The management of clinical emergencies in oncology

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Introduction

The incidence of cancer is remaining constant or slightly increasing in Europe. Due to screening programmes and better multi-modality treatment, the prevalence of cancer is significantly increasing. In addition, the aging population in Europe is rapidly rising. People over the age of 65 years may be diagnosed with a variety of other diseases such as cardiovascular, diabetes, arthritis and obstructive lung disease. Although cardiovascular disease is still the largest cause of death of men and women in Europe, it has recently been replaced in The Netherlands by cancer. In general elderly cancer patients have a variety of co-morbidities, which affect the choice and short- and long-term outcome of cancer treatment.

The majority of patients with solid tumours are surgically treated and a fair proportion receive treatment with (neo) adjuvant chemotherapy and/or pre-, peri- or postoperative radiation treatment. Age is not a contra-indication for surgery and radiation treatment. Adjuvant chemotherapy is increasingly safely given to the elderly. The combined treatment approach led to a breakthrough in the treatment of colo-rectal, breast and ovarian cancer with an increase in disease free and overall survival of over 10–15% [1]. The disadvantage of the combined treatment is the related short- and long-term morbidity, sometimes requiring (acute) surgical intervention.

Patients might present with an acute abdomen as the initial symptom of cancer, as a complication related to their initial cancer treatment or related to previous cancer therapy. An initial diagnosis of cancer is made in less than 1% of cases seen in a typical Emergency Department. This figure might be increasing, since more cancer patients receive (high-dose) antitumour therapy and are therefore at risk for acute treatment related morbidity and more cancer patients are prone to long-term treatment induced morbidity.

The literature with respect to the pattern of an acute abdomen in cancer patients is rare. Table 1 outlines the spectrum of cancer patients requiring emergency laparotomy in the early 1980s at the Memorial Sloan Kettering Cancer Centre. The laparotomies were performed for complications directly related to cancer in 35%, for complications related to cancer surgery in 44% and the remaining 21% were for reasons unrelated to cancer [2].

Table 1
Spectrum of diagnosis 213 cancer patients requiring emergency laparotomy [2]

Acute laparotomy in patients with cancer		Diagnosis	
Related to the cancer/	35%	Obstruction	39%
chemotherapy	44%	Perforation	22%
Related to surgery	21%	Haemorrhage	15%
Unrelated to cancer		Infection	10%
		Hernia	3%
		Vascular	3%
		Other	1%
		Negative laparotomy	7%

This review comprises a discussion of the various aspects of the diagnosis and treatment of the acute abdomen as an initial symptom of cancer, an acute abdomen during cancer treatment or follow-up, as well as the ethical considerations of the treatment of the acute abdomen in a cancer patient from the (surgical) oncology perspective.

Bowel obstruction

Intestinal obstruction is the most common indication for emergency surgery and a considerable source of morbidity and mortality. It is empirically managed by various disciplines causing marked variations in the clinical practice [3–8].

An ileus might be the result of a mechanical obstruction due to a primary malignancy, recurrent disease, a second primary malignancy or benign causes such as adhesions and hernia after previous surgery or adjuvant radiation (radiation enteritis). Pseudo

obstruction is often caused by tumour infiltration of the bowel wall. The etiology of the Ogilvie's syndrome, pseudo obstruction of the colon, is unknown and frequently diagnosed in elderly, seriously ill (cancer) patients. Cancer patients sometimes develop a dynamic obstruction due to chemotherapy or narcotics. Intraabdominal malignancies most often associated with obstruction of the gastrointestinal tract are ovarian, colon and gastric cancer. At least two-thirds of patients with ovarian cancer will develop at least one episode of bowel obstruction. The most common extra-abdominal malignancies metastasising to the peritoneal cavity or intestinal wall and mesentery causing obstruction are carcinomas of the lung, breast and melanoma.

The clinical symptoms of a bowel obstruction are complaints of abdominal pain, usually described as intermittent and cramping, abdominal distension, nausea, vomiting and/or constipation.

Physical examination of the abdominal usually reveals distension, tympani on percussion and hypertonic or no bowel sounds. Marked abdominal tenderness is a sign of an acute abdomen caused by a perforation or compromised loop of intestine. Vital signs, heart rate, blood pressure and diuresis, should be recorded since vomiting and sequestration may lead to hypovolaemic shock.

