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Rectal Cancer Decision-Making

W. Donald Buie and Anthony R. MacLean

Key Concepts

- Sound decision-making requires a full assessment of the primary lesion, the presence of metastatic disease, the patient's surgical risk, and goals of care.
- A submucosal excision may be used as a radical biopsy to assess a polyp for adverse features without compromising future radical excision.
- Following endoscopic excision of a malignant polyp, the pathology should be rereviewed and strict criteria adhered to regarding the need for radical surgery.
- While cT2 (clinical stage T2) lesions can be treated with radical excision alone, neoadjuvant treatment can be selectively given to patients with cT3 lesions, based on preoperative staging by MRI and multidisciplinary discussion.
- Pretreatment staging can be inaccurate, especially with regard to mesorectal nodal status. Treatment planning should include a discussion of what will be recommended if stage changes based on histologic analysis. This is especially true if patients are assumed to be node negative, undergo up-front proctectomy, and are found to be node positive or if patients undergo local excision and are found to have higher T stage than anticipated.
- Most operative decisions should be made prior to entering the operating room. The patient and the surgeon must be prepared for all eventualities. In some situations the ultimate surgical decision may depend on intraoperative findings.
- Patients with potentially curable Stage IV disease require multidisciplinary discussion with early involvement of hepatobiliary surgeons and medical oncologists to determine the optimal sequence of treatment.

By three methods we may learn wisdom: First, by reflection, which is noblest; Second, by imitation, which is easiest; and third by experience, which is the bitterest.
Confucius

Introduction

While a comprehensive knowledge base and consummate operative skill are required for optimal management of rectal cancer, sound decision-making is essential. Poor decisions whether preoperative, intraoperative, or postoperative may have a profound and irreversible affect on both short- and long-term patient outcomes. Thus, it is important to understand not only what you can do but what you should do.

The aim of this chapter is to examine common clinical situations encountered by the colorectal surgeon who treats rectal cancer and analyze the decision points. This includes identification of the variables that affect treatment decisions, the potential treatment options including the advantages and disadvantages of each, and finally the logic behind specific treatment decisions. The chapter is organized to include early rectal cancer, endoscopically removed cancers, locally advanced lesions, synchronous metastatic lesions, and special situations. While no chapter can cover all clinical situations, it is hoped that the principles outlined below can also be used as a guide in more unusual circumstances.

Assessment

Each situation like each patient is unique. Knowledge and a comprehensive understanding are paramount to making good surgical decisions. When first encountering a patient with a rectal neoplasm, our first step is to gather information. We assess the lesion in terms of size, location (distance from anal verge, distance from the superior aspect of the anorectal muscular ring, and circumferential position—anterior/posterior/lateral), morphology, fixation (fixed, tethered, mobile), and general appearance. Additional information is needed with respect to the presence of metastatic disease [1, 2]. Finally we assess the patient for surgical risk including anesthetic risk, procedural risk, and patient risk [3, 4]. As the surgeon you are responsible for ensuring that each patient is

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fully evaluated and optimized for the required treatment; the right procedure at the right time as safely as possible [5].

An important part of assessment includes goals of care. Oncologic surgery is a balance of cure versus morbidity, mortality, and quality of life. Patients with significant comorbidity or those who are elderly may place greater emphasis on quality rather than quantity of life and make decisions accordingly. You must facilitate this discussion and provide information to help each patient make a decision (s)he is comfortable with. The risk-benefit profile of each potential treatment should be outlined and discussed thoroughly.

The final part of assessment is a firm understanding of your own strengths, skills, and limitations. Utilizing senior colleagues for a second opinion or as an intraoperative assist is a sign of good judgment. The management of rectal cancer is multidisciplinary, and you must cultivate strong relationships with your colleagues in the associated disciplines of diagnostic radiology, radiation oncology, medical oncology, pathology, and hepatobiliary surgery to provide optimal patient care. Ideally rectal cancer patients should be discussed at regular multidisciplinary conferences which have been shown to enhance care and outcomes. In a study by Snelgrove et al., multidisciplinary conference resulted in a change in management plan in 29 % of patients, due in a large proportion to reinterpretation of the MRI [6].

