

Lateral Pelvic Lymph Node Dissection in Rectal Cancer. Optimal Treatment?

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Abstract

The prognostic importance of lymph node metastasis in rectal cancer has been proven with multiple trials and is broadly applied in the patient management. Lateral pelvic lymph node (LPLN) metastasis in rectal cancer is considered as systemic disease. The incidence of lateral lymph node involvement has been reported as 10 to 25% of all rectal cancers. The overall recurrence rate after curative resection in rectal cancer is more than 20% reported in various studies and the LPLNs metastasis is an independent risk factor for local recurrence. The extent of lymphatic spread in rectal cancer can be divided into mesorectal and extra-mesorectal lateral pelvic lymph node metastasis and it is the most important parameter regarding post-operative recurrence free as well as overall survival. The importance of lymphadenectomy respective to these lateral pelvic areas is of prognostic benefit both in survival as well as local control of the disease and also it determines the optimal extent of lymphadenectomy. Hence, the risk factors for lateral pelvic lymph node metastasis in patients with rectal cancer can be effectively studied in a broad set up because it may be a poor prognostic factor and the extended lymph node dissection might have a therapeutic role.

Keywords: Rectal cancer; Lateral pelvic lymph node; Metastasis; Regional recurrence

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Background

The prognostic importance of lymph node metastasis in rectal cancer has been proven with multiple trials and is broadly applied in the patient management. Lateral pelvic lymph node (LPLN) metastasis in rectal cancer is considered as systemic disease. The minimum of 12 lymph nodes should be examined in order to confirm the node negativity in rectal cancer. The conclusions of a four-arm trial (INT-0089) has indicated that the overall survival and cancer specific survival is significantly high as the number of reported lymph nodes increases even with negative nodes [1].

Anatomy of lymphatic drainage in rectal cancer

The regional lymphatic areas of lower rectum are classified among four areas, i.e., mesorectal area, superior rectal artery (SRA) area, inferior mesenteric artery (IMA) area, and lateral area. The lateral area, outside of the mesorectum is further divided into six regions based on the named vessels: 1) the internal pudendal (outside of the pelvic plexus), 2) the internal iliac (proximal to the superior vesical artery), 3) the common iliac, 4) the external iliac, 5) the obturator, and 6) the presacral regions.[2] Among these lateral regions, the internal pudendal artery region, the internal


iliac artery and obturator region have the highest rate of nodal involvement, which is called as "Vulnerable field" in the lower rectal cancers.[3]

Lateral pelvic lymph node metastasis in rectal cancer

The "Vulnerable field" has oncological significance due to close proximity to circumferential margin of the primary tumour. In rectal cancers, the incidence of lateral lymph node involvement has been reported as 10 to 25% [4-9] (**Table I**). There is a theory for metastasis to the LPLN that the lymphatic drainage from lower rectum passes beyond mesorectum through the lateral

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Table 1 Incidence of lateral pelvic lymph node metastasis in rectal cancer.

| Sr No | Study | Total cases | LPLN metastasis |
|-------|------------------------|-------------|-----------------|
| 1 | Kinugasa et al (2000) | 944 | 206(22%) |
| 2 | Takahashi et al (2000) | 764 | 66(8.6%) |
| 3 | Fujito et al (2003) | 204 | 29(11.9%) |
| 4 | Ueno et al (2007) | 244 | 41(17%) |
| 5 | Min et al (2009) | 151 | 36(23.8%) |
| 6 | Fujito et al (2012) | 784 | 117(14.9%) |
| 7 | NCT00190541 (2012) | 351 | 26(7%) |

ligament and then along the internal iliac artery and obturator space. Among lateral pelvic lymph node regions, the obturator region has the highest rate of nodal involvement, so it should be considered as an important region of cancer spread in cases of lower rectal cancer [3].

Risk factors for LPLN metastasis in rectal cancer

It is very difficult to generalize the indications of lateral pelvic lymphadenectomy because the parameters related to malignant potential of the tumour are not adequate to decide the selection criteria for prophylactic lateral pelvic lymphadenectomy. The clinically suspected lateral pelvic lymph nodes has greatest value to lymph node dissection. In the western world, surgeons are in favour of lateral lymph node dissection in a group of the patients with diverse prognostic factors [5,10,11]. The Colon and Rectal Surgery Guidelines 2000 have also mentioned that the lateral pelvic lymph node dissection should be done in clinically suspected lateral pelvic disease [12].

The clinical parameters of the malignant potential in lower rectal cancer are the level of distal tumour edge, annularity, depth of invasion, number of metastatic nodes other than LPLN, involvement of superior rectal artery region nodes, preoperative serum CEA level and histologic differentiation of tumour. Among all these features, only some risk factors including tumour aggressiveness as the status of mesorectal nodes and tumour grade, have been reported in previous studies [13,14]. Fujito proved the difference of benefit with the stage of the tumour at the time of diagnosis, LPLD improved the prognosis of patients with stage III disease and also better prognosis in patients with small number of lymph node metastasis [15].