Radiological investigations will provide insight in the case of bowel obstruction. Plain abdominal films show dilated loops of bowel with air-fluid levels while in case of a dynamic obstruction gaseous distension is seen without air-fluid levels. Spiral computer tomography (CT) can provide excellent information with respect to the underlying cause and is increasingly routinely used in the diagnostic work-up of patients with an acute abdomen. Marked distension of the cecum or colon (>12–14 cm) is associated with an increased risk of perforation and is an indication for colonoscopic decompression. A laparotomy is indicated when the decompression is unsuccessful.

A patient with an acute bowel obstruction requires a nasogastric tube, urinary catheter and central venous line for monitoring, stabilising and resuscitation with correction of fluid and electrolytes deficits. Parenteral feeding is started as soon as possible. If the clinical symptoms warrant an observation period, 25–33% of the bowel complaints will be solved with conservative management.

The decision regarding the timing and extent of surgery remains difficult in emergency surgical intervention of an acute bowel obstruction and is accompanied by a high morbidity (up to 50%) and mortality (range 10–25%), mainly caused by the extent of the tumour, the malnutrition and the poor physiological reserve capacity. The ultimate goal of the surgical intervention is to relieve the bowel obstruction with curative intent, which is unfortunately only possible in a minority of the patients [3–8].

In the past both the diagnostic work-up as well as the surgical options were limited. With the currently available spiral CT and the technique of laparoscopy, surgeons are better equipped to 'diagnose' and to 'attack' the acute abdomen in a minimally-invasive manner. Minimally invasive surgery (laparoscopically) or endoscopy (stenting) gains ground and is an excellent diagnostic tool and, in some cases, is therapeutic in patients with bowel obstruction. However, a significant number of patients will require conversion.

The surgical management of small bowel obstruction is resection with primary anastomosis or bypass surgery when resection is impossible. For a right-sided colon cancer, a right hemicolectomy with primary ileo-transverse colostomy is indicated. So far, two types of surgical approach have been used for obstruction of the left-sided colon: primary resection (primary anastomosis or Hartmann's procedure) with simultaneous treatment of carcinoma and obstruction, or staged resection (treatment of the obstruction prior to resection). However, neither strategy has been found to have any advantages over the other. A laparoscopic diverting colostomy may be an alternative.

Recently the technique of enteric stenting of a colonic or rectal obstruction has been developed. Stenting reduces the need for an acute surgical intervention, open or laparoscopically, and the possibility to perform an elective resection of the tumour with primary anastomosis. For disseminated disease the stent can even be used as definitive palliation and these patients achieve long-term relief of obstruction. Stent placement for cancer-related colorectal obstruction is successful in 91% [7]. According to the literature migration occurs in 9%, reobstruction in 5% and perforation in 4%.

The surgical therapy for malignant bowel obstruction remains problematic. The majority of the patients will undergo palliative surgery, resection of the tumour or an enteric bypass procedure(s) when resection of the bowel obstruction is impossible. Studies show a worse overall and disease-free survival and higher local and distant failure rates for patients with obstructing colorectal cancers who underwent resection. Symptom control is achieved in only 40–80% of the patients of the time and peri-operative morbidity and mortality are formidable. Bowel obstruction in cancer patients after previous colorectal cancer surgery occurs in 10–50% and is caused by benign pathology in

26% (range 18–40%) or recurrent cancer in 84% (range 60–73%). The mortality rate after surgery in these patients is 14% (range 9–16%) and palliation is achieved in only 71% (range 54–84%).

Sometimes the obstruction is caused by peritoneal carcinomatosis. Bowel obstruction from carcinomatosis is rarely amenable to surgical intervention. Bypass surgery or even a diverting colostomy is often impossible and bypasses are rarely effective. In general, surgery should be avoided in these patients. If surgery is performed, in case of limited peritoneal carcinomatosis, the morbidity varies between 37–45% and the mortality between 13–29%. Successful palliation is achieved in 45–73%, but reobstruction will occur in 24–48% of the cases. If reobstruction is diagnosed a gastrostomy might be indicated over a nasogastric tube.

Delayed intestinal motility after surgery may be caused by various factors such as narcotic analgesics, radiation therapy, malnutrition and bed rest. Patients who do not regain intestinal function should be offered a tailored palliative treatment with relief of abdominal pain, vomiting and dehydration and no further surgical intervention. Pharmacological management may be very effective, comprising analgesics, antisecretory drugs (octreotide) and anti- emetics. Medication should be tailored to each patient with regard to both the drugs to be administered and the route of administration.