Early Rectal Cancer

Local Excision

For rectal lesions that appear early (benign or cT1 cancers), we would typically arrange for local staging, most commonly with endorectal ultrasound to examine the depth of invasion as well as a pelvic MRI, for staging regional nodes, and to document the baseline appearance of the pelvis going forward [7–10]. If the lesion has a malignant appearance or is a proven cancer on biopsy, we also arrange systemic staging with a CT scan of the chest, abdomen, and pelvis.

As long as there are no features on biopsy or imaging that are high risk for nodal disease, we would offer local excision as a "radical biopsy." We typically use the transanal endoscopic microsurgery (TEM) technique for most lesions, although TAMIS is a good alternative [11–13]. For distal lesions below 7 cm from the anal verge, conventional transanal excision can be considered, though there are data suggesting a higher rate of specimen fragmentation and subsequent local recurrence [14].

We believe it is critical to have a thorough discussion with the patient prior to performing a local excision. While the prevailing opinion described in most textbooks advocates for full-thickness excision in all cases, we tend to be more selective in our approach.

For lesions that appear benign on biopsy and imaging or at worst T1, we try to gauge the patient's thoughts on what their wishes would be in response to the biopsy results. If the patient decides that he or she would want a radical excision for anything other than the most early, most favorable cancer, we feel that a partial thickness excision is a very reasonable option, as it provides definitive histology and allows assessment of high-risk features, including differentiation, lymphovascular invasion, tumor budding, and depth of invasion in microns (Table 32-1). For lesions invading to <1000 μm with no adverse pathologic features, particularly with no evidence of high-grade budding, local excision alone is felt to be an acceptable treatment, with close follow-up [16–18]. Additional reasons to consider a partial thickness excision also include less perioperative risk and no significant change in the perirectal fat that can affect the difficulty of (and complications from) subsequent radical excision in cases with unfavorable histologic features. Importantly, if the lesion is proven to be benign, then excision in the submucosal plane should be curative and will avoid the added morbidity of full-thickness excision.

Table 32-1. Risk of nodal involvement

	# Tumors	Nodal involvement (%)	Odds ratio	*P*-value
Tumor grade				
Favorable	176	5.7		
Unfavorable	75	29.2	2.9	0.023
Vascular invasion				
Absent	176	5.7		
Present	75	30.7	2.7	0.039
Cribriform pattern				
Absent	192	7.3		
Present	59	32.2	3.9	0.002
Tumor budding				
Negative	213	8		
Positive	38	42.1	3.7	0.008

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On the other hand, if the patient is more strongly in favor of avoiding radical surgery and would tolerate a slightly higher risk of local recurrence, we feel that a full-thickness excision is warranted for lesions that are proven on biopsy to be adenocarcinoma preoperatively or have gross features of malignancy, which again allows for histologic evaluation but also provides a wider deep margin for more significant lesions.

Once the histologic information is available (for which we also typically request a second opinion from an experienced GI pathologist), we have a thorough discussion with the patient about the results and define their risk of lymph node disease. For patients with T1 adenocarcinoma with high-risk features and/or depth of invasion greater than 1000 μm (or Kikuchi level SM2) [15, 18, 19], we recommend radical excision. However, in situations where the patient understands the risks and prefers to avoid radical excision, close follow-up is an acceptable alternative. For patients who are frail or have significant comorbidity that would preclude a radical excision, we consider extending our indications for local excision to more significant lesions.

Our follow-up depends somewhat on the characteristics of the lesion excised and the patient's age and comorbidity but, in general, would include sigmoidoscopic examination at 3–4 month intervals for the first 2 years when the risk of recurrence appears to be highest, then at 6-month intervals for an additional 2 years with colonoscopic evaluation as indicated for surveillance at year 1 and year 4. Additionally, we survey the pelvis with pelvic MRI scans at 6-month intervals for the first 2 years to look for nodal recurrence. Lastly, we typically arrange yearly CT scans of the chest, abdomen, and pelvis for the first 3 years to look for metastatic disease.

