Gastric MALT lymphoma presented with primary perforation in an adolescent: a case report

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Abstract

Background: Primary lymphomas of the gastrointestinal tract are rare, accounting for only 1 to 4% of malignancies arising in the stomach, small intestine, or colon. The stomach is the most common extranodal site of lymphoma and gastric mucosa-associated lymphoid tissue (MALT) lymphoma accounts for 40% of primary gastric lymphoma. Gastric MALT lymphoma reaches its peak incidence between 50 to 60 years of age, therefore, it is rarely encountered in pediatric population. The presenting symptoms of gastric MALT lymphoma are usually nonspecific and primary perforation of gastric MALT lymphoma is uncommon.

Case presentation: A 12 year-old female presented with iron deficient anemia developed gastric perforation. Emergency laparoscopic repair of the perforation was performed and tissue pathology showed gastric MALT lymphoma infiltration. Helicobacter pylori eradication and radiotherapy were sequentially performed. Complete remission was achieved at two months after radiotherapy. To our best knowledge, she is the youngest patient with gastric MALT lymphoma reported in the literature.

Conclusion: Iron deficient anemia is a common presenting manifestation of malignancies in adulthood. In pediatric population, iron deficient anemia is usually caused by nutritional deficient or blood loss. In this case report, we present a teenaged female without previous gastric ulcer history who presented with a rare gastric tumor and an uncommon primary perforation. Even if there is an uncertainty about the exact diagnosis prior to the surgery, the strategy of stomach-preserving therapy by laparoscopy for primary perforation was successful and provided a good quality of life.

Keywords: Gastric MALT lymphoma, Laparoscopy, Perforation, Iron deficiency, Adolescent

Background

Extranodal marginal zone B cell lymphoma of mucosa-associated lymphoid tissue (MALT lymphoma), which was previously considered a low-grade lymphoma, is the predominant histological subtype of primary gastric lymphoma, representing 1–6% of primary gastric neoplasm, 5–7% of all non-Hodgkin lymphomas, 40–50% of all gastric lymphomas, and 50–60% of all extranodal lymphomas [1–4]. The common symptoms of gastric MALT lymphoma include epigastric pain, nausea, vomiting, weight loss, and gastrointestinal bleeding [2, 3].

However, the description of perforation at presentation is rare in the literature [5–7]. Herein, we present such a case with successful management in a female adolescent.

Case presentation

A 12-year-old girl was admitted with noticeable palor and dyspnea on exertion for the past two weeks. No specific medicine or family histories were reported. She visited local clinics and her hemogram showed a low hemoglobin value. Physical examination showed a palor and mild tachycardia (110 bpm). Laboratory data taken in our hospital showed a hemoglobin level of 5.9 g/dL; mean corpuscular volume of 75.4 fl; C-reactive protein level of 1.02 mg/L; serum ferritin of 2.9 ng/mL; serum iron level of 9 μg/dL; and total iron binding capacity at 458.2 μg/dL. She denied bloody stool or abdominal discomfort history. Iron tablet (100 mg bid) was prescribed. Stool examination
showed a mild hemoccult-positive (1+). \(^{13}\)C urea breath test was a positive finding. Therefore, upper GI endoscopy was arranged.

However, 8 h prior to scheduled exams, patient complained of sudden onset of severe tenderness with involuntary guarding and rebounding pain involving the entire abdomen. Interpretation of standing view and left lateral decubitus abdominal film detected free intraperitoneal air, and peritonitis was confirmed. Because of the abnormal image findings, surgical intervention was advised and in light of hemodynamic stability, a laparoscopic approach was performed. After initial exploration of the peritoneal cavity, a burst perforation, approximately 1 cm in diameter, was noted over lower gastric body (Fig. 1). The edge of the perforation was excised, and simple closure was performed. The resected specimen was sent for pathological examination.

Histology confirmed the diagnosis of extranodal marginal zone B-cell lymphoma of MALT type. Section showed diffuse infiltration of small lymphocytes without residual normal architecture. The aggregation of tumor cells were composed of monocyteid cells with plasmacytoid and centrocyte-like cell differentiation (Fig. 2).

Immunohistochemically, these cells were positive for B-lymphocyte antigen cluster of differentiation (CD) 20, CD79a, and paired box protein Pax-5, but negative for CD3, CD5, CD10, B-cell lymphoma 2, CD30, terminal deoxynucleotidyl transferase, CD1a, c-Myc, and S100 (Fig. 3). Light-chain restriction for infiltrating plasma cells was not identified. Both Epstein-Barr encoding region in situ hybridization and cytomegalovirus were negative. The B-cell clonality exhibited monoclonality (Fig. 4).

Subsequently, a systemic workup for clinical staging, including lactate dehydrogenase (161 IU/L), \(\beta\)-2-microglobulin (148.0 μg/dL), hepatitis B virus (nonreactive), hepatitis C virus (negative), and human immunodeficiency virus (negative), was performed. Positron emission tomography-computed tomography (PET-CT) showed accumulation of fluorodeoxyglucose in the same area. CT, bone scan, and bone marrow biopsy were also performed, and no metastatic lesion was detected. The Lugano staging system was considered to be Stage IE.

