Emergencies Related to Primary Rectal Cancer

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Elisabeth Hain, Pénélope Raimbert, Magaly Zappa, and Yves Panis

9.1 Introduction

Colorectal cancer (CCR) is the third cause of cancer in Europe [1] and the second leading cause of cancer death in France [2]. CCR accounts for almost 12% of all cancer death, especially among patients aged 65 and over [3]. Although the widespread of CCR screening allows early management in a high proportion of patients, leading to a significant reduction of associated mortality, up to 15% of patients with CCR are still diagnosed as an urgent presentation that will require an emergency surgery in the majority of the cases [4–6]. Previous studies showed that emergency CCR presentation is associated with elderly, socially deprived, and comorbidities [7, 8]. Emergency presentations related to primary rectal cancer include digestive obstruction, rectal perforation, and severe hemorrhage. All of them remain rare and have been very few studied [9]. Despite improvements and advances in surgical techniques, when a surgery is required, CCR emergency presentations still have poor short-term outcomes as morbidity, mortality, and stoma creation rate remains higher than in elective procedure [10, 11]. Previous authors reported perioperative mortality rates between 5% and 34% for patients requiring an emergency resection of colorectal cancer versus only 4% for an elective surgery [4, 12]. Poor

E. Hain · P. Raimbert · Y. Panis (✉)
Department of Colorectal Surgery, Pôle des Maladies de l'Appareil Digestif (PMAD), Beaujon Hospital, Clichy Cedex, France

Assistance Publique-Hôpitaux de Paris (AP-HP), University Denis Diderot (Paris VII), Paris, France
e-mail: yves.panis@aphp.fr

M. Zappa
Department of Radiology, Beaujon Hospital, Clichy Cedex, France

Assistance Publique-Hôpitaux de Paris (AP-HP), University Denis Diderot (Paris VII), Paris, France

postoperative outcomes can be explained by several reasons, including patient's physical status often altered and advanced tumor. Both frequently associated in the same patient can be responsible of hydroelectrolytic imbalance, malnutrition, and digestive obstruction. Furthermore, metabolic disorders can also acerbate underlying disease such as heart disease and diabetes. Finally, emergency CCR presentations are more associated with advanced stage tumor, higher histologic grade [13], and synchronous liver metastases. Finally, the emergency management of those frail patients with a complicated rectal cancer remains even more difficult because of the lack of information regarding the diagnosis and the accurate staging of the tumor at the time of management, especially if emergency surgery is needed.

While there is a general consensus concerning the management of patients with obstruction or perforation of the right or left colon [14], decision-making in emergencies related to primary rectal cancer is unclear, mainly because of the lack of studies devoted to this situation. This emergency management depends on several elements such as patients' general status, surgeon's experience, and type of complication. Although to date, the surgical approach for emergency presentation of rectal cancer is not standardized, two main principles should be theoretically respected: (1) if emergency proctectomy is indicated, the necessity of accurate lymphadenectomy during rectal resection in order to have good carcinologic resection at the first operation, which is crucial for optimal oncological treatment but also for both accurate staging and possible indication of adjuvant chemotherapy, and (2) best postoperative management in order to ensure short recovery to allow timely initiation of adjuvant treatment [15].

Previous studies reported poor long-term outcomes [16, 17], after emergency surgery for CRC. McArdle et al. reported an overall survival at 5 years of 58% after elective procedure versus 39% after emergency curative surgery ($p < 0.001$) [16]. However, in their study including 747 patients with CRC, Weixler et al. suggested that poor oncologic outcome was rather a consequence of the clinical presentation than to the emergency surgery itself [18]. Although this study included a large number of patients, only nine patients had an urgent surgery for rectal cancer. The accurate localization of the rectal tumor and the type of surgery are not specified [18]. The poor oncologic outcomes observed can be explained not only by the advanced stage of the tumor at the time of the treatment but also sometimes by the impossibility for the patients to receive neoadjuvant radiochemotherapy (if mid- or low-stage T3–T4 and/or N+ rectal cancer) [15, 19].

Thus, management of patients with an urgent symptomatic rectal cancer remains complex and requires the intervention of several specialists: surgeons, radiologists, intensivists, and oncologists. In this chapter, we will focus on three specific scenarios: obstructing rectal cancer, perforated rectal cancer, and bleeding rectal cancer.