Endoscopically Excised Malignant Polyps

Occasionally we will be referred a patient who has had endoscopic excision of a malignant rectal polyp. In these situations, we obtain a pathologic review and then try to determine the risk of intraluminal recurrence as well as the risk of nodal disease and systemic recurrence. We examine the polypectomy site with sigmoidoscopy and, if not already done, mark it with a tattoo especially if completely excised. The patient is staged as in the early rectal cancer section above. However, it is important to remember that imaging can be affected by the thermal injury to the bowel wall from a large polypectomy. Occasionally lymphadenopathy related to local inflammation will be seen, that can be confused for nodal metastases. The risk of intraluminal recurrence is dependent on the margin of excision—while many textbooks advocate a 2 mm minimal margin, current evidence suggests that in the absence of other high-risk histologic features, a 1 mm margin is adequate [15, 20]. In terms of the risk of nodal disease, important factors include differentiation, lymphovascular invasion, tumor budding, and depth of invasion (see Table 32-1). When all histologic features are favorable and the margin is greater than 1 mm, close follow-up is recommended. When all histologic features are favorable, but the margin is <1 mm, we discuss re-excision transanally versus radical excision. When high-risk features for nodal metastases are present, we typically recommend radical excision assuming the patient is a suitable candidate. In high-risk patients where radical excision is not an option, we extend our indications for observation.

Operable and Locally Advanced Lesions

For lesions that are not amenable to local excision, our approach is to again assess the lesion as described above but also perform local staging with pelvic MRI and systemic staging with a CT of the chest abdomen and pelvis. We do not routinely advocate the use of PET scan in the preoperative staging of rectal cancer, except to help resolve an indeterminate lesion identified on CT or MRI.

For lesions that are T2 on imaging, we typically advocate a radical excision. We do not currently feel that there is sufficient evidence to recommend local excision in association with neoadjuvant [21] or adjuvant chemoradiation [22], though there is ongoing interest in this approach and further evidence could possibly change that opinion in the future.

The current standard of care for all clinical stage 2 and stage 3 rectal cancers is to receive neoadjuvant therapy followed by radical surgery when diagnosed on preoperative imaging and to receive postoperative chemoradiotherapy when final pathology unexpectedly demonstrates stage 2 or 3 disease [23]. However, it has become clear that some of these patients derive very little benefit from chemoradiotherapy and do suffer potential long-term complications from the administration of postoperative radiotherapy, including fibrosis/stricture of the anorectum and other issues with bowel, bladder, and sexual function [24–26]. It is also clear that receiving postoperative radiotherapy is less effective than neoadjuvant radiotherapy. Thus identifying those who are likely to derive the most benefit is important [27].

Current staging modalities are very accurate at determining T stage and distance to the expected mesorectal margin but are much less accurate in determining N-stage. TRUS, CT, and MR all suffer from a lack of sensitivity and specificity when queried to predict mesorectal nodal status [7, 28–31]. All the techniques suffer from the inherent limitation that they do not detect tumor but rather the size and morphology of the node. Tumor deposits in lymph nodes do not reliably produce lymphadenopathy greater than 1 cm; in fact more than 50 % of all positive nodes will be less than 5 mm in size. In addition, the inflammatory reaction from previous biopsies, or from the tumor itself, can result in nodal enlargement without tumor involvement, resulting in false positives. Metabolic imaging with 18-fluorodeoxyglucose positron emission tomography (FDG-PET) may not be effective in

detecting mesorectal nodal status because emission from the primary tumor may obscure adjacent nodal signal or because of the small size of some of the nodal metastases.

Given the limitations of preoperative staging, locally advanced lesions require a considerable amount of careful thought when deciding on the most appropriate course of treatment. One can decide that all patients with stage 2 or 3 disease require chemoradiotherapy and mandate that all patients with clinical stage 2 and 3 tumors receive neoadjuvant therapy and that all unsuspected stage 2 and 3 tumors receive postoperative chemoradiotherapy. An alternative strategy is to be more selective, trying to select those patients who are more likely to derive benefit from chemoradiotherapy, while avoiding the negative consequences of radiation in more favorable patients. We generally use the Mercury study group criteria [32, 33] to help decide which patients should be referred for neoadjuvant therapy. cT3a tumors with less than 5 mm of intrusion into the perirectal fat and predicted negative resection margins generally behave more as T2 lesions and thus can be spared the negative consequences of radiation therapy (Figure 32-1) [34]. For cT3 lesions with a close but predicted negative (>2 mm) margin based on staging MRI, neoadjuvant therapy is warranted. In this situation, both short-course radiation and long-course chemoradiation can be considered. For cT3 lesions with a predicted positive margin and for cT4 lesions, long-course neoadjuvant chemoradiation is required for tumor downstaging.

