Original Articles

MACROSCOPIC ASSESSMENT OF TOTAL MESORECTAL EXCISION QUALITY AFTER ROBOTIC ASSISTED RECTAL RESECTION FOR RECTAL CANCER IN BULGARIA: A PROSPECTIVE TRIAL

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Summary

Total mesorectal excision (TME) is a standard surgical procedure for rectal cancer. Robotic surgery has the potential to minimize the disadvantages of laparoscopic rectal resection. Circumferential margin and macroscopic quality assessment of the resected specimen are the major prognostic factors for local recurrence of the disease. The aim of this study was to research the macroscopic assessment of the quality of TME after robotic-assisted rectal resections for rectal cancer performed in a single center. Data was prospectively collected about macroscopic assessment of the quality of TME in thirteen patients after robotic-assisted rectal resections for rectal cancer between 09.04.2014 and 31.12.2016. After all robotic TMEs, a pathologist made macroscopic assessment of the completeness of the mesorectal excision. The quality of TME was complete in 12 cases and nearly complete in one case. The circumferential and distal resection margins were negative in all cases. The mean number of harvested lymph nodes was nine. This study indicated that using robotic surgery for rectal cancer does not lead to worsening the quality of TME. Further studies in this field are necessary.
Key words: rectal cancer, TME, quality of the specimen, robotic surgery

Introduction

Currently, the treatment of rectal cancer often includes neoadjuvant radiochemotherapy (RCT) and surgical removal of the rectum with total mesorectal excision (TME) following the "holly plane" as described by MacFarlane et al (1993) and Carsen et al. (1998) [1, 2]. Several multicenter randomized trials have shown that laparoscopic surgery is equal to conventional open surgery but the conversion rate is still high [3, 4]. The high conversion rate, the difficult pelvic anatomy and steep learning curve are the reasons why laparoscopic TME is still performed mainly in specialized centers [5].

Circumferential margin and macroscopic quality assessment of the resected specimen are major prognostic factors for the local recurrence of the disease, development of metastases and survival [6, 7]. Robotic surgery is an alternative to conventional

laparoscopic technique, which has the potential to minimize the disadvantages of laparoscopic rectal resection. There is still limited data about the quality of TME after robotic-assisted rectal resections for rectal cancer. The ROLARR trial – the only multicenter randomized trial that compared the results after robotic rectal resection for rectal cancer with conventional laparoscopic surgery up to date indicates 5.1% rate of positive circumferential resection margin for robotic surgery and 6.3% for conventional laparoscopic surgery (adjusted odds ratio=0.7; 95% CI, 0.35 to 1.76; p=0.560) [8].

The aim of this study was to research the macroscopic assessment of the quality of TME after robotic-assisted rectal resections due to rectal cancer performed in a single center.

Materials and Methods

Prospectively, data was collected about the macroscopic assessment of the quality of TME in thirteen patients from the first in Bulgaria robotic-assisted rectal resections for rectal cancer in the period between 09.04.2014 and 31.12.2016. A single team in the University Hospital – Pleven, Bulgaria using da Vinci S and da Vinci Si robotic surgical system, operated on all patients. All patients were with clinical, endoscopic and pathologic evidence of rectal cancer. In all cases preoperative evaluation and staging was performed by computer tomography (CT). Additional pelvic magnetic resonance (MRI) was used in cases of mid and low rectal cancer. The distribution of the cases by gender, age, TNM stage and localization is summarized (Table 1).

After all robotic TME macroscopic assessment of the completeness of the mesorectal excision was made by a pathologist. All specimens were categorized according to the guidelines of the College of American Pathologists in

Table 1. Distribution of the patients according to age, gender, location, TNM stage and presence of previous surgery

Patient	Gender	Age	Location in rectum	*TNM*	ASA	Previous surgery	Preoperative Radio therapy	Robotic system
1	M	78	Proximal third	***T3N0M1***	3	No	No	Si
2	***M***	75	Mid rectum/10cm from AV	***T4N0M0***	3	No	No	S
3	F	69	Mid rectum/10см from AV	***T2N0M0***	2	No	No	S
4	F	70	Mid rectum/11cm from AV	***T3N1M0***	2	No	No	S
5	F	55	Distal rectum/6см from AV	***T1N0M0***	3	Yes	Yes	S
6	M	78	Distal rectum/2см from AV	***T2N0M1***	4	Yes	Yes	S
7	M	72	Proximal third	***T1N0M0***	3	Yes	No	Si
8	M	81	Proximal third	***T3N0M0***	3	No	No	S
9	***M***	67	Rectal/4***см from*** AV	***T3N0M0***	2	No	Yes	Si
10	M	72	Mid rectum/9 cm from AV	T2N0M0	2	No	Yes	S
11	M	56	Distal rectum/5cm from AV	T3N1M0	2	Yes	Yes	S
12	M	75	Proximal third	T2N0M0	3	No	No	S
13	F	64	Distal rectum/5cm from AV	T2N0M0	2	Yes	Yes	S

*AV – anal verge; M – male; F – female

three levels: "complete", "nearly complete" and "incomplete". In complete mesorectal excision were categorized all cases without defects of the mesorectal fascia, preserved gloss or defects not deeper than 5 mm. In nearly complete category were classified cases with fascial defects deeper than 5 mm are present but the muscular layer is not reached; and as incomplete – cases with defects above 5 mm and visualized the muscularis propria layer of the rectal wall.