9.2 Acute Lower Gastrointestinal Bleeding due to Rectal Cancer

Rectal bleeding is a common cause of consultation in emergency department [20] and has been reported to concern up to 50% of patients with CCR [21, 22]. Rectal bleeding with recent bowel movement modification associated with impaired

general health and weight loss should be referred to CCR, and prompt endoscopy should be performed to locate the lesion and make some biopsies. The origin of rectal bleeding is erosion from the mucosal surface resulting in an occult hemorrhage, and it is rarely a cause of massive hemorrhage requiring emergency-specific treatment [23].

At admission of the patient, and before any attempt to stage the tumor, the priority is the assessment of the volemic status. In the presence of a hemodynamic unstable patient by acute massive rectal bleeding, the initial management is to restore normal blood pressure. Hemodynamic monitoring and large intravenous access have to be created for IV administration of crystalloid, before blood transfusion if needed. Management of electrolyte disturbances and underlying coagulopathy is also mandatory at the same time. As soon as hemodynamic status is stabilized, the priority is to try to localize the exact origin of bleeding and to precise the tumor stage before considering any surgical treatment [4]. For this reason, exact localization of the rectal bleeding by either endoscopy or angiography should be attempted before surgical treatment discussed.

The therapeutic management depends mainly on the hemodynamic status of the patients and is proposed on the algorithm on Fig. 9.1. After resuscitation measures, in case of a persistent hemodynamic instability with an active rectal bleeding diagnosed by angiography CT scan, embolization should be discussed as the first treatment. Although endoscopy has a better sensitivity to diagnose the origin of bleeding, for colonic and upper rectal bleeding lesions, active bleeding and the absence of bowel preparation can make this exam unfeasible [24–26]. Angiography CT scan
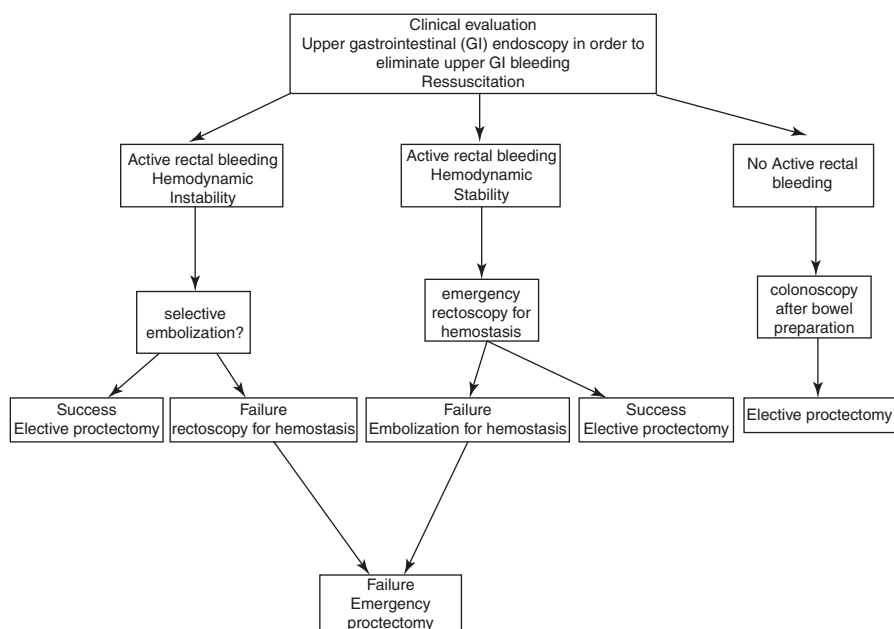
Fig. 9.1 Management of rectal cancer bleeding

and embolization has documented success rates of 42–86%; however, it carries the risk of worsening intestinal ischemia. In case of an active rectal bleeding with a hemodynamic stable patient, an urgent rectal endoscopy can also be performed. Rectal endoscopy is an important exam (1) which is known to identify the bleeding origin on the rectum in 74–89% of cases in the literature [24–26], (2) which permits to make efficient hemostasis, and (3) which allows tumor biopsies in order to have pathologic confirmation of the rectal cancer.

In case of failure of embolization or local hemostasis during rectal endoscopy, and in case of persistent severe bleeding and hemodynamic instability, emergency proctectomy should be discussed. Although no guidelines exist concerning the indications of emergency proctectomy for severe rectal bleeding, it includes hemodynamic instability despite vigorous resuscitation with more than six units of packed red blood cells, inability to stop hemorrhage with endoscopic techniques or embolization, recurrent bleeding after initial stabilization, recurrent hemorrhage associated with anemia, and ongoing slow bleeding requiring more than three units of blood products per day [27].