However, preoperative staging alone should not drive all treatment decisions with regard to neoadjuvant therapy. Pelvic morphology and tumor position may have a significant effect on decision-making. For example, a proctectomy in an obese man with a narrow pelvis and an anteriorly based tumor of the mid or distal rectum can be very challenging. Such a patient should be considered for neoadjuvant therapy and should be discussed in a multidisciplinary setting, ideally with radiologic review. Alternatively, proctectomy in a thin woman with a wide pelvis and a posteriorly based tumor should be relatively straightforward with little chance of positive margin if the tumor does not extend beyond the mesorectal fascia on preoperative imaging.

The inability to predict nodal status before embarking on a treatment course is of particular concern for the subset of patients staged as cN0 who undergo proctectomy as a first step in treatment and are upstaged to pN1+(2) following histologic review of the operative specimen. Prior to simply recommending postoperative radiotherapy because of N+status, it should be remembered that postoperative radiotherapy is not as effective as preoperative radiotherapy, must be administered at a higher dose with concurrent chemotherapy to achieve similar oncologic benefit, and has the downside of higher toxicity [35].

One strategy to avoid the issue of radiating patients postoperatively who are found unexpectedly to have node positive disease at proctectomy is to radiate all patients preoperatively regardless of pretreatment imaging results. Short-course radiotherapy is probably the best regimen for patients with non-fixed tumors if this strategy is adopted, as the oncologic results are equivalent to long-course chemoradiotherapy. In addition, short-course radiotherapy can be administered more quickly (shortening the time to full-dose cytotoxic chemotherapy in appropriate patients), is less costly, and is associated with less toxicity in the neoadjuvant period. The main downside of this approach is the large number of patients who would be treated and exposed to the

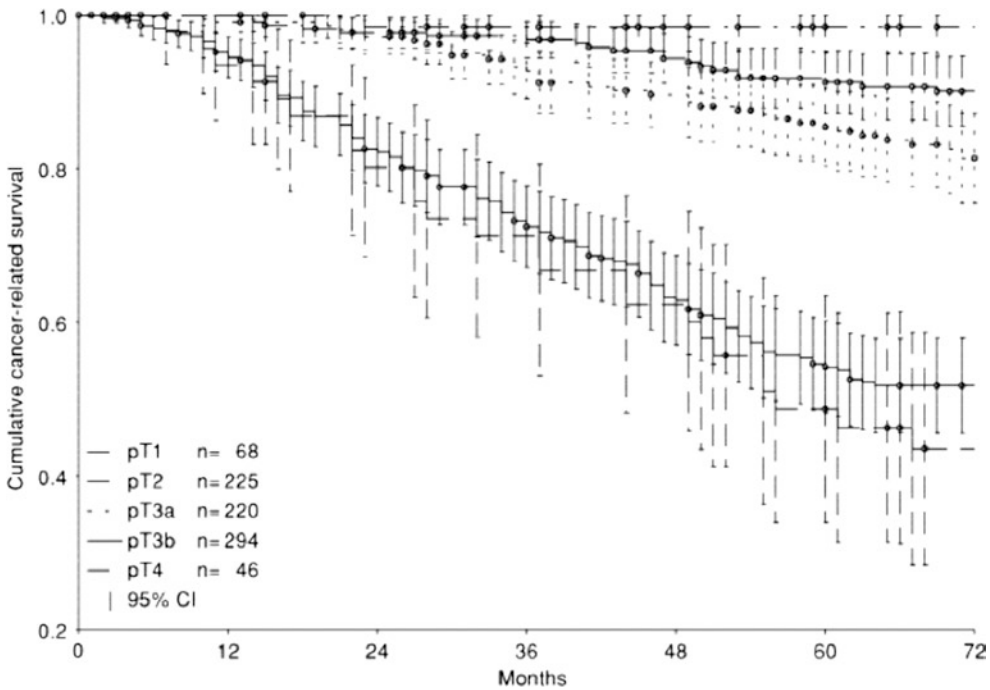

FIGURE 32-1. Cancer-related survival in relation to extended pT classification based on depth of invasion: pT1 submucosa, pT2 muscularis propria, pT3a<5 mm extramural disease, pT3b>5 mm extramural disease, and pT4 other organs. *With permission from Merkel S, Mansmann U, Siassi M, Papadopoulos T, et al. The prognostic inhomogeneity in pT3 rectal carcinomas. Int J Colorectal Dis 2001:16:298–304 © Springer 2001* [34].

long-term consequences of radiotherapy without deriving any significant benefit.

