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Five-year survival after sigmoid resection and low vascular ligation versus left hemicolectomy and high ligation for stage I–III sigmoid carcinoma: a retrospective study

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Background. There is still a discussion whether or not high ligation of the inferior mesenteric artery and vein during surgery for sigmoid cancer has survival benefit compared to low ligation. Both operations are used today. The aim of our study was to evaluate retrospectively 5-year survival after low ligation in comparison with high ligation for stage I–III sigmoid cancer.

Materials and methods. We reviewed 127 patients who were operated on for stage I–III sigmoid cancer during the period of 5 years (1 January 2003 – 31 December 2007) at the Oncology Institute of Vilnius University. Left hemicolectomy was performed in 20 cases (Group 1), whereas sigmoid resection was performed in 107 cases (Group 2). In Group 1 there were 10 men and 10 women, mean age was 66.4 (std. dev. 7.816, range 50–78). In Group 2 there were 46 men and 61 women, mean age was 66.71 (std. dev. 9.964, range 40–82).

Results. Mean hospital stay was 15.8 days (std. dev. 4.895, min. 10, max. 30) in Group 1 and 17.47 days (std. dev. 4.995, min. 7, max. 37) in Group 2 ($p > 0.005$). There were 2 postoperative complications in Group 1 (10%) and 27 in Group 2 (25.2%) ($p > 0.005$). 5-year survival in Group 1 was 70%, in Group 2 it was 72.9% ($p > 0.005$).

Conclusions. In our study there was no significant difference in operating time and other variables between the groups, but higher postoperative complication rate and a longer hospital stay was observed after sigmoid resection with low ligation in comparison with left hemicolectomy with high ligation. However, five-year survival rate was not different between the groups. In conclusion, our findings conclude that both techniques give adequate oncological results in cases of sigmoid cancer.

Key words: sigmoid cancer, high-ligation, low-ligation, sigmoid resection, left hemicolectomy

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INTRODUCTION

Colorectal cancer is the third most common cancer in men (663 000 cases, 10.0% of the total) and the second in women (571 000 cases, 9.4% of the total) worldwide. Almost 60% of the cases occur in developed regions. The highest rates are being estimated in Australia, New Zealand and Western Europe, the lowest rates occurring in Africa and South-Central Asia. Incidence rates are higher in men than in women (1.4:1) (1). In Lithuania it is the third most common cancer among men and women (1). 5-year survivability depends greatly on the stage of cancer. Stage 1 gives 93% 5-year survival, while 4th stage gives only 8% (2). 5-year survivability varies slightly depending also on the localisation of the tumor. Right colon 63.7%, transverse and left colon about 65% and sigmoid cancer gives a bit better prognosis – 69.8% 5-year survival (3). Treatment for sigmoid cancer is, of course, complex and multidisciplinary, but surgical treatment plays the most important role here. It is based on en bloc removal of the tumor with adjacent bowel and lymph nodes along the vessels (4). Two surgical techniques are most common – left hemicolectomy and high ligation of the inferior mesenteric artery and vein and sigmoid resection with low ligation. There is still a discussion among surgeons worldwide whether or not high ligation for sigmoid cancer has survival benefit compared to low ligation. Various studies show different results, and still there is no consensus therefore both approaches are used today. Our aim was to evaluate retrospectively 5-year survival after sigmoid resection with low ligation in comparison with left hemicolectomy with high ligation for stage I–III sigmoid cancer.

MATERIALS AND METHODS

We did a retrospective analysis of 127 patients who were operated on for stage I–III sigmoid cancer during the period of 5 years (1 January 2003 – 31 December 2007) at the Oncology Institute of Vilnius University. Only those patients who underwent open surgery (with high or low ligation) were selected and they were divided into two groups – Group 1 included cases of high ligation and Group 2 was cases of low ligation. Left hemicolectomy with high ligation was performed in 20 cases (Group 1), whereas sigmoid resection with low ligation was performed in 107 cases (Group 2). Type of surgery performed was chosen based only on surgeon's preference. In Group 1 there were 10 men and 10 women, mean age was 66.4 (std. dev. 7.816, range 50–78), mean duration of the operation was 118 min (std. dev. 42.855, min. 65, max. 225). In Group 2 there were 46 men and 61 women, mean age was 66.71 (std. dev. 9.964, range 40–82), mean duration of the operation was 106 min (std. dev. 39.916, min. 55, max. 305). Tumor stage distribution in both groups is shown in Table 1. After collecting all the data, 5-year survival, mean hospital stay, mean lymph node harvest and the rate of complications were evaluated in both groups.