Very few data are available in the literature on emergency rectal resection. Although urgent proctectomy presents the advantage to be a definitive approach with the resection of the rectal tumor, the surgery is performed in difficult condition on a frail patient, and the risk is to perform a suboptimal lymphadenectomy, and the risk of a left colostomy with Hartmann's procedure is probably high especially in case of hemodynamic instability during operation. Furthermore, in case of large T3–T4 tumor, surgery without neoadjuvant radiochemotherapy exposes the patient to a higher risk of R1 or even R2 resection. For all these reasons, initial conservative management (rectoscopy or embolization) presents the advantages: (a) to avoid unnecessary emergency laparotomy, (b) to expose the patient to a too long recovery period during when adjuvant treatment cannot be initiated if indicated, and (c) to propose preoperatively neoadjuvant chemoradiation if indicated. The only debate is about the possible adverse effect of neoadjuvant radiation on a rectal tumor with a recent bleeding requiring local hemostasis, but no information has been reported to date about this problem. As pelvic irradiation for rectal cancer is known to have early toxicity leading sometimes to rectal bleeding [28], we can suppose that the risk of bleeding is probably increased in such patients with recent massive rectal tumor bleeding.

9.3   Acute Intestinal Obstruction by Rectal Cancer

Despite progress of colorectal cancer screening, still 8–29% of patients have at first presentation an intestinal obstruction due to CRC [29, 30]. In the most severe presentation, besides classical signs of intestinal obstruction (i.e., abdominal pain, no bowel movements, abdominal distention), the patient can also present medical complications such as dehydration, electrolytic disorders, respiratory impaired function secondary to abdominal distention, even sometimes surgical complications such as intestinal perforation either by the tumor itself or on a dilated colon above the tumor.
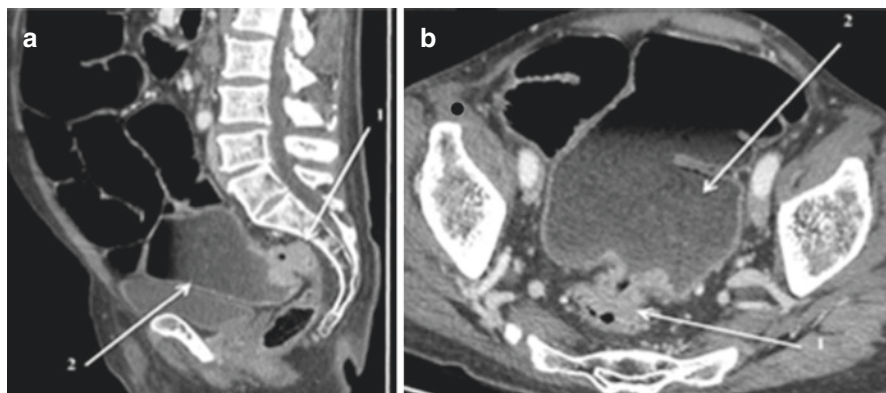
Fig. 9.2 (**a**) Sagittal CT scan with IV contrast: obstruction due to a rectal tumor. 1, rectal tumor; 2, dilated colon (**b**) axial CT scan
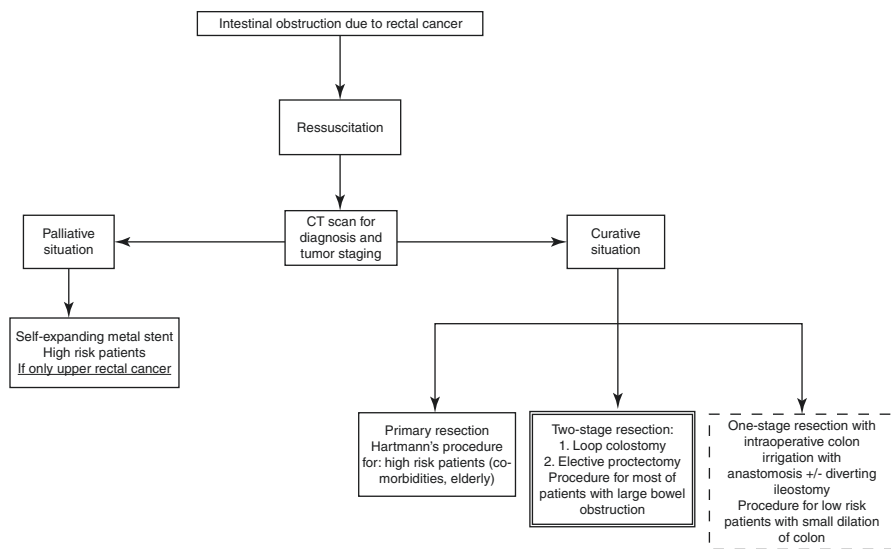
It can be diagnosed because of symptoms of diffuse peritonitis (in case of free perforation), or as a pelvic abscess.