Another approach is to agree at the initial multidisciplinary conference that patients recommended for up-front proctectomy will not be considered for postoperative radiotherapy unless margins of resection are positive, and will be treated with chemotherapy alone if they are found to be node positive and resection margin negative. This strategy will also shorten the time to full-dose cytotoxic chemotherapy and avoid the toxicity of postoperative radiotherapy, which can be substantial. The argument that this is not "standard of care" is based on recommendations from decades past, when trials were conducted without surgery or pathology quality control, radial margins were not assessed, and chemotherapeutic agents were less effective. This is our current treatment approach for patients who are upstaged on pathologic review following proctectomy.

Lastly, there is continued interest in a "watch and wait" approach following neoadjuvant therapy with complete clinical response [36–38]. The issue remains that complete clinical response does not always equate with complete pathologic response. Except in situations of compromise due to patient frailty or comorbidity, we feel that this approach should be relegated to participation in a clinical trial [39]. This opinion may change as additional information becomes available.

As one may see from the above discussion, decision-making for patients with rectal cancer is complex and nuanced. Unfortunately, this complexity cannot be easily transformed into simple treatment guidelines.

Surgical Considerations

Intraoperative Decisions

Most operative decisions should be made prior to entering the operating room. There is no substitute for advance preparation having thought through the potential problems and solutions away from the OR when planning and reflection can occur without distraction and emotion. In difficult situations we will seek the advice of a colleague and plan to have a second surgeon available intraoperatively should the decision have far-reaching consequences or should the unexpected arise.

Despite the surgeon's best intentions, there are occasions where the final decision can only be made at the time of surgery. The surgeon must be flexible and have very precisely articulated goals of care; know why you are there and what you are trying to accomplish. In exceptional cases, this may include backing out if the situation requires more than what has been planned for. It is better to return on another day when the patient and surgeon are emotionally and physically prepared for the operation that is required.

Midrectal Cancers

As mesorectal spread can extend up to 3–4 cm distal to the gross tumor margin, a 5 cm mesorectal margin is required to ensure complete removal of at-risk nodal tissue [40, 41]. We advocate a tumor-specific mesorectal excision for tumors in the upper third of the rectum, preserving rectal length and function without compromising cure. When the tumor is located in the distal third of the rectum, 5 cm or less from the end of the mesorectum, we advocate a total mesorectal excision (TME) to remove all nodal tissue [40–43].

For tumors in the middle third especially in obese patients, it may be very difficult to perform a tumor-specific mesorectal excision and save 2–3 cm of viable rectum above the pelvic floor. We feel it is often technically easier and safer for the patient to extend the resection for an additional 2 or 3 cm to complete a TME. The decision is based primarily on the technical feasibility of dissecting through the distal mesorectum at that level while preserving the viability of the rectal stump.

Low Rectal Cancers

Surgical decision-making in low rectal cancer is complex balancing cure with function. In most situations, the decision to proceed with a sphincter-preserving procedure rather than an abdominoperineal resection is made preoperatively based on history, physical examination, imaging studies, response to chemoradiation, and the ability to obtain clear surgical margins. In addition patient factors including age, comorbidities, body habitus, continence, and patient wishes must be considered [44]. Good quality MRI with careful interpretation is important to identify any absolute indications for APR including involvement of the levators or external sphincter [45].

On rare occasions due to body habitus, tumor size, or pelvic shape, it may be difficult to predict preoperatively whether a tumor can be successfully resected with sphincter-preserving techniques. In this situation the patient must be fully informed and all options discussed in detail including the reasoning behind the decision, the expected outcomes, and potential complications. We consent the patient for "a low anterior resection-possible abdominoperineal resection" and emphasize that we are operating for local control and will proceed with sphincter preservation provided that cure is not compromised. The patient should be counseled and marked for both a colostomy and a loop ileostomy.

