Mini review

Open Access

Current surgical treatment of colorectal cancer

Abstract

Surgical treatment of colorectal cancer is a cornerstone in the management of colorectal cancer. However it is associated with high morbidity and mortality as majority of affected individuals is elderly with co-morbid medical conditions. Moreover, good number of patients present as an emergency with intestinal obstruction which may necessitate urgent surgical intervention. The conventional surgical treatment of colorectal cancer has been revolutionized by the introduction of minimally invasive surgery (hand-assisted laparoscopic surgery, totally laparoscopic surgery and robotic surgery) and fast-track recovery programs. Nevertheless, the principles of surgical technique for colorectal cancer remained unchanged. To adopt safer surgical treatment of colorectal cancers, well-established recommendations and guidelines outlined by the specialized societies and associations need to be followed and implemented. This article highlights issues related to the surgical management of colorectal cancer in the era of multidisciplinary care and minimally invasive surgery.

Keywords: colorectal cancer, colorectal surgery, laparoscopic surgery

Volume 4 Issue 1 - 2016

Abdul Wahed Nasir Meshikhes
Department of Surgery, King Fahad Specialist Hospital, Saudi Arabia

Correspondence: Abdul-Wahed Nasir Meshikhes, Consultant Surgeon and Head, General & Minimally Invasive Surgery Section, Department of Surgery, King Fahad Specialist Hospital, Dammam 31444, Eastern, Email meshikhes@gmail.com

Received: January 21, 2016 | **Published:** January 28, 2016

Introduction

Colo-rectal cancer (CRC) is a disease of the industrialized world with the highest incidence in North America and Western Europe. It remains the 3rd leading cause of cancer death with the mean age at diagnosis in males and females are 57 and 53 years, respectively. It is strongly believed that the western fast food diet, especially saturated fats and alcohol increases the risk of CRC, while vegetables and insoluble fibres protect against it.[1,2] Genetic and family history also plays an important role in CRC genesis with an increased incidence in patients with familial adenomatous polyposis (APC gene).[3] Moreover, CRC may arise from adenomatous polyp (the adenoma-carcinoma sequence), and patients with ulcerative or Crohn's colitis are at increased risk of CRC.[3]

The conventional surgical treatment of colorectal cancer has been revolutionized by the introduction of chemotherapy, radiotherapy, and minimally invasive surgery (hand assisted laparoscopic, totally laparoscopic and robotic surgery). The fast-track recovery program has also played a role in shortening hospital stay and reducing cost. Nevertheless, the general principles of surgery for colorectal cancer remained unchanged. As surgical treatment of colorectal cancer plays a crucial part in the management of affected patients, it prudent for the practicing surgeon to follow and implement the well-established international guidelines and recommendations drawn by specialized societies and associations on the surgical treatment of colorectal cancer.

Preoperative workup

Curative surgical resection offers the greatest potential for cure in patients with invasive CRC. However, patients considered for such surgery are often elderly with co-morbid medical conditions. Hence, they should be evaluated preoperatively for fitness and for presence or absence of metastatic disease by thorough physical examination, biochemical studies, and preoperative staging in the form of imaging of the chest, abdomen and pelvis, carcinoembryogenic antigen (CEA) titer measurement and, if possible, full colonoscopy to detect synchronous polyps or neoplasms. The most useful adjunct for the preoperative assessment of rectal lesions is endorectal ultrasonography (EUS) which allows clear visualization of the layers of the rectal wall and thus enables precise determination of the depth of invasion.[4] However, its assessment of lymph node involvement and staging of stenotic lesions is less reliable.[4]

It is important that CRC should be treated by surgeons with appropriate training and adequate experience in colorectal surgery. A disturbing survey of Australian colorectal surgeons found 40% of the surveyed were unaware of the current best-practice on the management of colorectal cancer.[5] It is also recommended that all patients with CRC should have their management determined by a multidisciplinary team. This team consists of surgeons with interest in colorectal cancer surgery, medical oncologists, radiotherapists, gastrointestinal radiologists and GI surgical pathologists. Specialist colorectal nurses and stoma therapists may be added to this team. The team discusses and determines the management plans for all new CRC patients.[6] It also determines the transfer of care of each patient and communicates with the palliative care team.