CT scan is the gold standard imaging technique for patients presenting with suspicion of intestinal obstruction secondary to colorectal cancer: it can give the etiology and location of the obstruction and also possible complication. CT scan can make the correct diagnosis in nearly 89% of cases [31, 32] and allows accurate locoregional staging of the rectal tumor (Fig. 9.2). As patients presented with intestinal obstruction, colonoscopy is contraindicated. However, in some selected cases, rectosigmoidoscopy may be useful for placement of endoluminal stent, and this will be discussed later.

First of all, the management of patients with an obstruction due to rectal cancer should begin by resuscitation, rehydration, and correction of electrolytic disorders. Then, the decision-making for the treatment of the obstruction due to rectal cancer depends on the gravity of the obstruction. Except for the perforation cases, three main options remain for the treatment of the obstruction due to rectal cancer: the first two options can be defined as a "bridge to surgery", loop left colostomy and self-expandable metal stents. The third option is represented by proctectomy with or without anastomosis and includes Hartmann's procedure or a primary resection of the rectal tumor after intraoperative colonic irrigation with anastomosis, with or without a diverting ileostomy. The choice between those three strategies depends on the patient's general status, on the surgeon's expertise, and on the colonic dilation due to the rectal obstruction (Fig. 9.3).

9.3.1 Loop Left Colostomy

Proximal loop colostomy is an attractive option in emergency for the management of intestinal obstruction due to rectal cancer. The objective of the proximal colostomy (i.e., on the sigmoid) is to treat obstruction without performing resection which is delayed few days later. This operation presents many advantages:

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                    │ Intestinal obstruction due to rectal cancer │
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  │  situation   │        │  diagnosis and   │        │  situation   │
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│ Self-expanding metal stent │
│     High risk patients     │
│ If only upper rectal cancer │
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Figure flow — Curative situation branches to:
- Primary resection Hartmann's procedure for: high risk patients (co-morbidities, elderly)
- Two-stage resection: 1. Loop colostomy 2. Elective proctectomy Procedure for most of patients with large bowel obstruction
- One-stage resection with intraoperative colon irrigation with anastomosis +/- diverting ileostomy Procedure for low risk patients with small dilation of colon

Fig. 9.3 Management of intestinal obstruction due to rectal cancer

- A short operative time which is a real benefit especially in frail patients with poor general status.
- An oncologic approach with a "bridge" to the resection of the tumor. The proximal loop colostomy will allow performing a complete staging of the tumor before the second step of proctectomy or neoadjuvant radiochemotherapy if indicated.

In order to facilitate the second step of proctectomy and colorectal or coloanal anastomosis, the colostomy must be fashioned on the distal part of the sigmoid, and not above.

Today, this left colostomy represents for many centers the first choice of treatment for patients presenting intestinal obstruction due to either rectal or sigmoid cancer.

9.3.2 Proctectomy with Hartmann's Procedure and Left Colostomy

Hartmann's procedure is the resection of the primary tumor with the creation of a left colostomy and the closure of the distal rectal stump below the tumor. It is today probably the most common operation performed in emergency in case of intestinal obstruction due to sigmoid or rectal cancer. This operation presents some advantages: (1) it allows to perform an oncologic resection of the rectum during the first operation, and (2) it eliminates the risk of postoperative leakage in case of risky low pelvic anastomosis which can delay the beginning of adjuvant treatment if

persistent sepsis. However, Hartmann's procedure presents also some disadvantages: (1) risk of suboptimal lymphadenectomy due to technical difficulties during operation because of a dilated colon; (2) risk of R1 or even R2 resection in case of bulky tumor resected without neoadjuvant radiochemotherapy; and (3) finally, risk of definitive stoma in aged or high-risk patients for whom reoperation is thought to be risky or difficult. Indeed, the stoma reversal rate after Hartmann's procedure for CRC cancer remains close to 20% only [33, 34]. This low stoma closure rate can be easily explained by a poor general status at the time of surgery, the poor postoperative outcome with a higher mortality and morbidity than elective surgery. For these reasons, Hartmann's procedure should probably be restricted to elderly patients with underlying comorbidities and high American Society of Anesthesiologists (ASA) score and advanced obstruction with proximal distention on whom Hartmann's procedure is considered to be a definitive curative procedure.