After resuming an oral diet, a 2-weeks course of oral antibacterial treatment (clarithromycin 500 mg plus amoxicillin 500 mg twice a day for 7 days followed by metronidazole 500 mg twice a day for another 7 days) plus 4 weeks esomeprazole (40 mg daily) were prescribed for Helicobacter pylori infection eradication. Endoscopy was scheduled 4 weeks after operation and showed a deep and large ulcer over anterior wall of the body with convergence of thickened mucosal folds (Fig. 5a). Biopsy samples were again obtained and consistent with extranodal marginal zone lymphoma of MALT. Therefore, involved field radiation therapy was delivered to the stomach (30 Gy in 20 fractions given over 4 weeks). There were no gastrointestinal side effects noted during and after radiotherapy.

A follow-up endoscopy was performed at 4 months after operation, and showed a broad-based healed scar with rugae interruption (Fig. 5b). The histological evaluation of biopsy specimen showed absent plasma cells and small lymphoid cells and complete histological remission was achieved at 2 months after radiotherapy. During a 1-year follow-up at our outpatient clinic, she has remained free of symptoms and without relapse. The timeline was shown in Additional file 1.
Discussion and conclusions
Since MALT lymphoma is characterized as “low-grade” (or indolent) and has a natural history of slow progression, most cases occur in individuals 50 years or older, with disease being most common in the sixth decade [2–4]. To our best knowledge, this 12-year-old girl is the youngest patient with gastric MALT lymphoma reported in the literature.

*H pylori* has been identified as the cause of chronic gastritis with consequent acquisition of lymphatic tissue, and up to 98% of gastric MALT lymphoma are second to *H pylori* infection [8]. According to the clinical
practice guidelines recommended by the European Society for Medical Oncology (ESMO) Guidelines Working Group [9], *H pylori* eradication is the first-time treatment in any case irrespective of *H pylori* status and lymphoma stage [2, 8], and lead to a complete remission in 50–90% of cases [4]. Those patients revealing persistence or progression of lymphoma despite successful *H pylori* eradication should receive radiation or chemotherapy [1]. Surgery usually does not play a role in the therapy of gastric MALT lymphoma, however, complications such as perforation or bleeding that cannot be controlled endoscopically may require surgical intervention [2, 8].

The infiltration of MALT lymphoma is mostly confined to the mucosa, and only 10% of infiltration invade deeply beyond muscularis propria [4]. Therefore, primary perforation is a rare complication of gastric MALT lymphoma. On reviewing the literature starting from the first description of MALT lymphoma in 1983 [10], only 4 cases have been reported [5–7, 11]. Of these 4 patients, 3 were men, ranging in age from 24 to 84 years. Due to the rare cases reported in the literature, the management for primary perforation of gastric MALT lymphoma has been gastrectomy with lymphadenectomy [5–7]. However, in the case of low-grade lymphoma, immediate radical resection may be unnecessary and an organ-preserving therapy would provide a better quality of life [12]. Simple closure of perforated gastric MALT lymphoma (followed by clinical practice guidelines according to the ESMO Guidelines Working Group) seems to be an acceptable treatment. As experience with minimally invasive surgery has expanded in perforated peptic ulcer, laparoscopy is both feasible and safe for a gastric perforation by MALT lymphoma.

Radiotherapy usually offers a curative option to patients with *H pylori* negative or refractory to *H pylori* eradication [1]. In the present case, radiotherapy was given because of deep invasion and patient’s young age. The major concern of radiotherapy for the patient was the risk of radiotherapy-related gastric perforation and bleeding, about 4% reported in the literature [1, 13]. However, involved field radiotherapy with moderate-dose (30-Gy) may improve the target coverage and reduce radiation dose. Since gastric carcinoma is also associated with *H pylori* gastritis, 5% of metachronous gastric carcinoma occurred after remission of gastric MALT lymphoma and the risk of development of gastric carcinoma in patients with gastric MALT lymphoma were shown to be 6 times higher than in the general population [4, 14, 15]. Due to the diagnosis at the young age in the present case, long-term follow-up is mandatory for detection of metachronous gastric carcinoma at an early stage.

In pediatric population, iron deficient anemia is usually caused by nutritional deficient or blood loss. This case presents a relatively uncommon clinical problem. Even if there is an uncertainty about the exact diagnosis prior to the surgery, a stomach-preserving therapy by minimally invasive surgery is acceptable and should provide a good quality of life.

**Additional file**

**Additional file 1**: Timeline. (PDF 650 kb)

**Abbreviation**

MALT: Mucosa-associated lymphoid tissue

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The dataset supporting the conclusions of this article is included within the article.

**Authors’ contributions**

YTC treated the patient and drafted the initial manuscript. PCL treated the patient and reviewed and revised the manuscript. HHS treated the patient and reviewed and revised the manuscript. CCW reviewed the pathology and revised the manuscript. MYH and TYL designed the radiotherapy protocol and revised the manuscript. All authors read and approved the final manuscript.
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Not applicable.

Consent for publication
Written informed consent was obtained from the parents of the patient for publication of this Case report and any accompanying images. A copy of the written consent is available for review by the Editor-In-Chief of this journal.

Competing interests
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