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Case Report

Laparo-Therapy for Perforated Colon Cancer – Case Report with Review of Literature

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Abstract: Perforated colon cancer is considered as disseminated cancer. Though colon cancers are common, their presentation with perforated peritonitis is uncommon. Traditionally, disseminated cancers have been managed by conventional open surgery. We, herein, report the case of a 41 years old male patient who presented to the hospital with perforated transverse colonic malignancy and was managed by laparoscopy. The rationale for reporting this case is to underscore the fact that with appropriate case selection, even perforated colon cancers can be managed by minimal invasive surgery, in advanced setups by an experienced team.

Keywords: Colon cancer, disseminated, laparoscopy, open, perforated.

INTRODUCTION

Colon cancer ranks as the eighth most prevalent cancer in men and the ninth in women [2]. In contrast, colorectal cancer is the third most common cancer in men and the second most common in women in Western countries [2]. The greater incidence of colorectal cancer in regions like America and Europe, compared to Africa and Asia, is often linked to higher levels of development and income [2]. Although the incidence rates of colorectal cancer in India are relatively low, the total number of cases remains considerable due to the country's large population and underreporting of the disease. Interestingly, there is a higher occurrence of colon cancer among urban populations in India and Indian migrants living overseas. With the rapid urbanization and shifts in diet and lifestyle, it is expected that the rate of colon cancer in India will increase in the next decade. In India, the yearly rate of colon cancer is 4.4 per 100,000 in men and 3.9 per 100,000 in women [2]. Around 15% of individuals with colon cancer experience surgical emergencies, such as perforation and obstruction [1]. The occurrence of perforated colorectal cancer varies between 3% and 10% [1].

CASE REPORT

A 41 years old male patient presented to the emergency department with chief complaint of acute onset pain in the upper abdomen since 2 hours. He gave history of constipation since 3 months along with loss of apetite and weight loss of about 4 kgs over past 3 months. He had no known co-morbidities. He was an executive in the clothing retail sector and had no significant contributory relevant family history. He had no addictions. On examination, his pulse was 96 beats per minute, respiratory rate was 16 per minute and blood pressure was 130/80 mms of Hg. On per abdomen examination, he was guarded in the upper abdomen. A plain Xray chest did not reveal any free gas under diaphragm, but showed gas filled small and large bowel loops with no air fluid levels. A contrast enhanced computed tomography scan of the abdomen revealed a large mass arising from the proximal transverse colon with free leak of contrast from it. Also it showed free gas along with some free fluid in the supracolic compartment. He was advised emergency surgery for the same. It was decided to perform a laparoscopic SOS converted to open intervention for him, since there was not a lot of contamination in the peritoneal cavity and he was hemodynamically stable. The said surgery was

