

Robotic Subtotal Colectomy with en-bloc Resection of the Left Chest wall for Locally Advanced Colonic Cancer: A Case Report and Literature Review

Lesley-Ann Naik¹, MD; Samuel Stefan¹, MD; Christopher Ball², MD; Jim Khan^{1,3*}, PhD

¹Colorectal Department, Queen Alexandra Hospital, UK

²Radiology Department, Queen Alexandra Hospital, UK

³Anglia Ruskin University, UK

*Corresponding authors:

Jim Khan,
Colorectal Unit, Queen Alexandra Hospital, Southwick Hill Road, Portsmouth, PO6
3LY, UK. Tel: +2392286000
Email: Jim.Khan@porthosp.nhs.uk

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Abstract

Introduction: Locally advanced colonic cancers requiring multivisceral en-bloc resections are typically undertaken in an open or laparoscopic approach.

Case Presentation: Here, we report a case of a complex robotic subtotal colectomy with en-bloc resection of the chest wall and left 10th to 12th ribs for management of a locally advanced descending colon cancer and peritumoral abscess at our institution in June 2020. The procedure included intraoperative ultrasound scan-guided marking to delineate the tumoral extent. Histologically, negative excision margins (R0) were achieved. We also briefly reviewed the relevant literature. There are very few publications on multivisceral resections for advanced colonic cancer; this is the second reported case of robotic en-bloc colonic resection in English literature. A similar case report published in 2019 enforced the value of multidisciplinary collaboration and the benefits of robotic over laparoscopic surgery in en-bloc resections.

Conclusion: Considering the improved short-term outcomes and comparable oncological safety granted by laparoscopic surgery, minimally-invasive surgery has a clear role in the surgical management of locally advanced colorectal cancers.

Keywords: en-bloc resection, Multivisceral resection, Colonic cancer, Robotic surgery, Subtotal colectomy, Peritumoral abscess

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Introduction

Colorectal cancer is the second most common cancer worldwide, with 10–20% presenting as locally advanced cancers invading into adjacent organs (1, 2). Nonetheless, the potential for long-term survival or even cure of this advanced disease can be

offered with multivisceral en-bloc surgical resection with histologically-confirmed negative margins (R0) alongside oncological therapy (1, 2).

While multivisceral resections (MVR) are traditionally carried out via open surgery (2), our institution has previously reported feasibility and success with robotic MVR for locally advanced rectal

cancer (3). The robotic platform overcomes a number of the inherent ergonomic limitations of laparoscopy.

Here, we present a case of a robotic subtotal colectomy for a primary locally advanced descending colon cancer with en-bloc resection of the chest wall and the left 10th to 12th ribs. This case demonstrates the advantages of technological advances in improving the surgical and oncological outcomes for such patients. Emphasis is also on the multidisciplinary team (MDT) management of a complex case and the use of multimodal treatment options to achieve complete cancer clearance. This case was managed successfully with significant input from the surgeons, radiologists, oncologists, pathologists, anesthetists, and liver surgeons. We also present a literature review on the surgical management of locally advanced colonic cancers.

Case Presentation

A 70-year-old man complaining of a change in bowel habit was seen in a gastroenterology clinic. Colonoscopy diagnosed a tumor in the proximal descending colon and tissue biopsy confirmed a well-differentiated adenocarcinoma. The cancer was staged via chest, abdomen and pelvis (CAP) computed tomography (CT), which not only confirmed the initial endoscopy findings but also revealed at least six liver metastases. Locally, the tumor appeared to be involving the abdominal wall. Following a discussion among the MDT, the patient underwent further assessment with a positron emission tomography (PET)/CT scan for further characterization of the local disease in the left colon; liver magnetic resonance imaging (MRI) also confirmed the CT findings.