9.3.3 Other Surgical Options

Although no recommendations have been established, single-stage primary resection of the rectal cancer and colorectal or anal anastomosis after intraoperative colonic irrigation with temporary ileostomy can also be proposed theoretically in this situation of intestinal obstruction due to rectal cancer. However, for most of the patients, it seems to be not a reasonable option. The main reasons are as follows: firstly, performing a colorectal or a coloanal anastomosis in a dilated and unprepared large bowel expose the patient to a high risk of leakage; secondly, as for Hartmann's procedure, risk of R1 or R2 resection if bulky tumor still exists if no neoadjuvant radiochemotherapy; and finally intraoperative colonic irrigation also includes risks as a longer operative time, a fecal spillage in the abdominal cavity which can increase the occurrence of an anastomotic leakage. Only selected patients with only partial intestinal obstruction and minor large bowel dilation can be proposed for such strategy.

Finally, in the rare case with massive dilatation of the whole colon due to obstruction by rectal cancer but with ischemia or even perforation of the caecum, the best option is probably an ileocecal resection with ileostomy and right colostomy which permit to treat obstruction and to have time for tumor staging and possible neoadjuvant radiochemotherapy.

9.3.4 Self-Expandable Metal Stents

Self-expandable metal stents (SEMS) were developed for the management of intestinal obstruction due to left colonic cancer, with two theoretical aims: curatively, as bridge to surgery before rectal resection and as a palliative procedure in patients with unresectable distant metastases [35–38]. SEMS has been widely studied for colonic obstruction rather than rectal obstruction in which placement of the stent can be impossible in case of too low tumor. However, it can be theoretically

discussed in case of high rectal cancer. Although it seemed to be an attractive treatment of the obstruction allowing the correction of medical disorders and the complete tumor staging before treatment, this procedure is today known to be associated with a significant risk of perforation during the stent deployment, and also possible tumor cell dissemination, which can possibly jeopardize oncologic outcome [39, 40]. For these oncologic reasons, recent guidelines from several surgical and endoscopic societies have proposed to perform stent placement only as a palliative procedure bridge to surgery with curative intent.

9.4   Intestinal Perforation due to Rectal Cancer

Colorectal perforation is the second cause of surgical emergency in colorectal cancer. The incidence of perforation is estimated to be between 2.6% and 12% [41, 42]. The most frequent clinical symptom is abdominal pain. Perforation can be divided in two categories: free perforation, which causes diffuse peritonitis, and localized perforation which can be associated with a fistula between the rectum and a contiguity organ or only with a pelvic abscess.

Perforation due to rectal cancer commonly can occur (1) at the site of the primary tumor and can be due to a tumor lysis syndrome, sometimes facilitated by neoadjuvant radiochemotherapy, and (2) away from the tumor, on a dilated colon. The increasing pressure in the large bowel secondary to the rectal cancer obstruction can result to a localized ischemia of the large bowel and to a perforation according to the Laplace law. The most common site for a diastatic perforation is the cecum.

Perforation is associated with poor short-term outcome as it is known to be the most lethal complication of colorectal cancer with a mortality rate associated with peritonitis as high as 30–50% [4, 43]. Moreover, diastatic perforation of the cecum is an independent prognostic factor for morbi-mortality [44]. Very few information are reported about perforation due to rectal cancer, but this has been studied for colon cancer. It has been reported that colon cancer with perforation is considered as a poor prognostic factor along with T4 primary tumors [45, 46]. However, to the best of our knowledge, no studies have compared oncologic outcomes between patients with rectal cancer perforation and those with T4 rectal tumor.

