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Case Report

Accelerating Postoperative Recovery in Multiorgan Tumor Removal for Cancer

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Abstract

Desmoplastic Small Round Cell Tumor (DSCRT) is a rare soft tissue sarcoma that requires aggressive treatment. This tumor type proliferates on peritoneal tissue inside the abdomen and pelvis and can quickly spread to nearby organs. Current treatments include combinations of chemotherapy, resection, radiation, Hyperthermic Intraperitoneal Chemotherapy (HIPEC), Whole Abdominal Radiation Therapy (WART), and proton therapy. When treating DSCRT with HIPEC, the process involves removal of numerous organs within the abdomen, complicating recovery. Here we present a case report examining the benefits of using enteral nutrition after HIPEC to treat DSCRT in a 24-year-old male.

Keywords: Desmoplastic small round cell tumor; Hyperthermic intraperitoneal chemotherapy; Enteral nutrition; Multiorgan resection

Introduction

Desmoplastic Small Round Cell Tumor (DSRCT) is a rare, aggressive sarcoma that predominantly affects adolescent and young adult males. DSRCT originates in and primarily involves serosal surfaces of the abdominal cavity. It is identified by a unique chromosomal arrangement t(11;22)(p12;q12) and is also characterized by an EWSR1-WT1 gene fusion, causing upregulation of the expression of PDGFRα, VEGF, and other proteins that are related to tumor and vascular cell proliferation [1]. The management of DSRCT is typically a combination of chemotherapy, radiation, aggressive cytoreductive surgery, plus intraperitoneal hyperthermic chemotherapy. Outcomes for DSRCT are poor as most patients experience disease recurrence and die within three years [2].

Here we report the case of a 24-year-old male with DSRCT who underwent multiorgan tumor resections to obtain negative margins for resection of malignancy. Despite this multiorgan resection, he was transitioned to enteral feeds on postoperative day 6 after removal of omentum, spleen, distal pancreas, sigmoid colon with colocolonic anastomosis, and right colon with ileocolic anastomosis. There was also removal of 120 cm of ileum (with 220 cm of small bowel remaining), right diaphragm, and wedge resection of liver. There are few cases in the literature where multiorgan resection resulted in resumption of enteral feeds rapidly with an uncomplicated recovery. Here we also review the literature regarding time to enteral feeding postoperatively and its effect on patient outcomes in the context of abdominal tumor resection.

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Case Presentation

A 24-year-old male sought medical attention complaining of generalized abdominal pain. A CT was obtained that revealed multiple substantial peritoneal implants, measuring up to 5.7 × 4.7cm, distributed between the spleen and left kidney, in the porta hepatis region, LLQ, splenic hilum, RLQ, and lower pelvis. These findings, along with additional pericolonic nodules, scattered mesenteric nodes, and mild free fluid, were indicative of a significant metastatic malignancy or lymphoma, characterized by a high-grade tumor burden. Noteworthy observations also included splenomegaly, gastric distention, and distended small bowel loops suggestive of developing obstruction. DSCRT is known to have more disease presence than what is seen on imaging.

Initial chest CT with IV contrast detected pleural nodularity consistent with malignant pleural disease, along with trace pleural effusion. Further investigations uncovered potential pulmonary metastasis in the right upper lobe and confirmed peritoneal, retroperitoneal, and hepatic masses, aligning with metastatic disease. Brain MRI revealed no tumor involvement, while a diagnostic laparoscopy with omental and peritoneal biopsies indicated desmoplastic small round cell tumor with EWSR1 gene rearrangement (Figure 1).

The patient underwent multiple cycles of Vincristine, Doxorubicin and Cyclophosphamide (VDC); Ifosfamide and Etoposide phosphate (IE); Vincristine, Irinotecan and Temozolomide (VIT); and Cytoxan, Vinorelbine, and Temsirolimus (CVT). Fourteen cycles of neoadjuvant chemotherapy were given over approximately 9 months. Preoperative disease control of the 6 liver tumors was achieved by Post-Transarterial Radioembolization (TARE) with Y90 to segment 6 liver tumors. During preoperative evaluation, a PET/CT showed that the radioembolization was effective and there was little to no activity in the liver. In addition, the abdominal and pelvic masses were significantly decreased in size by 30% to 40%. There was a slight increase in hepatic lesion activity but a decrease in abdominal and pelvic masses.

