

SURGICAL TREATMENT OF COLORECTAL CARCINOMA

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Summary

Surgery remains the only radical treatment for colorectal cancer. However, with introduction of multidisciplinary teams and availability and advancement in all modes of treatments (surgical technique, technology and perioperative care, systemic therapy and radiotherapy protocols), in more advanced stages the better disease control is achieved. In this article we outline primarily indications and considerations in surgical treatment mode.

KEYWORDS: *surgery, colorectal cancer, multidisciplinary approach*

KIRURŠKO LIJEČENJE KOLOREKTALNOG KARCINOMA

Sažetak

Kirurško liječenje je jedini kurativni pristup liječenju kolorektalnog karcinoma. Ipak, uvođenjem multidisciplinarnih timova i napretkom i dostupnošću svih načina liječenja (kirurška tehnika i tehnologija kao i perioperativna skrb za pacijenta, te napredak u sistemske i radioterapiji) u podmaklim stadijima, su omogućili uspješniju kontrolu bolesti. U ovom članku izosimo primarno indikacije i dileme kirurškog načina liječenja.

KLUČNE RIJEČI: *kirurgija, kolorektalni karcinom, multidisciplinarni pristup*

PRINCIPALS OF ONCOLOGIC SURGERY

Radical surgery with curative intent is the treatment of choice in colorectal cancer. The basic surgical principles are to remove the major tumor feeding vascular pedicle along with adjacent lymphatics while obtaining tumor-free margins, and *en bloc* resection of structures or organs invaded by the tumor.

In tumors in the cecum, ascending colon, hepatic flexure, and proximal transverse colon, the right branch of the middle colic artery is ligated along with the right colic and the ileocolic arteries. If the middle colic artery is ligated at its origin, the

extent of the resection of the bowel should be performed to the distal third of the transverse colon. Tumors in the transverse colon may be resected by transverse colectomy or an extended right colectomy incorporating cecum, ascending colon, hepatic flexure, transverse colon, splenic flexure, and upper descending colon into the specimen. Descending and upper sigmoid colon cancers are resected with left hemicolectomy with ligation of the IMA at its origin from the aorta or by segmental resections. The continuity of colon is restored by either hand-sewn or stapled anastomosis. Good vascularization and no tension at the anastomosis are required to reduce leak and sepsis. The recom-

mended margin for colon cancer is at least a 5-cm margin of normal bowel on oral and aboral side of the tumor. Rectal cancer requires the distal surgical margin of at least 2 cm in the fresh specimen, since it rarely has distal submucosal spread. In patients with low rectal adenocarcinomas (less than 5 cm from the anal verge) at least a 1-cm margin of resection is required. Margins of less than 1 cm in patients who received neoadjuvant chemoradiation and underwent sphincter-saving procedures may be obtained without compromising either recurrence or disease-free survival (1). A set minimum of 12 examined lymph nodes is required for accurate staging of node negative disease. However, smaller number of lymph nodes is often identified in rectal cancer after neoadjuvant treatment and its significance is being discussed (1).

OBSTRUCTION AND PERFORATION

Obstruction or perforation and rectal bleeding in colorectal cancer has a negative effect on survival (2). Moreover, emergency setting and socioeconomic parameters also influence the outcome (3). In case of obstruction (with or without) in colorectal cancer patients, two or three staged procedures are performed. On one hand, resection of the obstructing tumor and proximal ostomy may be performed. On the other hand, a diverting stoma (the first stage), then a colorectal cancer resection (second stage), and the occlusion of the ostomy (the third stage) may be performed. Finally, resection and continuity formation may be performed in obstructing right-sided, distal transverse or splenic flexure carcinoma or when considering subtotal colectomy. The procedure must be tailored based on the patient performance status, the surgeon's skills and the comorbidities (4).

CONTIGUOUS ORGAN INVOLVEMENT

Adherence to adjacent organs is often found in colorectal cancer patients. This may be to local tumor growth or secondary to perforation or fistula formation. Mostly the colon cancer is adherent to abdominal wall, stomach, duodenum, small bowel, ureters, urinary bladder, uterus, and ovaries, while rectal cancers invades uterus and vagina, urinary bladder, sacrum or coccyx. The principal is to surgically remove the tumors en bloc

without disturbing the adhesions. These adhesions are malignant in nature in over 40% of the cases (5).

PERITONEAL DISEASE

Peritoneal carcinomatosis is encountered in a number of patients at diagnosis and it carries a poor prognosis. For these, after careful selection, some benefit may be derived from cytoreductive surgery combined with intraperitoneal chemotherapy (6,7).

RECTAL CANCER

Due to its anatomical specificities and location within confined pelvic space and mostly extraperitoneal localisation rectal cancer has a different treatment strategies than the rest of the colon. Presently, combined-modality therapy greatly reduced, the risk of local and distant recurrence and improved overall survival. However, surgical resection remains the most important treatment mode. The rectum is divided in three parts by curves and distance from the anal verge. Tumors in proximal two thirds are resected by low anterior resection. The lower rectum, however, could be resected with ultralow resection with/without diverting ileostomy or abdominoperineal extirpation. Only in emergency setting or occasionally after neoadjuvant treatment and in line with patient's preferences Hartmann procedure is warranted. Inoperable cases or obstructed cases planned for neoadjuvant treatment receive a diverting ostomy. For all the procedures and their choice, multiple reports in the surgical literature correlate better stage-adjusted results in expert hands (8). The availability of adjuvant therapy encourages surgeons to be more aggressive in treatment, including treatment of metastatic disease. As the local recurrence rate decreased to the teens with total mesorectal excision (TME), the practice of neo/adjuvant use of chemoradiation has been selectively decreased (9).