Hernias and benign adhesions should be lysed with care. In case of radiation enteritis the vulnerable bowel should be gently handled. Internal bypass surgery is in general the best surgical treatment of the involved part of the small intestine. Resection is only performed for a small involved segment.

Perforation

Bowel perforation is the second most common indication for urgent abdominal surgical intervention in cancer patients [9]. Perforation of the gastrointestinal tract can be tumour and non-tumour related and might be accomplished with signs of local or generalised peritonitis and sepsis or muted by steroids and/or narcotic medications and is a life-threatening event. An abdominal CT provides insight into the cause of the perforation and the extent of the perforation. The perforation may lead to the formation of an abscess, a fistula (enterovesical, cutaneous) or an intra-abdominal perforation with soiling and peritonitis. In general an emergency surgical intervention is indicated, unless the patient is in an end stage of the disease. Gastrointestinal perforations in cancer patients occur by various mechanisms. Causes of the perforation are spontaneous tumour rupture mostly associated with lower GI-malignancies (perforations from the tumour or proximal to an obstructive tumour), occasionally with upper GI malignancies, cancers metastatic to the bowel (melanoma), necrosis of the tumour after chemotherapy (lymphoma, GIST), or non-cancer related perforations such as inflammatory perforations, drug-related perforations (steroids and non-steroids), or perforations after endoscopic procedures. The incidence of perforation of lymphoma due to cytotoxic treatment is around 4%. Patients receiving bevacizumab in combination with chemotherapy have an increased risk for gastrointestinal perforations (2–4%) [10].

Intestinal perforation is an acute indication for exploratory laparotomy, unless the co-morbidity, end stage of the disease or the patient's decision exclude a surgical intervention. The mortality rate is high, even in patients able to undergo surgery. Morbidity and mortality figures up to 50% are described. Resection of the involved bowel and diversion is the treatment of choice, and primary anastomosis is restricted to patients with small bowel perforations. The prognosis and postoperative recovery is influenced by the patient's condition, nutrition status, performance status and the availability of intensive care facilities. Studies show a worse overall and disease-free survival and higher local and distant failure rates for patients with obstructing and/or perforating colorectal cancers who underwent resection. Early diagnosis and aggressive surgical intervention is essential to improve survival following intestinal perforation in this high-risk population. Gastrointestinal perforations under bevacizumab are difficult to manage due to the fact that these patients also have an increased risk for bleeding, thromboembolisme, and last but not least, with wound healing disturbances. The complication is fatal in 30% of the patients [10].

Haemorrhage

Anaemia may be the first sign of a gastro-intestinal malignancy. Gastrointestinal bleeding is a frequent complication encountered in cancer patients and should not automatically be presumed to arise directly from a tumour [9]. Cancer patients receiving chemotherapy are at risk for irritation of the mucosa and thrombocytopenia. Corticosteroids, nonsteroidal anti-inflammatory drugs and broad-spectrum antibiotics might cause candida oesophagitis, gastric and peptic

ulcers and/or CMV-enteritis. The majority of the bleeding is usually caused by simple gastritis (36%), a peptic or stress ulcer (26%) rather than a necrotic tumour (23%). Low gastrointestinal bleeding may arise from diverticula or colitis. Acute gastrointestinal haemorrhage is a frequent problem requiring emergency abdominal operation in cancer patients despite H2 blockers and proton pump inhibitors and the availability of endoscopic local treatment.

Intra-abdominal bleeding is often the result of rapid tumour necrosis with bowel perforation and bleeding following effective chemotherapy for lymphomas or gastrointestinal stromacell tumours (GIST). The incidence of bleeding of lymphoma due to cytotoxic treatment is around 4%. Patients receiving bevacizumab in combination with chemotherapy have an increased risk of bleeding (2%), and thromboembolism, as well as gastrointestinal perforation [10]. Postoperative gastrointestinal haemorrhage can occur after visceral resection, bypass procedures or in the presence of an uncontrolled infection or sepsis.

