Case Report
Running Title: Cytoreductive Surgery for Colorectal Adenocarcinoma
Received: February 3, 2026; Accepted: September 28, 2026

Cytoreductive Surgery plus Mitomycin-Based Hyperthermic Intraperitoneal Chemotherapy for a Patient with History of Right Hemicolectomy due to Mucinous Colorectal Adenocarcinoma with a Background of Myeloma Multiple: A Case Report

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Abstract
Cytoreductive surgery (CRS) combined with hyperthermic intraperitoneal chemotherapy (HIPEC) using mitomycin C is an established locoregional treatment for selected patients with peritoneal metastases due to mucinous colorectal adenocarcinoma. Management becomes increasingly complex when such malignancies occur in individuals with concurrent hematologic disorders, such as multiple myeloma. We report a patient with recurrent mucinous colorectal adenocarcinoma who underwent right hemicolectomy followed by CRS and mitomycin-based HIPEC. The patient's medical history was notable for multiple myeloma, raising concerns regarding immune dysfunction, perioperative risks, and postoperative recovery. Complete cytoreduction was achieved, and HIPEC was administered without significant perioperative complications. Subsequent pathology and fluorodeoxyglucose positron emission tomography-computed tomography examination performed 3 months post-surgery showed no signs of malignancy. This case highlights the feasibility of CRS and HIPEC in patients with recurrent mucinous colorectal adenocarcinoma in the setting of coexisting multiple myeloma. It illustrates the potential oncologic benefit of mitomycin-based HIPEC in addressing peritoneal disease from mucinous colorectal carcinoma.

Keywords: Multiple myeloma, Colorectal Neoplasms, Hemicolectomy, Case Report

Introduction
Mucinous colorectal adenocarcinoma accounts for 10%-20% of colorectal adenocarcinoma cases. The probability of peritoneal metastasis is higher in the mucinous subtype than in non-mucinous adenocarcinoma[1] The treatment regimen of choice for locally advanced disease and

colorectal cancer with peritoneal metastases is cytoreductive surgery (CRS) plus mitomycin-based hyperthermic intraperitoneal chemotherapy (HIPEC) and adjuvant chemotherapy.[2] However, this may not be preferred for specific patients due to advanced age and comorbidities, including neutropenia and infections caused by systemic chemotherapy. Additionally, the effect of systemic chemotherapy on overall survival is considered limited in the mucinous subtype. In cases of advanced age and the presence of coexisting hematological malignancies, CRS plus HIPEC is emerging as a treatment modality that can prevent local recurrence and peritoneal dissemination.[3] It is considered a suitable choice to prevent complications such as carcinomatosis, related ascites, and intestinal obstruction, which significantly affect patient comfort.

Dealing with recurrent colorectal cancer in someone with serious health issues is not easy. When multiple myeloma is added to the mix (a disease that messes with the immune system, damages the bone marrow, and brings its own set of treatment side effects), things get even trickier.[4] Planning surgery, helping the patient recover, and figuring out the best way forward all become a lot more complicated. It is pretty rare to see someone facing both a solid tumor that needs big surgery and a blood cancer with effects all over the body. There is not much out there in the medical literature about such cases. Doctors have to work together, weighing the possible benefits of cancer treatment against the risks that come with it.

In this report, we describe a patient who had recurrent mucinous colorectal adenocarcinoma. The patient, who had undergone a right hemicolectomy for mucinous adenocarcinoma of the colon one year previously, was diagnosed with multiple myeloma during follow-up and was concurrently found to have recurrent mucinous colonic adenocarcinoma, for which cytoreductive surgery (CRS) and mitomycin C-based hyperthermic intraperitoneal chemotherapy (HIPEC) were performed. This case really shows how complicated cancer care can get when someone is dealing with more than one type of cancer, and why it is crucial to tailor treatment plans to each individual.

Case Presentation

The approval of this study in accordance with the ethical rules of the Declaration of Helsinki was approved by the Ethics Committee of Tehran University (ethical code: IR.TUMS.VCR.REC.1396.4202), on 30.05.2025 and at the meeting numbered 191.

A 79-year-old man underwent right hemicolectomy one year before referral because of a moderately differentiated mucinous adenocarcinoma of the ascending colon. Histopathological examination demonstrated a pT4aN1bM0 (Stage IIIB, AJCC 8th edition) tumor with invasion through the visceral peritoneum, three metastatic lymph nodes among 24 examined, negative surgical margins (R0), and no evidence of distant metastasis. Core body temperature was continuously monitored intraoperatively using an esophageal temperature probe integrated with the anesthesia monitoring system. During HIPEC, intraperitoneal perfusate temperature was maintained at 41–42°C, while the patient's core temperature was closely monitored and maintained below 38.5°C through active anesthetic temperature management. Following surgery, the patient completed eight cycles of adjuvant capecitabine plus oxaliplatin chemotherapy and entered routine surveillance.