Preoperatively, all approaches that enhance distal dissection should be considered including a stapled coloanal anastomosis and a hand-sewn coloanal anastomosis with or without intersphincteric resection. Although a stapled anastomosis results in better function and less morbidity, an intersphincteric dissection provides additional distal margin length [46–48]. We restrict this technique to very low tumors

that are contained within the rectal wall, that do not invade the pelvic floor or anal sphincters, in patients who can tolerate and accept the functional compromise [44]. The functional results depend on preoperative sphincter function, the effect of neoadjuvant radiation, and the variable amount of residual internal sphincter left below the dentate line [49–52]. We feel it is critical that the surgeon carefully reviews and correlates the preoperative imaging and the findings on physical examination prior to considering an intersphincteric dissection, as it is essential that the tumor is well clear of the intersphincteric plane, to prevent a positive margin and consequently a high risk of local recurrence.

Generally speaking we will accept a 1 cm distal margin although a margin less than 1 cm may be acceptable following chemoradiation [53, 54]. Every effort should be made prior to rectal division to ascertain if the margin will be adequate. Once the rectum is divided and the specimen has been removed, it should be examined off table and if possible in concert with the pathologist. If the distal mural margin is inadequate, we would proceed directly with a completion proctectomy after repositioning in prone jack-knife position.

In the obese male with a bulky tumor and relatively small pelvis, distal mesorectal dissection under direct vision and thus sphincter preservation may be impossible using standard open or laparoscopic techniques such that an APR may be required to obtain clear margins. We discuss this situation with the patient preoperatively to ensure they are aware of the surgical limitations and the potential consequences. Transanal TME (taTME) with either TEM or TAMIS is a promising new technique to augment a technically difficult distal dissection. The distal margin and lower mesorectum are dissected transanally under direct vision and when combined with a laparoscopic or open TME extends the distal limits of dissection in these patients. While the initial case series are promising, this technique is not ready for universal adoption as the oncologic results are not mature, indications and contraindications remain to be refined, and the learning curve has yet to be established [55–57].

A clear circumferential margin is also critical to local control. Every effort should be made preoperatively in conjunction with your radiologist to identify potentially difficult areas of dissection where the margin may be compromised with steps taken to extend resection to an uninvolved plane as necessary. If, the decision to proceed with an APR is made intraoperatively, it should be made as soon as possible to maximize the circumferential tumor margin with a cylindrical dissection. The mesorectal plane leads the surgeon through the levator hiatus onto the bare area of the rectum with potential compromise to the circumferential margin in an ultralow tumor [58, 59]. All options need to be considered prior to entering this area of dissection. Intraoperatively, as we proceed distally, we frequently don an extra glove and bimanually palpate the tumor changing gloves prior to reentry into the operative field. If we feel that sphincter preservation will compromise the circumferential margin, we stop and proceed with a proctectomy in prone jack-knife position. We will often make this decision with a second surgeon present to ensure optimal care.

Low Hartmann's vs. APR

Patients with poor preoperative anal sphincter function who would normally have a low anterior resection with a coloanal anastomosis may also be treated with a low Hartmann resection. While this obviates the need for a perineal wound with its attendant risks of nonhealing and chronically draining sinus tract, a low Hartmann's is occasionally complicated by blowout of the stump and chronic pelvic sepsis [60]. We use this option primarily in the elderly in situations without preoperative radiation.

Special Situations

Obstructing Rectal Cancer

Obstructing rectal cancers present a challenging situation and require careful thought and planning to ensure that the patient's oncologic outcome is optimized. In the case of widely metastatic disease that is clearly not resectable, endoluminal stenting is a reasonable consideration provided that the bottom of the stent will lie clearly above the anorectal ring, to avoid causing pain and tenesmus [61, 62]. The tumor should be quite tight to ensure that the stent is held in place.

Alternatively, in patients with partial obstructive symptoms and without evidence of proximal colonic dilatation, administration of chemoradiotherapy will usually relieve the obstructive symptoms if instituted without delay.

In the case of curable disease, several scenarios can present themselves.

In cases requiring fecal diversion where an abdominoperineal resection will ultimately be required, we recommend using a loop colostomy for fecal diversion. At the time of the APR, the distal limb of the stoma can be divided, leaving the colostomy in situ if it is functioning well, or it can be revised to an end colostomy if needed. These patients are not good candidates for endoluminal stenting, because the stent will lie in contact with the anal canal and become symptomatic.