The initial treatment of a haemorrhage is conservative and should be focused on stabilisation and resuscitation and correction of the coagulopathies and definition of the site and source of the bleeding. Many factors present in cancer patients may increase the risk of a bleeding diathesis. In case of an upper GI-bleeding, a gastroscopy is performed. Bleeding due to an ulcer is treated with cautery or laser, while gastritis is not amenable to focal therapy. Supportive treatment consists of H_2-receptor blockers and antacids. When conservative treatment is unsuccessful selective angiography with embolisation or surgical intervention is indicated. In case of a gastric bleeding, a near total or total gastrectomy is the treatment of choice and for a peptic ulcer a truncal vagotomy with pyloroplasty. The bleeding of an ulcerated gastric tumour can easily be stopped with radiotherapy. Lower GI-bleedings are much more difficult to localise with colonoscopy. Occasionally, nuclear bleeding scans or selective angiography with selective embolisation may be indicated. An acute (subtotal) colectomy is seldom performed.

Infection

Two sources of infection can be distinguished: extra-abdominal and intra-abdominal infection, with or without concomitant chemotherapy. Causes for extra abdominal infections are fungemia, viremia and bacteremia, for intra-abdominal infections, appendicitis hepatitis, cholecystitis, cholangitis, pancreatitis, enteritis, radiation enteritis, colitis, diverticulitis, hepatic abscess, splenic abscess, nephrolithiasis, pyelonephritis, and cystitis which might cause sepsis in the neutropenic patients. In cancer patients undergoing extensive surgical resections followed by treatment postoperatively on the intensive care, abdominal and pulmonal infections are frequently the cause of septicemia, while in the neutropenic patients, enterocolitis or pancreatitis are diagnosed. Neutropenic enterocolitis (NE) is the most common cause of abdominal pain in the neutropenic patients with an incidence of 1.6% (range 0.35–6.1%) requiring surgery in 20% (range 1.1–61%) and accomplished with a mortality of 43% (range 8.3–92%) according to the current literature. The clinical symptom is characterised by abdominal pain, mostly in the right lower quadrant (also diagnosed as typhilitis, ileocecal syndrome), nausea, vomiting, (bloody) diarrhea, fever, sometimes accompanied with sepsis or bowel perforation. The peak incidence of NE is 7–14 days after initial chemotherapy treatment and caused by 'chemical' bowel damage. The initial treatment is nasogastric decompression, antimicrobial therapy and parenteral feeding. Surgery is only indicated in case of a perforation, severe bleeding, abscess formation or failure of conservative management. Even with currently recommended therapy and intensive care facilities, a high mortality rate, approximating 45%, can occur. Best outcomes for NE rely upon understanding of risks for the condition, prompt empiric therapy with broad-spectrum antimicrobial agents, systemic antifungal therapy, and meticulous attention to supportive care [11].

Pancreatitis is rarely a cause of abdominal pain in cancer patients and, when diagnosed, mainly caused by direct invasion of the pancreas by tumour. It is sometimes diagnosed as a complication after extensive surgical procedures in the upper abdomen for gastric or colon malignancies or cytoreductive surgery in combination with hyperthermic intraoperative intraperitoneal chemotherapy (HIIC). When conservative treatment fails, surgical intervention is indicated.

Radiation enteritis

Radiation, especially for rectal, prostate and pelvic malignancies, with radiation doses of over 40–50 Gy, is accompanied with a severe risk of short- and long-term induced radiation enteritis which can effect the large and small bowel, with an incidence of 5–25%. The risk of radiation enteritis is not only related to the extent of the previous surgery, but also the radiation field size and dose. Other factors

influencing the risk for radiation enteritis are older age, combined chemotherapy, poor radiation technique and post-operative radiation. Careful surgery will reduce the risk of adhesion formation, while technically well performed bowel anatomosis will lead to fewer stricture formation and vascular damage of the bowel and therefore reducing the risk for radiation enteritis. Also, improvements of radiation technique with multiple fields and CT radiation planning decreased the risk for radiation induced bowel complications [12].

