



General and Supportive Care

Surgical emergencies in oncology



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ABSTRACT

An oncologic emergency is defined as an acute, potentially life threatening condition in a cancer patient that has developed as a result of the malignant disease or its treatment. Many oncologic emergencies are signs of advanced, end-stage malignant disease. Oncologic emergencies can be divided into medical or surgical. The literature was reviewed to construct a summary of potential surgical emergencies in oncology that any surgeon can be confronted with in daily practice, and to offer insight into the current approach for these wide ranged emergencies.

Cancer patients can experience symptoms of obstruction of different structures and various causes. Obstruction of the gastrointestinal tract is the most frequent condition seen in surgical practice. Further surgical emergencies include infections due to immune deficiency, perforation of the gastrointestinal tract, bleeding events, and pathological fractures.

For the institution of the appropriate treatment for any emergency, it is important to determine the underlying cause, since emergencies can be either benign or malignant of origin. Some emergencies are well managed with conservative or non-invasive treatment, whereas others require emergency surgery. The patient's performance status, cancer stage and prognosis, type and severity of the emergency, and the patient's wishes regarding invasiveness of treatment are essential during the decision making process for optimal management.

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Introduction

Over the past decades, there has been an increasing incidence of cancer diagnoses, resulting from changing lifestyles, aging of the population and the implementation of screening programs [1–3]. Luckily survival has improved due to earlier detection and the development of more efficient cancer specific treatment regimens. Consequently, there will be an increasing number of patients with a history of cancer presenting at the Emergency Room (ER). Cancer patients can present at the ER for various reasons; symptoms caused by malignant disease, complications of cancer treatment, or symptoms not directly related to malignant disease or treatment [4–9]. As cancer patients admitted through the ER often have advanced disease, and the frequency of visits to the ER rises near the end of life, this patient category requires special attention [10,11].

An oncologic emergency is defined as an acute, potentially life threatening condition in a cancer patient that has developed, directly or indirectly, as a result of the malignant disease or cancer

treatment [12,13]. Any cancer patient can experience emergencies that require surgical consultation and possible surgical treatment, and any physician can be confronted with these emergencies. Therefore, an understanding of the pathophysiology and prognosis of the various emergencies is necessary for correct management. Many emergencies in oncology are signs of advanced, end-stage disease. To determine which procedures should be undertaken or avoided, it is essential that a surgeon is informed on the performance status of the individual patient, the cancer stage and prognosis, (need for) future cancer-treatment, and the patient's wishes regarding aggressive interventions and treatment at the end of life [14–17].

In the past decades, several reviews have been published concerning emergencies in oncology and their management in general [5,12,13,18–24]. These oncologic emergencies are mostly categorized as metabolic, hematologic, cardiovascular, infectious, and structural [5,12,21,24]. These emergencies can also be categorized as medical or surgical [15]. However, to our knowledge, no review article has been written on the surgical emergencies in oncology specifically. For this article, the literature was reviewed to construct a summary for potential surgical emergencies in oncology that any surgeon can be confronted with in daily practice, and to offer insight into the current approaches for these wide ranged

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emergencies. Guidelines for management are given, but for some cases no details of specific procedures are described, since institutions might have different protocols for execution and management.

Obstruction

Cancer patients can experience symptoms of obstruction of different structures and various causes [15]. A substantial number of obstructions is benign in nature and not caused by tumor mass [15,25].

Obstruction of the gastrointestinal tract

Obstruction of the gastrointestinal tract is the most frequent emergency seen in surgical practice and is characterized by clinical intolerance to oral intake resulting in nausea, vomiting, (abdominal) pain, and absence of stool passage [26–29]. Many patients do not experience a solitary obstruction, but concurrent intestinal obstructions [28].

Initial treatment of any obstruction in the gastrointestinal tract starts with conservative treatment; i.e. restoration of fluid and electrolyte balance, alternatives for feeding, restriction of medications that have a paralytic effect on the intestines, and nasogastric tube placement for decompression with stimulation of intestinal passage with laxatives for distal obstructions [15]. This conservative regimen will keep the patient in (the most) optimal condition and it gains time for diagnostic methods in order to identify the origin of the obstruction, staging of the malignant disease, and multidisciplinary evaluation. Minimally invasive diagnostic methods include imaging studies, endoscopy, and laboratory tests including tumor markers. The route for nutrition depends on the site of obstruction and the patient's clinical tolerance for oral intake. Options for feeding are liquid dietary supplements, a feeding tube past the obstruction if possible, or total parenteral nutrition. Nutrition for patients with obstruction of the small or large intestine should be given through the parenteral route, as a feeding tube functions poorly in case of obstruction more distally. A conservative treatment should be instituted during the diagnostic process for as long as the cause of obstruction is unknown or to see if the obstruction resolves spontaneously, but not longer than 3–7 days [15,30–32]. After this period, decisions have to be made regarding invasive therapy, (diagnostic) surgery, or refraining from any intervention and withdrawal of care. It is important that these decisions are made multidisciplinary and in deliberation with the patient and family; to provide the patient with the essential information regarding prognosis, treatment options and the expected impact, and to follow the patient's and families wishes [33,34]. The routine use of long term parenteral nutrition for patients with malignant obstruction is controversial and should be reserved for patients with minimal tumor burden who will receive surgery or chemotherapy in the near future [34]. When refraining from interventions, it must be considered that continuation of nutrition for the terminally ill patients doesn't influence survival, and may even reduce quality of life by the presence of feeding tubes or indwelling catheters. Table 1 provides a summary of causes and treatment options for the variety of obstruction symptoms.

