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SURGICAL NANAGEMENT OF COLORECTAL NEOPLASMS

Oliver H. Beahrs, M.D.

Emeritus Professor of Surgery, Mayo Medical School

Rochester, Minnesota 55905

Surgical resection of cancer of the colon, rectum, and anus remains the primary treatment of cancer of the large bowel. In many respects, such resection should be considered local treatment, in that the surgical procedure removes the segment of bowel in which the tumor is located and those appropriate regional tissues that can be safely sacrificed. If the lesion is localized (Dukes' A or B) and if the resection is definitive, the chance of cure is excellent. Unfortunately, resection has no long-term effect on tumors that have spread distantly or where infiltration has occurred into tissues at or beyond the margin of resection. However, resection of primary lesions from the colon or rectum as a palliative procedure provides the patient relief from symptoms of bleeding, obstruction, and tenesmus.

The anatomic stage of the cancer at the time of diagnosis and treatment is the most important factor which not only dictates the treatment but also predicts the prognosis. Although there are several recommendations regarding staging of cancer of the colon, the one originally proposed by Dukes[1] in 1932 for cancer of the rectum remains the most acceptable. Its use has been extended to cancers of the colon, and it has undergone several modifications by several authors[2-4]. That recommended by Astler and Coller[4] is the modification of Dukes' classification that our group has used in evaluating our cases. A Dukes' A lesion is one that is localized to the mucosa and in which the regional nodes contain no metastasis; a B1 lesion is a tumor that is infiltrating into the muscularis but has not penetrated it; a B2 lesion is one in which tumor extends through the muscularis into the immediately adjacent tissues but in which the regional nodes are negative; a C1 tumor is one in which the tumor penetrates the bowel wall, and the immediately adjacent nodes contain metastatic lesions; and a C2 lesion in one in which the primary lesion has penetrated the full thickness of the bowel wall, and lymph nodes beyond the immediate regional area are also positive. If one wished to identify the entire spectrum of the anatomic extent of a cancer, a Dukes O lesion is considered an in situ lesion, while a Dukes D lesion is a lesion with distant metastasis.

Unfortunately, on a clinical diagnostic basis, it is not always possible to be accurate in staging a cancer, and for this reason if all patients are to benefit from surgical treatment, some patients have to be overtreated in order to prevent other patients from being undertreated. The error rate in clinical diagnostic staging compared with pathologic staging is probably 10 to 20%. Dukes' A and B lesions are associated with a 10 to 12% incidence of nodal metastasis, which then makes them Dukes' C lesions. Staging is more accurate when done after surgical resection and detailed study of the resected specimen. It is unfortunate when the resection is more extensive than necessary to remove the cancer (especially if it entails removal of the anus); but a greater error is to have been conservative in the extent of the resection only to jeopardize the future well-being of the patient.

Although there may be an error in the clinical diagnostic staging, by carefully and properly evaluating historical, physical, and diagnostic data, lesser surgical procedures can be used in the management of selected cancers, especially of the lower colon, rectum, and anus. Nevertheless, the philosophy expressed by Miles[5] is a description of the best cancer operation:

There are, I hold, two main principles to be observed in the surgical treatment of cancer of the rectum, and indeed of all cancers wherever they are found: first, the operation should be based on a knowledge of the demonstrable facts of pathology, and, second, the most extensive operation possible in conformity with that knowledge should be performed on all patients no matter how small or early the local manifestation of the disease may seem to be.

While a few decades ago the risk of surgery of the colon and rectum was significantly high, it is reasonably safe at the present time. In the late 1930's, the risk of operation on the colon and rectum generally was associated with a mortality rate of 20%. With the advent of chemotherapeutic agents during the early 1940's and of antibiotics later, the hospital mortality decreased to about 5%. Presently with the availability of a wide range of antibiotics, improved anesthesia, blood transfusions, and other supportive aides (cardiac and pulmonary support), mortality rates are reported in the 1 to 2% range, with death being caused by complications other than

Table 1. Bowel Preparation of Patients Undergoing Surgery for Colorectal Neoplasms

1. Two days before surgery:
   Diet—minimal residue
   Mechanical preparation—At 12 noon, 15 ml of Phospho-Soda
   In p.m. before 6:00, two tap water enemas (1,000 ml in knee-chest position)
   Antibiotics—neomycin, 1 g (9 a.m.; 1, 5, 9 p.m.)
   Tetracycline, 250 mg (9 a.m.; 1, 5, 9 p.m.)
2. One day before surgery:
   Mechanical preparation—At 8 a.m., 15 m. of Phospho-Soda
   At 9 a.m. and 6 p.m., three tap water enemas (1,000 ml in knee-chest position)
   If not clear, two more enemas
   If still not clear, notify service
   Antibiotics—neomycin, 1.5 g (9 a.m.; 1, 5, 9 p.m.)
   Tetracycline, 250 mg (9 a.m.; 1, 5, 9 p.m.)
3. Day of surgery
   Diet—Nothing by mouth after midnight
   Mechanical preparation—At 6 a.m. and every 2 hours until surgery—rectal aspirations

those associated with the operative procedure. Likewise, the morbidity associated with colon and rectal surgery is significantly less and, for the most part, is related to wound and anastomotic complications.