performed in supine position with both lower limbs in straight and split up positions. The surgeon stood in between the patient's legs, the camera surgeon stood on the patient's right side and the scrub nurse on the left side. The monitor was placed above the patient's right shoulder. He was strapped firmly to the table, after due soft padding of concerned pressure points, over the chest, in order to enable steep intraoperative position changes. Pneumoperitoneum was established by the closed technique at the umbilical site. Then a 10 mm trocar as inserted at the same site. This was the 1st optic port. Then, under vision, another 10 mm trocar was inserted in the suprapubic area along the midline. Two 5 mm trocars were inserted one in each of the iliac fossae. A large phlegmonous mass was noted arising from the proximal half of the transverse colon with some pus around it. A 2 mm sized perforation was also noted in the lower aspect of the mass. The pus was sucked out and a laparoscopic radical right hemicolectomy was planned. A medial to lateral approach was adopted. The ligasure and harmonic scalpel were used as the energy sources. The ileo-colic pedicle was first identified, skeletonized and divided between clips. The dissection the moved cephalad o the right colic vessels which were also skeletonized and divided between clips. Then the middle colic artery was identified, skeletonized and divided between clips. Along the way the C-loop of the duodenum along with the head of pancreas were identified and dissected down. The transverse colon was then transected about 10 cms distal to the distal extent of the mass, using an Endo GIA linear cutter loaded with a blue cartridge. Thereafter, the terminal ileum was transected using the same about 10 cms proximal to the ileo-colic junction. After this, the lateral dissection was commenced and completed so as to free the specimen. Hemostasis was achieved and a thorough peritoneal toilet was given. Then, a completely intra-corporeal side to side ileo-transverse stapled cum sutured anastomosis was performed. The specimen was then retrieved through the widened hypogastric trocar site, after first 'bagging' it; while using the wound protector. A 32 French tube drain was left in situ in the right side after introducing it through the widened right 5 mm trocar. The immediate postoperative recovery was uneventful, He passed flatus on postoperative day (POD) 3 and was started on liquid feeds. Upon tolerating these, semisolid diet was started after removal of naso-gastric tube on POD 4 and the drain was removed. He moved bowels on POD 5 and was discharged from the hospital. On his POD 10 out patients department follow up visit, all his wounds had healed well. The specimen histopathology report revealed a moderately differentiated mucinous adenocarcinoma involving and invading the serosa with tumor site perforation. Twenty four nodes were found in the specimen and were all negative for metastasis (pT4aN0). He was then referred to the medical oncologist for further treatment. An adjuvant chemotherapy regime was started and he was put on a surveillance protocol.

At the time of writing this paper, a telephonic interview was held with the patient. Thirty two months after his surgery, he had completed his chemotherapy cycles, continues to follow up with reports advised as part of surveillance, with the medical oncologist and is disease free, so far.

DISCUSSION

Colon perforation, while uncommon, is a serious complication in colon cancer patients that typically necessitates emergency surgery. The presentation of perforation can differ depending on whether it occurs at or near the cancerous site. Peritonitis tends to be more severe when the perforation is proximal to the cancer. However, the effect of perforation location on patient outcomes is still uncertain. Surgical approaches to managing colon cancer with perforation have evolved over time. Recent studies have highlighted the safety and effectiveness of a single-stage procedure, which includes resection and primary anastomosis, often with intraoperative colonic lavage [3].

In certain situations, laparoscopic surgery may be considered as it provides the advantage of being less invasive. However, despite these advancements, emergency surgery for colon cancer with perforation is still linked to high mortality and morbidity rates. The long-term outcomes for these patients do not seem to be significantly influenced by the presence of perforation. Oncologically curative resection remains a feasible option for patients with perforated colon cancer.

Perforation occurs in about 2 to 12% of patients with colorectal diseases, making it the second most common emergency complication in those with colorectal cancer [4]. Perforation may cause bowel contents and tumor cells to leak freely into the peritoneal cavity, or it may remain contained within an abscess. Patients with free perforation typically face worse outcomes due to significant physiological disruptions, often rapidly developing peritonitis and septic shock, along with severe complications. Despite progress in intensive care and perioperative care for critically ill surgical patients, the perioperative mortality rate continues to be high, around 12% [4]. The 2017 National Emergency Laparotomy Audit in the UK indicates a similar mortality rate of 13-18% for patients undergoing emergency laparotomy for different clinical indications. This suggests that patients with perforation caused by malignancy tend to die from the physiological consequences of sepsis rather than from the cancer itself.

Typically, the standard surgical approach is laparotomy, which is carried out after resuscitation, provided the patient's condition permits. During the laparotomy, a comprehensive peritoneal lavage is performed, the site of the perforation is identified, and sepsis is treated. Although identifying and documenting any peritoneal disease is recommended at this stage, it can be challenging due to fecal peritonitis and extensive

contamination. The perforation site must be resected, and if malignancy is suspected or previously confirmed, oncological surgical principles should be followed, including performing the appropriate lymphadenectomy. For right-sided tumors, the choice between performing an anastomosis or creating a double-barrel stoma depends on the patient's condition and the extent of contamination. In left-sided tumors, the decision follows similar guidelines as for perforated benign conditions. A study by Constantinides et al. on over 900 patients undergoing emergency surgery for acute diverticulitis revealed that primary anastomosis had a lower mortality rate (7.4% vs. 15.6%) compared to Hartmann's procedure, although sicker patients were more likely to undergo

Hartmann's, so these findings should be interpreted with caution [4]. The decision-making process must ultimately be individualized, taking into account the patient's unique circumstances and the available surgical expertise.

