive Turnbull ileostomy was performed in 14 (48.3%) of 29 operations when bowel continuity was preserved: in all 10 patients with J pouch anal anastomosis and in 4 patients after PME and straight

stapled colorectal anastomosis, when anastomotic conditions were judged to be suboptimal.

Concerning the 10 patients with J-pouch anal anastomosis, in one case ileal-J-pouch anal anastomosis was made in a-40 year-old ulcerative colitis patient who had colectomy with ileosigmoid anastomosis in his twenties and developed Duke C rectal cancer and, in the rest 9 patients the pouch was made from the colon: sigmoid colon was used in 5 cases, descending colon in 1 case and transverse colon in 3 cases.

In 3 (9.4%) of 32 operations, an on-table colonic lavage using Radcliffe technique was performed because of severely contaminated colon.

Concerning the anastomotic technique in 29 operations (3 patients underwent abdominoperineal resection with permanent stoma), a single-layer handsewn anastomosis with 3.0 vicryl interrupted sutures was performed in 4 (13.8%) cases, single stapling technique was used in 3 (10.3%) cases and double stapling in 22 (75.9%) cases.

The operations performed each year are listed in Table 4.

Table 4. Number of mesorectal excisions performed each year						
Year	1997 (6 months)	1998	1999	2000	2001	2002 (6 months)
Number of mesorectal excisions	3	4	4	5	12	4

Each patient was included in a follow-up program, which consisted of yearly abdominal ultrasound and proctoscopy for a 5-year period.

RESULTS

There were no postoperative deaths. Complications occurred in a total of 10 (31.25%) patients. Complications, treatment and outcome are shown in detail in Table 5.

A total of 3 (10.3%) patients from 29 operations with preserved bowel continuity developed suture insufficiency. From 32 operated on, one (3.1%)

Patient, age, sex	Type of operation	Complication	Treatment	Outcome
1	2	3	4	5
V. J., 63, male	TME, straight coloanal anastomosis	Suture insufficiency, purulent peritonitis	Relaparotomy, lavage, drainage, transversostomy	Recovered. Stoma not closed due to lung dissemination
T. J., 56, male	TME, straight coloanal anastomosis	Suture insufficiency, fecal peritonitis	Relaparotomy, lavage, drainage and transversostomy; plus 2 scheduled relaparotomies	Recovered. Stoma closed after 7 months
T. E., 73, female	TME, J-pouch (sigmoid)-anal anastomosis, ileostomy	Suture insufficiency of the top of the pouch	No operation; lavage through anus inserted tube	Recovered. Stoma closed after 4 months.
R. K., 60, female	PME, straight colorectal anastomosis	Intraabdominal abscess	No operation; abscess drained spontaneously through vagina	Recovered
M. V., 75, female	TME, J-pouch (sigmoid)-anal anastomosis, ileostomy	Wound infection	Wound opened	Recovered. Stoma closed in 4 months
K. J., 65, male	PME, straight colorectal anastomosis	Urinary infection	Antibiotics	Recovered
G. O., 50, female	TME, J-pouch (sigmoid)-anal anstomosis, ileostomy	Urinary infection	Antibiotics	Recovered. Stoma closed in 4 months
V. A., 40, male	TME, ileo-J-pouch-anal anstomosis, ileostomy	Bowel obstruction	Conservative	Recovered. Ileostomy closed in 3 months

Table 5 continued				
1	2	3	4	5
P. C., 71, male	TME, j-pouch(desc. Colon)-anal anstomosis, ileostomy	Voiding disturbance	Conservative	Recovered. Ileostomy closed in 1.5 month
G. R., 74, male	TME, J-pouch(transverse colon)-anal anstomosis, ileostomy	Urethral lesion due to Folley baloon insufflation	Epicystostomy	Urethral stricture, permanent epicystotomy. Stoma closed in 4 months

patient developed intraabdominal abscess, one (3.1%) patient had wound infection and one (3.1%) bowel insufficiency. There were two (6.25%) patients with urinary infection, one (3.1%) with voiding disturbance and one (3.1%) with urethral stricture.

