Sphincter-Preserving Operations for Rectal Cancer

Review Article

Sphincter-preserving operations represent an important model for integrating the goals of surgery for rectal cancers. These goals--the achievement of cure and local control and the preservation of autonomic visceral function.

Introduction

The cancer-related and functional goals of operations for rectal cancer are integrally related. Although the goals of cancer treatment are cure and local control, careful selection of the planes of pelvic dissection can help preserve both sexual and urinary function. Even the long-term goal of local control affects the success of sphincter preservation. The single greatest cause for the creation of a colostomy remote from the initial treatment site is pelvic recurrence. Successful treatment is defined by the achievement of all these goals in concert. This article will focus on sphincter preservation and the preservation of anorectal function.

Defining the Rectum Anatomically

On lateral view of the pelvis, the rectum may be divided into three levels: the low, mid-, and high (or upper) rectum. Due to variations in body habitus, height, and individual anatomy, it is difficult to assign exact measurements, but, as a general rule, the following statements are true: (1) The rectum may be regarded as the distal 6 inches of the large bowel. (2) A more accurate reflection of rectal anatomy is the extraperitoneal portion of the large bowel situated within the pelvis. A working definition of the rectum adopted by numerous authors and the cooperative groups is the distance of 0 to 12 cm from the anal verge in the left lateral Sims' position on rigid proctoscopy. The low rectum is generally regarded as 0 to 5 cm from the anal verge; the mid-rectum, 6 to 10 cm from the anal verge; and the upper rectum, 11 or 12 cm from the anal verge. Cancers of the low rectum may be intimately associated with the voluntary sphincters, anal canal, or levator ani, and are usually below the coccyx. Cancers of the mid-rectum are usually situated proximally, within the sacral hollow between the tip of the coccyx distally and the peritoneal reflexion. Cancers situated more than 12 cm from the anal verge tend to manifest a local recurrence rate equal to that of colonic cancers (6%), as compared with the 30% rate traditionally observed in rectal cancer.

The American College of Surgeons includes cancers up to 15 cm from the anal verge as part of the "upper rectum." This enhances the apparent rates of local failure by including some lesions less prone to recur locally. Various studies consider the 12-cm upper limit to be a more stringent criterion.

Principles of Adequate Resection

During the past few decades, numerous pathologic studies have confirmed that the mesorectum, ie, the integral mesentery surrounding the rectum, is the regional site of either direct extension or spread from a primary rectal cancer. Such regional spread can manifest as lymph node metastases, separate foci of tumor implanted in the mesorectum, lymphatic vascular or perineural invasion, or extracapsular nodal penetration, among other presentations.

The rectum and the mesorectum form a single unit that is contained within the envelope of the visceral pelvic fascia. The parietal layer of the pelvic fascia covers the sacrum, presacral fascia, musculoskeletal boundaries of the pelvic side walls, internal iliac vessels, pelvic autonomic nerves, and plexuses controlling both sexual and urinary function.

Utilizing sharp dissection along an areolar plane that separates the parietal from the visceral fascia, the affected rectum and mesorectum can be completely excised as an intact unit with negative margins.
circumferential margins, achieving high rates of cure and low rates of local failure. This recently introduced practice is now known as total mesorectal excision (Figure 2). By contrast, conventional surgery is associated with blunt dissection along undefined planes and often violates the integral mesorectum, leaving tumor behind and accounting for a worldwide local recurrence rate of 30%. Local recurrence has been pathologically related to involved circumferential margins and really represents the clinical manifestation of persistent disease. The 45% to 50% 5-year survival rate achieved by conventional surgery compares poorly to the 75% rate attained with total mesorectal excision (in T3, N0 or T3, N, any M0 disease). In contrast to the worldwide local failure rate of 30% associated with conventional surgery, total mesorectal excision is associated with a local failure rate on the order of 4% to 8% for T3, N0 and T3, N1-2, M0 disease.[2]

Sphincter-Preserving Operations

The past 2 decades have witnessed extraordinary progress in the implementation of sphincter-preserving operations for rectal cancer. Although first introduced in 1938, sphincter-preserving operations for rectal cancers (deep within the narrow confines of the pelvis) remain technically demanding and have been less rapidly adopted by the surgical community than have sphincter-preserving operations for cancers of the rectosigmoid (more than 12 cm from the anal verge). Indeed, still widely prevalent are the outdated belief and practice that the operation of choice for all rectal cancers within reach of the examining finger is abdominoperineal excision of the rectum and permanent colostomy.