The metastatic workup should be completed before the case is presented to the multidisciplinary team. These workup studies are particularly important for patients with significant co-morbid disease who might represent poor operative candidates and for patients who have symptoms suggestive of metastatic hepatic or pulmonary spread. The identification of metastases however, is not an absolute contraindication to surgery in patients experiencing tumor-induced gastrointestinal bleeding or bowel obstruction, but it dictates a more conservative operative procedure designed primarily to relieve symptoms and improves quality of life.[7]

Surgery for colon cancer

Surgery for CRC is based on the pattern of local disease spread and on the vascular anatomy of the bowel. Limited or wedge resections are certainly inadequate as the regional lymph nodes draining of a given segment of large bowel should be removed, along with associated mesenteric blood vessels, and surgical margins of at least 5 cm should be obtained.[8] During laparotomy, the entire abdomen should be

thoroughly examined including the liver, hemidiaphragms and pelvis, and the full length of the large bowel is carefully palpated. It is now accepted that a minimum number of 12 lymph nodes is adequate to retrieve with the resected colon cancer.[9]

There is wide range of colon resections available. Colectomy (right hemicolectomy, extended right hemicolectomy, transverse colectomy, left hemicolectomy, sigmoid colectomy) can be offered based on the tumor location and local spread. Restorative proctocolectomy with ileal pouch is performed for patients with ulcerative colitis and familial adenomatous polyposis. Defunctioning stoma (colostomy or ileostomy) is performed as part of the definitive curative procedure or as emergency palliation for intestinal obstruction.[10]

Surgery for rectal cancer

Anterior resection can be either high or low with end-to-end anastomosis. Functionally better alternatives to end-to-end anastomosis is side-to-end, transverse coloplasty or colonic J-pouch anastomosis.[11] The surgical management of cancers that arise in the distal rectum presents a particular problem because the traditional operative procedure for these lesions is abdomino-perineal resection (APR) which requires creation of a permanent colostomy. APR is reserved for rectal tumors at 5 cm from the dentate line, poorly differentiated lesions, in patients with weak anal sphincter, obese patients, patients with very narrow pelvis, extensive lateral dissection that is associated with increased risk of bladder dysfunction and sexual impotence. Although such an operation remains unavoidable in most cases in which the cancer occurs within 5 to 6 cm of the anal verge, use of stapling devices permit the construction of end-to-end anastomoses for many patients with mid-rectal lesions. These low anastomoses allow the preservation of the anal sphincter, which can also be achieved by the use of transanal or transcoccygeal resection in selected patients who have superficial, non-ulcerated tumors that are too close to the anal verge for a stapled anastomosis to be safely performed.[12,13] It is recommended that if any doubt regarding the choice of operation between low anterior resection or APR of the rectum exists, an experienced second opinion should be sought. It is also recommended that total mesorectal excision (TME) as described by Heald should be performed for cancer in the lower two-thirds of the rectum, either as part of a low anterior resection or an APR.[14] In tumours of the upper rectum, the mesorectum should be divided no less than 5 cm below the lower margin of the tumour. Care should be taken to preserve the pelvic autonomic nerves and plexuses, and perforation of the tumour during operation should be avoided. The ideal margin for rectal cancer resection is 2 cm or more distally and 5 cm or more proximally.

As ultra-low pelvic anastomoses are associated with a higher leak rate, the judicious use of a temporary defunctioning stoma is recommended.[15]