TOTAL MESORECTAL EXCISION (TME)

Total Mesorectal excision consists of sharp dissection of the space between the endopelvic fascia and the mesorectum. The mesorectum

should be removed with intact fascia propria and with preservation of the pelvic fascia and the autonomic nerve plexus. This ensures the control of distal extramural spread and gains free circumferential margins. Discontiguous spread in the mesorectum varies from 5% to 64% for which lymph nodes are most responsible. Circumferential or radial margin involvement by tumor is a prognostic factor for both local and distant disease. The radial margin of excision can also serve as an indicator of the quality of the surgery, evaluated by the pathologist after the resection (9).

EXTENDED LATERAL PELVIC NODE DISSECTION

Internal iliac node dissection is no longer recommended in rectal cancer surgery. Metastases to these lymph nodes occur in approximately 10% of patients and imply a poor prognosis. If clinically indicated, an attempt to remove these lymph nodes at the time of surgery is warranted(10).

RECURRENCES

Rectal salvage surgery for recurrences includes re-resection with a low anterior resection, abdominoperineal resection, pelvic exenterations (or its modifications), and, occasionally, extended sacral resections. If chemoradiation was not used during the management of the primary tumor, preoperative chemoradiation may be warranted prior to re-resection. It must be mentioned that these procedures are generally performed in conjunction with urology, neurosurgery, and plastic surgery. If available, intraoperative radiotherapy should be strongly considered. After re-resection of isolated pelvic recurrences, there is a 15% 5-year survival (11). It cannot be overemphasized that these procedures carry a significant morbidity and mortality and should be performed by experienced surgeons. Other forms of palliation should be considered prior to undertaking an aggressive surgical approach in a patient in whom cure will not be attainable.

SURGICAL PROGNOSIS

Advanced perioperative management greatly reduced perioperative morbidity and mortality

(12). Despite the complementary systemic and local treatment, surgical results also depend on tumor stage and its biologic behavior. Early colorectal cancers (T1-2N0M0) can be cured with surgery alone. The 5-year survival for patients with stage II colorectal cancer is approximately 70%. Surgery alone in stages II and III rectal cancer carries a high failure rate; postoperative chemoradiation is warranted if the patients were not treated with neoadjuvant chemoradiation. Because the 5-year survival in stage II (T3N0M0) colon cancer patients is approximately 77% with surgery alone, adjuvant therapy is not widely recommended for these patients. As previously discussed, molecular markers may help in deciding adjuvant therapy for a subgroup of these patients. T4N0M0 colon cancer patients are at high risk of both local and distant recurrence and should be considered for adjuvant chemoradiation. Stage III colorectal cancer patients (any T N1-2 M0) have a 20% to 50% 5-year survival rate after surgery alone (13). It is in stage III colon cancer patients that adjuvant therapy has proven to be effective. Again, due to complementary mode of treatments many stage III and IV patients are downstaged and become eligible for surgical treatment, therefore multidisciplinary meetings after treatment evaluation are highly recommended.

FOLLOWUP AFTER PRIMARY THERAPY FOR COLORECTAL CANCER

Sixty percent to 80% of recurrences after curative intent surgery for colorectal cancer occur within the first 2-years of therapy which requires an intensive follow up during that period. Controls are usually scheduled every 3-6 months, and every six months after second year, yearly after five years. Follow up diagnostics at our Institution consists of CEA levels, imaging (abdominal US or chest X ray, and MR/CT abdomen and chest CT when indicated). Colorectal tumor recurrence is most common when the nodal involvement and tumor penetration beyond the bowel wall (T3 and T4 disease) are present. Differentiation and subtypes of tumors are also prognostic factors for therapy failure (14,15). Moreover, resection of lower rectal cancers is technically more demanding and wide negative margins due to physical anatomic restrictions may be difficult to obtain

which leads to a higher recurrence risk with lower tumors (16). In fact, there is an association with number of resected lymphnodes and favorable prognosis (17). Survival is also influenced by regression rate after neoadjuvant therapy in rectal cancer (18). Finally, type of institution where the patient is treated- availability of multidisciplinary team- is important for the outcome(19).

The role of adjuvant chemoradiotherapy in colorectal cancer is well established by landmark Phase III trials that showed that concurrent chemoradiation improved survival in resected stages II and III rectal cancer() The recognition that 5-FU-based alone or in combinations reduces distant failure risk led to the current standard of postoperative chemoradiation integrated with four cycles of adjuvant chemotherapy (with 5-FU and leucovorin). Adjuvant chemotherapy has traditionally been given for two months both before or six months after surgery, but this standard was empirically established. Neoadjuvant radio/chemoradiation became the standard in rectal cancer after initial clinical staging on MRI. Its role in colon cancer is still a matter of debate.

CONCLUSION

The primary surgical resection of colorectal cancer is the only mode of treatment considered curative. However, for patients who had an inadequate surgical resection of the primary tumor or who had been downstaged and then resected, multimodal treatment including combination of surgery, systemic and radiotherapy in various sequences, seem to be a good way to obtain disease control (21).

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