Approximately six months after colectomy, the patient was diagnosed with IgG-kappa multiple myeloma (Revised International Staging System stage II) following evaluation for anemia and monoclonal gammopathy. He received induction therapy

with bortezomib, lenalidomide, and dexamethasone (VRd), achieving a very good partial response. At the time of referral for recurrent colorectal cancer, the hematologic disease remained clinically stable without evidence of active progression, and the patient was considered suitable for major surgery following multidisciplinary assessment involving colorectal surgeons, hematologists, anesthesiologists, and medical oncologists.

During follow-up, fluorodeoxyglucose positron emission tomography/computed tomography (FDG-PET/CT) demonstrated localized recurrence associated with peritoneal carcinomatosis. Preoperative colonoscopy identified two polypoid lesions located 30 cm and 60 cm from the anal verge, which were removed endoscopically. Histopathological examination showed tubular adenomas with low-grade dysplasia.

Exploratory laparotomy demonstrated recurrent tumor arising from the previous ileotransversostomy site with involvement of the greater omentum, Gerota's fascia, right paracolic gutter, retroperitoneum, and the second and third portions of the duodenum. The calculated peritoneal cancer index was 9, indicating a limited peritoneal tumor burden suitable for complete cytoreduction. Complete macroscopic cytoreduction (CC-0) was achieved by en bloc resection of all visible disease (Figures 1 and 2), followed by HIPEC using mitomycin C according to the institutional CRS-HIPEC protocol. Following CC-0, HIPEC was administered using mitomycin C (35 mg/m²) for 90 minutes with a target intraperitoneal temperature of 41–42°C, according to our institutional CRS-HIPEC protocol.

The operative duration was approximately 430 minutes, with an estimated blood loss of 550 mL. The patient required no reoperation or intensive care beyond routine postoperative monitoring. Recovery was uneventful except for a transient postoperative ileus that resolved with conservative management (Clavien-Dindo grade I). Oral feeding was resumed on postoperative day 5, and the patient was discharged home on postoperative day 9.

Histopathological examination confirmed recurrent mucinous colorectal adenocarcinoma with complete (R0) resection. FDG-PET/CT performed three months after surgery demonstrated no evidence of residual or recurrent disease. At the latest follow-up, the patient remained clinically well, with stable multiple myeloma under hematologic surveillance and no evidence of colorectal cancer recurrence.

Discussion

In colon adenocarcinoma, the mucinous subtype has a higher tendency for peritoneal dissemination than the non-mucinous subtype.[1] The response to systemic chemotherapy and its effect on overall survival are more limited in the mucinous subtype than in the non-mucinous subtype.[5] The importance of local-regional treatment strategies is particularly crucial in advanced-stage disease. Several series have shown that the combination of R0 resection and HIPEC provides a significant advantage in overall survival and reduces peritoneal recurrence in selected patients with peritoneal metastases or colorectal cancer at high risk of peritoneal dissemination.[5] Previous tudies have demonstrated the effectiveness of mitomycin-C-based HIPEC in reducing local and peritoneal recurrence.[6] Both prospective series and cohort studies have indicated that advanced age is not an absolute contraindication to CRS plus HIPEC, and mortality and morbidity are acceptable in selected patients.[7] Advanced age alone cannot be considered an exclusion criterion. Individualized decisions should be made based on comorbidities, performance status, and expected toxicity.

Here, the patient with a history of right hemicolectomy due to mucinous adenocarcinoma one year ago received CRS and HIPEC with mitomycin C for recurrence of the disease. Mitomycin C is still one of the main drugs used for HIPEC in such cases. It works well because it stays active in the belly, reaches high concentrations where needed, and teams up nicely with the heat to kill cancer cells. There is solid evidence from different studies showing patients live longer when surgeons can remove all visible tumors and follow-up with HIPEC, especially if their peritoneal cancer index is low or moderate and they do not have much disease outside the belly.[8] The recent PRODIGE 7 trial stirred things up by questioning whether adding oxaliplatin to HIPEC really helps, but mitomycin-based treatments still look promising. They tend to have manageable side effects and can help the right patients.[4]

