International Surgery Journal
Aboelatta IH et al. Int Surg J. 2019 Jun;6(6):1838-1843
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: http://dx.doi.org/10.18203/2349-2902.isj20192150

Original Research Article

Role of pelvic lymphadenectomy in rectal cancer

Ibrahim H. Aboelatta*, Soliman A. El-Shakhs, Abd Elmieniem F. Mohammed, Mohammed H. Milegy

Department of Surgery, Faculty of Medicine, Shebin, Menoufia, Egypt

Received: 01 May 2019
Revised: 15 May 2019
Accepted: 16 May 2019

***Correspondence:**
Dr. Ibrahim H. Aboelatta,
E-mail: ibrahimaboelatta33@gmail.com

ABSTRACT

Background: Rectal cancer constitutes about one third of all colorectal cancer cases. Total mesorectal excision has become the gold standard in rectal cancer treatment. However total mesorectal excision does not involve any approaches for lateral pelvic lymph nodes (LPLN), which may be asource of local recurrences. Tumor containing LPLN were reported to be found in about 10%-20% of the rectal cancer patients. In japan lateral pelvic lymph node metastasis is accepted to be curable with excision.
Methods: This study included 20 patients presented to Menofia Hospital for elective colorectal re sections and LPLN dissection, in the period from July 2016 to January 2019.
Results: This study on 13 male (65%), 7 female (35%), all patients included in the study underwent preoperative chemoradiation according to the technique described by Marks et al. with an overall administration of 45 cGy over 5 weeks. Dissection of 180 lymph nodes was retrieved (20%) lymph nodes pathologically were positive for malignancy.
Conclusions: Lateral pelvic lymph nodes dissection is an important in rectal cancer treatment.

Keywords: Rectal cancer, Lateral pelvic lymph node, Metastasis, Neoadjuvant chemoradiotherapy

INTRODUCTION

The importance of lymph node metastasis in the prognosis of colorectal cancer has been recognized for many years.[1] It has played an integral part in the various staging systems (including Dukes' staging and its modifications, and the TNM which are acknowledged to provide valuable information about prognosis and appropriate therapeutic management.[2] Although these different staging systems have on occasion caused some confusion, the value of lymph node metastasis is generally accepted.[3] In colorectal cancer the presence of lymph node metastases has a major impact on prognosis. Moreover, nodal status determines the need for adjuvant therapy after surgical resection of the tumour.[4] Considering the developments in adjuvant treatment, it is crucial to get accurate information regarding lymph node status in patients with colorectal cancer.[5]

The chance of finding tumour-positive nodes rises as the total number of lymph nodes examined increases, it is advisable to harvest as many lymph nodes as possible from the specimen.[6]

Curative resection for colorectal cancer should include removal of the lymphatic drainage of the tumour bearing segment of bowel.[7] Total mesorectal excision (TME) is currently the standard surgical procedure for low rectal cancer. A number of recent reports have described a low incidence of local recurrence after TME2–4 and the prognostic significance of circumferential resection margin involvement. There is little controversy about the

increased incidence of lateral lymph node metastases in patients with low-lying and deeply invading tumours.[8]

LLN involvement is considered to be a local disease, and thus extensive PSD is performed to reduce local recurrence and improve survival.[9] Lateral dissection has therefore been regarded as part of the standard operation for advanced low rectal cancer in many institutions in Japan.[10] However, the reported incidence of lateral lymph node metastases ranges from 8.8:16.4, suggesting that lateral dissection is not beneficial in the majority of patients with advanced low rectal cancer.[11]

The extent of the lymphadenectomy for colorectal cancer, however, remains a matter of debate.[12] Therefore, this is prospective study to compare the result of lateral pelvic lymphadenectomy on short term outcome.

METHODS

This is a prospective study on twenty patients with colorectal cancer presented to Menufia University Hospital, in the period from July 2016 to January 2019.

Inclusion criteria

All patients indicated for elective colorectal sections with no contraindications to operation under general anesthesia

Exclusion criteria

Exclusion criteria were patient age >80 years' old; presented with intestinal obstruction or perforation; patients with inflammatory bowel disease; recurrent cases.

Evaluation and investigations

Preoperative evaluation

History taking (personal history and present history, family history of colorectal disease, past history including previous colorectal disease, medical diseases, history of surgical operations and history of drug intake and general condition of the patients).

Investigations

Laboratory: Complete blood count, kidney function, liver functions, fasting blood sugar, coagulation profile, tumor markers for example CEA, CA9-19.

