



## Original Article

### COMPLETE MESOCOLIC EXCISION FOR RIGHT SIDED COLONIC CARCINOMA- OUR EXPERIENCE IN TERTIARY CARE HOSPITAL.

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#### Abstract

**Background:** The concept of Complete Mesocolic Excision(CME) as a surgical technique for colonic carcinoma,was first introduced in the west in 2008. CME follows the same principle as Total MesorectalExcision(TME) in rectal carcinoma. We have adopted this new technique since 2014.

**Objective:** Here we describe the CME technique in open and laparoscopic right hemicolectomy, and our initial experience of the surgery.

**Methods:** This is a prospective observational study. Data collected from 24 patients admitted under our care in BIRDEM General Hospital from January 2015 to January 2017 with carcinoma caecum or ascending colon.

**Results:** Out of 24 patients 14 patients opted for laparoscopic right hemicolectomy and 10 patients choose open right hemicolectomy. In laparoscopic right hemicolectomy with CME the mean operating time was 152 minutes, amount of blood loss ranges 70-100ml. Number of lymphnodes removed enbloc with specimen 25-30(mean27). Distance of tumor from mesenteric margine at the point of vascular tie 11-15 cm. In open right hemicolectomy with CME mean operating time was 142 minutes, estimated blood loss 120-300 ml, harvested lymph nodes within mesocolic envelop 24-31(mean27), and distance of tumor from vascular tie is 9-15 cm. there is one major complication of ureteric injury. Histopathology shows resection margin are free of tumor in all except 2 cases.

**Conclusion:** Right hemicolectomy with CME in both open and laparoscopic approach can be easily adopted by general surgeons and colorectal surgeons who are performing 'standard technique' or 'conventional technique' routinely for right hemicolectomy. With the encouraging results available from centers who are routinely performing CME in colonic surgery it is now considered as the new bench mark of quality of standard colonic surgery.

Key Words: Complete Mesocolic Excision, Right hemicolectomy, Total mesorectal excision.

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## Introduction

The worldwide adaptation of total mesorectal excision for rectal carcinoma has changed the outlook of the disease dramatically. The 5 year survival has increased from 50% to 75%, the local recurrence is reduced from 30% to 5-8%<sup>1</sup>. The technique is based on dissection in the mesorectal plane produces an intact fascial-lined specimen, which contains all the blood vessels, lymphatic vessels, and lymph nodes through which the tumor may disseminate<sup>2,3</sup>. The idea of total mesorectal excision is also applicable for colonic resection and here it is named-complete mesocolic excision (CME).

Recognition, that central vascular ligation and enblock tumor resection may provide optimal lymphovascular clearance was first recognized 100 years ago<sup>4</sup>. Formal CME was first introduced by Hohenberger et al<sup>5</sup> in 2008. However, the principles of CME are yet to be adopted in a widespread manner<sup>6</sup>, and the survival rates for colon cancer now lag behind those of rectal cancer<sup>7</sup>.

Our present study describes the technical aspects of complete mesocolic excision and our initial experience of the surgery.

## Methods

This prospective observational was done between January 2015 to January 2017. During this period 24 patient were treated under our care in BIRDEM hospital for carcinoma caecum and ascending colon. Pre operative, per operative, and post operative data of 24 patient who were treated with open or laparoscopic right hemicolectomy with complete mesocolic excision has been recorded.

## Surgical Technique

### Open surgery

In open surgery, a lateral to medial approach is performed for right-side colon cancers, the dissection starts laterally by identifying the lateral peritoneal fold. The dissection continues medially between the mesentery and retroperitoneal fascial interface. The mesenteric root up to the origin of the superior mesenteric pedicle is mobilized, and the dissection continues over the duodenum and pancreatic uncinata process to allow complete access to the superior mesenteric vein, and inferomedially located superior mesenteric artery. Continuing medially, the small intestinal mesentery, ileocecal junction, right colon, right mesocolon and mesenteric confluence are fully mobilized and is entirely intact from the underlying fascia and retroperitoneum. The autonomic nervous plexus is identified and preserved.

After the complete mobilization, the ligation of the supplying vessels follows. Initially, the ileocolic and the right colic vessels (if present) are divided at their origin from the superior mesenteric vessels. For caecal and ascending colon cancers, only the right branch of the middle colic vessels is divided. The transverse mesocolon dissection is continued vertically to meet the dissection along the superior mesenteric vascular pedicle, producing a rectangular specimen with an intact mesocolic envelope containing all central lymph nodes. At that point, the colon is divided at the level of the middle colic vessels.

### Laparoscopic surgery

In laparoscopic surgery, a medial to lateral approach is preferable. The mesocolon is incised along the mesenteric axis close to the superior mesenteric vein. The ileocolic vessels are divided as close as possible to the superior mesenteric vein. After exposing the mesocolic interface, a wide separation between the pancreatic head and the transverse colon is achieved. Next, the middle colic artery is identified as it rises from the superior mesenteric artery and is severed at the root of its right branch. This is accompanied by lymph node dissection, taking care to preserve the left branch of the middle colic artery. Simultaneously, the middle colic vein is identified and severed at the root of its right branch. Next, an anterior-to-medial approach is performed by dissecting the right side of the greater omentum. The fusion fascia is detached between the omentum and transverse mesocolon and the hepatic flexure is mobilized and the transverse mesocolon is dissected below the lower edge of the pancreas, uncovering the superior mesenteric vein. Then lateral dissection is completed. The specimen is extracted by a mini-laparotomy and an extracorporeal anastomosis is performed.

