The Journal of Emergency Medicine, Vol. 57, No. 1, pp. e13–e16, 2019
© 2019 Elsevier Inc. All rights reserved.
0736-4679/$ - see front matter

https://doi.org/10.1016/j.jemermed.2019.03.004

Clinical Communications: Pediatric

ABDOMINAL LYMPHOMA PRESENTING AS TERMINAL ILEITIS: A CASE REPORT

Ronine Zamor, MD,*† Myesa Emberesh, MBBS,†‡ Michael J. Absalon, MD, PHD,†‡ George C. Koberlein, MD,†§ and Selena Hariharan, MD, MHSA*†

*Department of Emergency Medicine, Cincinnati Children's Hospital and Medical Center, Cincinnati, Ohio, †Department of Pediatrics, University of Cincinnati College of Medicine, Cincinnati, Ohio, ‡Cancer and Blood Diseases Institute, Cincinnati Children's Hospital and Medical Center, Cincinnati, Ohio, and §Department of Radiology, Cincinnati Children's Hospital and Medical Center, Cincinnati, Ohio

Corresponding Address: Ronine Zamor, MD, Department of Emergency Medicine, Cincinnati Children's Hospital and Medical Center, 3244 Burnet Avenue, Cincinnati, OH 45229

□ **Abstract—Background: Most pediatric patients with lymphoma do not have classic symptoms of fever, night sweats, and weight loss. Lymphoma can present as vague symptoms and may mimic common pediatric abdominal emergencies. In this case report, we present a child who presented with abdominal pain and who was initially misdiagnosed as having a surgical emergency. Case Report: An 11-year-old previously healthy male was referred to the pediatric emergency department after he presented to an outside hospital with 3 days of right lower quadrant pain and 1 episode of diarrhea. The initial concern was appendicitis. He had a computed tomography scan of the abdomen and pelvis that showed thickening of the bowel wall, peritoneal thickening, and a right pleural effusion. His laboratory assessments were only notable for a mildly elevated lactate dehydrogenase level of 506 units/L. He had a colonoscopy, and biopsy specimens obtained from the terminal ileum and cecum were negative. He developed worsening symptoms, and subsequently underwent laparoscopic biopsy procedures of the omentum and terminal ileum, which were consistent with Burkitt lymphoma. Why Should An Emergency Physician be Aware of This?: We discuss the important oncologic findings of pediatric lymphoma, including oncologic emergencies and important laboratory and imaging tests that providers should consider while in the emergency department. This case highlights how pediatric lymphoma can mimic common pediatric pathologies providers often encounter in the emergency department.** **© 2019 Elsevier Inc. All rights reserved.**

□ **Keywords—Burkitt lymphoma; lymphoma; oncologic emergencies; pediatrics; terminal ileitis**

INTRODUCTION

Lymphoma is a common neoplastic disease of childhood. Although some children can have the classic symptoms of fevers, night sweats, and weight loss, patients often present to the emergency department (ED) with vague symptoms. Subsequently, patients are at risk of misdiagnosis, which can have consequences in a diagnosis that requires prompt treatment that can be facilitated in the ED. We present a case of a pediatric patient who presented with initial concern for appendicitis. His abdominal computed tomography (CT) scan showed terminal ileitis and he was admitted for surgical management. He did not respond to usual therapy and his condition worsened. Ultimately, a biopsy specimen was obtained and the results were consistent with Burkitt lymphoma.

CASE REPORT

An 11-year-old previously healthy male was referred to the ED for an abnormal abdominal CT scan. He had a

Reprints are not available from the authors.

Received: 6 December 2018; Final submission received: 27 February 2019;
Accepted: 4 March 2019

3-day history of intermittent right lower quadrant pain and 1 episode of non-bloody diarrhea. He did not have anorexia, nausea, or vomiting. He denied weight loss. He did not have any significant medical or surgical history. His immunizations were up to date. He did not have any allergies. He was evaluated at an outside adult hospital with an initial concern for appendicitis. He had a CT scan of his abdomen and pelvis that was concerning for thickened bowel wall with adjacent peritoneal thickening and a right pleural effusion. The decision was made to transfer the patient to a pediatric ED for further evaluation.