Patient Selection

Patients with cancers of the mid-rectum (6 to 10 cm) or above are candidates for sphincter-preserving operations. Patients may be selected for a sphincter-preserving operation based on the distance of the tumor from the anal verge, mobility, and, in cases which border on the low rectum, early T-stage. Adjacent organ involvement, size or shear bulk of the primary tumor, or depth of penetration may influence the complexity of a given operation but are not contraindications to sphincter preservation. In cases where a tumor may be resected with negative circumferential margins and the rectum fully mobilized, creating an adequate distal margin (vide infra), sphincter preservation is generally indicated.

In 1974, Stearns compared the results of a large series of patients who underwent sphincter-preserving operations for mid-rectal cancer with results in patients with mid-rectal cancer who underwent abdominoperineal resection of the rectum on technical grounds alone.[10] Sphincter preservation did not compromise either cure or local control. Numerous studies have since confirmed these results. Thus, whenever possible, cancers of the mid-rectum should be treated by sphincter preservation.

Types of Sphincter-Preserving Operations

A sphincter-preserving operation may be classified as (1) a standard low anterior resection, (2) a low anterior resection with a coloanal anastomosis, or (3) a low anterior resection or coloanal anastomosis with a J-pouch colonic reservoir. By definition, all low anterior resections represent a resection and an anastomosis between the serosalized colon and the extraperitoneal nonserosalized rectum. A standard low anterior resection usually involves an intrapelvic anastomosis situated within the sacral hollow proximal to the floor of the pelvis (Figure 3).

A coloanal anastomosis is an extrapelvic anastomosis situated at the apex of the anal canal or lower in the anal canal at the dentate line. In a standard low anterior resection, the amount of the remaining distal rectal segment may be variable, while in a coloanal anastomosis, there is no remaining distal rectal pouch (vide infra).

Low Anterior Resection--A low anterior resection is accomplished by the complete mobilization of the rectum and mesorectum down to the levator ani by using sharp dissection along the planes previously described. With complete mobilization, the rectum, which was previously situated along the sacral curvature, straightens upward, producing a new 4- or 5-cm length of rectal wall distal to the lowest edge of the primary tumor. This distance provides a safe margin that allows for transection of the bowel and reconstruction.

The majority of low anterior anastomoses are performed using circular stapling devices (Figures 3A-3C). Two concentric rows of staples are placed through the walls of the rectum and colon, which have been brought together over the shaft of the circular anastomotic stapling device. Either of two methods of anastomosis is generally employed:
1. The "purse-string" or "whip-stitch method." In this method, a suture is sewn along the cut edge of the distal rectal stump. A similar stitch or an automatically placed purse-string suture is placed proximally along the edge of the colon to be anastomosed (Figure 3A). Both ends are tied down, gathering the bowel wall to the shaft of the intact stapler (Figure 3B), and the instrument is then closed (the cartridge and the anvil are approximated to each other) and fired (Figure 3C).

2. The double-staple technique. In this method, the rectum to be resected is completely mobilized, and the point at which the rectum will be divided is determined (Figure 4A). A transverse or horizontal staple line is created by applying a linear stapler to the rectum at the chosen level for division (Figure 4B). The rectum must be cleared of all surrounding fat at this point. The rectum is divided above this staple line, and the specimen is removed, leaving the distal stump of the rectum sealed by a linear transverse staple line (Figure 4C).

The anvil from the circular stapling device is introduced into the sigmoid colon and the purse-string suture is tied down along its shaft. The cartridge of the stapling device is now introduced transanally. In contrast to the purse-string method, the cartridge is introduced without the anvil attached.