One of the most important aspects of this case is the perioperative management of a patient with concomitant multiple myeloma undergoing extensive CRS and HIPEC. Multiple myeloma is associated with profound immune dysregulation resulting from impaired humoral immunity, dysfunctional plasma cell proliferation, and disease-related bone marrow suppression. Consequently, these patients frequently present with anemia, thrombocytopenia, leukopenia, renal dysfunction, and an increased susceptibility to bacterial and opportunistic infections, all of which may increase perioperative morbidity. Furthermore, anti-myeloma therapies—including proteasome inhibitors, immunomodulatory agents, corticosteroids, and monoclonal antibodies—may further compromise immune function, impair wound healing, alter coagulation, and increase the risks of postoperative infection and delayed recovery.

For these reasons, successful management requires careful multidisciplinary collaboration among colorectal surgeons, hematologists, anesthesiologists, and perioperative physicians. Preoperative evaluation should include optimization of hematologic parameters, assessment of renal function and nutritional status, review of ongoing anti-myeloma therapy, and exclusion of active infection. Decisions regarding the timing of surgery should consider the current activity of the hematologic malignancy, anticipated surgical complexity, and the patient's functional status. In our patient, the multiple myeloma was well controlled following induction therapy, hematologic parameters were considered acceptable for major surgery, and no active infection was present, allowing CRS and HIPEC to be performed safely.

Although patients with multiple myeloma are generally considered to be at increased operative risk, this case illustrates that the disease itself should not automatically preclude aggressive locoregional treatment when careful patient selection and perioperative optimization are undertaken. CC-0 was achieved without major postoperative complications, supporting the feasibility of CRS and mitomycin C-based HIPEC in selected patients with controlled hematologic malignancy. Nevertheless, treatment decisions should remain individualized, balancing the potential oncologic benefit against the increased risks associated with immune dysfunction, hematologic abnormalities, and systemic therapy.

The principal novelty of this case is that it demonstrates the successful application of complete CRS with mitomycin C-based HIPEC in a patient with recurrent mucinous colorectal adenocarcinoma and concomitant multiple myeloma, a clinical scenario for which published evidence is exceedingly limited. Rather than simply describing the coexistence of two malignancies, this report provides practical evidence that multiple

myeloma, when appropriately controlled and carefully evaluated through a multidisciplinary approach, should not be considered an absolute contraindication to potentially curative locoregional treatment. The favorable perioperative course and early disease-free assessment observed in this patient suggest that carefully selected individuals with hematologic comorbidities may still benefit from aggressive surgical management. Although larger studies are required to confirm these findings, this case contributes clinically relevant evidence to support individualized patient selection and multidisciplinary decision-making for complex oncologic cases.

Although this patient demonstrated an uneventful postoperative recovery and no radiological evidence of disease recurrence during the first 3 months after CRS and mitomycin C-based HIPEC, this short follow-up period does not permit conclusions regarding long-term oncologic efficacy or recurrence-free survival. Therefore, the primary value of this case lies in demonstrating the feasibility of achieving complete cytoreduction and safely performing CRS-HIPEC in a carefully selected patient with controlled multiple myeloma, despite the significant hematologic and perioperative challenges associated with this condition. Longer follow-up and additional reports are required to determine the durability of disease control and to better define the role of CRS-HIPEC in patients with concomitant hematologic malignancies.

The published literature describing the coexistence of colorectal adenocarcinoma and multiple myeloma is extremely limited and consists predominantly of isolated case reports or small case series. Most reports focus on the diagnostic challenges, the occurrence of synchronous or metachronous malignancies, or the effects of systemic therapy, while detailed descriptions of aggressive surgical management are scarce. Likewise, although CRS combined with HIPEC has become an accepted treatment for selected patients with colorectal peritoneal metastases, patients with active hematologic malignancies are generally underrepresented or excluded from major clinical studies. Consequently, evidence regarding the safety and efficacy of CRS-HIPEC in this population remains limited. Compared with the existing literature, the present case provides additional clinical evidence that carefully selected patients with well-controlled multiple myeloma may successfully undergo complete cytoreduction and mitomycin C-based HIPEC without major perioperative complications. While this single case cannot establish treatment recommendations, it contributes to the growing body of evidence supporting individualized multidisciplinary decision-making rather than excluding patients solely because of a concomitant hematologic malignancy.

Informed Consent

Written informed consent to participate in the study was obtained from the patient.

Availability of Data

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Funding

The study was financially supported by Istanbul Okan University.