RESULTS

Mean hospital stay was 15 days (std. dev. 4.895, min. 10, max. 30) in Group 1 and 17 days (std. dev. 4.995, min. 7, max. 37) in Group 2 ($p > 0.005$). There were 2 postoperative complications in Group 1 (10%) and 27 in Group 2 (25.2%) ($p > 0.005$) (Table 2). Lymph node harvest in Group 1 was on an average 11.25 ($n = 20$, std. dev. 4.76), in Group 2 it was 8.91 ($n = 107$, std. dev. 4.306), $p > 0.005$. 5-year survival in Group 1 was 70% ($n = 14$), in Group 2 it was 72.9% ($n = 78$), $p > 0.005$.

DISCUSSION

During the years many studies were performed that tried to compare high and low ligation, but majority of them could not show a significant difference in 5-year survival (Table 3). Therefore both techniques are used although there are various other

Table 1. Tumour staging in Group 1 and Group 2

Procedure	Stage			Total
	I	II	III	
High ligation (Group 1)	2 (10%)	10 (50%)	8 (40%)	20
Low ligation (Group 2)	15 (14.02%)	48 (44.86%)	44 (41.12%)	107

Table 2. Complication rates in Group 1 and Group 2

Complications	Groups	
	Group 1 (n = 20)	Group 2 (n = 107)
Postoperative pneumonia	–	2
Fistula	–	4
Gastrointestinal bleeding	–	1
Dynamic ileus	–	2
Mechanic ileus	1	2
Anastomotic leakage	–	5
Urinal retention	–	2
Fever	–	1
Postoperative pancreatitis	–	1
Flegmona of abdominal wall	–	1
Seroma of laparotomic incision	–	2
Atrial fibrilation	–	1
Suppuration of laparotomic incision	1	2
Thrombophlebitis of lower limb	–	1
Total:	2 (10%)	27 (25.2%)

Table 3. Various studies comparing high ligation and low ligation

Trials	Type of study	Years of study	Number of patients		Overall mortality, %		5-year survival rate	
			High ligation	Low ligation	High ligation	Low ligation	High ligation	Low ligation
Rosi 1962 (8)	Retro-spective	1945–1955	137	154	2.2	5.1	58.3	47
Grinnell 1965 (9)	Retro-spective	1949–1955	179	181	6.2	5.5	5.7% higher than low tie	n. d.
Pezim 1984 (10)	Retro-spective	1953–1972	586	784	2.2	3.1	64.5	65.2
Slanetz 1997 (11)	Retro-spective	1951–1975	1 107	1 154	4.2	5	95% Dukes' A 84% Dukes' B 58.6% Dukes' C1 26.9% Dukes' C2	95.3% Dukes' A 76.6% Dukes' B 49% Dukes' C1 26.2% Dukes' C2
Adachi 1998 (12)	Retro-spective	1984–1996	134	38	0	0	83.2%	91.5
Zong 2007 (13)	Retro-spective	1985–2000	857	552	n. d.	n. d.	77%	79%

considerations and advantages / disadvantages for those techniques. According to some studies, high ligation has an advantage over low ligation because of higher lymph node harvest, which is, of course, a prognostic factor for 5-year survivability (5). Therefore more adequate lymphatic clearance in case of high ligation suggests that this approach is more suitable for lymph node positive disease and pT3-pT4 tumors. Also it is beneficial in those cases when there are lymph node metastases at the root of IMA. On the contrary, low ligation cannot ensure sufficient radicality and lymphatic clearance, especially in case of metastases at the root of IMA, but it could be sufficient for pT1 tumors and lymph node negative disease (5). We found higher lymph node harvest in the high ligation group, but it was not related with 5-year survival benefit.