Utilizing a sharp plastic spike specially designed for the purpose, the shaft is gently advanced through the apex of the rectal stump, immediately adjacent to the horizontal staple line (Figure 4D). The anvil and the cartridge are reunited, closed, and fired through the apex of the rectal stump (Figure 4E). With the firing of the instrument, the circular concentric rows of staples intersect with the horizontal row of staples (Figure 4F).

Both methods have been found to be relatively safe. The double-staple technique seems to be more applicable to higher rectal lesions, requiring a wider pelvis or a more proximal tumor in order to have room to manipulate the transverse linear stapling device.

**Low Anterior Resection With Coloanal Anastomosis**—Coloanal anastomosis is utilized under various circumstances (Figure 5). Technically, the coloanal anastomosis may be hand sewn via a perianal approach or it may be a stapled anastomosis situated within the anal canal anywhere between the dentate line and the anorectal junction or ring (Figures 5A and 5B).

The coloanal anastomosis may be utilized under any of the following circumstances:

1. In mid-rectal cancer when a patient is oncologically suited to having a sphincter-preserving operation, but it is technically difficult or impossible to accomplish a standard anastomosis; eg, in the obese or stocky male patient with a narrow pelvis and an enlarged prostate.[11]
2. As a substitute for abdominoperineal resection of the rectum in selected early stages of low rectal cancers.
3. When used in combination with radiation therapy or both chemotherapy and radiation as an experimental, protocol-based substitute for an abdominoperineal resection of the rectum.[12]

**Low Anterior Resection With J-Pouch Reservoir**—In addition, a low anterior resection, with or without a coloanal anastomosis, may be combined with an anastomosis from the colon to the anus or with a small colonic J-pouch serving as a reservoir (Figure 6).

Optimally, the coloanal anastomosis will be used as a means of reconstruction when a traditional low anterior resection is technically impossible.[11,13] Patey and coworkers have reported on the oncologic results of low anterior resection with coloanal anastomosis.[13] Rates of survival and local control at 5 years were equivalent to figures observed after standard low anterior resection.

**Coloanal Anastomosis Plus Preoperative Radiation**

In the case of locally advanced lesions, the coloanal anastomosis may be combined with preoperative irradiation.[12,14] Under certain circumstances, ie, a patient who refuses a colostomy, low anterior resection with coloanal anastomosis has been used as a substitute for abdominoperineal excision of the rectum, provided that the patient understands the oncologic as well as functional risks.

Minsky and coworkers reported on the use of radiation therapy in conjunction with coloanal anastomosis as a substitute for abdominoperineal resection in selected cases.[14] Preoperatively, 4,680 cGy of external irradiation was administered to the whole pelvis with a cone-down boost (total dose, 5,040 cGy) to the primary tumor. This phase I/II trial enrolled 30 patients with a diagnosis of invasive resectable primary adenocarcinoma.[14] Twenty-eight of the lesions were clinically and/or radiographically T3. All of the lesions would have required abdominoperineal resection of the rectum. Of the 29 patients who underwent resection, 3 (10%) had a complete pathologic response to preoperative multimodality treatment. Although the 4-year actuarial survival rate was 65%, the
4-year actuarial local failure rate was 23%.
Local control remains a key problem. Local control rates for a T3, N0, M0 or T3, N1-2, M0 carcinoma of the rectum after abdomino-perineal resection of the rectum with total mesorectal excision now range from 5% to 13%. [11] Until combined-modality treatment together with low anterior resection with coloanal anastomosis can produce similar results, patients with lesions 0 to 5 cm from the anal verge are best treated by abdominoperineal resection in accordance with the principles of total mesorectal excision.

