




# Safe oncological and standardised (“SOS”) right hemicolectomy for colon cancer

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Complete mesocolic excision (CME) is a surgical technique in colonic malignancies and was first introduced in 2009 by Hohenberger. The goal of CME was to remove the afflicted colon and its accessory lymphovascular supply by preserving the visceral peritoneum. After introduction of this technique, which was inspired by total mesorectal excision in rectal cancer surgery, oncologic results improved [1]. The extent of lymph node dissection in general has become a topic of interest for many colorectal surgeons, since the number of retrieved lymph nodes has significant influence on oncological outcome [2, 3].

In recent years, the objective level of lymph node harvesting in right hemicolectomy resection for cancer has been a valid point of discussion. This is because there has been a lack of consensus on the proper level of a “D2” or “D3” dissection. Some studies define “D3” dissection as the harvesting of lymph nodes over the superior mesenteric artery, yet other studies only harvest the lymph nodes over the superior mesenteric vein [4–6]. Nowadays, many colorectal surgeons are convinced that dissection over the superior mesenteric artery can lead to higher morbidity, such as erratic bowel habit, gastroparesis and intraoperative bleeding or vascular injury. Also, in the literature, harvesting lymph nodes over the superior mesenteric artery is considered challenging and is associated with a higher rate of short- and long-term complications [7, 8]. Besides, metastases, which are only present at the “D3” level and thus result in upstaging, occur in only 2.2% of the cases where “D3” lymphadenectomy

is performed. As a consequence, the Japanese Society for Cancer of the Colon and Rectum (JSCCR) advocates D3 surgery in selected cases [9]. CME and “D3” surgery for right colon cancer remain controversial in the western world and have not been fully adopted by all colorectal surgeons [10]. There remains a concern about the learning curve of this procedure and associated morbidity. The trade-off between improving survival and increasing morbidity has to be carefully considered.

All of the above results in the terms “D2”, “D3” and “CME” being used interchangeably in the assessment of oncological quality and anatomical landmarks [11–13]. Due to this heterogeneity, it is impossible to make a meaningful comparison of the published data. There is a growing need for a standardised system to describe these techniques, which should cover the key aspects of radical right colectomy.

Performance of right hemicolectomy and the oncological results can be improved with focused training, workshops and a step wise progression to more complex cases. Expert CME surgeons offer the technique to all their patients. An avenue to explore will be to identify preoperatively patients who have high-risk cancer and require central lymphadenectomy [14] and refer them to a CME specialist surgeon. Surgeons without expertise in CME should improve their skill set by learning and progressively developing a more radical right colectomy procedure.

We would like to put an end to the confused nomenclature and develop a more objective resection approach using clear anatomical landmarks, which is safe and yet oncologically responsible. By this, we hope to improve short- and long-term outcomes.

The new approach has to maintain safety. The superior mesenteric vein and the trunk of Henle appear to be the most constant factors in the anatomy of the right colon, since their presence reported 86–100% of cases [15–18]. We propose identification and dissection of the ventral side of the superior mesenteric vein in the cranial direction until the trunk of Henle is reached. Subsequently, the ileocolic vein and artery

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and the colic branch of the trunk of Henle are resected, along with the right colic vein and artery, if present. This dissection over the superior mesenteric vein, preserves the arterial nerve plexus and avoids dissection over the superior mesenteric artery. In our opinion, this results in a safe and standardised oncological resection in right hemicolectomy for colon cancer.

The steps of this procedure can be broken down into segments and modules and provide a good skeleton for training residents and surgeons in a safe manner. There is need for a safe oncological and standardised (“SOS”) right hemicolectomy to improve survival, reduce morbidity and increase the uptake of radical colon resection amongst colorectal surgeons.

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## Declarations

**Conflict of interest** All authors report no other direct conflict of interest for this work.

**Ethical approval** This article does not contain any studies with human participants or animals performed by any of the authors.

**Informed consent** For this type of study formal consent is not required.

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