Many effective preoperative bowel preparations have been proposed and are in current use. Whichever one is selected, it should be done properly. At the Mayo Clinic, Washington and associates[6] reported their experience in a double-blind study using a mechanical preparation comprised of a laxative of Phospho-Soda and (1) neomycin alone, (2) neomycin and tetracycline in combination, and (3) a placebo. The morbidity of wound infection and other complications was significantly lower in the group that used neomycin-tetracycline than in the other two groups. Based on these results and those reported much earlier by Dearing and Needham[7], our group prefers to use combination drugs, along with the mechanical preparation during a 36-hour period before surgery. The method recommended by Washington and associates[6] has been most effective in our hands (Table 1).

There is little controversy over the surgical management of cancer of the abdominal colon, because the lesion can be removed by segmental, partial, or total colectomy without altering the external anatomy or bowel function through the anal canal. The extent of the colonic resection is important, but the decision rests with the surgeon. The resection should be as extensive as indicated to offer the patient the best chance of cure of the cancer and any other coexisting diseases that might be present. Intestinal continuity can be reestablished at the time of the excisional surgery or in a subsequent operation if a decompression proximal colostomy has been established.

Controvery does exist when the cancer is in the rectosigmoid, rectum, or anus. If the philosophy as expressed by Miless is to be followed, then a combined abdominoperineal resection would have to be done in almost all patients. Although the mortality rate of this procedure is very low, it leaves the patient with altered anatomy—a permanent colostomy—and with altered bowel function. As previously stated, it is unfortunate if a colostomy has been done and the prognosis has not been altered; however, it is also unfortunate if the surgical approach has been compromised in order to avoid a colostomy only to jeopardize the future well-being of the patient.

However, by the use of patient history, physical findings, and pathologic findings to arrive at surgical judgment, lesser procedures than the combined abdominal resection are justified in well-selected patients. If the surgeon is conservative in arriving at his surgical judgment, offsetting the error in clinical staging, then few patients will be undertreated.

The anterior resection and low anterior resection offer a reasonable compromise for most lesions of the lower colon and upper rectum, in that an adequate resection proximally, laterally, and distally for a distance of aproximately 5 cm below the lesion is possible. Intestinal continuity can be reestablished by an anastomosis, using

one of several techniques, with a very low mortality and morbidity rate.

Although the use of the stapler in establishing a low anastomosis is gaining in acceptance, preference is given to the suture technique that establishes a careful and anatomic approximation of the bowel (mucosa to mucosa) with continuous chromic or iodized catgut and of the muscularis to muscularis, with or without peritoneal cover and interrupted fine silk sutures.

A study of 902 patients with anterior resection (556 with anterior resections in whom the anastomosis was made between bowel proximally with peritoneal cover and also distally with peritoneal cover and 346 with low anterior resection in whom the bowel distally had no peritoneal cover) revealed that the prognosis was directly related to the anatomic extent of the tumor on pathologic examination. The prognosis was not significantly altered by the symptoms, the level of the tumor above the anus, the size of the tumor, or the degree of differentiation[8]. For patients with lesions that were localized, the 5-year survival rate was 79%. When one node was metastatic, the rate was 64%, but when four or more nodes were positive for cancer, the rate decreased to 30%. The mortality rate for the series was 2%, and the cause of death was unrelated to the surgical procedure in all cases. There was a 6% incidence of leakage of the anastomosis, but in no case did this lead to mortality and in only seven cases was a temporary proximal colostomy necessary to manage the leakage. These survival figures compare very favorably with those for combined abdominoperineal resection done in a series of 1,766 cases in which survival rates were 68% for localized lesions, 41% when nodes were metastatic, and 55% for all cases[9]. The corresponding survival rates for anterior resection in the series were 64%, 37%, and 51%.

Because anterior resection can be accomplished for lesions of the lower sigmoid colon, rectosigmoid, and upper third of the rectum, it remains the most viable option; resection can be done safely; it removes the primary tumor, regional tissues, and the segment of bowel in which the tumor is located; and it still preserves the normal external anatomy and bowel function. For these reasons, resection is preferred over a lesser surgical procedure for these cancers.

The difficulty in decision-making arises for many cancers of the middle third of the rectum since a low anterior resection technically is difficult when possible or is not feasible for all cancers of the lower third of the rectum. For such lesions, a combined abdominal resection is necessary as the most effective operation. Since many of the lesions are small or localized (Dukes' A or B1 or B2) and since only approximately 50% or fewer of the lesion will have regional spread, a lesser operation offers the patient a chance of cure without alteration in body function. Emphasis should be made that, if conservative treatment is done, these patients should be followed very carefully for evidence of persistence or recurrence of the cancer. If either should occur, then radical treatment is immediately required.