**Determining That Sphincter Preservation Is Possible**
The determination that a sphincter-preserving operation is possible is invariably an intraoperative decision, although preoperative assessment of the patient may argue against the wisdom of performing such a procedure. An elderly patient with a weak anal-canal resting pressure (ie, sphincter tone) may end up with a very poor functional result, for example.
A sphincter-preserving operation should not be performed in the absence of complete local control, ie, the resection of gross disease. Residual pelvic peritoneal seeding or pelvic side wall involvement are contraindications to sphincter preservation. Under these circumstances, small bowel exclusion, intraoperative radiation therapy, and external-beam radiation therapy combined with systemic chemotherapy should be the uppermost considerations. A Hartmann's resection (end sigmoid colostomy and defunctional rectal stump) is appropriate in this situation.
Under normal circumstances, the final determination that a sphincter-preserving operation can be performed can be made only after complete mobilization of the rectum, exposing the levator ani muscles and freeing the rectum to the anal hiatus. In this manner, the rectum is now straightened from the anal hiatus up to the apex of the specimen. Such mobilization and straightening of the rectum usually creates 4 to 5 cm of normal rectal wall distal to the lowest edge of the palpable tumor. Mid-rectal cancers situated on the anterior rectal wall do not mobilize as well as do tumors on the posterior wall. It is generally safe to divide the rectum 3 to 4 cm below the distal palpable edge of the tumor (Figure 7).

**Combined-Modality Adjuvant Therapy**
Perioperative radiation therapy has generally reduced the traditional 30% rate of local recurrence to approximately 15%. [15] Despite this impact of radiation therapy on local failure, most studies have demonstrated no benefit in terms of survival. The overwhelming majority (approximately 65%) of patients with lymph node-positive rectal cancer develop systemic failure despite the reduction in the rate of local failure.
Systemic chemotherapy has been combined with radiation therapy in an effort to reduce distant metastases and to enhance the regional effects of the radiation therapy. Prospective randomized cooperative group studies have demonstrated a statistically significant reduction in the risk of local recurrence, as well as a significant improvement in survival, following conventional surgery. [4,5] Nevertheless, these results do not approach those achieved with total mesorectal excision alone, in terms of both survival and local recurrence rates. [2,3]

**Preoperative Radiation Therapy**
Preoperative radiation therapy, alone or in combination with chemotherapy, has been advanced by Marks, Mohiuddin, et al, [16] Minsky et al, [17] and Pahlman and Glimelius. [18] The rationale for preoperative radiation therapy includes the potential for downstaging and for enhancing the resectability of marginally resectable lesions.
In a European Organization for Research and Treatment of Cancer (EORTC) trial, preoperative radiation therapy was associated with a statistically significant reduction in local recurrence. [15] The Swedish Multi-center Trial conducted by Pahlman and Glimelius compared 25.5 Gy administered over five preoperative days with high doses (6,000 cGy) of postoperative radiation in rectosigmoid cancers. A statistically significant reduction in the local recurrence rate was observed after preoperative radiation (12%) when compared with postoperative radiation therapy (25%). [18] Marks, Mohiuddin, et al combined preoperative radiation therapy with resection and sphincter preservation for cancers of the mid-rectum. Local recurrence rates in 86 patients observed for more than 2 years ranged from 14% to 19%. A survival rate of 79% was noted. [16] In a recent update of their experience, Bannon and coworker reported on 109 patients with cancers situated within 3 cm of the anorectal ring (5 to 6 cm from the anal verge) treated by 4,500 to 7,000 cGy of radiation preoperatively and either resection with coloanal anastomosis (65 patients) or local excision (44 patients). At a median follow-up of 40 months, the local recurrence rates in the two groups were 9% and 14%, respectively, and the Kaplan-Meier survival rates were 85% and 90%,
respectively. The local failure rate for early lesions, ie, T1 and T2, was 0%; however, the local recurrence rate after resection in patients with T3 disease or with N1 or N2 disease remained 20%, despite the extensive preoperative radiation.[19] As a rule, local recurrence rates and survival must be judged after 5 years of follow-up in order for data to prove meaningful. Minsky and coworkers at the Memorial Sloan-Kettering Cancer Center conducted a phase I/II trial of preoperative radiation therapy (5,040 cGy) combined with total excision of the rectum and coloanal anastomosis in 22 patients with low rectal cancers. The median distance from the anal verge was 4 cm (3 to 7 cm) and median tumor size was 4 cm in diameter. Of the 21 patients who underwent resection, 10% had no residual cancer in the specimen and 90% were able to undergo resection with coloanal anastomosis. All surgical resection margins were negative. The 3-year actuarial disease-free survival rate was 69%, and the actuarial 5-year local recurrence rate was 23%.[14] As mentioned above, Pahlman and coworkers initially reported on the role of 2,500 cGy of preoperative radiation therapy in the prevention of local recurrence in rectal cancer. Based on this earlier report,[18] 1,168 patients with resectable rectal cancer were randomized to receive 2,500 cGy in five fractions over 1 week followed by surgery within 1 week or to undergo surgery without radiation therapy. The short-term results of the two approaches, first reported in 1993, were the same with respect to morbidity and mortality.[20] Long-term results of this trial, published in 1995, confirmed a statistically significant survival benefit in the patients receiving preoperative radiation therapy. After a minimum of 5 years' follow-up, 60% of patients with resectable rectal cancer who had received 2,500 cGy of radiation were alive, as compared with 46% of patients who underwent surgery without preoperative radiation therapy. These results are entirely attributable to a real decrease in local recurrence from 24% to 9% in association with the preoperative radiation.[21]