Radiology (CT abdomen and pelvis and \or MRI pelvis) : To diagnosis site of tumor, staging before and after neoadjuvant therapy, echocardiography, chest X-ray or CT chest+ bone scan.

Colonoscopy and biopsy

All patients included in the study underwent preoperative radiotherapy according to the technique described by Marks et al. with an overall administration of 45 cGy over 5 weeks.

The irradiated areas were the anus, rectum, and mesorectum, as well as the regional and iliac lymph nodes. During radiotherapy, continuous intravenous infusion of 5-FU 200 mg/m^2/day was administered. At 40 days after the end of neoadjuvant radiochemotherapy a second preoperative staging and evaluation of the lesion was performed by endoscopy to assess any variation in tumor diameter (using the tattoo spots as reference points), transanal ultrasound, CT scan, and/or MRI and digital examination. The operation was performed 8 weeks after the completion of chemoradition.

Examination to be studies

Operative time and blood loss, intraoperative complication. Postoperative complication and hospital stay.

Histopathology

Number of positive lymph node harvested.

Statistical method

The full detailed form is SPSS 20, IBM, Armonk, NY, United States of America.

RESULTS

Table 1 show 13 (65%) were male and 7 (35%) were female. The average age was 58 year, ranging between 40 and 76 year. Main symptoms were 8 cases (40%) bleeding, 9 cases (45%) constipation, 3 cases (15%) spurious diarrhea. By colonscopy, there is 3cases (15%) show ulcer, 13 cases (65%) show mass, 4 cases (20%) show annular stricture.

Table 2 show 75% cases underwent law anterior resection while 10% underwent abdominoperineal resection, 5% underwent intersphincteric resection, and 10% underwent ultra-law anterior resection (ULAR). During the operation, only one case was complicated with bleeding (5%), 2 cases were complicated with Small intestinal injury (10%), only one case was complicated with ureteric injury (5%)

Table 3 show the lymph node metastasis was analyzed according to histological grade, depth of invasion, perirectal lymph node metastasis, lymphatic invasion.

Table 4 show total number of 180 lymph nodes was dissected from patients. According to the LN study, 36

(20%) of total number was positive (8-13LN/patient), the size varied from 0.5 cm to 1.3 cm.

Table 5 shows the post-operative complication occurred chest infection (10%), DVT (5%) and wound infection (10%).

Table 1: Demographic data.

	Number		N	%
Age	20	Range	40–76	
		Mean±S. D	58.50±9.71	
Sex	20	Male	13	65
		Female	7	35
Main symptoms		Bleeding	8	40
		Constipation	9	45
		Spurious diarrhea	3	15
Colonoscopy		Ulcer	3	15
		Mass	13	65
		Annular stricture	4	20

Table 2: Details of operation performed and complication may occur intraoperative.

		N	%
Distance from anal verge	Minimum	3 cm	
	Maximum	8 cm	
Type of operation	Abdomino prenneal resection	2	10
	Intersphincteric resection	1	5
	Ultra-law anterior Resection (ULAR)	2	10
	Law anterior resection	15	75
Complications	Bleeding	1	5 (controlled) pack for 48 hours and secondary lock
	Small intestinal injury	2	10 (repair)
	Ureteric injury	1	5 (repair) stent and repair

Table 3: Clinicopathological characteristics of patients undergoing lateral pelvic lymph node dissection.

Lymph node study		Number of patients (20)		Total number of lateral pelvic lymph nodes (n=180)		Number of positive lymph nodes (n=36)		X2	P value
		N	%	N	%	N	%		
Histological grade	Well	10	50	90	50.0	10	37.5	9.028	* <0.025
	Moderate	7	35	60	33.3	18	33.3		
	Poor	3	15	30	16.7	8	29.2		
Depth of invasion	T2	3	15	28	15.5	2	5.5	11.457	* <0.005
	T3	12	60	90	50	27	75.0		
	T4	5	25	62	34.5	7	19.5		
Perirectal LN metastasis	No	7	35	70	38.9	21	58.3	7.159	<0.01*
	Yes	13	65	110	62.1	15	41.7		
Lumphatic invastion	No	10	50	82	45.6	23	63.9	6.098	<0.01*
	Yes	10	50	98	54.4	13	36.1		

Table 4: Lymph nodes overview.

	N	%
Total number	180	100%
Positive LN	36	20%
Number of LN/pt	8–13	
Average Size of LN	0.5 cm-1.3 cm	

Table 5: Post-operative complications.