In patients with malignancy, a critical consideration is that an anastomotic leak not only exacerbates morbidity and mortality but also significantly delays the commencement of systemic chemotherapy, thus increasing the risk of systemic disease progression. Once a tumor perforates, tumor cells are released into the peritoneal cavity, thereby elevating the likelihood of developing colorectal peritoneal metastasis (CPM), a condition once regarded as terminal. However, recent advancements in research and therapeutic approaches have profoundly shifted this perspective. Certain patients who undergo cytoreductive surgery (CRS) followed by hyperthermic intraperitoneal chemotherapy (HIPEC) have achieved extended survival, and in some cases, even a cure.

For patients with a perforated colorectal tumor, comprehensive staging is essential, typically involving computed tomography (CT) scans of the chest, abdomen, and pelvis. If this has not been performed during the acute phase, it should be done once the patient has stabilized post-sepsis. Treatment should be coordinated through a multidisciplinary team, as collaboration across various specialties is vital.

A review of eleven retrospective cohort studies, encompassing a total of 2,696 patients with perforated colorectal cancer (PCC), revealed that these patients generally experience poorer outcomes than those without perforations. Specifically, those with PCC face a higher risk of death within 30 days after surgery (8-33% vs. 3-5%), increased postoperative complications (33-56% vs. 22-28%), lower overall survival rates (36-40% vs. 48-65%), and diminished disease-free survival (34-43% vs. 50-73%) [5]. Furthermore, two studies differentiated between free and contained perforations, revealing that free perforations are associated with significantly higher 30-day mortality (19-26% vs. 0-10%), reduced overall survival (24-28% vs. 42-64%), and lower disease-free survival (15% vs. 53%) compared to contained perforations [5].

Perforation can occur in two primary ways: either directly through the tumor due to tumor necrosis, or in the colon proximal to the tumor as a result of a "blow-out" caused by a closed-loop obstruction. In this scenario, increased pressure in the colon above the obstruction occurs because of a functioning ileocaecal valve. Perforations are most commonly found in the sigmoid colon and caecum [6].

Additionally, metastatic spread is more commonly seen in cases of perforated colon cancer than in those with non-perforated colon cancer [6]. In patients with obstructive colorectal malignancy, considerable dilation of the right colon, especially the caecum, without concurrent ileal distention, may suggest an impending diastatic perforation of the caecum due to closed-loop obstruction, resulting from the failure of decompression through the ileocaecal valve. Furthermore, a caecal diameter exceeding 9 cm is linked to an elevated risk of perforation, with pneumatosis potentially preceding the perforation itself [6]. In instances of colon cancer perforation combined with colonic obstruction, a considerable volume of free air is commonly detected.