So far, 2 (6.25%) local recurrences were detected, both in patients with stage III rectal cancer, one in the suture line and one in perirectal tissue. The former was asymptomatic and was dectected at 12 months after PME during a yearly check-up, and the latter was symptomatic and detected at 11 moths after TME. Both patients had their recurrent disease diagnosed at one year after surgery. Both were referred to Lithuanian Oncology Center for radiotherapy, underwent secondary surgery and consequently died from dissemination of the disease.

DISCUSSION

The need of rectal dissection for rectal cancer in the proper plane causes no doubt. R. J. Heald himself demonstrated a 4% rectal cancer recurrence rate in radical surgery for rectal cancer (6). The most important matter is: do we or do we not need radiotherapy for each rectal cancer prior to surgery? A Swedish trial showed an obvious benefit of preoperative radiotherapy (7), but it might be a way of 'hiding' the shortcomings of unproper, or old-fashioned surgery. The recent Dutch trial with TME with and without preoperative radiotherapy showed a benefit for the radiotherapy treatment (8), and should that be confirmed by others, a demand will be obvious. That would change our approach too.

From the macroscopical point of few, nothing is as satisfying to a surgeon as to ligate the inferior mesenteric artery trunk just below the aorta and the inferior mesenteric vein at the level of flexura duodenojejunalis. It creates an image that none of the removable lymphatic spread is left behind. However, it should be borne in mind that for rectal cancers below the upper third, a lymphatic involvement along the lateral (pelvic) lymphnodes is pos-

sible. Thus, high ligation would cure only one direction of cancer spread. I performed lateral lymph node dissection only in one case. Moreover, two most demonstrative randomized controlled trials failed to show a survival benefit for patients with high ligation compared to low (9, 10). That was the reason why only 1/5 of these patients had high ligation, and all the rest had superior rectal artery ligation at the level of aortic bifurcation, just below the left colic artery, leaving or not leaving the first sigmoid branch as advised by Goligher J (11).

In the group of patients with total mesorectal excision, colonic J pouch was favoured. Five cases when after TME straight coloanal anastomosis was performed included first four TMEs and one TME for a patient with metastatic disease, when ileostomy and colonic J-pouch was considered a disadvantage due to a short postoperative survival expected. Colonic J-pouch as a reconstruction of rectal ampulla after surgery for rectal cancer was first introduced in 1986 (12, 13). Since then, a number of authors have demonstrated a functional advantage of reservoir compared to straight anastomosis (14-17). All of these authors proved less frequent stools compared to straight anastomosis in a randomized setting. A better continence was observed in the pouch group as well (15). We have chosen a 5 to 6 cm long J colonic pouch, as larger colonic pouches are likely to have more evacuation disorders (18). Another very important issue is that aging seems to have little effect on postoperative results, given that sphincter tone in elderly prior to operation is normal (19). In time, the the functional superiority of colonic pouch seems to be less evident. Even though there is evidence that this superiority over straight anastomosis can last for at least two years (20), it is likely to be greatest at one year after surgery and become less evident later (21, 22). However, there is one more reason for a pouch - a fourfold decrease in anastomotic complications (22). Our preference of a pouch from the descending or transverse colon rather than from sigmoid is based on the evidence that the former may provide a better function (23), probably due to high pressure zones in the sigmoid.

To use or not a diverting stoma might always be a matter of debate. Experience of the same institution or surgeon with a big number of cases with either solution is always a good argument for any decision - whatever is demonstrated to be advantageous. However, we should not neglect the fact that from 10 to 20% of cases with low anastomosis leakage is unavoidable. This study confirms the mentioned observation - the leakage rate in these series was 10.3%. That was the reason why in this study, with limited experience, stoma was used in all cases with pouch-anal anastomosis and whenever anastomotic conditions were judged to be suboptimal. Turnbull ileostomy was preferred, as transverse colostomy was demonstrated to have no advantages over ileostomy in two randomized trials (24, 25), and from the surgeon's point of view a bit more effort should be done to place it in the abdominal wall, and certain bulking would be still unavoidable. An interesting observation is that temporary fecal diversion and early closure of the stoma may adversely effect survival and local reccurence rate (26). However, this is not a generally accepted view. Even though, experimental studies have shown a number of events happening with the large bowel after fecal diversion, including proliferative instability of colonic mucosa (27) or promotion of cell proliferation and carcinogenesis (28). The latter was induced by colostomy closure in rats. Ileostomy closure by the author of this article is preferred at a 3-month interval after primary surgery, as it provides best conditions of the small bowel dissection and suture compared to earlier dates, as it is done on macroscopically normal tissues.