Emergency surgical treatment of CRC

In the absence of perforation or life-threatening bleeding due to colorectal cancer, every effort should be made to operate during the day time in presence of experienced surgeons and anaesthetists. An exception to this is closed-loop obstruction when the caecum is at risk of perforation due to an obstructing left-sided colonic lesion in presence of competent ileo-caecal valve. This calls for an urgent surgical intervention to avert perforation and subsequent peritonitis with its attendant high morbidity and mortality. It is important, however, that in any patient presenting with colonic obstruction, CT scanning should be carried out to exclude pseudo-obstruction before contemplating any surgical intervention. It is now accepted that defunctioning stoma is not generally favoured even in emergency surgery for obstructing left colon malignancy, except in extreme situations when the patient is unfit for an extensive procedure in the form of resection of the obstructing cancer either as a Hartmann's procedure with end colostomy or as a resection with primary anastomosis when conditions are favourable.[16] For right-sided obstructive lesions, primary resection and ileocolic anastomosis is usually feasible and does not require the creation of a stoma.[17]

A recent advance in the management of malignant large bowel obstruction is the endoscopic insertion of an expanding stent.[17] This is an attractive treatment option if adequate local expertise and facilities exist. Once the obstruction is relieved by endoscopic stenting and the patient is optimized, elective surgical resection is performed after adequate preoperative staging and discussion at the multidisciplinary meeting. This 'endo-laparoscopic' approach makes a one-stage procedure more feasible and obviates the need for emergency surgery which most likely requires the creation of defunctioning stoma with its attendant morbidity.[17] Stenting is hence used as a bridge to surgery, or for palliation to relieve obstruction allowing the patient to receive chemotherapy –if needed- in case of colon cancer or chemo-radiotherapy for obstructing rectal cancer.

Laparoscopic colorectal surgery

The first reported laparoscopic assisted colectomy was in 1991.[18] Since then, the number of performed minimally invasive laparoscopic colectomy is increasing in the surgical management of CRC. As laparoscopic colorectal surgery is technically demanding, it is recommended that all laparoscopic operations are performed by surgeons properly trained and who are conversant in laparoscopic colorectal surgery. This approach has been proven to be oncologically sound and therefore, adequate oncological resection can be achieved by either totally laparoscopic or hand-assisted laparoscopic colonic resection.[19,20] The laparoscopic resection of rectal cancer is technically more demanding and challenging than that of colon cancer. However, due to the numerous advantages of minimally invasive techniques, attempts should be made to utilize laparoscopic colorectal resection as much as feasible; albeit after adequate training and accreditation. The long and steep learning curve for laparoscopic colorectal surgery can be bridged and facilitated by the use of hand-assisted laparoscopic[20] or robotic surgery[21] especially for rectal cancer. The introduction of the enhanced recovery program with laparoscopic colorectal cancer surgery may further improve short term postoperative recovery and reduce hospital stay and cost.[22,23]

Conclusion

Colorectal cancer remains a leading cause of cancer death world-wide. The overall management should be determined by a multidisciplinary team in specialized institutions to offer patients the optimal care. Curative surgical resection offers the greatest potential for cure in affected patients. The high morbidity and mortality associated with surgical treatment of colorectal cancer can certainly be reduced by adherence to the international guidelines and recommendation drawn by specialized societies and associations. It is hoped that the increasing utilization of minimally invasive (hand-assisted, laparoscopic and robotic) surgery, together with fast-track recovery programs will revolutionize the surgical management of colorectal cancer.

Acknowledgments

None.

Citation: Meshikhes AWN. Current surgical treatment of colorectal cancer. *Gastroenterol Hepatol Open Access.* 2016;4(1):11–13.
DOI: 10.15406/ghoa.2016.04.00085

Conflicts of interest

The authors have no conflict of interest for this research.

Funding

None.