His vital signs on arrival to the pediatric ED were temperature 37.2°C, pulse 78 beats/min, respiratory rate 20 breaths/min, blood pressure 125/65 mm Hg, and oxygen saturation 98% on room air. On physical examination, he was noted to be well appearing. He had a normal respiratory effort with clear breath sounds. His heart sounds were normal, with regular rate and rhythm. His abdomen was soft and not distended. There was no hepatosplenomegaly. He had tenderness in the right lower quadrant, without rebound or guarding. He had a normal genitourinary examination. Laboratory results, including a complete blood cell count, C-reactive protein, erythrocyte sedimentation rate, renal profile, hepatic profile, amylase, and lipase were within normal limits. Stool studies were sent. His abdominal CT images were sent to radiology (Figures 1 and 2). The CT scan was concerning for terminal ileitis, liver lesions, and right pleural effusion.

Surgery, gastroenterology, and oncology services were consulted. He was placed on intravenous fluids and started on intravenous piperacillin-tazobactam before admission to the surgery service. He had a normal uric acid level and his lactate dehydrogenase (LDH) was mildly elevated at 506 unit/L (normal 100–325 unit/L). His chest radiograph did not show a mediastinal mass. A colonoscopy was performed on hospital day 3, and biopsy specimens of the terminal ileum and cecum were obtained and were normal. He developed a worsening right pleural effusion that required intermittent oxygen support and diuresis. On hospital day 6, he was taken to the operating room for a diagnostic laparoscopy and he was found to have diffuse thickening of the omentum with a mesenteric mass at the terminal ileum. He underwent biopsy procedures of the omentum and terminal ileum as well as a thoracentesis of the pleural fluid. The cytology of his pleural fluid was found to have malignant cells, consistent with lymphoma. His pathology reports confirmed Burkitt lymphoma. He was transferred to the oncology service, and he was started on induction chemotherapy. His hospital course was complicated by oral mucositis, febrile neutropenia, and a brief period of total parenteral nutrition. He was discharged home after 1 month in good condition.

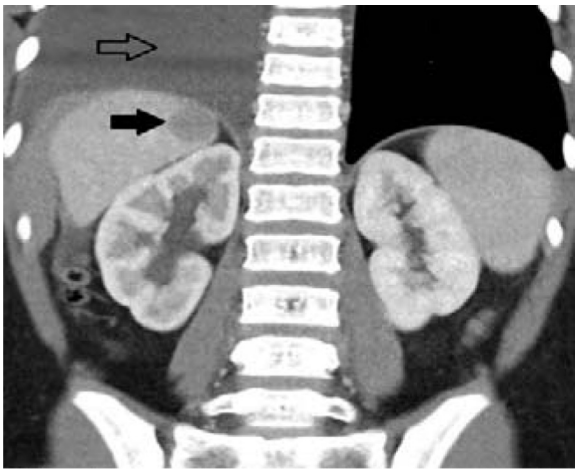

Figure 1. Contrast-enhanced coronal computed tomography image through the upper abdomen showing a right pleural effusion (open arrow) and one of the two well circumscribed, hypodense intrahepatic lesions (closed arrow). In addition, there is a delayed nephrogram on the right, with the right kidney enhancement being slightly behind the left kidney. There is mild right hydronephrosis caused by the right lower quadrant changes described in the computed tomography report.