## Results

We have 24 patients in our series out of which 10 patients are operated by open right hemicolectomy and 14 patients had laparoscopic right hemicolectomy. The choice was made by the patients. 15 patients had growth in the caecum and 9 patients had growth in the ascending colon. The age of our patients ranging from 32-69 years. 7 female and 17 male patients were operated. Diagnosis were confirmed in all cases by colonoscopic biopsy. 2 patients had well differentiated adenocarcinoma, 19 patients had moderately differentiated adenocarcinoma, 3 patients had poorly differentiated adenocarcinoma. CT scan was done in all patients for staging.

**Table 1:** Pre operative Data

Gender	Number	Site of tumor	Tissue diagnosis
Male	17	Caecal Growth	9 moderately differentiated adenocarcinoma
		10	1 poorly differentiated adenocarcinoma
	7	Ascending Colon growth	6 moderately differentiated adenocarcinoma
		7	1 poorly differentiated adenocarcinoma
7	Caecal growth	4 moderately differentiated adenocarcinoma	
	5	1 Poorly differentiated adenocarcinoma	
		Ascending colon growth	2 Well differentiated adenocarcinoma

**Table 2:** Comparison of technical aspects between group

Operative Data	Open right hemicolectomy 10 cases	Laparoscopic right hemicolectomy 14 cases
Duration of operation (minutes)	110-150	130-180
Amount of blood loss (ml)	120-300	70-100
Number of harvested lymphnode	24-31	25-30
Distance of tumor from vascular Tie (cm)	9-15	11-15

**Table 3:** Complication

	Ureter injury	Gonadal vessel injury	Duodenum injury	Chylurrhoea
Open RT hemicolectomy	1	0	0	0
Laparoscopic RT hemicolectomy	0	0	0	1

Histopathological staging of our series is shown in Table 4. Proximal and distal bowel resection margins are free of tumor in all cases. The tumor invaded through serosa into the para colic fat in 5 cases, but as the dissection plane of complete mesocolic excision is carried out keeping the

para colic fat plane intact, 3 out of this 5 cases circumferential resection margin was also free of tumor. In the remaining 2 cases tumor had invaded further into the lateral peritoneal wall and hystopatolgy shows circumferential resection margin are not free of tumor.

**Table 4:** Pathological Staging

Laparoscopic right hemicolectomy - 14	Resection margin	Open right hemicolectomy - 10	Resection margin
Growth in Caecum 9	*PT <sub>2</sub> N <sub>1</sub> M <sub>0</sub> - 6 *PT <sub>3</sub> N <sub>1</sub> M <sub>0</sub> - 3 Free of tumor	Growth in Caecum 7	*PT <sub>1</sub> N <sub>0</sub> M <sub>0</sub> - 5 *PT <sub>3b</sub> N <sub>1</sub> M <sub>0</sub> -2 Invaded by tumor
Grow th in Ascending colon 5	*PT <sub>2</sub> N <sub>1</sub> M <sub>0</sub> - 3 *PT <sub>3a</sub> N <sub>1</sub> M <sub>0</sub> -2	Grow th in ascending colon 3	*PT <sub>3a</sub> N <sub>1</sub> M <sub>0</sub> - 3 Free of tumor

\*Pathological staging in done as per American Joint Committee on Cancer (AJCC) TNM Staging .  
Number of cases are marked by Blue color code

## Discussion

The CME technique was introduced in the West in 2008, but Japanese, Chinese, Korean and Taiwanese surgeons have used D3 lymphadenectomy resections for colon cancer for decades. The D3 lymphadenectomy is defined as the dissection of the paracolic, intermediate and central lymph nodes, a procedure equivalent to CME<sup>8</sup>.

The vast number of available studies evaluating CME is retrospective. In a small number of series, CME has been compared to “standard” or “traditional” colon surgery<sup>9</sup>. The problem with “standard” colon surgery is that the surgical technique is ‘individualized’ rather than ‘standardized’.

West et al<sup>10</sup> reported that specimens from colon cancer resections from Erlangen, Germany, where CME and central venous ligation are routinely applied, are more often in the correct anatomical (mesocolic) plane and have higher number of lymph nodes harvest compared to standard specimens from Leeds, United Kingdom. In our series number of lymph nodes removed along with resected colon is 25-30, in laparoscopy group and 24-31 in open group, which is comparable to these studies<sup>9</sup>. Surgeons in Erlangen have routinely practiced CME for a number of years and have reported greater 5-year survival rates than standard mesocolic plane excisions for potentially curative colon cancer resected in Leeds.<sup>5,11</sup> Japanese surgeons utilizing this technique report overall 5-year survival rates of up to 76% in stage III disease<sup>12</sup>.

The improved outcome after CME is likely related to resection in the mesocolic plane and to high ligation of the tumor-feeding vessels<sup>13</sup>. It is unclear which of the two components of CME is more important. We believe that complete removal of an intact mesocolic envelope (complete mesocolic excision), along with central vascular ligation and apical node dissection, is essential for improving the outcomes.

**Conclusion:** Complete Mesocolic Excision was originally described as an open procedure. We have done both open and laparoscopic CME. We still have to wait to see our 5 year survival and local recurrence. However the principle of CME is logical and anatomical. The encouraging results published from far east (80% 5 year survival for stage III disease) should guide us.

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