9.4.1   Free Perforation

Free perforation with stool leak in the abdominal cavity leads to symptoms of diffuse peritonitis: major abdominal pain, fever, and generalized abdominal tenderness. CT imaging is generally performed (1) to confirm the diagnostic of perforation based on the presence of a pneumoperitoneum (Figs. 9.4 and 9.5a) and (2) to search some gravity signs such as pneumatosis and portal venous air. CT scan has a very good sensitivity and specificity to diagnose perforation from colorectal carcinoma (95–98% and 95–97%, respectively) [4]. A free perforation secondary from a colorectal tumor remains a surgical emergency responsible of poor short-term outcome.
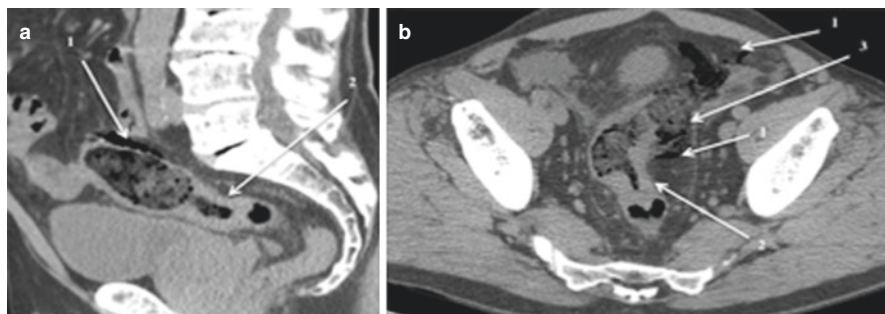
Fig. 9.4 (**a**) Sagittal CT scan with IV contrast: perforation due to a rectal tumor. 1, extra-digestive gas; 2, rectal tumor. (**b**) Axial CT scan. 3, site of the perforation
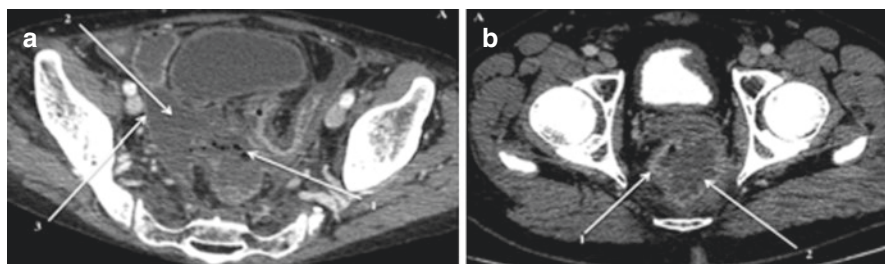
Fig. 9.5 (**a**) Axial CT scan with IV contrast: peritonitis secondary to an upper rectal tumor perforation. 1, extra-digestive gas; 2, peritoneal effusion; 3, peritoneum. (**b**) Axial CT scan 1, rectal tumor; 2, pelvic abscess

The surgical approach of this complication depends on the site of the perforation. In case of a perforation of the site of the rectal tumor associated with diffuse peritonitis, only a Hartmann procedure can be performed. In case of a diastatic perforation of the cecum, an ileocecal resection without rectal resection is the best option.

9.4.2   Pelvic Abscess

Contained perforation is diagnosed in a patient with localized abdominal pain, fever, and localized tenderness. CT scan confirms easily the diagnosis (Fig. 9.5b) which is more common than free perforation in colorectal cancer [47]. Treatment of pelvic abscess due to a rectal cancer perforation remains unclear and has to be discussed in multidisciplinary team meeting. For a small size abscess (<5 cm), IV antibiotics may probably be sufficient. For larger abscess, antibiotics associated with an ultrasound-guided or CT-guided percutaneous drainage can theoretically avoid the morbidity of an emergency proctectomy. Although percutaneous drainage presents many advantages as sparing the risk of a laparotomy, lower morbidity, and shorter length of hospital stay, drainage may result in spreading tumor cells along the drainage tract, in subcutaneous and skin plan which can lead to a metastatic

disease [47]. For this reason, if the diagnosis of rectal is known, we prefer to avoid any percutaneous drainage if the aim is to treat the patient with curative intent. In these cases, if antibiotics fail to control sepsis, surgery with Hartmann's procedure is the only remaining option.

9.5   Conclusion

Emergencies related to primary rectal cancer remain rare and have been poorly reported in the literature. For this reason, it remains a subject of debate, and no guidelines have been proposed to date. The management of these patients needs most of the time a multidisciplinary team meeting with surgeons, intensivist, radiologists, and oncologists. The aim of the treatment is to try to avoid the high morbidity and the risk of suboptimal oncologic resection associated with emergency proctectomy.

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