In 1961, Jackman[10], in a careful selection of 211 patients with tumors that were small, pedunculated, and well-differentiated and half of which were in situ and often asymptomatic, treated the lesions by excision and fulguration without mortality. In this group of patients, 96% survived at 5 years. This illustrates well that, with expert selection of favorable cancers, local treatment can be successful. In only eight patients (3.8%) did the treatment fail, and in these patients, radical surgery was done subsequently.

Culp and Jackman[11] treated 80 patients who had more advanced lesions and medical complications that increased the risk of major surgery and had 50% survive. This rate is largely based on the fact that overall about 50% of the patients had localized tumors without regional spread at the time of treatment. Madden and Kandalaft[12] and Crile and Turnbull[13] have had similar experiences in the treatment of both high- and low-risk patients. Fulguration with the patient under general anesthesia for destruction of cancer may required multiple operations, and hospitalization is expensive, and is associated with some morbidity. Success in the treatment of cancer in this manner depends on the conservative and proper selection of patients. About 25% of patients with only nodal spread survive at least 5 years when treated by the Miles procedure. Most of these patients would have been lost to disease if managed conservatively.

In addition to excision, fulguration, and fractional electrodesiccation, cryosurgery might be used for the local destruction of tumor. Likewise, Papillon[14] and Sischy and associates[15] and others have suggested the use of intracavitary radiation in high doses (12 to 15,000 R), with low penetration as a preferred local treatment for highly selected patients. This is successful if the lesions are localized. Unfortunately, because Dukes' A lesions are associated with a 10% incidence of regional nodal metastasis and Dukes' B tumors with an incidence of 12%, local treatment would fail in these situations.

The selection of patients for local treatment should be based on the following characteristics: the cancer should be small, easily movable, not encircling the bowel, Dukes' A or B stage, well-differentiated on the basis of Broders' classification, and preferably polypoid. Other selection factors might be an increased risk to radical

surgery and the refusal of the patient to undergo the Miles operation.

For the lesions of the mid rectum and lower rectum, where a segmental resection of the bowel is desirable and yet an anastomosis from above cannot be accomplished, the surgeon might consider a combined endorectal pull-through operation or other pull-through operations or might use the transsacral approach to accomplish the anastomosis; however, these operations are not supported by many.

Ninety-five percent of cancers of the colon and rectum are adenocarcinomas. Lesions of the anal canal and anus, which comprise only 1% to 2% of cancers of the large bowel, are most frequently squamous cell epithelioma and secondly basaloid carcinoma (cloacogenic carcinoma). In addition, infrequently seen lesions are Paget's disease, basal cell epithelioma, melanoma, and adenocarcinoma. When these lesions are invasive, the only option is an abdominoperineal resection. Originally, it was believed that the basaloid lesion had a worse prognosis than the squamous cell tumor, but in a review of 64 of the former and 113 of the latter lesions, the prognosis was approximately the same (63% vs. 59% at 5 years and 48% vs. 44% at 10 years)[16]. Again, the major factor in determining the prognosis was the extent of the disease at the time of treatment.

The place of inguinal node dissection in the management of cancer of the anus is uncertain, because clinically evident metastasis or nodal metastasis at the time of elective groin dissection indicates an extremely poor prognosis.

Perianal and squamous cell cancer (that within 5 cm of the anal verge) is often identified early and, therefore, might be treated by excision, radiation, or other conservative measures, with excellent results. However, if local treatment requires destruction of the external anal sphincter, then radical treatment should be done.

The proper place of irradiation in the surgical management of cancer of the colon and rectum is still to be determined. It is indicated either before or after operation for any patient with a lesion that cannot be completely removed by surgical resection. By preference, any lesion that can be definitively resected should be surgically treated, and radiation should be used at a later date if indicated for recurrence. In the future, data may support the use of radiation preoperatively for resectable lesions, but at the present time, this is not so.

The exact place of chemotherapy in the elective treatmemotnt of cancer of the colon and rectum is still waiting validation. Although the use of drugs singly or in combination will produced objective responses for short periods (5mont hs), in 20 to 40% of patients with measurable lesions, long-term results are not frequent. Morbidity from chemotherapy can be significant.

The determination of levels of chorioembryonic antigen in the blood may be valuable in the care of patients with colon and rectal cancer. However, at the present time, we do not use this determination as the sole indicator of the patients' progress or as the determinant for reoperation. A baseline value at the time of definitive surgery should be considered in all patients. Subsequent levels, if elevated, may suggest recurrence of disease, which would lead to the consideration of further treatment.

Finally, the stage of the disease at the time of treatment is the most important single factor in the prognosis of colorectal-anal cancer. Treatment of known precancerous lesions—single or multiple polyps, familial polyposis, longstanding chronic ulcerative colitis—before the development of cancer is the most effective management of the disease. Proper selection of early cancers for conservative treatment is acceptable practice. Otherwise, radical treatment is most important if most patients are to be offered a chance of cure.

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