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Intestinal perforation after treatment of Burkitt's lymphoma: Case report and review of the literature ☆

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Abstract Non-Hodgkin's Lymphoma (NHL) is the most common intestinal malignancy in children, and Burkitt's lymphoma is the most frequently encountered histologic subtype. In pediatric patients, intestinal involvement of the lymphoma is a common finding. As over half of these intestinal tumors are unresectable at the time of presentation, chemotherapy is the mainstay of treatment. However, as the tumor responds to chemotherapy, regression of the tumor in the bowel wall can result in intestinal perforation. We report a unique case of a pediatric patient with lymphoma-related intestinal perforation which was managed with a damage control laparotomy, discuss operative management strategies in these difficult cases, and provide a review of similar cases in the literature.

Non-Hodgkin's Lymphoma (NHL) is the most common intestinal malignancy in children, and the predominant histology is Burkitt's lymphoma [1]. Eight-five percent of NHL in pediatric patients involves the intestine, of which 93% is in the ileocolic region [2]. Fewer than half of the patients with Burkitt's lymphoma involving the GI tract are candidates for resection at the time of diagnosis, and chemotherapy is often the first-line treatment [3]. As these tumors are very fast-growing, they respond dramatically to chemotherapy, which can result in rapid regression of the tumor with full thickness involvement of the bowel wall and subsequent perforation [2]. While intestinal perforation in the setting of lymphoma has been found to be a poor prognostic factor in adults with the disease, this complication has less certain prognostic implications in children, as their disease typically responds well to chemotherapy and the patients have a better physiologic reserve [4]. We present the first case reported in the literature of lymphoma-related perforation successfully managed with a damage control laparotomy and an open abdomen while undergoing chemotherapy, and discuss other reported pediatric cases.

1. Case presentation

The patient, a 12 year old male with a history of obesity (BMI 33), hypertension, and epilepsy, presented to his primary pediatrician for a routine annual check-up with some mild abdominal pain complaints. On abdominal exam, a non-tender, non-mobile mass in the right upper quadrant was

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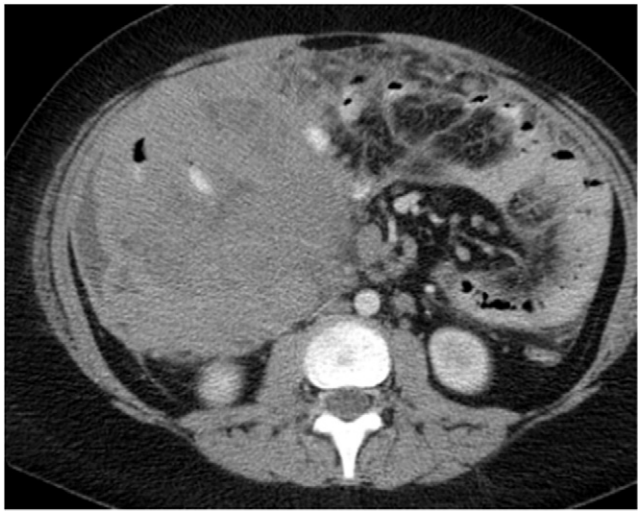

Fig. 1 Computed tomography scan of the abdomen demonstrating large intraabdominal mass at diagnosis, prior to chemotherapy.

palpated; no other abdominal abnormalities were noted. The rest of the physical exam was unremarkable. He was sent directly to the emergency room for further work-up of the mass. Computed tomography (CT) confirmed the presence of a 14 cm × 14 cm × 17 cm mass in the right mid-abdomen which extended into the ascending colon with associated ascites and lymphadenopathy involving supraclavicular and mediastinal nodes (Fig. 1). At this point, the suspected diagnosis was Burkitt's lymphoma, given the patient's age, the large mass size, and its apparent rapid appearance, although other types of lymphoma and retroperitoneal sarcomas were included in the differential diagnosis. A laparoscopic biopsy, performed concurrently with a bone marrow biopsy, a lumbar puncture, and a port placement, confirmed the diagnosis of Stage III Burkitt's lymphoma. Bone marrow and cerebrospinal fluid were negative for malignancy.

Reduction chemotherapy was initiated based on the Children's Oncology Group protocol ANHL01P1. He received a preliminary week of reduction chemotherapy with intravenous cyclophosphamide, vincristine, oral prednisone, intrathecal methotrexate and hydrocortisone. Approximately one week following initiation of chemotherapy, he developed acute onset diffuse peritonitis and fever. A repeat CT scan demonstrated a contained perforation in the

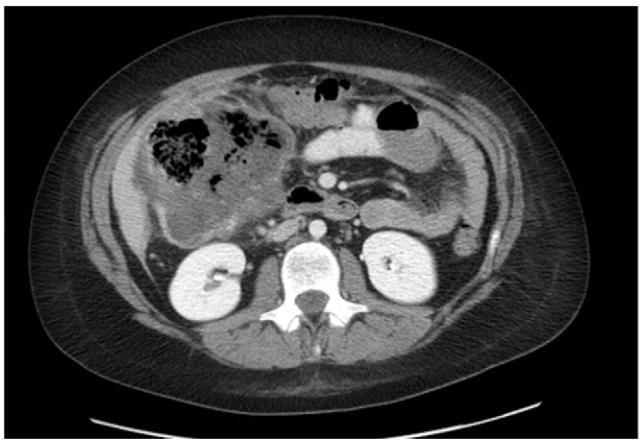

Fig. 2 Computed tomography scan of the abdomen showing a contained colon perforation after tumor reduction with chemotherapy.

Table 1 Timeline of patient events.

Day 1	Patient presents to the emergency room; is suspected of having Burkitt's lymphoma
Day 3	Patient taken to operating room for diagnostic laparoscopy, biopsy, central line placement
Day 5	Patient begins reduction chemotherapy
Day 10	Patient presents with perforation—readmitted and taken to the operating room for right hemicolectomy, mucous fistula formation, and end ileostomy
Day 17	Patient receives additional reduction chemotherapy
Day 23	Patient begins Induction Chemotherapy Cycle 1
Day 27	Patient develops first enterocutaneous fistula and wound dehiscence—taken to OR for control of fistula. The abdomen was left open with a wound vac placed
Day 45	Induction Chemotherapy Cycle 2 started
Day 70	Consolidation Chemotherapy Cycle 3 started
Day 93	Persistent Candida tropicalis central line infection—port-a-cath removed
Day 99	Bilateral sphenoidotomies and total ethmoidectomy to rule out persistent fungal infection
Day 103	Consolidation Chemotherapy Cycle 4 started
Day 118	Central line infection with Enterobacter—catheter removed in OR
Day 132	Thoracoscopic biopsy of mediastinal mass—negative for disease
Day 146	Final wound vac removal, which is replaced with a stoma bag
Day 152	Morphine PCA discontinued—continues wean from oral pain medication
Day 174	Patient on full solid diet (still receiving TPN for hyperalimentation)
Day 193	Discharged home on cycled TPN with stoma bag over multiple EC fistula (hospital day 182)
Day 408	Returned to operating room for fistula takedown, small bowel resection, diverting loop jejunostomy, and closure of the abdominal wall using bilateral component separation with Strattice mesh inlay
Day 433	Patient discharged from hospital after post-operative course complicated by a central line infection with MSSA
Day 562	Jejunostomy takedown, patient restored to full continuity
Day 613	Drainage of abdominal wall abscess; final trip to the OR to date
Day 993	Patient remains disease free, off of pain medication, enjoying normal activities of daily living