Causes

Proximal esophageal and gastric outlet obstruction can lead to the initial presentation of esophageal or gastric cancer, or be a symptom of recurrence of locally advanced disease [15,35–37]. It may be caused by intraluminal tumor presence, intraluminal invasion, or extrinsic compression by tumor mass. Benign causes of esophageal obstruction are treatment-related edema, initial

worsening of obstructive symptoms due to chemo- or radiation therapy, and anastomotic strictures after surgery. With the exception of (postoperative) gastroparesis, gastric outlet obstruction is malignant in nature and usually a sign of advanced, incurable disease [38].

Patients with a history of cancer, frequently experience symptoms of small intestine obstruction [15,27]. Benign causes have been reported to account for about 18% up to 55% of cases of small intestine obstruction, including postoperative adhesions, intestinal strangulation or hernia, and structures following radiation therapy [27,32,39–41]. Malignant causes can be intraluminal tumor presence, intraluminal invasion, or extrinsic compression by tumor in primary disease, local recurrence, and peritoneal carcinomatosis [25,27,31,32,42]. Small intestinal obstruction due to recurrent cancer is commonly seen in colorectal cancer, ovarian cancer, gastric cancer and melanoma, and is often a sign of end-stage disease [12,31,42]. The time of the occurrence of obstruction symptoms after surgery tends to be shorter for malignant causes (within three years after the initial surgery), compared to benign causes (median time five years) [25,27,43]. Incomplete obstruction, non-permanent pain, the presence of ascites and a known cancer recurrence prior to the obstruction seem to be indicative for malignant small intestinal obstruction [25,27].

For patients with colorectal obstruction 80% of cases is malignant, and 10–30% of patients with colorectal cancer present with symptoms of obstruction [44]. Malignant colorectal obstruction is often caused by intraluminal tumor presence in cases of colorectal cancer, with the majority located in the left side of the colon [45,46]. Other malignant causes can be metastatic disease of other origin, and pelvic tumors causing obstruction through extrinsic compression or invasion [45,47]. A pseudo-obstruction, Ogilvie's syndrome, may mimic a mechanical obstruction [15,45,48]. Other forms of benign colorectal obstruction can be volvulus, diverticulitis, intussusception, and anastomotic strictures developed after surgery [45]. Colorectal obstruction becomes life-threatening when the presence of a competent ileocecal valve leads to a closed-loop situation with distention of the colon and subsequent risk of colonic perforation [4,15,46].

Management

For proximal obstructions in locally advanced esophageal cancer, there is no indication for palliative surgical resection or bypass [15]. In contrast, some patients with gastric outlet obstruction and a good performance status, may benefit from surgery, e.g. bypass gastrojejunostomy, or distal gastrectomy [15,38,49,50]. Less invasive interventions to establish nutrition in patients with proximal obstruction and poor performance status are endoscopic stent placement, percutaneous gastrostomy or surgical jejunostomy for feeding past the obstruction, [15,35,36,51–55]. Esophageal stent placement and percutaneous gastrostomy should be reserved for patients with fair prognosis, e.g. benign strictures or patients who receive treatment with curative intent, since it is associated with a high complication rate [56–58]. For gastric outlet obstruction, surgery has the potential of causing less long term morbidity dependant on the life expectancy of the patient, by reducing the risk of re-obstruction compared to stent placement. Surgery may be considered for patients with a short tumor length, a single site obstruction, and a life expectancy greater than 60 days [34,59]. Endoscopic ablative techniques are available to reduce proximal obstruction; however, these techniques have a substantial risk of bleeding or perforation and decreased peristaltic motility [36,60,61].

Conservative treatment with stimulation of intestinal passage appears ineffective in many cases of (benign and malignant) obstruction of the small intestine as the obstruction symptoms often reoccur in 47% up to 72% of patients within one year after

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