



# Complete Lymph Node Dissection as a Vascular-Sparing Alternative to Complete Mesocolic Excision for Colon Cancer

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## Dear Editor,

It was a great pleasure to read an invited review, “The Concept of Complete Mesocolic Excision,” by the undisputed expert Hohenberger.<sup>1</sup> Complete mesocolic excision became a standard of surgical care, significantly improving the survival outcomes in colon cancer surgery.<sup>2</sup> Central vascular ligation (CVL) and lymph node dissection (LND) at the origin of the main feeding colic arteries with mesocolon excision within the undisrupted fascial envelope have a lot in common with the principles of total mesorectal excision for rectal cancer, suggested by Heald et al.<sup>3</sup>, and D3 LND,<sup>4</sup> described in the Japanese Society for Cancer of the Colon and Rectum (JSCCR) guidelines. However, partial mesorectal excision (PME), widely adopted in the treatment of the upper rectum, was shown to be an oncologically safe procedure and recommended by the European Society for Medical Oncology and the JSCCR guidelines.<sup>4,5</sup>

CVL and inclusion of the arterial arcade demand extensive resection of the colon outside the 10 cm borderlines,<sup>2</sup> even though 10 cm margins were shown to be oncologically adequate regarding the tumor lymphatic spread.<sup>4</sup> With this perspective, the term “tumor-specific mesocolic excision” might be more accurate in describing the resection of the

bowel 10 cm proximally and distally with the associated mesocolon and preserved fascial envelope analogous to PME. Yet, the bowel-sparing approach demands selective arterial ligation to preserve the blood supply of the colon. Kobayashi et al.<sup>6,7</sup> were some of the first surgeons to describe the technical aspects of the left colic artery and superior rectal artery preservation with D3 LND at the origin of the inferior mesenteric artery (IMA). It was shown that D3 LND at the origin of the IMA and vascular preservation was associated with comparable survival rates.<sup>8,9</sup>

Considering that CVL for right colon cancer is at the origin of the colic branches of the superior mesenteric artery (SMA), the level of CVL for left colon cancer should be at the level of the colic branches of the IMA as well (Figure 1A).

It is crucial to ligate the colic vessels at their origin and perform LND along the arterial and venous trunks. Thus, it is important to follow standard anatomical landmarks to fully excise the lymph nodes from the apical regions and avoid the ligation of the vessels at their origin, if clinically acceptable.

- For the right colon (Figure 1B, C), the medial borders of the LND are the anterior and latero-posterior surfaces of the SMA, the lower edge of the pancreas cranially, and 2 cm from the ileocolic artery caudally.<sup>10</sup>

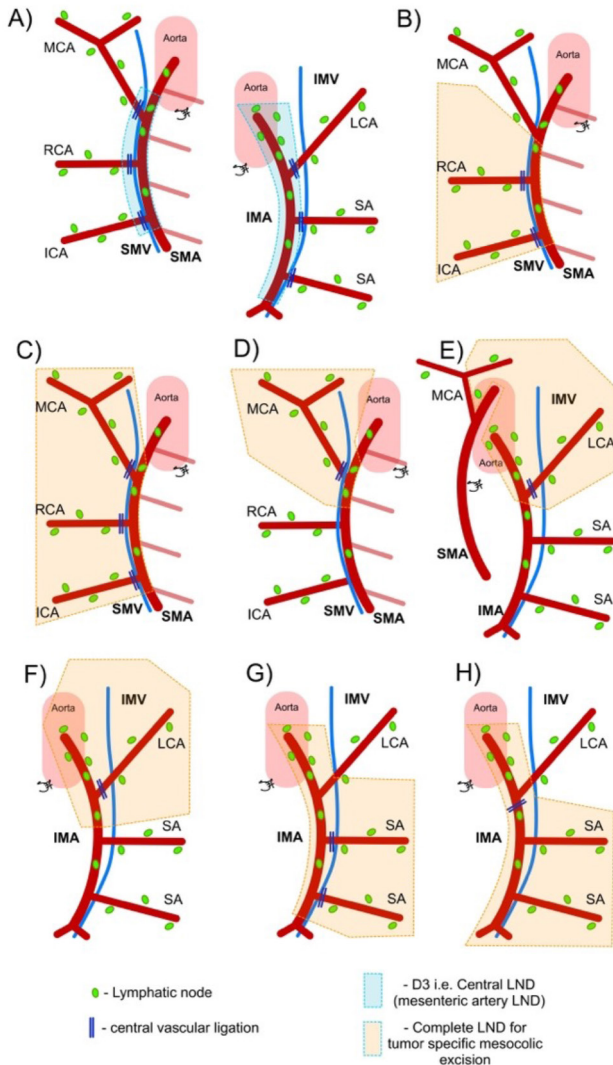


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- For tumors in the transverse colon, the surface of the SMA should be exposed 1-2 cm both proximally and distally to the middle colic artery (Figure 1D).
- For splenic flexure, the LND at the root of the IMA with ligation of the left colic artery is performed. Also, LND at the root of the middle colic artery with the preservation of the latter should be carried out. The left branch of the middle colic artery should be ligated. (Figure 1E).



**Figure 1.** The schematic borders of central lymph node dissection, CLND, and CVL for colon cancer: (A) The area of central LND for the SMA and IMA (within the blue area) and the level of CVL for the colic branches. (B) CLND for cecal colon cancer. (C) CLND for ascending colon cancer and hepatic flexure cancer. (D) CLND for transverse colon cancer. (E) CLND for splenic flexure colon cancer. (F) CLND for descending colon cancer. (G) CLND for proximal sigmoid colon cancer. (H) CLND for distal sigmoid colon cancer.