Post-operative complications	N (%)	Treatment
Chest infection	2 (10)	Antibiotic
DVT	1 (5)	Anticoagulant
Wound infection	2 (10)	Antibiotic and dressing

DISCUSSION

In the study by Kim, Jeong et al the mainstay of treatment of carcinoma of the rectum is radical surgery, with or without sphincter preservation. The beneficial effect of preoperative pelvic irradiation as an adjuvant treatment has been confirmed in several studies.[12]

In the study by Bosset et al many studies reported that combining convential dose preoperative radiotherapy with 5-FU was safe, tolerable increased surgical downstaging, improved loco, regional control and may contribute to enhancing survival.[13]

In the study by Matsumoto, et al, LPLND may be therapeutic in the presence of enlarged lateral pelvic nodes or may be prophylactic in the absence of any obviously enlarged lateral pelvic nodes. It is hypothesized that LPLND removes those nodes that contain micrometastasis and, hence, decreases the development of locoregional recurrence.[14]

Male to female ratio 0.65 to 0.35 observed in this study was higher than that ratio in almost US studies, which have showed no gender difference according to Brenner et al.[15]

Finding on gender differences were similar to those of all published reported on colcrectal cancer among Egyptians. We speculate that more outdoor environmental exposure among working men than women results in the more common occurrence of the disease among men.

According to Pox, different studies found that 30.8% of cancer rectum was located in the upper third 32.6% in the middle third 36.6% in the lower third this figures were derived from the pathological examination of 1000 operative spacemens. Steams and Binkley, and Aldridge et al, reported that the incidence of cancer is higher in the upper than the lower and middle third.[16]

In this study the incidence of cancer rectum was 75% in the upper third and 25% in the middle and lower two thirds.

In the study Tamura et al study, all patients received R0 resection of primary site with the operative procedure as follows: 31 patients received low anterior resection, 18 patients received abdominoperineal resection, 1 patient received pelvic exenteration.[17]

In this study, all patients received R0 resection of primary site with the operative procedure as follows: 15 patients received low anterior resection, 2 patients received abdominoperineal resection, 2 patients received ultralow anterior resection, 1 patient receive Intersphincteric resection.

In the study by Ueno et al recent meta-analysis of local staging by ERUS and MRI, highlighted some difference among these modalities with regard to distinguishing T category. The sensitivity these modalities for detecting muscularis propria invasion (T1 vs T2) was similar, but the specificity of ERUS was better. MRI tended to over stage patients with T1 tumors conversely, the specificity of all modalities was similar for assessing perirectal fat invasion (T3 status) but ERUS was more sensitive. MRI appeared to under stage T3 tumors compared to ERUS. It could be argued that ERUS, when feasible more appropriately distinguishes T1 from T2 and T2 from T3 cancers.[18]

In this study ERUS and MRI were performed to detect T and N stage of tumor and total number of lymph nodes pre and after neoadjuvant therapy then comparison between clinical stage and pathological stage to detect the effect of neoadjuvant on LN and tumor we found the neoadjuvant thereby lead to down staging and down shifting of T& N stage.

In the study by Kobayashi et al studied 1272 patients of low rectal cancer in which LPLND was done in 784 patients. The oncological outcomes were compared between those who had undergone LPLND with those who had not undergone LPLND and found that the two groups were comparable in terms of rates of local recurrence and five-year overall survival. However, it was found that involvement of lateral pelvic nodes was an independent poor prognostic factor and indicator of local recurrence.[19]

In this study we found that 20% was positive for malignant cells and there was significant benefit with extended lymph node dissection in terms of recurrence, although intraoperative blood loss observed in one case and controlled, duration of hospital stay, and sexual and urinary dysfunctions were insignificantly with extended lymph node dissection.