**Morbidity of Low Anterior Resection**

The short-term morbidity of a low anterior resection includes all of the potential complications of major surgery; these include bleeding, infections, failure of anastomotic suture lines to heal, bowel obstruction secondary to adhesions, and adjacent organ injury. Anastomotic leak is associated with the greatest mortality and significant morbidity.Leaks are more common in rectal anastomoses for a number of reasons.[6] The extraperitoneal rectum is not a serosalized piece of bowel, weakening its ability to heal sutures.[7] As one approaches the anal canal, the longitudinal muscle layer, rectum, and rectal wall become very thin, and mural integrity is diminished.[8] Radiation therapy, when used in the preoperative setting, impairs wound healing.[9] Anti-inflammatory drugs, including steroids, may impair wound healing in patients with arthritis, steroid-dependent chronic obstructive pulmonary disease, and other disorders.

Over the past 20 years, the rate of anastomotic leaks has declined from approximately 20% following low anterior resection to approximately 8% nationwide. Further reduction to the range of 3% to 5% has been reported by individual surgeons.[2] Recent experience has demonstrated an increase in anastomotic leaks in association with total mesorectal excision, as these anastomoses are often located within 3 to 5 cm from the anal verge where the rectal wall is thinnest.[22] This experience with total mesorectal excision has forced colorectal surgeons to revisit the issue of a temporary defunctioning colostomy. Over the past 2 decades, a declining incidence of defunctioning colostomy has been a by-product of the declining rates of anastomotic leak. In view of recent experience, however, in which total mesorectal excision is associated with low pelvic anastomosis, there must be no reluctance to perform a defunctioning colostomy. The benefits of a protective defunctioning colostomy are: the avoidance of fatality even in the presence of an anastomotic leak, the avoidance of poor function secondary to uncontrolled pelvic sepsis, and the avoidance of delayed postoperative adjuvant therapy, especially when preoperative radiation therapy or preoperative combined-modality therapy is used. The colostomy or ileostomy can be closed after 2 months.

**Autonomic Nerve Preservation**

As previously indicated, all the goals of resection are interrelated. Thus, cure and local control are achieved together with sphincter preservation whenever possible. Similarly, identification, dissection, and preservation of the pelvic autonomic nerves allows for optimal preservation of sexual and urinary function in conjunction with total mesorectal excision and sphincter preservation. The anatomic foundation for autonomic nerve preservation in conjunction with total mesorectal
excision has been recently presented.[23] The key anatomic elements are the preservation of the sympathetic distribution (the superior hypogastric plexus and superior hypogastric nerves), the parasympathetic distribution (the anterior sacral nerve roots of S3, S4, and S5), and the pelvic autonomic nerve plexus situated along the anterolateral boundaries of the pelvic side wall. The results of autonomic nerve preservation in conjunction with sphincter preservation and total mesorectal excision have been reported.[24] In an extensive recent update of male and female patients who were sexually active prior to surgery, approximately 85% have preserved sexual and urinary function and may resume their preoperative sexual activity.[25]