For performing lymph node dissection, it is important to have pre-operative diagnosis of LPLN metastasis, but the available imaging including CECT or MRI has low accuracy in diagnosing metastatic LPLN in about 85% cases [16,17]. The combined use of clinico-pathological factors with these modalities can achieve more precise diagnosis. However, the evidence level to justify prophylactic lateral pelvic lymphadenectomy is still low [16]. The nodal diameter in the "vulnerable" lateral regions is the most efficient means of determining the effectiveness of lateral dissection preoperatively [13].

Importance of LPLN dissection in rectal cancer

The importance of lymphadenectomy respective to these lateral pelvic areas is of prognostic benefit both in survival as well as local control of the disease and also it determines the optimal extent of lymphadenectomy. [13,14] Takahashi, et al suggested a

concept based on retrospective study that the lateral lymphatic flow from low-lying rectal cancer passes outside the boundaries of total mesorectal excision but within the range of curative surgery by three-space dissection [4].

The UICC staging has also included the internal iliac artery region lymph nodes as the regional lymph nodes in rectal cancer. The five year survival of patients with lateral pelvic lymph node metastasis has been found to be comparable to patients with resectable liver or lung metastasis, as about 40% and recurrence free survival is about 55% [13,14]. These data are based on the reports from Japan and China. Contrary to most of the reports, Kobayashi showed that pelvic sidewall dissection does not have definite overall benefits regarding local recurrence or survival, but in specific patient groups result remains uncertain. Hence, a randomized controlled study is necessary to clarify this issue [18].

The overall recurrence rate after curative resection in rectal cancer is more than 20% as has been reported in various studies and the LPLNs metastasis is an independent risk factor for local recurrence [5,18].

The Japanese Clinical Oncology Group did a multicentre, randomised controlled trial (NCT00190541) to compare the results of mesorectal excision alone and with lateral lymph node dissection between June 11, 2003, and Aug 6, 2010. The primary analysis planned for 2015 with primary endpoint is relapse-free survival and the primary analysis will be published later [19].

There are few drawbacks of the prophylactic lateral pelvic lymphadenectomy as well. These include longer operative time, higher intraoperative blood loss and higher rate of post-operative complications including urinary and sexual dysfunction especially in non-metastatic lateral lymphadenectomy cases [20,21].

Argument for debate

The extent of lymphatic spread in rectal cancer can be divided into mesorectal and extra-mesorectal lateral pelvic lymph node metastasis and it is the most important parameter regarding post-operative survival. After curative resection in rectal cancer, LPLN metastasis is the major cause of pelvic recurrence that imposes high morbidity and ruins the patient's quality of life [22]. For the mesorectum, total mesorectal excision (TME) is the standard procedure for surgically resectable low rectal cancer and has been accepted due to good prognosis and low morbidity. The available strategy to treat the extra-mesorectal disease, is TME followed by adjuvant radiotherapy. The Korean study demonstrated that adjuvant radiotherapy without lateral lymph node dissection was not enough to control the local recurrence and LPLN metastasis [22]. On the other side, the lateral pelvic lymph node dissection has been demonstrated to have the survival benefit with pathologically proven metastatic LPLN, which is why it is in routine practice in Japan but not in Western and Indian subcontinent. Contrary to this, in Dutch TME trial, TME plus radiotherapy showed that most frequent site of recurrence was presacral area rather than lateral pelvic wall [23]. In its support Swedish study also concluded that LPLN metastasis is not an important cause of local recurrence in lower rectal cancer patients [24].

The most important matter in this regard is to diagnose metastatic LPNL pre-operatively. The sensitivity of cross sectional imaging either trans-abdominal or trans-rectal, is not satisfactory. However, available data indicates that the incidence of metastatic lateral pelvic lymph nodes should be correctly assessed in lower rectal cancers for which pathological proof of lymph node metastasis is necessary in a large prospective study.

Conclusion

It is important to identify the tumour characteristics such as those having the risk of the metastasis to lateral pelvic lymph nodes. The available studies in literature are mainly from Japan,

Korea and China and the clinical results published on lateral lymphadenectomy in the literature are conflicting. Hence, the risk factors for lateral pelvic lymph node metastasis in patients with rectal cancer can be effectively studied in a broad set up with randomization because it may be a poor prognostic factor and the extended lymph node dissection might have a therapeutic role.