In the study by Moran et al the incidence of lateral nodal involvement in patients with lower rectal cancer has been reported as 8.6% to 27%. The incidence of lateral nodal involvement in patients with lower rectal cancer in the

east and the west may be similar but the management of LPLN completely differs. In the west, NACTRT is more commonly used, which is also seen in India, whereas, in Japan, patients are subjected to upfront surgery.[20]

In the study by Blake et al incidence varies according to the tumor location, size of the tumor, pathological T stage, number of mesorectal nodes, and grades of differentiation and presence of lymphovascular emboli. Involvement of the lateral pelvic nodal in the absence of the distance from the anal verge decreases, the incidence of lateral pelvic nodes increases, with the reported incidence of lateral nodal involvement for tumors located below peritoneal reflection of 14.9% compared with 8.2% for those located above the peritoneal reflection.[21]

In the study by Sueda et al, among the tumors situated below the peritoneal reflection, the incidence of lateral pelvic nodes for those situated within 2 cm from anal verge is as high as 42%. The incidence of lateral nodal involvement is directly proportional to pathological T stage. Incidence of lateral nodes in pT2, pT3, and pT4 being 6.5%-7.1%, 17.9%, and 31.6%, respectively. Lateral pelvic nodes are rarely involved in pT1 tumors or in high-grade dysplasia although development of recurrence in lateral pelvic nodes has occasionally been reported even in pT1 tumors.[22]

Japanese Clinical Oncology Group (JCOG) has started a phase 3 randomized-controlled clinical trial comparing TME alone and TME LPLND for stage II/III rectal cancer with extra mesorectal nodes less than 1 cm in size on MRI to determine the role of prophylactic LPLND. The final results of this study may better define the role of prophylactic LPLND. However, those patients receiving neoadjuvant or adjuvant CRT are excluded. Hence, the value of radiotherapy, which might be an alternative to LPLND, will not be assessed.[23]

Dharmarajan, et al showed that The LPLNs that were identified on pretherapy imaging do not affect the overall or disease-free survival after the neoadjuvant therapy and proctectomy in stage III rectal cancer. A lateral pelvic lymph node dissection does not appear to be justified in stage III patients with LPLNs on pretherapy imaging who receive neoadjuvant therapy because his study was include stage III colorectal cancer only.[24]

Georgiou et al did a meta-analysis comparing extended lymph node dissection versus conventional rectal cancer surgery in which they included 5502 patients from one randomized, three prospective nonrandomized, and 14 retrospective case-control studies. They found that there was no significant benefit with extended lymph node dissection in terms of survival or recurrence although intraoperative blood loss, duration of hospital stay, and sexual and urinary dysfunctions were significantly higher with extended lymph node dissection. Hence, they concluded that extended lymphadenectomy does not confer a significant oncological advantage but increased complications. However, this was based on retrospective studies performed over a long period of time with significant heterogeneity between the groups.[25]

There for we will make another study include more patients in a long period to detect the survival and prognosis.

CONCLUSION

The incidence of LPLN metastasis in patients with advanced rectal cancer is high even after preoperative CRT when we perform selective LPLD based on the pretreatment imaging. LPLN metastasis can be treated with a multidisciplinary approach consisting of preoperative CRT and selective LPLD. Lateral pelvic lymph nodes dissection is an important in rectal cancer treatment.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Heald RJ, Ryall RD. Recurrence and survival after total mesorectal excision for rectal cancer. Lancet. 2006;1:1479–82.
2. Birbeck KF, Macklin CP, Tiffin NJ, Parsons W, Dixon MF, Mapstone NP et al. Rates of circumferential resection margin involvement vary between surgeons and predict outcomes in rectal cancer surgery. Ann Surg. 2004;235:449–57.
3. Jass JR, Baker M, Fraser L et al. APC mutation and tumour budding in colorectal cancer. J Clin Pathol. 2007;56:69–73.
4. Enker WE, Thaler HT, Cranor ML, Polyak T. Total mesorectal excision in the operative treatment of carcinoma of the rectum. J Am Col Surg. 2005;181:305–46.
5. Moriya Y, Hojo K, Sawada T, Koyama Y. Significance of lateral node dissection for advanced rectal carcinoma at or below the peritoneal reflection. Dis Colon Rectum. 2009;32:307–15.
6. Kapiteijn E, Marijnen CA, Nagtegaal ID, Putter H, Steup WH, Wiggers T, et al. Preoperative radiotherapy combined with total mesorectal excision for resectable rectal cancer. N Engl J Med. 2011;345:638–46.
7. Colorectal Cancer Collaborative Group. Adjuvant radiotherapy for rectal cancer: a systematic overview of 8507 patients from 22 randomised trials. Lancet. 2013;358:1291–304.
8. Komuta K, Okudaira S, Haraguchi M, Furui J, Kanematsu T. Identification of extracapsular invasion of the metastatic lymph nodes as a useful prognostic sign in patients with resectable colorectal cancer. Dis Colon Rectum. 2011;44:1838–44.