Acknowledgements
The authors would like to express their sincere gratitude to the surgical team, operating room staff, nursing personnel, and pathology laboratory staff who contributed to the diagnosis, surgical management, and postoperative care of the patient. We also thank the patient and his family for their cooperation and for providing consent for the publication of this case report.

Authors' Contributions
Conceptualization: K.G; Clinical management and surgical treatment: K.G and M.Ü; Data collection: M.Ü and N.A; Pathological and clinical data interpretation: N.A; Literature review: M.S; Manuscript drafting: M.S; Manuscript review and editing: M.Ü; Supervision: K.G. All authors read and approved the final manuscript version and agreed with all parts of the work in ensuring that any queries about the accuracy or integrity of any component of the work are appropriately investigated and handled.

Conflict of Interest
None declared.

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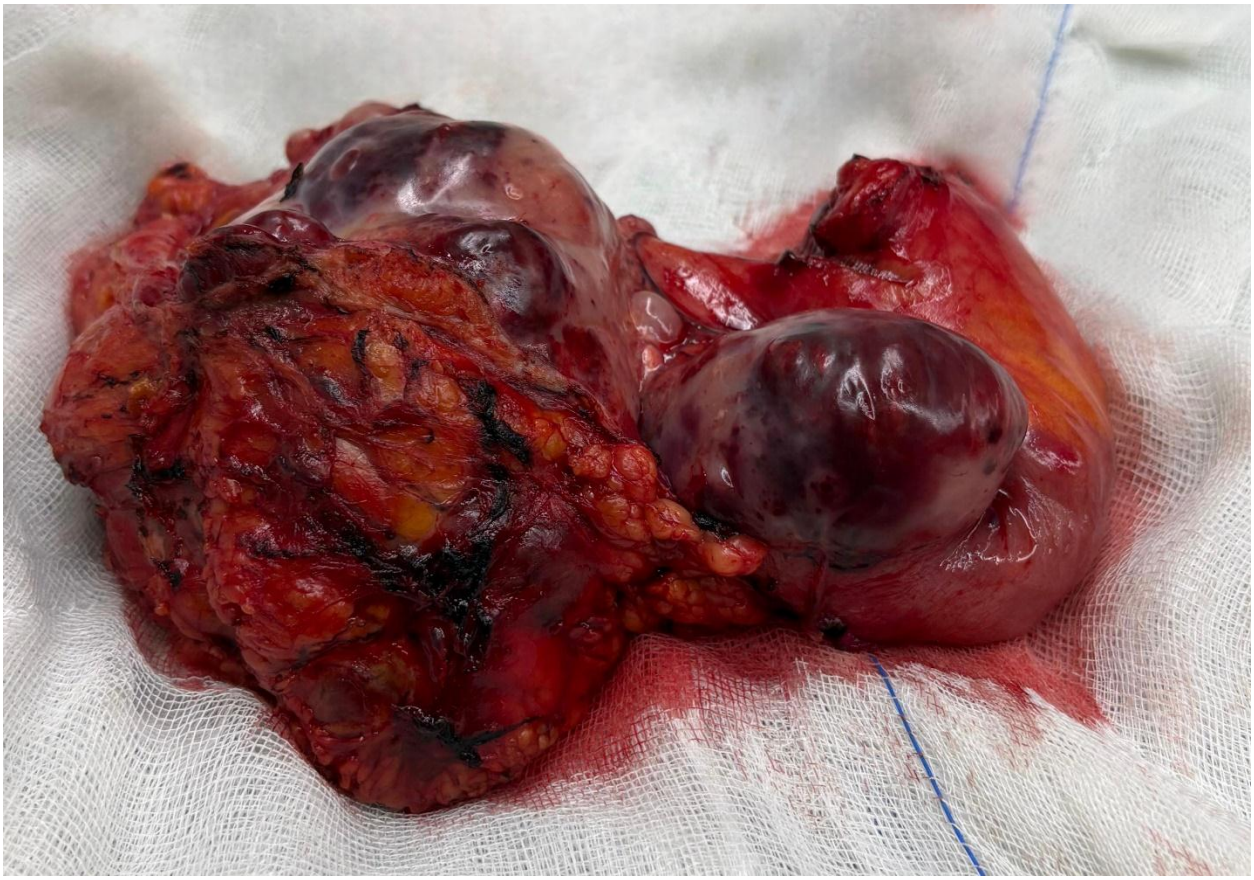

Figure 1. This figure shows the resected surgical specimens following cytoreductive surgery: Resected recurrent tumor involving the distal ileum, resected tumor tissue, resected involved Gerota's fascia. The specimens were obtained during en bloc resection of all visible peritoneal disease to achieve complete macroscopic cytoreduction (CC-0).