DISCUSSION

Lymphoma is the third most common childhood malignancy after leukemia and central nervous system tumors. It accounts for approximately 15% of all childhood malignancies. Most cases of pediatric lymphoma have an excellent prognosis, with a long-term event-free survival >85%. Lymphomas are categorized as either Hodgkin's lymphoma or non-Hodgkin's lymphoma (NHL), which

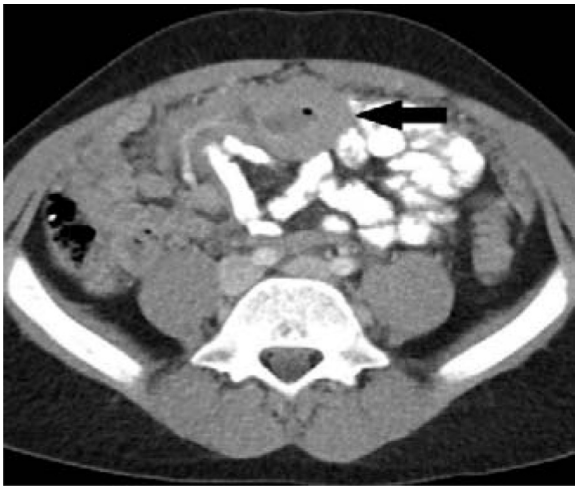

Figure 2. Contrast-enhanced axial computed tomography image through the mid-abdomen showing a thick-walled bowel loop with slight aneurysmal dilatation of the lumen. There is mild mucosal hyperenhancement of this loop. There is oral contrast in the proximal small bowel loops without dilatation or findings of obstruction.

is based on histopathologic features. Young patients in the United States with Hodgkin's lymphoma typically present in adolescence through young adulthood (1). The risk of NHL increases with age. Aggressive NHL predominates in the pediatric population whereas indolent NHL is most common in older adults. Lymphomas can arise from primary lymphoid tissues or various secondary lymphoid tissues (tissues other than lymph nodes) like the spleen, mucosa-associated lymphoid tissue, or nonlymphoid organs, such as the skin, bone, or the lungs (2). Given the various locations that can be involved, lymphoma can present with many different symptoms. Only one-third of patients have the classic "B-symptoms," including fever, night sweats, and weight loss (2). Patients may present with vague symptoms that imitate other pathology. While the rate of pediatric patients who have their diagnosis revealed in the ED has not been directly studied, adult patients are commonly screened by their primary physician and sent to the ED for additional testing and revelation of the diagnosis (3). However, some literature suggests that between 10% and 40% of children with oncological processes present primarily to the ED (4–6). Therefore, emergency providers need to have a heightened awareness about lymphoma regardless of clinical presentation. Many of these children are initially evaluated in community or adult EDs as opposed to dedicated pediatric EDs. As a result, it is vital for adult emergency providers to recognize the symptoms of pediatric lymphoma (7).

Complications of lymphoma are often severe. Complications may be caused by tumor compression or invasion to the surrounding structures, including superior vena cava syndrome, airway or abdominal obstruction, or spinal cord compression (2,8–10). Pericardial effusion and acute tamponade have also been reported as initial presentations of lymphoma (11). The presence of primary or metastatic central nervous system lymphoma can manifest with a life-threating raised intracranial pressure. Tumor lysis syndrome (TLS) is a potentially fatal complication that is usually associated with the initiation of chemotherapy. However, TLS can present before the initial diagnosis and consists of hyperuricemia, hyperkalemia, hyperphosphatemia, and hypocalcemia. Patients may have asymptomatic TLS, which only consists of laboratory abnormalities. Symptomatic TLS includes laboratory abnormalities plus signs of end-organ damage, such as anasarca from renal failure. Patients with Burkitt lymphoma have a high risk of developing TLS because of its rapid cell turnover (2,12).