> Received 8 September 2002 Accepted 11 December 2002

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VISIŠKA MEZOREKTINĖ EKSCIZIJA SERGANT TIESIOSIOS ŽARNOS VĖŽIU: ASMENINĖ 5 METŲ PATIRTIS

Santrauka

Šio darbo tikslas buvo apibūdinti naudotą mezorektinės ekscizijos techniką bei įvertinti asmenine patirtimi paremtus chirurginio gydymo rezultatus.

Medžiaga ir metodai. Penkerių metų laikotarpiu, nuo 1997 metų birželio iki 2002 metų birželio, atliktos 32 mezorektinės ekscizijos. Operuota 16 vyrų ir 16 moterų, am-

žius – nuo 25 iki 78 metų, vidurkis – 58 metai. Penkiems (15,6%) pacientams diagnozuotas sinchroninis vėžys: dviem tiesiojoje žarnoje, vienam sigminėje ir dviem nusileidžiančioje gaubtinėje žarnoje. Aštuoni vėžio atvejai diagnozuoti apatiniame, 9 - viduriniame ir 17 - viršutiniame tiesiosios žarnos trečdalyje. Vienas pacientas sirgo I stadijos, 15 - II stadijos, 12 - III stadijos ir 4 - IV stadijos storosios žarnos vėžiu. Iš 32 operacijų 18 buvo visiškų mezorektinių ekscizijų ir 14 dalinių (dėl viršutinio trečdalio tiesiosios žarnos vėžio), šalinant 5 cm mezorektum žemiau apatinio tumoro krašto. Storosios žarnos J formos rezervuaras suformuotas 9 atvejais, klubinės žarnos J formos rezervuaras - vienu atveju. Apsauginė Turnbull ileostoma buvo atlikta visais atvejais suformavus rezervuarus bei 4 atvejais - po dalinės mezorektinės ekscizijos, kai anastomozės sąlygos manytos esant suboptimalios. Tik 3 iš 32 pacientų atlika abdomonoperinealinė ekscizija, suformuojant nuolatinę ileostomą. Visi pacientai stebėti kasmet penkerius metus, atliekant pilvo organų sonoskopiją bei endoskopini tiesiosios žarnos tyrima.

Rezultatai. Pooperacinė eiga komplikavosi 10 (31,25%) pacientų. Trims (10,3%) pacientams iš 29, kuriems išsaugotas virškinamojo trakto vientisumas, pasireiškė siūlės nesandarumo klinika. Iš 32 operuotų pacientų vienam (3,1%) susiformavo pilvo ertmės abscesas, vienam (3,1%) – žaizdos infekcija, vienam (3,1%) – žarnų nepraeinamumas. Du (6,25%) pacientai turėjo šlapimo takų infekciją, vienam (3,1%) susilaikė šlapimas ir vienam (3,1%) susiformavo uretros striktūra.

Dviem (6,25%) pacientams diagnozuoti vietiniai recidyvai, abu sirgo III stadijos tiesiosios žarnos vėžiu: vienu atveju vėžio recidyvas diagnozuotas anastomozėje, kitu – pararektiniuose audiniuose.

Išvados. Mezorektinė ekscizija buvo saugi ir efektyvi operacija tiesiosios žarnos vėžiui gydyti. Tolimesnis pooperacinis stebėjimas padės tiksliau įvertinti vietinių recidyvų skaičių ir pooperacinį išgyvenimą. Tai pirmasis straipsnis apie šios metodikos įdiegimą Lietuvoje.

Raktažodžiai: tiesiosios žarnos vėžys, visiška mezorektinė ekscizija, chirurgija, komplikacijos, storosios žarnos rezervuaras