Radiation enteritis can cause diarrhea, nausea, weight loss, abdominal pain, intestinal obstruction, and perforation and may cause malabsorption of varying degrees. The acute radiation enteritis develops shortly after radiation and resolves within 2–6 weeks. Radiation enteritis usually manifests 6–18 months after radiation, but can present as late as 20 years. Fibrosis may cause structure formation, and small bowel obstruction is often the first clinical sign of the underlying disease. Prevention is the key to avoid radiation enteritis. A conservative approach is advised; metabolic abnormalities are corrected, treatment of inflammation and surgery only on indication. Approximately one-third of the patients progress to a point were surgery is required, in general persistent ileus, intestinal fistulisation, and massive adhesions. If surgery is performed, resection of the involved bowel is the best treatment and generally is terminal ileum resected and right hemicolectomy with an ileo-transverse anastomosis performed. Another adequate procedure is not resection but bypass surgery with side-to-side anastomosis, not interfering with the circulation. The surgical morbidity is high, especially in patients undergoing emergency surgery, mortality rates are as high as 10–20%. Many patients require more than one laparotomy. Non-surgical oncologists often underestimate radiation complications since diffuse fibrosis and adhesions between bowel loops can make resection technically challenging. There is an increased risk of anastomotic leakage. Extensive bowel resections may lead to a short bowel syndrome [12].

Miscellaneous

Biliary obstruction

Obstruction of the biliary tree can result from benign disease (calculous disease), primary biliary tract tumours (intrinsic disease) or metastatic disease (extrinsic disease). Profound jaundice can be associated with coagulopathy, malabsorption, malnutrition, and immune dysfunction. The treatment of the jaundice is dependent on the cause of the jaundice. The site of obstruction can be visualised with the aid of ultrasonography, CT and/or MR of the liver, biliary tree and pancreas and imaging of the tumour with an ERCP, if possible. Jaundice may also be caused by hepatic metastases, cirrhosis, hepatitis, hepatotoxic drugs or sepsis. The treatment of the biliary obstruction can be surgically, endoscopically (stent) or by the intervention radiologist with transhepatic biliary drainage. Hepatic abscesses are well managed non-surgically by directed ultrasound guided drainage. Surgery of liver metastases (liver resection, local excision, radio frequency ablation, cryosurgery), biliary tree, or pancreatic cancer should only be performed with curative intent. Routine preoperative biliary drainage has no effect on the morbidity or mortality figures for biliary tree or pancreatic surgery. Endoscopic stents (polyethylene stent or Wallstent) are preferable to palliative surgical biliary bypass procedures in palliation of malignant distal biliary tract obstruction. In selected cases there may be an indication for radiation treatment and/or chemotherapy, often combined with a stenting procedure [13].

A calculous or acalculous cholecystitis is sometimes diagnosed following chemotherapy and may cause biliary obstruction. These patients can be treated with antibiotics, drainage of the gallbladder, conventional or laparoscopic cholecystectomy.

Ascites

Malignant ascites complicates the clinical course of many patients with cancer and represents a grave prognostic sign. Ascites is commonly the result of peritoneal carcinomatosis and seen in ovarian cancer, breast cancer, or gastrointestinal malignancies. The pathophysiology is an exudation of intraperitoneal fluid by the tumour implants or the result of obstructed subdiaphragmatic lymphatics. Ascites is uncomfortable for the patient, may cause anorexia, nausea, and hamper respiration. Malignant ascites, proven with cytology, has been a notoriously difficult problem to treat. Although paracentesis relieves symptoms, it is not an effective treatment, since fluid accumulation is rapid. The 'best' treatment of ascites is the treatment of the underlying disease and should be highly individualised. Only in selected cases is surgical intervention with a peritoneovenous shunting indicated [14].

Abdominal pain in bone marrow transplants

The role of bone marrow transplants (BMT) in the treatment of solid tumours is controversial and well accepted for many haematologic malignancies. Half of the patients experience abdominal pain during their

BMT treatment. Three phases of abdominal pain might be distinguished during the BMT treatment. First, the marrow ablative chemotherapy and radiation are toxic for the gastrointestinal mucosa causing dysphagia, nausea, vomiting, diarrhea and colicky pain. Oesophagitis or gastritis might cause gastrointestinal bleeding. Secondly, neutropenia is responsible for all kinds of intraabdominal bacterial, fungal, or viral infections. The infections are treated conservatively. The third phase is characterised by the graft versus host disease (GVHD) that occurs in 30–80% of the patients subject to an allogeneic transplant. Surgical intervention is seldom indicated. Severe bleeding, obstruction or perforation are the most common indications for surgery. Veno-occlusive-disease (VOD) is another complication seen in 20–50% of these patients. In 15% of these patients the VOD is so severe that the mortality rate is almost 100%.