Although it is known in the oncology literature that lymphoma can have a variety of different presentations, patients are still at risk of being misdiagnosed in the ED. While most patients present with painless lymphadenopathy, like a painless supraclavicular or inguinal lymph node, there have been reports of lymphoma presenting as acute upper extremity swelling (13,14). Abdominal cases of lymphoma may mimic different abdominal pathologies, such as acute appendicitis, Crohn's disease, or benign, reactive conditions (15–17). In addition, lymphoma can cause serious abdominal complications, such as obstruction, volvulus, bowel ischemia, or perforation (2,18). The ileum and the cecum can be sites of primary lymphoma and the malignancy can also extend to the appendix, which is why primary appendicitis should always be sent for pathology review; however, cases of pediatric lymphoma presenting as terminal ileitis are rare in the emergency medicine literature (18). In this case, the patient was initially thought to have appendicitis, then the patient was thought to have a severe presentation of inflammatory bowel disease because of involvement of the terminal ileum. It was not until a biopsy of the intestinal mucosa was obtained and analysis of samples of the pleural effusion were completed that NHL was confirmed.

If emergency providers are thinking of pediatric lymphoma as a potential diagnosis, there are several interventions that can be beneficial if started in the ED. For instance, all patients are theoretically at risk for TLS and require close monitoring and aggressive hydration, which should be started as soon as possible. In any patient where lymphoma is suspected, an initial laboratory evaluation should include a complete blood cell count with differential, a complete metabolic panel, and phosphate, uric acid, and lactate dehydrogenase measurements. Imaging studies should be guided by the patient's primary complaint, including a chest radiograph to rule out a mediastinal mass when the patient presents with respiratory symptoms or when a supraclavicular lymph node is discovered. Given the risk of TLS, unless otherwise contraindicated, patients should be started on aggressive fluid hydration, such as one and a half or twice maintenance intravenous fluids, ensuring that potassium, phosphate, and calcium are not added to the intravenous fluids until it is proven that the child is not in danger of TLS. Electrolyte imbalances associated with TLS can be life-threatening; therefore, electrolytes need to be monitored every 4 to 6 hours. Another essential rule of therapy for TLS is using drug agents to prevent or manage high levels of uric acid to prevent development of uric acid nephropathy. Allopurinol inhibits the enzyme xanthine oxidase, which in turn inhibits the formation of uric acid. However, allopurinol does not reduce the level of uric acid developed before its initiation. In patients presenting with elevated uric acid levels, intervention with rasburicase may be a better approach. After discussion with a pediatric oncologist, patients can also receive the first dose of rasburicase or allopurinol while in the ED. The primary

contraindication to administering rasburicase is a patient known to have glucose-6-phosphate dehydrogenase deficiency because there is an increased risk of hemolysis or development of methemoglobinemia (19). This condition occurs in approximately 5% of the population and is highest among males of African, Asian, and Hispanic descent (20,21). Therefore, if suspected or in patients with high risk, a glucose-6-phosphate dehydrogenase assay should be sent in the ED to help facilitate the use of rasburicase after admission if the results are negative.

WHY SHOULD AN EMERGENCY PHYSICIAN BE AWARE OF THIS?

Emergency providers should be aware that lymphoma, particularly in children, can mimic several other diseases and present with unexpected and nonclassic constellations of symptoms. Most children, especially in rural communities, are evaluated in community and adult EDs, and if the evaluating provider does not have a high level of suspicion for this treatable malignancy with a favorable prognosis, delays in care can result in unfortunate complications and worsened prognosis. In particular, abdominal lymphomas in children can mimic different pathologies, including intussusception, obstruction, volvulus, and, as in this case, terminal ileitis. If emergency providers have lymphoma as a potential diagnosis, therapies can be initiated in the ED that are beneficial to the patient that improve outcome after admission. In addition to initiating prompt diagnostic and interventional medical care, emergency physicians are in a unique position to assist patients and their families when dealing with a new diagnosis of a potentially catastrophic illness. Being knowledgeable about the generally favorable outcomes in pediatric lymphomas can help provide cautious optimism to families. It is important for emergency providers to be aware of the various presentations of pediatric lymphoma as well as the prognosis for this patient population.