**Functional Outcomes of Sphincter Preservation**

Following low anterior resection, patients routinely have an increased number of bowel movements daily, smaller bowel movements, and some degree of urgency. These changes are attributable to a decline in rectal capacity and some decline in anal-canal resting sphincter pressure. Over the ensuing 9 to 12 months, function improves, with one or two daily bowel movements being the norm. Gradual resumption of a normal fiber intake (30 grams of dietary fiber daily), adequate fluid intake (65 to 100 ounces of liquid daily), and adequate lubrication are essential dietary elements for the resumption of normal bowel function.

Functional results are judged 12 months following the operation or closure of a diverting stoma. Elements of function include the number of bowel movements daily; continence at rest, both by day and at night; voluntary continence; dependence on medication, enemas, or laxatives; function or nonfunction of the J-pouch; the need to change one's job because of altered bowel function; and lifestyle issues, such as the ability to participate in recreational activities or take a long drive. A long-term commitment to dealing with the patient's functional needs is essential.

**Factors Influencing Functional Outcome**

The more distal the anastomosis, the greater is the likelihood of functional disturbance. The parasympathetic nerves to the colon enter the mesentery along the inferior mesentery artery. For very low anastomoses, complete left colon mobilization may denervate the distal colonic segment, resulting in poor contraction waves. As the volume of fecal material builds up in the distal colonic segment, the colon empties as a series of small movements every 3 to 4 days. This "periodicity," which is extremely difficult to control, may alter the patient's work, sleep, or recreational pattern. Dependence on spasmodic drugs or enemas is common among patients who have had extremely low anterior resections or low anterior resections with coloanal anastomoses.

Other factors, including a complete restoration of the colon along with sacral contours, faithful reconstruction of the anorectal right angle, pudendal nerve latency, voluntary and involuntary sphincter tone, and damage to baroreceptors within the levator fascia, all influence functional outcome. In the extreme situation, patients cannot distinguish gas from stool, have periods of incontinence, and, on exceedingly rare occasions, require defunctionalization. Most cases of severe dysfunction occur after coloanal anastomosis. The addition of a short (7- to 8-cm) rectal J-pouch has decreased the functional disturbance experienced by some of these patients.[27]

**Perioperative Radiation**--Two studies have indicated that perioperative radiation, particularly postoperative radiation, is related to a worsening of functional outcome.[28,29] The pathophysiology appears to be rather straightforward. Colorectal continuity is restored via an anastomosis in the distal rectum or anus. Postoperative treatment includes the newly constructed "neorectum" within the pelvic radiation fields. As in radiation enteritis, repeated exposure of the colon to daily fractions of radiation induces scarring of the distal colonic segment immediately above the anastomotic ring. As the scar tissue contracts, the circumferentially contracted bowel wall will produce a stricture. In mild cases, the fibrosis and lack of compliance serve as functional barriers to any contractile wave. Solid stool remains proximal to the anastomosis, and the patient may describe the sensation of feeling stool within the rectum but being unable to evacuate it past this barrier--a feeling similar to tenesmus. These symptoms may be less common after preoperative radiation.

**Local Excision in Low Rectal Cancer**

The rationale for a major resection of the rectum and the integral mesorectum is the presence of regional disease, ie, lymph nodes or other forms of spread within the mesorectum. Approximately 15% of patients with rectal cancer have Dukes' A (ie, T1-2, N0, M0) carcinomas of the rectum with no metastases in the perirectal lymph nodes. If preoperative staging could be considered to be accurate, some of these patients would be able to avoid abdominoperineal resection of the rectum. Approximately 10% to 12% of patients with T1 lesions and approximately 20% of patients with T2...
lesions are thought to harbor lymph node metastases. Lymphatic, vascular, and perineural invasion are not visible on ultrasound, CT scans or MR imaging. In the final analysis, only 3% of patients may have tumors that are small and mobile enough to be removed locally with safety.[30]

Candidates for local excision generally have cancers in the low rectum (0 to 5 cm from the anal verge) that are highly mobile, are less than 3 cm in size and not deeply penetrating (ie, they appear to be stage T1 or T2), and are not deeply ulcerating, fixed, or tethered. Endorectal ultrasound or MRI with intrarectal coil may confirm the clinical impression of T1 or T2 disease.

