Achieving complete mesocolic excision (CME) for colon cancer by laparoscopy

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INTRODUCTION

CME Concept

In accordance to the total mesorectal excision concept for rectal cancer, that of the complete mesocolic excision (CME) for colon cancer has been recently developed. CME involves dissection along the embryological planes, ligation and division of the supplying vessels at their origin and removal of a specimen with intact fascia and peritoneum, adequate distal and proximal bowel margin as well as the maximum number of the regional lymph nodes. CME surgery seems to achieve better oncological outcomes, in terms of local recurrence and survival, as compared to standard colectomy.

CME has also been attempted by the laparoscopic approach. Provided that the tumour is located at the left or right and not at the transverse, a specimen of high quality can be resected, similar to that obtained by the open approach. There is also evidence that the oncological results of laparoscopic CME are superior to those achieved by the standard laparoscopic surgery, and similar to those achieved by open CME.

Key words: complete mesocolic excision, colon cancer, laparoscopy

Standard Laparoscopic Colectomy for Colon Cancer

Among several other studies, three large randomised comparative multicentre trials\cite{12-14} and systematic reviews\cite{16,17} have shown that the laparoscopic approach for the surgical treatment of colon cancer is associated with faster recovery, lower rate and of a less severity morbidity and shorter hospital stay as compared to the standard open approach. All three large multicentre trials\cite{12-14} provide the length of proximal and distal bowel margins as the only morphometric parameters, and show now difference between the laparoscopic and the open approach. However, according to the meta-analysis by Kuhry et al\cite{16}, a significantly less number of lymph nodes are retrieved by laparoscopy than by open. This finding does not seem to be reflected to the oncological outcomes, which are similar between the two approaches.
CME Laparoscopic Surgery for Colon Cancer

There is an increasing number of studies reporting on the implementation of the CME concept for colon cancer by laparoscopy. Bertelsen et al.\(^\text{18}\) and Kang et al.\(^\text{19}\) report on the feasibility and safety of CME by the laparoscopic approach. The former group also report that acquired CME specimen presented adequate morphologic features, similar to those reported after open surgery. Several other studies compare the quality of the acquired specimen after laparoscopic CME to that after open CME; rate of mesocolic excision, surface of the specimen, distance of high tie to tumour or bowel and number of lymph nodes retrieved are comparable between the two approaches\(^\text{20-25}\) (figures 1-3). In addition, there is evidence that morphometric features after CME laparoscopic surgery are superior to those acquired by standard laparoscopic surgery\(^\text{24}\). Improved quality of CME laparoscopic surgery seems to reflect to oncological outcomes; overall survival rates are well above 80%\(^\text{26,27}\), similar to those observed after CME by the open approach\(^\text{26,29}\).

Cancer of the Transverse Colon

Notably, cases with cancer located at the transverse colon have been constantly excluded from the large multi-centre trials that compare open to laparoscopic approach, obviously because of the technical difficulties in controlling the middle colic vessels at their origin in order to achieve adequate lymphadenectomy and determining the extent of colectomy\(^\text{30}\). An additional reason that increases the technical difficulty of laparoscopic surgery for transverse colon cancer is the necessity of, en-block with the specimen, removal of lymph node packages of the hypopyloric tissue, the gastroepiploic vessels and that below the inferior border of the pancreas, in order to achieve a complete lymphadenectomy\(^\text{22,31}\).

All, but two\(^\text{20,28}\) of the aforementioned studies report on CME for right or left by laparoscopy, excluding cases with lesions of the transverse colon. In the study by Storli et al.\(^\text{28}\), although transverse colon cancer cases were included, they were not analysed as a separate subgroup. In the study by Gouvas et al.\(^\text{20}\), laparoscopic CME specimen with transverse colon cancer were compared to those acquired by open surgery: laparoscopy did not match the quality of retrieved specimen achieved by open surgery. In detail, although rate of mesocolic excision was similar between the two approaches, resected mesocolon surface, length of high tie and number of retrieved lymph nodes were significantly less by laparoscopy than by open (figure 2). The authors attribute their findings to inability in achieving a very high tie of the middle colic vessels at their origin from the superior mesenteric vessels by laparoscopy, as it is the case by open surgery.

Admittedly, exposure of the middle colic vessels at their very origin by the medial-to-lateral dissection by laparoscopy is technically very demand.

Mori et al.\(^\text{32}\) propose the access to the middle colic vessels after i) a medial-to-lateral approach and development of the avascular plane between the two leaves of the Toldt fascia, ii) ligation and division of the ileo-colic vessels at their origin from the superior mesenteric vessels, iii) identification and safe ligation and division of the gastro-epiploic vessels and iv) identification and safe ligation and division of the gastro-colic trunk, if present. However, by this approach, the ileo-colic artery cannot be ligated centrally, if it runs posteriorly to the inferior mesenteric vein.

Alternatively, the middle colic vessels can be approached at the initial stage of dissection by the superior route after the division of the gastro-colic ligament\(^\text{33}\). In any case and in particular to the obese patient, central access of the middle colic vessels by laparoscopy is extremely technically demanding.

CONCLUSION

CME for the surgical treatment of colon cancer can be safely achieved by the laparoscopy, as by the open approach, provided the tumour is located to the left or the right colon. Quality of the acquired specimen, as assessed by the intactness of the mesentery and the fascia covering the mesocolon, length of high tie, surface of the
mesocolon and number of retrieved lymph nodes, is similar between the two approaches. There is also accumulated evidence that oncological outcomes after CME laparoscopic surgery much those achieved by open CME.

**SUMMARY**

POSTIZANJE KOMPLETNE MEZOKOLIÈNE EKSCIZIJE KOD KARCINOMA KOLONA LAPAROSKOPSKIM PRISTUPOM

U skladu sa konceptom totalne mezorektalne ekscižije kod karcinoma rektuma, poslednjih godina je razvijena kompletna mezokolièna ekscižija (CME) kod karcinoma kolona. U CME spade disekcija du` embrioloških ravni, ligiranje i presecanje vaskularne peteljke pri ishodištu i uklanjanje preparata intakte fascije i peritoneuma, adekvatnih distalnih i proksimalnih margina resekcije creva, kao i sa maksimalnim brojem regionalnih limfnih žlezda. Istra`ivanja pokazuju da se CME-om postžie bolji onkološki ishod u smislu lokalnog recidiva i pre`ivljavanja u poredjenju sa standardnim kolektomijama.

Izvodjenje CME je moguæe i laparoskopskim pristupom u zavisnosti od položaja tumora (levo ili desno), ali ne na transverzumu. Preparat dobrog kvaliteta se mo`e dobiti slièno otvorenim pristupom. Takodje, postoje doga`i da su pacijenti operisani laparoskopskom CME imali bolje onkološke rezultate, nego standardne resekcije kolona izvedene laparoskopskim pristupom, tj. slièene resekcijama uèinjenim otvorenim pristupom.

Kljuène reèi: kompletna mezokolièna ekscižija, karcinom kolona, laparoskopija

**REFERENCES**