REFERENCES

1. Blum KA, Keller FG, Castellino S, Phan A, Flowers CR. Incidence and outcomes of lymphoid malignancies in adolescent and young adult patients in the United States. Br J Haematol 2018;183:385–99.
2. Buhtoiarov IN. Pediatric lymphoma. Pediatr Rev 2017;38:410–23.
3. Figg WD, Smith EK, Price DK, et al. Disclosing a diagnosis of cancer: where and how does it occur? J Clin Oncol 2010;28:3630–5.
4. Jaffe D, Fleisher G, Grosflam J. Detection of cancer in the pediatric emergency department. Pediatr Emerg Care 1985;1:11–5.
5. Roskin J, Diviney J, Nanduri V. Presentation of childhood cancers to a paediatric shared care unit. Arch Dis Child 2015;100:1131–5.
6. Kundra M, Stankovic C, Gupta N, Thomas R, Hamre M, Mahajan P. Epidemiologic findings of cancer detected in a pediatric emergency department. Clin Pediatr (Phila) 2009;48:404–9.
7. American Academy of Pediatrics Committee on Pediatric Emergency Medicine, American College of Emergency Physicians Pediatric Committee, Emergency Nurses Association Pediatric Committee. Joint policy statement–guidelines for care of children in the emergency department. J Emerg Nurs 2013;39:116–31.
8. Tantawy AA, Ebeid FS, Mahmoud MA, Shepl OE. Spinal cord compression in childhood pediatric malignancies: multicenter Egyptian study. J Pediatr Hematol Oncol 2013;35:232–6.
9. Jain R, Bansal D, Marwaha RK, Singhi S. Superior mediastinal syndrome: emergency management. Indian J Pediatr 2013;80:55–9.
10. Gupta V, Ambati SR, Pant P, Bhatia B. Superior vena cava syndrome in children. Indian J Hematol Blood Transfus 2008;24:28–30.
11. Hajra A, Bandyopadhyay D, Layek M, Mukhopadhyay S. Cardiac tamponade as initial presentation of Hodgkin lymphoma. J Clin Imaging Sci 2015;5:67.
12. Burns RA, Topoz I, Reynolds SL. Tumor lysis syndrome: risk factors, diagnosis, and management. Pediatr Emerg Care 2014;30:571–6.
13. McCallin TE, Thampi S, Eighmy SM, Griffin TC, Sorrell AD. Acute upper extremity edema in a 10-year-old girl as presenting symptom of a rare cancer. Pediatr Emerg Care 2017; https://doi.org/10.1097/PEC.0000000000001214. [epub ahead of print].
14. Dhillon RK, Spahr CD. Two cases of upper-extremity swelling: Paget-Schroetter syndrome and non-Hodgkin lymphoma. Pediatr Emerg Care 2010;26:290–2.
15. Erkan G, Çoban M, Çaliskan A, et al. A Burkitt's lymphoma case mimicking Crohn's disease: a case report. Case Rep Med 2011;2011:685273.
16. Smith LB, Owens SR. Gastrointestinal lymphomas: entities and mimics. Arch Pathol Lab Med 2012;136:865–70.
17. Hamzeh R, Zeidan S, Bechara E, Al Hamod D, Nassif Y. Gastric perforation: unusal presentation of gastric lymphoma in pediatric population. Pediatrics 2018;141:491. 1 MeetingAbstract.
18. Hoeffel C, Crema MD, Belkacem A, et al. Multi–detector row CT: spectrum of diseases involving the ileocecal area. Radiographics 2006;26:1373–90.
19. Belfield KD, Tichy EM. Review and drug therapy implications of glucose-6-phosphate dehydrogenase deficiency. Am J Health Syst Pharm 2018;75:97–104.
20. Chinevere TD, Murray CK, Grant E Jr, Johnson GA, Duelm F, Hospenthal DR. Prevalence of glucose-6-phosphate dehydrogenase deficiency in U.S. Army personnel. Mil Med 2006;171:905–7.
21. Nkhoma ET, Poole C, Vannappagari V, Hall SA, Beutler E. The global prevalence of glucose-6-phosphate dehydrogenase deficiency: a systematic review and meta-analysis. Blood Cells Mol Dis 2009;42:267–78.