Another problem with low ligation is the length gain for tension-free anastomosis. According to Bonnet et al. (4) high ligation provides more

proximal colon length thus ensuring better feasibility of anastomosis. Anastomotic leakage is one of the most severe complications which may lead to patient's death therefore tension-free anastomosis is crucial. Of course, in case of low ligation additional colonic length could be gained by mobilizing the lienal flexure. Anastomotic insufficiency also could be caused by poor blood supply for the anastomosis in case of high ligation for elderly patients with possible atherosclerotic damage to middle colic or other arteries. In this case low ligation is favorable for these patients because left colic artery (or rot of inferior mesenteric) is left intact thus ensuring better blood perfusion for the proximal limb (4, 6). There are also some other considerations, for example, Candela et al. [7] states that hypogastric nerve lesions are more often encountered during high ligation. In general, high ligation is considered to be technicaly more difficult and is a longer operation. Complication rates are also higher compared to low ligation (7).

CONCLUSIONS

In our study there was no significant difference in operating time and other variables between the groups, but higher postoperative complication rate and a longer hospital stay was observed after sigmoid resection with low ligation in comparison with left hemicolectomy with high ligation. However, five-year survival rate was not different between the groups. In conclusion, our findings conclude that both techniques give adequate oncological results in cases of sigmoid cancer.

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SERGANČIŲJŲ I–III STADIJOS RIESTINĖS ŽARNOS VĖŽIU PENKERIŲ METŲ IŠGYVENAMUMO PALYGINIMAS PO KAIRIOSIOS HEMIKOLEKTOMIJOS, KAI KRAUJAGYSLĖS PERRIŠTOS AUKŠTAI, IR RIESTINĖS ŽARNOS REZEKCIJOS, KAI PERRIŠTOS ŽEMAI: RETROSPEKTYVINĖ ANALIZĖ

Santrauka

Įvadas. Pasaulyje vis dar tebediskutuojama dėl to, ar apatinės pasaito arterijos ir venos perrišimas aukštai, palyginti su perrišimu žemai, turi privalumų lyginant išgyvenamumą šių dviejų grupių ligonių, operuotų dėl riestinės žarnos vėžio. Pasaulyje taikomos abi metodikos. Mes atlikome I–III st. riestinės žarnos vėžiu sergančių ligonių, kuriems atlikta riestinės žarnos rezekcija ir perrišimas žemai arba kairioji hemikolektomija ir perrišimas aukštai, retrospektyvinę analizę siekdami nustatyti ryšį su 5 metų išgyvenamumu.

Pacientai ir metodai. Peržiūrėjome 127 ligonių, operuotų Vilniaus universiteto onkologijos institute per penekrius metus (2003 01 01–2007 12 31) dėl I–III st. riestinės žarnos vėžio, ligos istorijas. Kairioji hemikolektomija buvo atlikta 20 pacientų (1 grupė), o riestinės žarnos rezekcija – 107 pacientams (2 grupė). Pirmoje grupėje buvo 10 vyrų ir 10 moterų, vidutinis amžius 66,4 m. (std. dev. 7,816, min. 50, max. 78), antroje grupėje – 46 vyrai ir 61 moteris, vidutinis amžius – 66,71 m. (std. dev. 9,964, min. 40, max. 82).

Rezultatai. Pirmos grupės pacientų hospitalizacija truko 15 dienų (std. dev. 4,895, min. 10, max. 30), antros – 17 dienų (std. dev. 4,995, min. 7, max. 37; $p > 0,005$). Pirmoje grupėje buvo 2 pooperacinės komplikacijos (10 %), antroje – 27 (25,2 %, $p > 0,005$). Pirmos grupės pacientų penkerių metų išgyvenamumas buvo 70 %, antros – 72,9 % ($p > 0,005$).

Išvados. Tyrimo metu negavome statistiškai patikimo skirtumo tarp operacijos trukmės ar kitų kintamųjų grupėse, tačiau antroje grupėje buvo daugiau pooperacinių komplikacijų, ilgesnė šių pacientų hospitalizacijos trukmė. Nenustatyta ir statistiškai patikimo skirtumo tarp grupių 5 metų išgyvenamumo.

Raktažodžiai: riestinės žarnos vėžys, kairioji hemikolektomija, sigmos rezekcija, perrišimas aukštai, perrišimas žemai