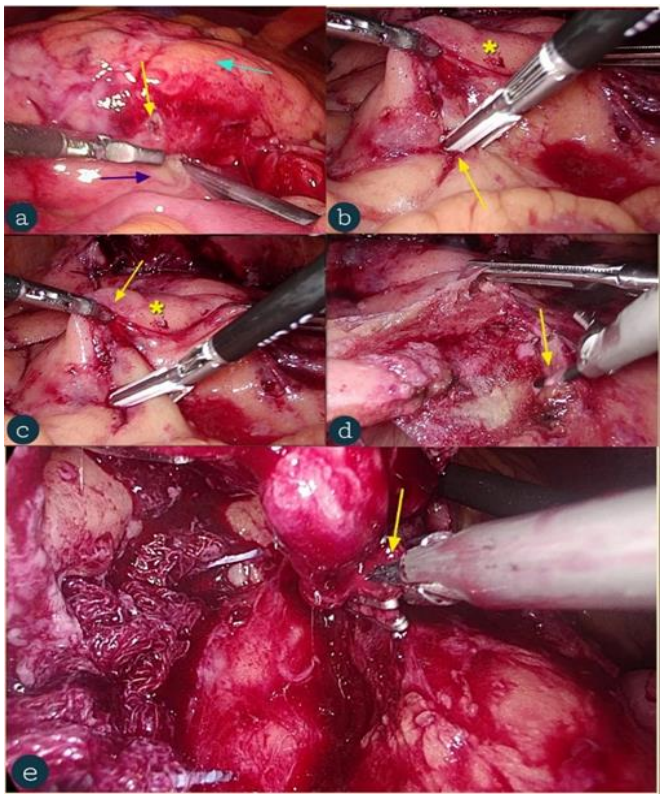

Fig. 1: a) shows transverse colonic mass (light blue arrow) with pus (dark blue arrow) and perforation (yellow arrow), b) identification of ileo-colic pedicle (yellow asterisk), c) dissection around ileo-colic pedicle using ligasure (yellow arrow), d) skeletonization of ileo-colic pedicle using harmonic scalpel (yellow arrow), e) division of ileo-colic pedicle between clips (yellow arrow)

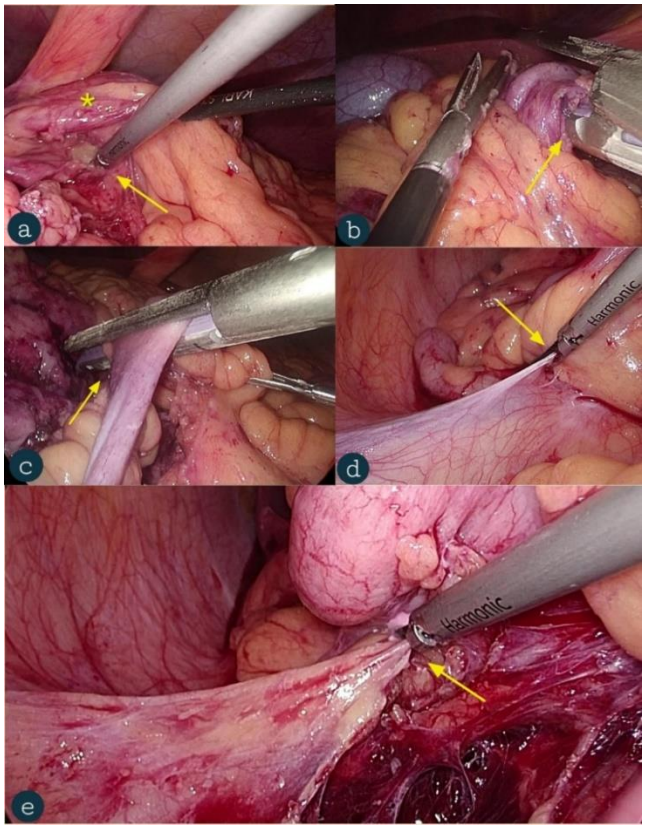

Fig. 2: a to e) Clipping and division of right colic and middle colic pedicles respectively