9. Murphy J, Pocard M, O'Sullivan G et al. Causes and prognostic significance of variable lymph node retrieval in Dukes' B rectal carcinoma. Gut. 2009;44:84.
10. Brynes RK, Hunter RL, Vellios F. Immunomorphological changes in regional lymph nodes associated with cancer. Arch Path Lab Med. 2013;107:217.
11. Pihl E, Nairn R, Milne BJ. Lymphoid hyperplasia: a major prognostic feature in 519 cases of colorectal carcinoma. Am J Pathol. 2010;100:469.
12. Kim TH, Jeong SY, Choi DH, Kim DY, Jung KH. Lateral lymph node metastasis is a major cause of locoregional recurrence in rectal cancer treated with preoperative chemoradiotherapy and curative resection. Ann Surg Oncol. 2009;15:729-73
13. Bosset JF, Collette L, Calais G, Mineur L, Maingon P, Radosevic-Jelic L, et al. Chemotherapy with preoperative radiotherapy in rectal cancer. N Engl J Med. 2006;355:1114–23.
14. Matsumoto T, Ohue M, Sekimoto M, Yamamoto H, Ikeda M, Monden M. Feasibility of autonomic nerve-preserving surgery for advanced rectal cancer based on analysis of micrometastases. Br J Surg. 2005;92:1444-8.
15. Brenner H, Hoffmeister M, Arndt M, Haug U. Gender differences in colorectal cancer:implications for age at initiation of screening. Br J Cancer. 2007;96:828–31.
16. Pox CP, Altenhofen L, Brenner H, Theilmeier A, Theilmeier A, Von Stillfried D, Schmiegel W. Efficacy of a Nationwide Screening Colonoscopy Program for Colorectal Cancer. Gastroenterology. 2012;14(7):1460-7.
17. Tamura H, Shimada Y, Kameyama H, Yagi R, Tajima Y, Okamura T, et al. Prophylactic lateral pelvic lymph node dissection in stage IV low rectal cancer. World J Clin Oncol. 2017;8(5):412-9.
18. Akiyoshi T, Ueno M, Matsueda K, Konishi T, Fujimoto Y. Selective lateral pelvic lymph node dissection in patients with advanced low rectal cancer treated with preoperative chemoradiotherapy based on pretreatment imaging. Ann Surg Oncol. 2014;21:189-96.
19. Kobayashi H, Mochizuki H, Kato T, Mori T, Kameoka S, Shirouzu K, et al. Outcomes of surgery alone for lower rectal cancer with and without pelvic sidewall dissection. Dis Colon Rectum. 2009;52:567-76.
20. Yano H, Moran BJ. The incidence of lateral pelvic side-wall nodal involvement in low rectal cancer may be similar in Japan and the West. Br J Surg. 2008;95:33-49.
21. Mercury Study Group, Shihab OC, Taylor F, Bees N, Blake H, Jeyadevan N, et al. Relevance of magnetic resonance imaging-detected pelvic sidewall lymph node involvement in rectal cancer. Br J Surg. 2011;98:1798-804.
22. Sueda T, Noura S, Ohue M, Shingai T, Imada S, et al. Case of isolated lateral lymph node recurrence occurring after TME for T1 lower rectal cancer treated with lateral lymph node dissection: report of a case. Surg Today 2013;43:809-13.
23. Fujita S, Akasu T, Mizusawa J, Saito N, Kinugasa Y, Kanemitsu Y, et al. Postoperative morbidity and mortality after mesorectal excision with and without lateral lymph node dissection for clinical stage II or stage III lower rectal cancer (JCOG0212): results from a multicentre, randomised controlled, non-inferiority trial. Lancet Oncol. 2012;13:616-21.
24. Dharmarajan S, Shuai D, Fajardo AD, Birnbaum EH, Hunt SR, Mutch MG, et al. Clinically enlarged lateral pelvic lymph nodes do not influence prognosis after neoadjuvant therapy and TME in stage III rectal cancer. J Gastrointest Surg. 2011;15(8):1368-74.
25. Georgiou P, Tan E, Gouvas N, Antoniou A, Brown G, Nicholls RJ, et al. Extended lymphadenectomy versus conventional surgery for rectal cancer:a meta-analysis. Lancet. 2009;10(11):1053-62.

Cite this article as: Aboelatta IH, El-Shakhs SA, Mohammed AEF, Milegy MH. Role of pelvic lymphadenectomy in rectal cancer. Int Surg J 2019;6:1838-43.