References

1. Orlich MJ, Singh PN, Sabaté J, et al. Vegetarian dietary patterns and the risk of colorectal cancers. *JAMA Intern Med*. 2015;175(5):767–776.
2. Song Y, Liu M, Yang FG, et al. Dietary fibre and the risk of colorectal cancer: a case-control study. *Asian Pac J Cancer Prev*. 2015;16(9):3747–3752.
3. Raskov H, Pommergaard HC, Burcharth J, et al. Colorectal carcinogenesis-update and perspectives. World J Gastroenterol. 2014; 20(48):18151–18164.
4. Zhou Y, Shao W, Lu W. Diagnostic value of endorectal ultrasonography for rectal carcinoma: a meta-analysis. *J Cancer Res Ther*. 2014;10:319–322.
5. Zhou Y, Shao W, Lu W. Diagnostic value of endorectal ultrasonography for rectal carcinoma: a meta-analysis. *J Cancer Res Ther*. 2014;10:319–322.
6. Ward JE, Gattellari M, Solomon MJ. Management of patients with colorectal cancer: do Australian surgeons know the scientific evidence?. *Arch Surg.* 2002;137(12):1389–1394.
7. Xynos E, Gouvas N, Triantopoulou C, et al. Clinical practice guidelines for the surgical management of colon cancer: a consensus statement of the Hellenic and Cypriot Colorectal Cancer Study Group by the HeSMO. *Ann Gastroenterol*. 2016;29(1):3–17.
8. Law WL, Choi HK, Chu KW. Comparison of stenting with emergency surgery as palliative treatment for obstructing primary left-sided colorectal cancer. *Br J Surg*. 2003;90(11):1429–1433.
9. Lee JH, Chie EK, Kim K, et al. The influence of the treatment response on the impact of resection margin status after preoperative chemoradiotherapy in locally advanced rectal cancer. *BMC Cancer*. 2013;13:576.
10. Park JS, Choi GS, Hasegawa S, et al. Validation of the seventh edition of the American Joint Committee on cancer tumor node-staging system in patients with colorectal carcinoma in comparison with sixth classification. *J Surg Oncol*. 2012;106(6):674–679.
11. Mann CD, Norwood MG, Miller AS, et al. Non resectional palliative abdominal surgery for patients with advanced colorectal cancer. *Colorectal Dis*. 2002;12(10):1039–1043.
12. Hüttner FJ, Tenckhoff S, Jensen K, et al. Meta-analysis of reconstruction techniques after low anterior resection for rectal cancer. *Br J Surg*. 2015;102(7):735–745.
13. García Flórez LJ, Otero-Díez JL. Local excision by transanal endoscopic surgery. *World J Gastroenterol*. 2015;21(31):9286–9296.
14. Buchs NC, Nicholson GA, Ris F, et al. Transanal total mesorectal excision: A valid option for rectal cancer?.*World J Gastroenterol.* 2015;21(41):11700–11708.
15. MacFarlane JK, Ryall RD, Heald RJ. Mesorectal excision for rectal cancer. *Lancet*. 1993;341(8843):457–460.
16. Gong H, Yu Y, Yao Y. Clinical value of preventative ileostomy following ultra-low anterior rectal resection. *Cell Biochem Biophys*. 2013;65(3):491–493.
17. Deans GT, Krukowski ZH, Irwin ST. Malignant obstruction of the left colon. *Br J Surg*. 1994;81(9):1270–1276.
18. Cheung HY, Chung CC, Tsang WW, et al. Endolaparoscopic approach vs conventional open surgery in the treatment of obstructing left-sided colon cancer: a randomized controlled trial. *Arch Surg*. 2009;144(12):1127–1132.
19. Cooperman AM, Katz V, Zimmon D, et al. Laparoscopic colon resection: a case report. *J Laparoendosc Surg*. 1991;1(4):221–224.
20. Ringley C, Lee YK, Iqbal A, et al. Comparison of conventional laparoscopic and hand-assisted oncologic segmental colonic resection. *Surg Endosc*. 2007;21:2137–2141.
21. Meshikhes AW. Controversy of hand-assisted laparoscopic colorectal surgery. *World J Gastroenterol*. 2010;16(45):5662–5668.
22. Isik O, Gorgun E. How Has the Robot Contributed to Colon Cancer Surgery?. *Clin Colon Rectal Surg*. 2015;28(4):220–227.
23. King PM, Blazeby JM, Ewings P, et al. Randomized clinical trial comparing laparoscopic and open surgery for colorectal cancer within an enhanced recovery program. *Br J Surg*. 2006;93(3):300–308.
24. Khoury W, Dakwar A, Sivkovits K, et al. Fast-track rehabilitation accelerates recovery after laparoscopic colorectal surgery. *JSLS*. 2014;18(4): pii:e2014.00076.