The patient underwent cytoreductive surgery and Hyperthermic Intraperitoneal Chemotherapy (HIPEC) using cisplatin.

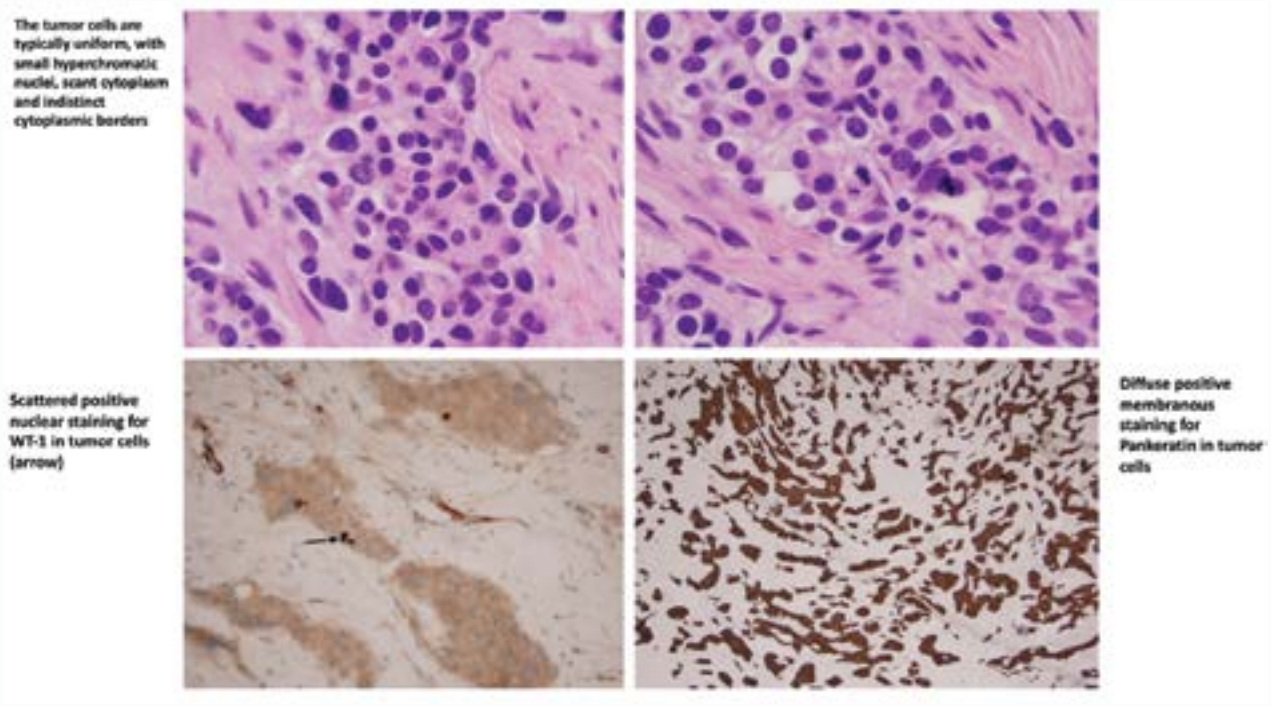

Figure 1: Histological findings of desmoplastic small round cell tumor.

Intraoperative findings included multiple nodules in the omentum, splenic hilum nodules requiring splenectomy, a left diaphragm nodule requiring resection, nodules in various locations necessitating resection and repair, and extensive disease resection in the pouch of Douglas. Total surgery details included: laparotomy, distal pancreatectomy with splenectomy, right diaphragm resection and diaphragm peritonectomy, segment 6 wedge resection of the liver, sigmoidectomy, right colectomy, placement of a gastrojejunostomy tube, cytoreduction and HIPEC. He had bilateral chest tubes, a foley, a nasogastric tube, a left radial arterial line, and a left subclavian central line. Though the surgery required extensive dissection of tissue, no anastomotic leakage occurred post-op.