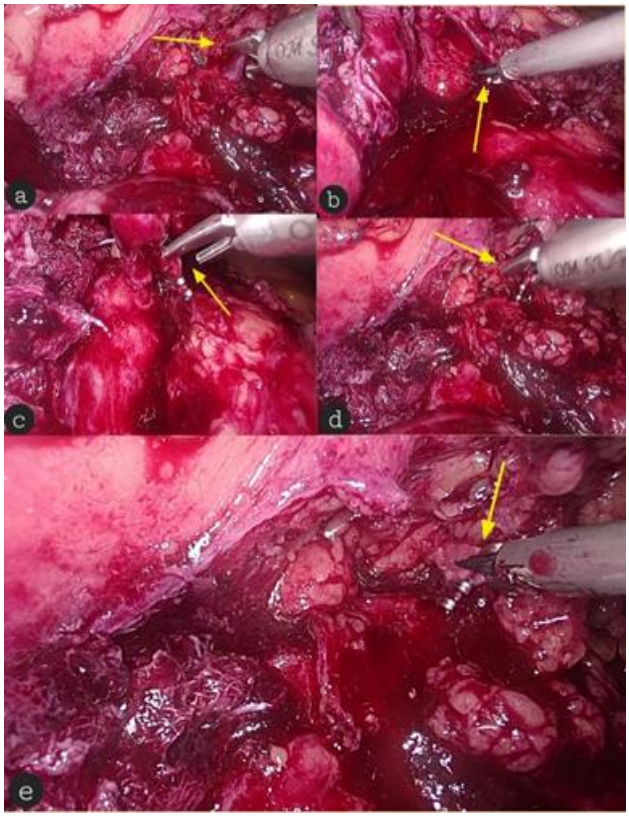

Fig. 3: a) creation of window (yellow arrow) in transverse mesocolon (yellow asterisk), b) transection of transverse colon with stapler (yellow arrow), c) transection of terminal ileum with stapler (yellow arrow), d, e) lateral dissection (yellow arrows)

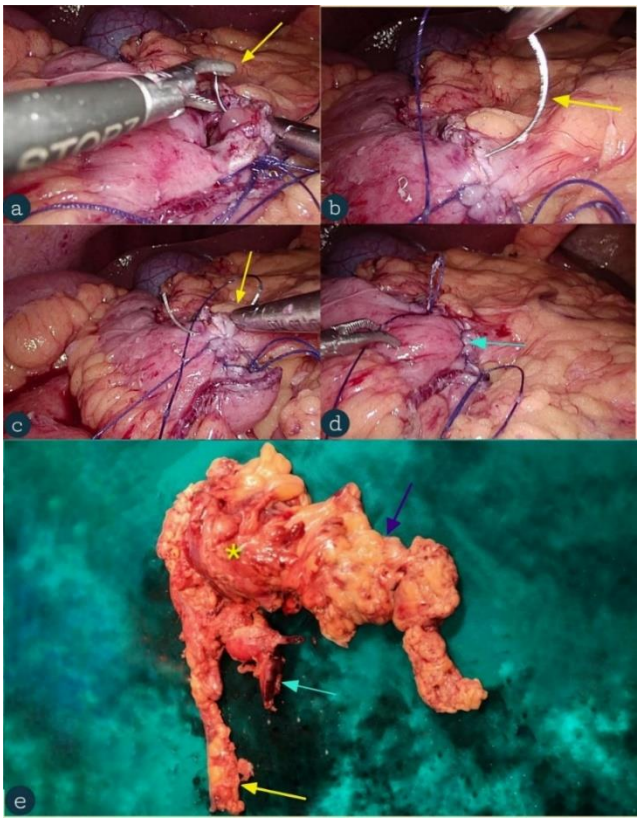

Fig. 4: a, b, c) stapled cum sutured ileo-transverse anastomosis (yellow arrows), d) endresult (yellow arrow), e) specimen showing ileum (yellow arrow), mass (yellow asterisk), ileo-colic pedicle (light blue arrow) & transverse colon (dark blue arrow)

CONCLUSION

As seen in this report, it is feasible to manage some cases of perforated colon cancer, laparoscopically. This requires an advanced setup and a well trained experienced surgical team. Also, as seen here, with appropriate case selection, the results and outcomes of minimally invasive surgery are at par with open surgery even for perforated colon cancer. However, larger volume randomized studies are required to further validate this.

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