Results

In all thirteen cases robotic assisted rectal resections with TME was performed with no conversion registered. Neoadjuvant radiotherapy was performed in four cases. In one case abdominoperineal extirpation (APE) of the rectum was done. In another case Hartman procedure was performed due to preoperative incontinence. In all other 11 cases rectal resection with primary anastomosis was performed. TME was performed in all cases. The quality of TME was complete in 12 cases and near complete in one case (Figure 1).

The circumferential and distal resection margins were negative in all cases. The mean number of harvested lymph nodes was nine. Postoperative results are shown on Table 2.

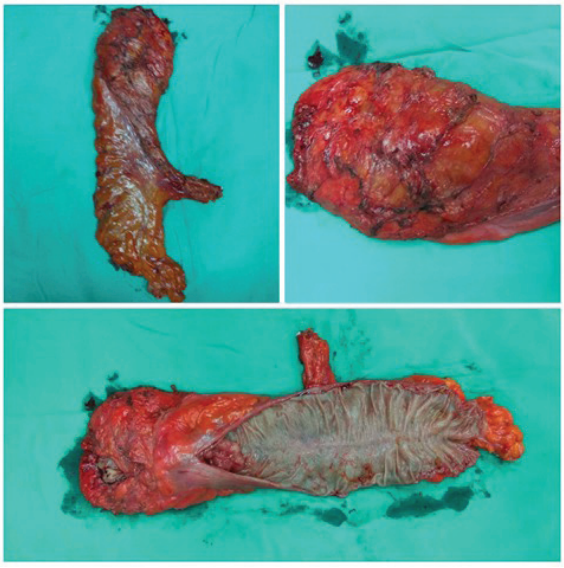

Figure 1. Case with complete TME. Pictures from the specimen immediately after removing from the patient

Table 2. Postoperative results from the robotic rectal resections

Patient	Resection margins	Harvested lymph nodes	Quality of TME	Stoma	Discharged (POD)	Hospital stay (days)	Early postoperative complications	Late complications
1	Negative	8	Complete	None	4	5	None	None
2	Negative	8	Complete	Colostomy	5	7	Bleeding	Died
3	Negative	5	Complete	None	5	7	None	None
4	Negative	7	Complete	None	7	10	None	PO hernia
5	Negative	4	Complete	Ileostomy	5	7	None	None
6	Negative	3	Complete	None	8	10	None	None
7	Negative	9	Complete	None	10	15	Suppuration	None
8	Negative	10	Complete	None	7	9	None	None
9	Negative	8	Nearly complete	Colostomy	7	9	None	None
10	Negative	12	Complete	None	8	9	None	None
11	Negative	10	Complete	Ileostomy	7	8	None	None
12	Negative	12	Complete	None	7	8	None	None
13	Negative	12	Complete	None	7	8	None	None

Discussion

This study indicates the assessment of the completeness of TME in the first robotic assisted rectal resections in Bulgaria due to cancer. In only one case of very low rectal cancer and APE of the rectum, the level of completeness was near complete and in all other cases it was fully complete.

Total mesorectal excision is standard procedure in surgical treatment of rectal cancer, which led to dramatically lower local recurrence rate. Macroscopic assessment of the completeness of total mesorectal excision is important prognostic factor and incomplete TME is related to higher rate of local recurrence and worsening prognosis for the patient [9].

Despite that many randomized trials already proved the safety of laparoscopic surgery regarding to oncological results, it is not still standard procedure for treatment of rectal cancer. Furthermore, laparoscopic rectal resection is connected with high rate of conversion in many randomized trials. Conversion in itself leads to higher rate of positive resection margins and worse prognosis for the patients compared with the non-converted patients [7].

Robotic surgery has some technical benefits compared to the conventional laparoscopic surgery as stable three dimensional camera views wrist-like movements of the instruments. This technical rate of benefits could be translated in clinical benefits. There is lacking data on the rate of conversion of the robotic rectal surgery. The only one randomized multicenter ROLARR trial did not showed significant difference in robotic TME compared to the conventional laparoscopic surgery, but further evaluation showed that in cases of low and very low rectal cancer the conversion rate is significantly lower in the robotic arm [8]. There is still limited data about the macroscopic quality of the specimen after robotic assisted TME. There are only few trials with small patient groups. Langer et al. (2017) have similar results as ours in evaluation of TME quality after robotic rectal cancer surgery. The authors indicate that the robotic surgery is safe and feasible in hard cases as obese patients, male gender and low tumors [10].

Our study indicates that robotic surgery is safe and feasible for performing good quality of TME. There is only one near complete case in a patient with very low rectal cancer. The abdominoperineal excision is traditionally connected with worse quality of the TME and higher intramuscular\incomplete rate of TME. The main disadvantage of this study is the small count of patients and the patients' selection.

Conclusions

We evaluated the quality of TME after robotic rectal resections due to cancer. This study indicates that using of robotic surgery for rectal cancer does not lead to worsening the quality of TME. Further studies in this field are necessary.

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