In cases requiring fecal diversion where an eventual reconstructive surgery is anticipated, decision-making can be more complex. In the "near-obstructing" but not clinically obstructed situation, and in situations where significant patient symptoms are a relative indication for fecal diversion, we select the type of stoma based primarily on the degree of stenosis. If the lesion can be passed by a colonoscope or gastroscope and the proximal bowel can be visualized, we would in general select a diverting loop ileostomy, which can be left in situ following the low anterior resection if needed. If the lesion cannot be passed with a colonoscope

or gastroscope, then we would generally construct a diverting loop colostomy. This prevents the possibility of a "closed loop" developing between the tumor and a competent ileocecal valve should the lesion swell and obstruct during neoadjuvant therapy. It also allows us to perform a colonoscopy preoperatively through the stoma to clear the rest of the colon. If fecal diversion is required following the reconstructive procedure, a loop ileostomy can still be brought through the previous left-sided loop colostomy site. A transverse loop colostomy is another option in these situations but is a more difficult stoma to manage for the patient and in general we avoid using them.

In cases presenting with a complete obstruction requiring emergency treatment, endoluminal stenting can be considered to relieve the obstruction and allow for semi-elective treatment of the cancer. The benefits of this approach include a rapid recovery from the procedure, that allows for prompt initiation of neoadjuvant chemoradiation if required, or to proceed on to radical surgery in the less common situation where neoadjuvant therapy is not indicated. The potential downsides of stenting include the risk of perforation and stent migration. The other main treatment option in the case of complete obstruction is a diverting loop colostomy. This strategy also provides relief of the obstruction and will reliably allow the patient to get through their neoadjuvant therapy, in addition to allowing for a preoperative colonoscopy prior to radical excision. The downsides include the fact that these cases do not always lend themselves to a laparoscopic approach (e.g., if there is loss of domain because of the distended colon) and therefore might require a longer period of recovery prior to initiation of neoadjuvant therapy. The open approach can also cause adhesions and make the future radical excision slightly more difficult. Our approach for these situations in general is to consider endoluminal stenting followed by semi-urgent radical excision (tumor-specific mesorectal excision) for the proximal rectal cancers and to use a diverting colostomy for most mid and distal rectal cancers, followed by neoadjuvant therapy, and radical excision.

Perforated Rectal Cancer

We tend to think of perforated rectal cancer in two ways: intraperitoneal perforations and extraperitoneal perforations.

For free intraperitoneal perforations, urgent surgery is generally required. The operation ideally should include an oncologic resection of the primary tumor. The decision on whether to perform a primary anastomosis (with or without and proximal diverting stoma) or a Hartmann procedure depends on several factors, including the overall health of the patient, their perioperative stability, the duration and extent of fecal contamination, and the anticipated intraoperative technical difficulties. Rarely should one simply divert these patients, as they risk having ongoing intraperitoneal tumor dissemination.

For contained intraperitoneal perforations, for example, those presenting with an abscess, we typically arrange percutaneous drainage, ensure that the patient is stable and fully staged, and then typically proceed with radical excision with or without an anastomosis.

For contained extraperitoneal perforations, we typically advocate proximal fecal diversion, drainage of sepsis, neoadjuvant chemoradiation, followed by radical excision, to include all tissues felt to have been contaminated by the perforation. This can require an exenterative procedure and/or an extrafascial dissection.

In the situation where a rectal cancer presents with perianal sepsis and fistulas, we generally ensure that the sepsis is well controlled, strongly consider fecal diversion with a laparoscopic loop sigmoid colostomy, and then arrange for neoadjuvant chemoradiotherapy. This is then followed by an APR with wide pelvic and perineal excision. These patients typically have large perineal wounds, and many benefit from a rectus abdominis myocutaneous flap for perineal reconstruction.

Synchronous Hepatic Metastases

Advancements in liver surgery and systemic chemotherapy have made it possible to consider alternative approaches to traditional primary tumor resection (PTR) in stage IV rectal cancer with synchronous hepatic metastases. These include synchronous resection (SR) and primary liver resection (PLR) [63]. No all-encompassing protocol exists for resectable stage IV rectal cancer as each alternative targets a different subpopulation [64]. SR and PLR should be used selectively and require multidisciplinary discussion with group ownership of the patients and the decisions.

Assuming that the patient is a surgical candidate, there are three overriding questions that need to be answered: is the primary resectable, is the metastatic liver disease resectable, and is there extrahepatic metastatic disease?