The patient was referred to the regional hepatobiliary surgeons (HPB). The consensus of the HPB MDT was to treat the patient with systemic chemotherapy with a view for assessment of response three months later. He received three cycles of triple chemotherapy, and a subsequent staging CT scan showed a favorable response at both the primary tumor site and in the liver. However, there was new evidence of local tumor

perforation with abscess formation in the abdominal wall. This was treated with a two-week course of antibiotics and the patient's condition improved sufficiently to proceed with further chemotherapy. Meanwhile, clinical decision-making contemplated the timing of the liver and colonic surgery; the liver metastases required a two-stage resection whilst the primary colonic tumor needed a subtotal colectomy with ileo-sigmoid anastomosis.

After six months of chemotherapy, reassessment with CAP CT and PET/CT confirmed no further spread of the disease. Liver MRI showed a complete radiological response; however, the colonic tumor had persistent residual activity on PET/CT. The localized perforation and abdominal wall abscess, as previously noted, had progressed to track cranially within the chest wall (Figure 1). Soon after, the patient had an emergency admission with a week's history of worsening left upper quadrant pain and pyrexia. Following further MDT discussion and in light of his emergency presentation, he underwent a robotic subtotal colectomy with en-bloc excision of the chest wall and left 10th to 12th ribs.

The Da Vinci X® surgical system (Intuitive Surgical California, USA) was used for this procedure. We undertook suprapubic port placement with docking over the left shoulder. Subtotal colectomy was performed as there was extensive nodal disease at the root of the middle colic vessels, which was cleared with D3 lymphadenectomy and complete mesocolic excision. An ileo-sigmoid side-to-side stapled anastomosis was performed.

The main challenge was the excision of the involved abdominal and chest walls as well as the ribs as the abscess was seen expanding into the subcutaneous and subfascial plane for some distance cranial to the tumor. A gastrointestinal radiologist was present during the surgery to perform intraoperative ultrasound scan (IUS)-guided marking of the chest wall with spinal needles. These markings aimed to delineate pathological tissue within the chest wall (tumoral invasion and peritumoral abscess) and to improve the orientation of excision margins (Figure 2).

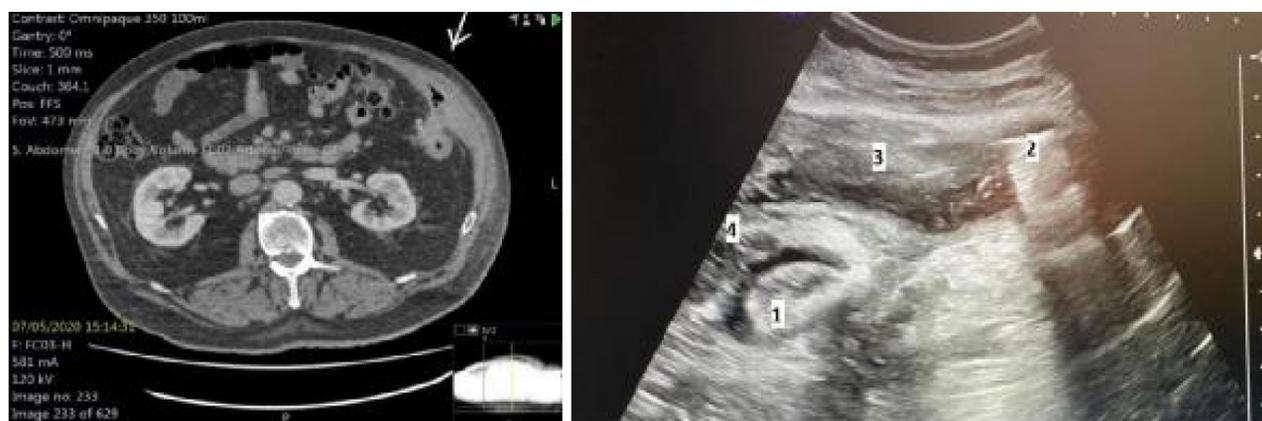


Figure 1: Left: CT scan description of the peritumoral abscess (arrow) in the abdominal wall; Right: intraoperative ultrasound scan (IUS), 1 - descending colon, 2 - 11th rib, 3 - intramuscular abdominal wall abscess cavity, 4 - extra-muscular tumor extension.