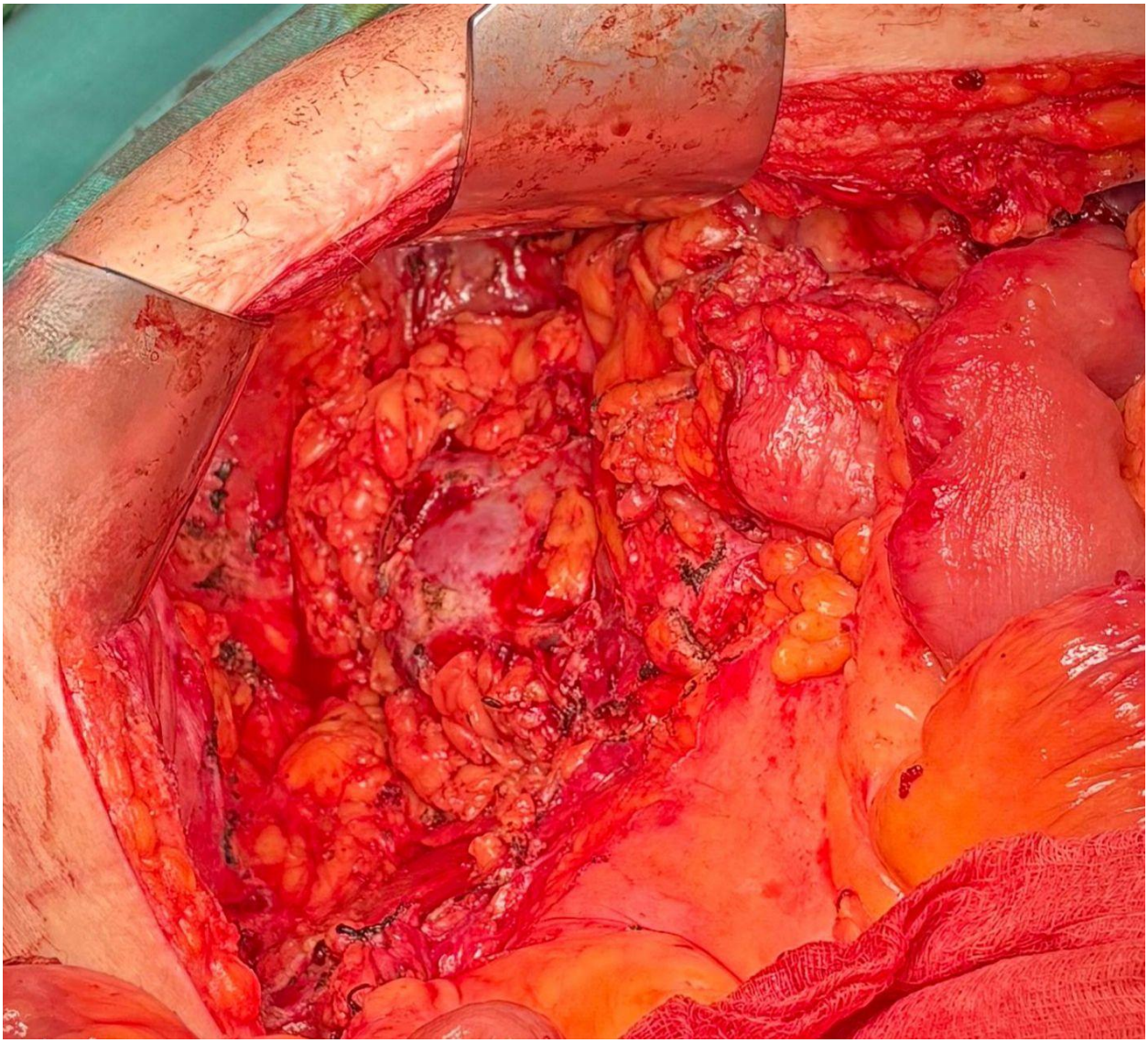

Figure 2. This figure shows the intraoperative surgical field following cytoreductive resection: Gerota's fascia following resection of the involved tissue, mesentery of the transverse colon, right kidney. The surgical field demonstrates removal of the visible recurrent peritoneal disease and achievement of complete macroscopic cytoreduction (CC-0) before administration of mitomycin C-based hyperthermic intraperitoneal chemotherapy.