D3 LYMPHADENECTOMY in Right Colonic Resection

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ABSTRACT

Lymph node dissection in colon cancer is without a doubt necessary, it is just the extent of that dissection that is still under debate. As the individual steps of an oncologic operation cannot be separated from each other, analysis of the significance of lymph node dissection alone is difficult. It has been proven that the T category is directly related to the number and central spread of lymph node metastases. Micrometastases and isolated tumor cells may be detected in lymph nodes by using special staining techniques; their presence may worsen prognosis significantly and approximate it to UICC stage III. The numbers of dissected lymph nodes and the ratio of involved versus dissected lymph nodes have been used as markers for quality of surgery and histopathological evaluation. JMS 2018; 21 (2):109-113

Key words: D3 Lymphadenectomy, Colon Cancer, Mesocolic excision, Lymph node metastasis.

INTRODUCTION

Lymph node dissection in colon cancer is without a doubt necessary, it is just the extent of that dissection that is still under debate. As the individual steps of an oncologic operation cannot be separated from each other, analysis of the significance of lymph node dissection alone is difficult. It has been proven that the T category is directly related to the number and central spread of lymph node metastases. Micrometastases and isolated tumor cells may be detected in lymph nodes by using special staining techniques; their presence may worsen prognosis significantly and approximate it to UICC stage III. The numbers of dissected lymph nodes and the ratio of involved versus dissected lymph nodes have been used as markers for quality of surgery and histopathological evaluation. Recent results

underscore the importance of technique and extent of dissection. Dissection must be performed along the embryologic planes of the mesocolon and leave them intact. A high vascular tie with preservation of the central hypogastric nerves must be applied in order to achieve the best oncologic results while preserving quality of life. Extended lymphadenectomy is oncologically relevant only when it is combined with removal of the primary tumor with adequate longitudinal clearance, an intact complete mesocolon, and high vascular tie. It is part of a concept in which the tumor-bearing specimen is harvested as an enveloped package to minimize the risk of tumor cell spillage and local recurrence^[1].

Central ligation of the arteries should remove the highest draining nodes that may harbor occult metastases^[2] and thus offer the best chance at successful treatment by the eradication and control of the lymphatic metastasizing process. The surgery of malignant disease is not the surgery of organs; it is the anatomy of the lymphatic system. Lymphadenectomy includes elective lymph node dissection, i.e., the prophylactic excision of lymph nodes

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that may be affected with metastasis although it cannot be identified macroscopically by inspection or palpation. Numerous characteristics of the primary tumor determine the risk of metastatic spread, including T category, grade, and lymph vessel invasion^[3,4]

In the Japanese literature, in colon carcinoma, pericolic (D1), intermediate (D2), and central (D3) lymph nodes along the trunks of named vessels are distinguished^[5-9]. In colon cancer, D2 dissection means removal of peri-colic nodes and intermediate nodes, and D3 dissection means removal of main lymph nodes at the root of the regional artery in addition to D2 dissection. In Japanese literature colon resection for malignancies with dissection of lymph nodes near the SMA or SMV is called “D3-resection”^[10]. Studies have shown that number of lymph nodes retrieved to be an important prognostic variable not only in Stage II but also in Stage III colorectal cancer, and it is most prominently determined by the scope of nodal dissection. It is necessary to carry out appropriate nodal dissection and examine as many lymph nodes as possible.

Complete mesocolic excision (CME)

In the surgical treatment of colorectal carcinoma, total mesorectal excision, multivisceral en-bloc resection of cT4 colon carcinomas, and the avoidance of tears or incisions of the tumor have been accepted as common principles for more than 20 years. Recently, the significance of the circumferential resection margin was acknowledged^[11], and finally the quality of dissection, first along the mesorectal fascia^[12] and recently along the surface of the mesocolon^[13-16], both of which derive from the same embryologic plane. The fascia of the mesocolon envelopes the colonic mesentery and extends distally as mesorectal fascia. Thus, the plane of surgery in colon cancer also has been linked to patient outcome. The colonic mesentery within the protected planes contains the vascular and lymphatic drainage systems of the colon; this is why adequate clearance is likely to have the same oncologic benefit as

TME surgery in the rectum. All potential routes of metastatic tumor spread, including micrometastases, have to be removed with the entire mesocolon as a whole by meticulous dissection along the embryologic planes. Recent studies have shown that CME and central vascular ligation remove more mesocolon and are best able to completely remove lymph node metastases in the draining area and thus improve outcome compared to an incomplete or damaged excision of the mesentery. Meticulous mesocolic plane surgery is associated with a 15 % greater 5-year overall survival compared with cases where defects of the mesocolon reach the muscularis propria^[13]. By routinely practicing this technique 5-year survival rates of greater than 89 % in potentially curative resections have been reported^[14]. In a Danish study of 198 patients^[17], the effect of standardizing colon cancer surgery with complete mesocolic excision on the quality of surgery was investigated. It was demonstrated that significant improvements were achieved in completion of vascular high tie and numbers of harvested lymph nodes, without an increase in complications. It is the individual surgeon's responsibility to carefully dissect along the mesocolic plane. As this has not been standard practice in many institutions until recently, differences in long-term outcome are understandable. The surface of the mesocolon must not be damaged at all, including the mesorectal fascia of the mesorectum. Metastatic tumor islands may be located right below mesorectal and mesocolic fascia and opening them up would mean a high risk of tumor spread. The safest technique is to preserve the entire mesocolon, including its fascia, by dissecting it as far centrally as possible, with high tie of the feeding vessels, and leaving behind only short vascular stumps and preserving the hypogastric nerve plexuses located immediately around the superior mesenteric artery and aorta. The specimen is retrieved as a package lined with peritoneum and intact fascia containing all the blood vessels, lymphatic vessels, and lymph nodes through which the tumor may disseminate. The risk of an involved circumferential resection margin is minimized. The resulting plane of surgery can be graded by the pathologist. This grading offers a valid and reproducible method of specimen assessment and comparison, and could be used as a marker of surgical quality^[18] as it has been shown to be independently related to the risk of developing local recurrence^[13, 19]. For scientific reasons, thorough documentation of the performed surgical measures is

warranted, including photographing the specimen and measuring the distances between the primary tumor and the high vascular tie, the closest bowel wall to the high vascular tie, the length of the resected large bowel and eventually the ileum, and the area of the mesentery (tissue morphometry). Significant correlations between greater lengths and areas and higher lymph node yields have been found. An extended lymphadenectomy, however, does not have disadvantages for the patient like increased complication rates ^[20]. The increased number of negative lymph nodes with CME and central vascular ligation has been linked to improved survival in both lymph node-negative cases ^[21-22] and stage III disease ^[13,23].

Ileal diverticulum attached to mesentery via fibrous band

Vascular Anatomy of right colon

Resected specimen morphology

Surgical Bed after removal of specimen

Luminal view of tumor

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