Communication between the operating surgeon and pathologist must be optimal in the management of locally excised rectal cancers. The pathologist experienced in dealing with local excisions must orient and ink the surgical margins correctly, and must then determine the T-stage, the presence or absence of involved margins, the degree of differentiation, and the presence or absence of blood vessels, lymphatic vessels, or perineural invasion.

Follow-up treatment is based on the T stage and the presence or absence of other adverse conditions. For patients with T1 lesions, survival exceeding 90% is likely without any further adjuvant therapy. In the case of T2 lesions, there is a 10% to 20% risk of lymph node metastases, as well as a 10% or 15% chance of local failure. Under the circumstances, external-beam radiation therapy (with or without concomitant systemic chemotherapy) is advised.

Stage T3 lesions are associated with a marked increase in regional spread, ie, a 50% to 60% incidence of lymph node metastases.[31] Consequently, resection of the rectum, even if it means abdominoperineal excision of the rectum, must be advocated both for cure and local control. In cases where radiation therapy has been substituted for resection in T3 lesions, approximately a 40% failure rate has been reported, including both local recurrence and distant spread from inadequately treated lymph node metastases.

Delay in the management of adverse pathologic features, whether it is based on the overall medical condition of the patient or on a policy of "watchful waiting," is associated with only a 60% 5-year survival rate and underscores the need to treat adverse pathologic features promptly.[32]

**Current Trends**

Surgeons within the British, Scandinavian, and Dutch communities have been quick to recognize the benefits of total mesorectal excision. Communication as to the benefits of this approach to US surgeons has taken place only recently.[2] One of the major benefits of local control is the enhancement of long-term sphincter preservation. Whereas a local failure rate of 20% will generally lead to a diverting colostomy in a similar percentage of patients, this figure may be reduced to only 5% to 8% in patients undergoing total mesorectal excision. Currently, Scandinavian and Dutch efforts to enhance local control center on: (1) combining radiation therapy with resection, according to the principles of total mesorectal excision, and (2) preoperative multidisciplinary treatment combined with total mesorectal excision.

Since optimized rectal cancer surgery can achieve local recurrence rates in the range of 5% to 10% even without radiation therapy,[2,3] the projected incremental benefit from 2,500 cGy of radiation preoperatively combined with total mesorectal excision represents an exciting prospect for near-total local control. A randomized multicenter trial of this approach is currently being planned in the Netherlands. Surgical preceptorship has been extensively utilized in the Scandinavian countries, the Netherlands, and the United Kingdom in order to broaden the number of surgeons who can perform total mesorectal excision-related resection of rectal cancer. These workshops have been extremely well received and can serve as a model for the introduction of new surgical techniques into the United States.

Two recent papers from widely separate institutions have described the results of rectal cancer surgery in patients undergoing resection in accordance with the guidelines of total mesorectal excision. These studies involve nearly 450 patients with classic Dukes' B and C cancers of the rectum (T3, N0 and T3, any N, M0; 0 to 12 cm from the anal verge).[2,3] Local recurrence rates of 5% to 8% can be expected for all stages of disease in all patients.

As total mesorectal excision has emerged as the optimal operation for rectal cancer,[23] the data of Pahlman et al regarding 2,500 cGy of preoperative radiation have been simultaneously evolving. Currently, it appears that the optimal combination for treatment of primary resectable rectal cancer would be preoperative radiation (2,500 cGy over 5 to 7 preoperative days), resection in accordance with the principles of total mesorectal excision with autonomic nerve preservation, and sphincter preservation with the selective use of pouch reconstruction for patients requiring either low pelvic anastomoses or coloanal anastomoses.
Trials of systemic chemotherapy, alone or in combination with the Swedish method for preoperative radiation therapy, should answer questions about systemic spread.

References:


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