The patient received a predetermined regimen of postoperative fluid resuscitation dictated within a standard order set. This standard order set is routinely used by the primary surgeon in DSRCT and cytoreductive surgery and HIPEC cases.

Post-operative course

POD 1-3: Patient was NPO, but drainage was measured from NG tube, G tube, and two JP drains. He was given 1.5x maintenance fluid and electrolytes were repleted, as necessary. On POD 4 TPN was started at 90 cc/hr.

POD 5: Right JP drain was removed on POD 5 after output was found to be lower than 30 cc for 48 hours. Patient's GJ tube is in place with G tube to gravity and J tube clamped. Tube feeds were not started at this point due to the patient's elevated drain amylase. However, daily amylase was trended at this point to monitor for when trickle feeds through J Tube could be started.

POD 6-10: On POD 6, trickle feeds were started at 20 cc/hr, with a goal of increasing by 20 cc every 6 hours with the goal of reaching 60 cc/hr and daily amylase trending continued. TPN continued while tube feeds were being advanced. On POD 8 the patient was able to reach the full feed goal of 60 cc/hour; a trial of clamping GJ tube was started and the left JP drain was removed on POD 10. Throughout this period (POD 6-8), the patient had several days where he had difficulty tolerating feeds and had to be titrated down. On the last day of hospitalization (POD 11), the patient was able to move to oral feeds. He was discharged after having his JG tube clamped and given vitamin B12 and ensured supplementation.

Discussion

There is currently no agreed consensus as to the best route for nutrition support after HIPEC procedures. The extent of multi organ removal in this patient is unusual and not well documented in the literature. Few patients require this amount of extensive resection. Considering the age of this patient and the disease that is chemo sensitive, we recommend prompt transition to enteral nutrition. There were no postoperative complications. Several studies have demonstrated that receiving Early Enteral Nutrition (EEN) post-operatively in the context of upper gastrointestinal cancer is associated with a shorter length of stay, reduced septic morbidity, improved gut oxygenation, lower costs, and improved clinical outcomes [3-5]. In a small randomized clinical trial by Liu and colleagues, 60 patients undergoing pancreaticoduodenectomy for the treatment of pancreatic cancer were randomized to receive a jejunostomy and early enteral feeding versus Parenteral Nutrition (PN) [6]. Results showed that a significant number of patients in the enteral nutrition group had lower rates of upper GI hemorrhage, pancreatic fistulas, and delayed gastric emptying, however, minimal difference was noted in the incidence of liver dysfunction or intra-abdominal infections.

In a systematic review and meta-analysis, Lewis et al compared early commencement of feeding (within 24 h) with no feeding in patients undergoing gastrointestinal surgery, finding no obvious

advantage in keeping patients 'nil by mouth' following gastrointestinal surgery. Early enteral nutrition was associated with reduced mortality. Little is known, however, regarding nutritional outcomes for patients who have undergone multiorgan resections.

A gastroparesis in this setting of HIPEC is expected. However, throughout management, emphasis was placed on starting enteral nutrition as soon as possible. A study was done by Tian et.al in 2020 comparing the use of Early Enteral Nutrition (EEN) vs. a Standard Postoperative Nutritional Protocol (SPNP) looked at the risk of recurrent leakage after definitive resection of anastomotic leakage after colorectal surgery [6]. Their results showed a leakage rate of 19.05% in the EEN group compared to 40% in the SPNP group. Anastomotic leakage is a chief concern for HIPEC surgeries because of the extensive amount of tissue dissection and trauma from the heated chemotherapy, and therefore.

Conclusion

Prompt enteral feeding has been shown to be the superior choice of nutritional management post-operatively for gastrointestinal tumors. While little is known about early enteral nutrition for HIPEC surgeries requiring multiple organ removal, the literature suggests that enteral nutrition should be the preferred method of nutritional management because it reduces several of the post-operative risks discussed above. Because one case report's generalizability is limited, further prospective studies should be conducted to collect data across multiple hospitals to explore rates of complication after HIPEC treatment requiring multiple organ removal for the treatment of DSCRT.

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