Figure 2: Left: IUS-guided marking with needles demarcating the pathological area in the left upper abdominal wall; Middle: intraoperative aspect after undocking the robot; Right: surgical specimen.

The entire surgical procedure was completed robotically, and the abdominal wall muscles were divided internally around the tumor and abscess cavity. An incision was then made to excise the skin and abdominal wall en-bloc as outlined by the IUS markings. Parts of the 10-12th ribs were excised en-bloc with the tumor mass (Figure 2, right). The mass and abscess were successfully evacuated without spillage. The whole procedure took 480 minutes including the robotic time of 350 minutes and IUS time of 20 minutes. There were no intraoperative complications and the estimated blood loss was 100 mL.

Post-operatively, the patient was admitted to the intensive care unit where he required a short duration of inotropic support followed by a gradual de-escalation of care on the local colorectal enhanced recovery pathway. His recovery was further complicated by ileus and a minor extraction wound infection. He was discharged on postoperative day 16.

Histopathology analysis confirmed the perforation of the tumor into the abdominal wall with an abscess cavity extending up to the ribs. The tumor was a well-moderately differentiated adenocarcinoma of the colon with local invasion through the muscularis propria into the adjacent abdominal wall, classified as pT4b N1b M1a with clear excision margins and involvement of 3/65 lymph nodes. The case was further discussed in the MDT follow-up meeting in a plan to offer the patient adjuvant chemotherapy in view of the histological findings. He will be under regular surveillance for his liver metastases.

Discussion

En-bloc resection of colonic cancers has been reported to be successful in the literature; however, we find this case unique due to the multimodal management approach, enhanced by technological advances and an expansive MDT effort consisting of contributions from the regional liver and local colorectal MDTs as well as the oncological and surgical departments.

This case highlights the role of MDT involvement from the initial presentation of fit individuals with borderline resectable cancers. Continual discussion and reassessment of the patient's progress within the MDT cannot be understated, as opposed to defaulting to a palliative paradigm on the diagnosis of such advanced disease.

We also showcase the management of a complex cancer case with robotic surgery and intraoperative imaging. The robotic approach offers several technical advantages over laparoscopic surgery, namely better ergonomics, enhanced camera view, multiple operator-controlled arms, and surgical precision whilst navigating a narrow cavity. The IUS-guided marking of the abdominal wall allows the surgeon real-time intraoperative navigation, which was key towards achieving R0 resection margins in this case.

A review of the literature revealed a single video case report of a robotic colonic and en-bloc resection for the treatment of T4b colon cancer in Taiwan last year. Chen *et al.* noted a similarly prolonged operation time and successfully achieved R0 resection, good tumor control, and cure on a six-month follow-up. Chen *et al.* also highlights the value of MDT collaboration and echoes the mentioned benefits of robotic over laparoscopic surgery (4).

We further reviewed the literature on the outcomes of laparoscopic versus open surgery in the context of locally advanced colorectal cancer. Three studies analyzed 126, 94, and 140 patients, respectively, and concluded that laparoscopic en-bloc resections resulted in less blood loss and a shorter hospital stay compared to open surgery while offering similar oncological outcomes (5-7). Considering the improved short-term outcomes and comparable oncological safety granted by laparoscopic surgery, minimally-invasive surgery has a clear role in the surgical management of locally advanced rectal cancers.

Lastly, although the response to neoadjuvant chemotherapy can be variable (1), this patient had an excellent outcome in downstaging the liver

metastases. The FOxTROT trial concluded with evidence in histological regression for 59% of patients, including high tumor response rates in cases of metastatic/locally advanced colonic cancer (8).

Discussion within a complex cancer MDT can offer a multitude of therapeutic options for fit individuals with extensive metastatic disease. These patients should only be considered for palliation after exhibiting a poor response to aggressive treatment including multi-agent chemotherapy. From the surgical aspect, the robotic approach in combination

with other technological advances such as IUS can be a valuable option.

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Conflicts of Interests: None declared.

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