MCA: Middle colic artery, RCA: Right colic artery, ICA: Ileocolic artery, SMV: Superior mesenteric vein, SMA: Superior mesenteric artery, IMV: Inferior mesenteric vein, IMA: Inferior mesenteric artery, LCA: Left colic artery, SA: Sigmoid artery, LND: Lymph node dissection, CLND: Complete lymph node dissection, CVL: Central vascular ligation

- For the left colon, the central LND area is embordered within the horizontal part of the duodenum, IMA root, medial surfaces of the splanchnic nerves, and caudally at the point of the mesentery fixation to the pre-hypogastric fascia (Figure 1F, G, H).

These landmarks ensure not only CVL but the completeness of central LND (Figure 1A).

The presented approach allows for the removal of all regional mesenteric lymph nodes while preserving blood flow with the help of the skeletonization of the non-tumor feeding arteries, i.e., to perform mesocolic complete lymph node dissection (CLND). Tumor-specific mesocolic excision with CLND results in individualized surgery based on the tumor location and arterial anatomy, ensuring oncological radicality. At the same time, vascular preservation is not associated with higher rates of short-term complications or poorer survival outcomes according to recent studies and, therefore, can be considered in clinical practice and future studies.<sup>8,9</sup>

## Ethics

Peer-review: Externally peer-reviewed.

## Authorship Contributions

Surgical and Medical Practices: S.K.E., C.K., Concept: S.K.E., A.A.Z., C.K., Design: S.K.E., A.A.Z., C.K., Data Collection or Processing: S.K.E., A.A.Z., Analysis or Interpretation: S.K.E., A.A.Z., Literature Search: S.K.E., A.A.Z., Writing: S.K.E., A.A.Z., C.K.

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## References

1. Hohenberger W. The Concept of Complete Mesocolic Excision. *Turk J Colorectal Dis* 2022;217-228.
2. Hohenberger W, Weber K, Matzel K, Papadopoulos T, Merkel S. Standardized surgery for colonic cancer: complete mesocolic excision and central ligation--technical notes and outcome. *Colorectal Dis* 2009;11:354-364; discussion 364-365.
3. Heald RJ, Husband EM, Ryall RD. The mesorectum in rectal cancer surgery--the clue to pelvic recurrence? *Br J Surg* 1982;69:613-616.
4. Hashiguchi Y, Muro K, Saito Y, Ito Y, Ajioka Y, Hamaguchi T, Hasegawa K, Hotta K, Ishida H, Ishiguro M, Ishihara S, Kanemitsu Y, Kinugasa Y, Murofushi K, Nakajima TE, Oka S, Tanaka T, Taniguchi H, Tsuji A, Uehara K, Ueno H, Yamanaka T, Yamazaki K, Yoshida M, Yoshino T, Itabashi M, Sakamaki K, Sano K, Shimada Y, Tanaka S, Uetake H, Yamaguchi S, Yamaguchi N, Kobayashi H, Matsuda K, Kotake K, Sugihara K; Japanese Society for Cancer of the Colon and Rectum. Japanese Society for Cancer of the Colon and Rectum (JSCCR) guidelines 2019 for the treatment of colorectal cancer. *Int J Clin Oncol* 2020;25:1-42.
5. Glynne-Jones R, Wyrwicz L, Tiret E, Brown G, Rödel C, Cervantes A, Arnold D; ESMO Guidelines Committee. Rectal cancer: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. *Ann Oncol*

- 2017;28(suppl\_4):iv22-iv40. Erratum in: *Ann Oncol* 2018;29(Suppl 4):iv263.
6. Kobayashi M, Okamoto K, Namikawa T, Okabayashi T, Araki K. Laparoscopic lymph node dissection around the inferior mesenteric artery for cancer in the lower sigmoid colon and rectum: is D3 lymph node dissection with preservation of the left colic artery feasible? *Surg Endosc* 2006;20:563-569.
  7. Kobayashi M, Okamoto K, Namikawa T, Okabayashi T, Sakamoto J, Hanazaki K. Laparoscopic D3 lymph node dissection with preservation of the superior rectal artery for the treatment of proximal sigmoid and descending colon cancer. *J Laparoendosc Adv Surg Tech A* 2007;17:461-466.
  8. Akagi T, Inomata M, Hara T, Mizusawa J, Katayama H, Shida D, Ohue M, Ito M, Kinugasa Y, Saida Y, Masaki T, Yamamoto S, Hanai T, Yamaguchi S, Watanabe M, Sugihara K, Fukuda H, Kanemitsu Y, Kitano S. Clinical impact of D3 lymph node dissection with left colic artery (LCA) preservation compared to D3 without LCA preservation: Exploratory subgroup analysis of data from JCOG0404. *Ann Gastroenterol Surg* 2020;4:163-169.
  9. Efetov S, Zubayraeva A, Kayaalp C, Minenkova A, Bağ Y, Alekberzade A, Tsarkov P. Selective approach to arterial ligation in radical sigmoid colon cancer surgery with D3 lymph node dissection: A multicenter comparative study. *Turk J Surg* 2022;38:382-390.
  10. Efetov SK, Picciariello A, Tulina IA, Sidorova LV, Kochneva KA, Bergamaschi R, Tsarkov PV. Three-plane Model to Standardize Laparoscopic Right Hemicolectomy with Extended D3 Lymph Node Dissection. *Surg Technol Int* 2020;36:136-142.