Abdominal pain in bone marrow transplants is seldom an indication for surgery. Surgical intervention is only indicated in case of a perforation or haemorrhage.

Abdominal pain in patients treated with bevacizumab

Bevacizumab, a humanised monoclonal antibody against vascular endothelial growth factor (VEGF), is linked to an increased incidence of gastrointestinal perforation (2–4%) fistula, intra-abdominal abscess and/or wound healing disturbances, in some instances resulting in fatality. Gastrointestinal perforation should be included in the differential diagnosis of patients presenting with abdominal pain. Gastrointestinal perforation occurred at various time points during treatment. Regardless of the underlying oncologic diagnosis, patients with gastrointestinal perforation typically present with abdominal pain, nausea, fever, constipation and/or vomiting. Events occurred from 1 week to 1 year following initiation of therapy, with most events occurring within the first 50 days and 30% of reported cases were fatal. Permanent discontinuation of bevacizumab is advised in patients with GI perforation or wound dehiscence and/or serious bleeding requiring medical intervention. The appropriate interval between surgery and subsequent initiation of bevacizumab therapy to avoid the risks associated with impaired wound healing remain unclear. An interval of at least 28 days post surgery is advised. Similarly, the appropriate interval between termination of bevacizumab therapy and subsequent elective surgery has not been determined. Study showed that addition of bevacizumab to chemotherapy had an increased rate of wound healing/bleeding complications (15%). The calculated half-life of bevacizumab (20 days) should be considered when determining the interval between treatment end and subsequent elective surgery [10].

Ethical considerations in the treatment of the acute abdomen

The surgeon evaluating a patient with an acute abdomen without any previous medical history will perform the standard diagnostic approach and appropriate surgical or non-surgical treatment. Non-surgical treatment, as described previously, can be drainage of an abscess by the intervention radiologist, stenting of common bile duct or obstructing colon malignancy by the gastroenterologist. When an exploratory laparotomy or diagnostic laparoscopy is performed the surgical treatment is based on the intraoperative diagnosis, the tumour diagnosis and the presence or absence of disseminated disease. An abdominal catastrophe is often diagnosed in a severe ill patient with limited reserves. Although extensive surgery is almost always possible and intensive care facilities available, the surgery will hardly significantly alter the disease outcome [15].

Ethical considerations in emergency situations are especially encountered in terminal ill cancer patients under (palliative) chemotherapy treatment or in patients with complications of recurrent disease. In general, conservative treatment is the first treatment option for these patients under palliative care. Surgical intervention will hardly prolong survival or improve the quality of life. The treatment options, expected risks and outcome, but also the options of resuscitation should be discussed with the patient, family and supportive care givers. It is often more difficult not to operate than transferring the patient to the OR and afterwards to the recovery or intensive care. The final decision must be collaborative interaction between the patient and the surgeon [16,17]. Sometimes *"it is better to die, than to be surgically treated"*. Surgeons are confronted in emergencies in surgical oncology and palliative care with numerous ethical dilemmas and complex treatment decisions. Surgical skills and moral sensibility are the two cornerstones in palliative care in surgical oncology. Since a great majority of cancer patients are treated with a combined approach in which various disciplines are involved, the indication for surgical intervention or a conservative approach should sometimes be a 'team decision'. Honest information to these patients without destroying hope requires skills. It urges moral education and ethical reflection and should not only

be part of surgical training programs but should be incorporated in all the curriculae of physicians treating patients with cancer [18].

Summary

A patient with an acute abdomen requires surgical consultation. The acute abdomen might be the first symptom of a malignancy. When the patient has been treated for cancer in the past, the acute abdomen might be related to the previous cancer treatment or recurrent disease. Since the majority of cancer patients are treated with combined modality treatment, with (neo)adjuvant chemotherapy, pre-, post-, or perioperative radiation treatment and the radiation doses and dose intensity of cytostatic or antiangionetic agents is increasing, the risk for treatment related complications increased too. Beside this, the vast majority of these, often elderly, patients have co-morbidities effecting the treatment outcome for an acute abdomen. An aggressive surgical approach is in the majority of the cases indicated, if ethically appropriate, to solve the complication. There are still marked variations in clinical practice concerning surgery in these patients between the surgical procedures, morbidity figures, and final outcome, which is based on the individual experience of the surgeon, the department, the hospital and the cancer centre.

Conflict of interest statement

None declared.

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