Prior to considering liver resection, the primary tumor must be staged and determined to be resectable, either primarily or following neoadjuvant therapy. We involve the hepatobiliary (HPB) surgeon very early to determine if the liver lesions are either resectable, potentially resectable with downstaging, or unresectable. It has been shown that resectability is best judged by an HPB surgeon [65].

Provided both the primary and hepatic metastases are resectable, then the decision is made to perform the rectal and liver resections either sequentially or in low-risk situations synchronously. We would typically consider PTR followed by liver resection for most patients [66]. Synchronous resection is offered to very selected patients to take advantage of a shorter overall recovery time accepting the increased risk of morbidity [67–69]. Generally speaking the magnitude of the two surgeries, the experience of the operating teams, the level of perioperative support and patient comorbidities/operative risk determines whether or not synchronous resections can

Table 32-2. Ideal criteria for liver-first protocol

1. Local regional control does not require downstaging with neoadjuvant therapy
2. Liver metastases are very clearly resectable for cure with adequate residual liver
3. Good overall operative risk patient with normal physiologic status and no known risk factors for perioperative infectious complications and major morbidity
4. Surgery can be performed in a high-volume liver unit with low-operative mortality and acceptable morbidity
5. Delays due to unexpected postoperative complications will not jeopardize local control or cure

and should be performed [70, 71]. For example, a high anterior resection can be combined with a nonanatomic resection in a low-risk patient with expected good results. On the other hand, an extended right hepatectomy and an extended low anterior resection should be done sequentially. The volume of resected liver is an important risk factor for postoperative complications. In a recent retrospective study, patients with postoperative complications averaged 350 g of resected liver tissue vs. patients in the non-complication group who averaged only 150 g [72].

When the rectal lesion is clearly resectable and the liver lesion is borderline or requires an extended resection, a PLR may be the best option [73]. In this situation the liver disease is the major determinant of survival. Because PLR is associated with a considerable increase in morbidity without the application of stringent selection criteria, it should be limited to very specific situations (Table 32-2) as a significant complication following liver resection may delay treatment of the primary [74–76]. Although it is tempting to push these limits, it is important to remember that it is the patient who takes on all the risk.

Patients with liver metastases and locally advanced primaries requiring neoadjuvant therapy are much more complicated. Most liver-first protocols exclude locally advanced rectal cancer patients due to the radiotherapy requirements of neoadjuvant therapy. In addition, the chemotherapy in long-course neoadjuvant therapy is relatively low dose; consequently liver metastases run the risk of growing and becoming unresectable. The presence of a borderline liver lesion further complicates the decision. In this situation, we typically use full-dose chemotherapy to downstage both lesions [77]. If there is a favorable response to several cycles of chemotherapy, then the patient may be treated with neoadjuvant chemoradiotherapy followed by either SR, PTR or PLR as determined by multidisciplinary discussion weighing the risks and benefits of each treatment course [77].

A promising new technique for this situation is the use of short-course radiotherapy to control margins followed by full-dose chemotherapy to allow time for tumor downstaging and systemic treatment for liver metastases. Prospective trials are currently underway to assess the efficacy of this pathway [78].

The presence of extrahepatic disease is generally a contraindication to hepatic resection for cure in stage IV disease. However, in select situations, in a good risk highly motivated patient, we will consider a lung resection following curative resection of the primary and all liver lesions. Surgery should be done sequentially at a reasonable time interval after recovery from the previous resections to ensure that the disease remains localized and the patient is fully optimized.

Conclusion

Nowhere in colorectal surgery are therapeutic decisions more complex or more important to long-term patient outcomes than in the treatment of rectal cancer.

As a young surgeon, decisions are made primarily by imitating our mentors. With experience we find that not all situations fit cleanly into algorithms, and we are forced to make decisions without a complete data set or in situations where there may not be a single correct answer only a best answer given the available information and the specific circumstances.

The treatment of rectal cancer is ever changing as new information is brought forward into practice. The surgeon must keep abreast of new developments, with a fundamental knowledge of all potential treatment options including the risks, benefits and alternatives. In addition to application of this knowledge set, each patient requires a full assessment of the primary lesion, the presence of metastatic disease, the patients' operative risk, and goals of care.

While skills and knowledge are important for optimal patient care, it is often a surgical decision that ultimately determines patient outcomes. Much like surgical skills, decision-making requires practice with continuous analysis and reflection for improvement to ensure the right care, at the right time as safely as possible for each patient.

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