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References

- Haller DG, Catalano PJ, Macdonald JS, O'Rourke MA, Frontiera MS, et al. (2005) Phase III study of fluorouracil, leucovorin, and levamisole in high-risk stage II and III colon cancer: final report of Intergroup 0089. *J Clin Oncol* 23: 8671-8681.
- Japanese Society for Cancer of the Colon and Rectum (1997) *Japanese Classification of Colorectal Carcinoma*. Tokyo: Kanehara.
- Canessa C, Miegge L, Bado J, Silveri C, Labendara D, et al. (2004) Anatomic study of lateral pelvic lymph nodes: implications in the treatment of rectal cancer. *Dis Colon Rectum* 47: 297-303.
- Takahashi T, Ueno M, Azekura K, Ohta H (2000) Lateral node dissection and total mesorectal excision for rectal cancer. *Dis Colon Rectum* 43: 59-68.
- Ueno M, Oya M, Azekura K, Yamauchi T, Muto T (2005) Incidence and prognostic significance of lateral lymph node metastasis in patients with advanced low rectal cancer. *Br J Surg* 92: 756-763.
- Hojo K, Koyama Y, Moriya Y (1982) Lymphatic spread and its prognostic value in patients with rectal cancer. *Am J Surg* 144: 350-354.
- Sugihara K, Kobayashi H, Kato T, Mori T, Mochizuki H, et al. (2006) Indication and benefit of pelvic sidewall dissection for rectal cancer. *Dis Colon Rectum* 49: 1663-1672.
- Wu ZY, Wan J, Li JH, Zhao G, Yao Y, et al. (2007) Prognostic value of lateral lymph node metastasis for advanced low rectal cancer. *World J Gastroenterol* 13: 6048-6052.
- Min BS, Kim JS, Kim NK (2009) Extended lymph node dissection for rectal cancer with radiologically diagnosed extramesenteric lymph node metastasis. *Ann Surg Oncol* 16: 3271-32718.
- Moriya Y, Hojo K, Sawada T, Koyama Y, et al. (1989) Significance of lateral node dissection for advanced rectal carcinoma at or below the peritoneal reflection. *Dis Colon Rectum* 32: 307-315.
- Mori T, Takahashi K, Yasuno M (1998) Radical resection with autonomic nerve preservation and lymph node dissection techniques in lower rectal cancer surgery and its results: the impact of lateral lymph node dissection. *Langenbecks Arch Surg* 383: 409-415.
- Nelson H, Petrelli N, Carlin A, Couture J, Fleshman J (2001) Guidelines 2000 for colon and rectal cancer surgery. *J Natl Cancer Inst* 93: 583-596.
- Ueno H, Mochizuki H, Hashiguchi Y, Ishiquro M, Miyoshi M, et al. (2007) Potential Prognostic Benefit of Lateral Pelvic Node Dissection for Rectal Cancer Located Below the Peritoneal Reflection. *Ann Surg* 245: 80-87.
- Fujita S, Yamamoto S, Akasu T, Moriya Y (2012) Prognostic Factors of Rectal Cancer Patients with Lateral Pelvic Lymph Node Metastasis. *Hepato-Gastroenterol* 59: 2494-2497.
- Fujita S, Yamamoto S, Akasu T, Moriya Y (2003) Lateral pelvic lymph node dissection for advanced lower rectal cancer. *Br J Surg* 90: 1580-1585
- Fujita S, Yamamoto S, Akasu T, Moriya Y (2009) Risk factors of lateral pelvic lymph node metastasis in advanced rectal cancer. *Int J Colorectal Dis* 24: 1085-1090.
- Akasu T, Iinuma G, Takawa M, Yamamoto S, Muramatsu Y et al. (2009) Accuracy of high-resolution magnetic resonance imaging in preoperative staging of rectal cancer. *Ann Surg Oncol* 16: 2787-2794.
- Kobayashi H, Mochizuki H, Kato T, Mori T, Kameoka S et al. (2009) Outcomes of surgery alone for lower rectal cancer with and without pelvic sidewall dissection. *Dis Colon Rectum* 52: 567-576.
- Fujita S, Akasu T, Mizusawa J, 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 multi-centre, randomised controlled, non-inferiority trial. *Lancet Oncol* 2012;13:616-621.
- Georgiou P, Tan E, Gouvas NA, et al. Extended lymphadenectomy versus conventional surgery for rectal cancer: a metaanalysis. *Lancet Oncol* 2009; 10:1053-1062.
- Nagawa H, Muto T, Sunouchi K, et al. Randomized, controlled trial of lateral node dissection vs. nerve-preserving resection in patients with rectal cancer after preoperative radiotherapy. *Dis Colon Rectum* 2001; 44:1274-1280.
- Kim TH, Jeong SY, Choi DH, et al. Lateral lymph node metastasis is a major cause of locoregional recurrence in rectal cancer treated with preoperative chemo-radiotherapy and curative resection. *Ann Surg Oncol* 2008; 15:729-737.
- Kusters M, Beets GL, van de Velde CJ, et al. A comparison between the treatment of low rectal cancer in Japan and the Netherlands, focusing on the patterns of local recurrence. *Ann Surg* 2009; 249:229-235.
- Syk E, Torkzad MR, Blomqvist L, Ljungqvist O, Glimelius B. Radiological findings do not support lateral residual tumour as a major cause of local recurrence of rectal cancer. *Br J Surg* 2006; 93:113-119.