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Case Report

Eosinophilic gastroenteritis with hemorrhagic ascites: a case report

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Abstract: Eosinophilic gastroenteritis (EGE) is an inflammatory disease characterized by a significant increase in eosinophils. EGE itself is rare, and cases with clinical manifestations of hemorrhagic ascites are even rarer, which undoubtedly increases the risk of misdiagnosis. Given this, this study reports a rare case of pediatric EGE presenting with paroxysmal abdominal pain without apparent cause, accompanied by acute tonsillitis and mesenteric lymphadenitis, suggesting a possible intestinal infection. Following diagnostic evaluations, including abdominal ultrasound, abdominal computed tomography (CT), ascites sediment smear, bone marrow aspirate smear, and gastroscopic pathology, the child was diagnosed with EGE. Initial intravenous treatment with Ceftriaxone Sodium (Rocephin) didn't alleviate abdominal pain, and ascites gradually increased. After confirming EGE, the patient was given oral anti-inflammatory and anti-allergic treatment with Singulair and cetirizine tablets, as well as anti-inflammatory treatment with prednisone tablets. This case report will provide valuable insights into the diagnosis and treatment of EGE.

Keywords: Eosinophilic gastroenteritis, clinical treatment, diagnosis, case report

Introduction

Eosinophilic gastroenteritis (EGE) is a gastrointestinal disorder of unknown etiology characterized by eosinophilic infiltration in the stomach and small intestine [1-3]. Although the precise cause and pathogenesis of EGE remain uncharacterized, limited evidence suggests that it may be a polygenic allergic condition with the mechanisms falling between Immunoglobulin E (IgE)-mediated and delayed T helper 2 cell (Th2) responses [1, 4]. Allergens induce eosinophil release from tissues, leading to them infiltrating the gastrointestinal tract and causing inflammatory reactions.

Depending on the degree of infiltration, EGE can be divided into mucosal, muscular, and serosal variations. Patients with mucosal EGE often experience nausea, vomiting, abdominal pain, and diarrhea; those with muscular lesions often present with spasmodic abdominal pain, gas and fecal retention; while patients with serosal lesions are accompanied by ascites, peritonitis, and peripheral eosinophilia [5]. Adult EGE patients typically report a higher incidence of chest pain, nausea, and abdominal distension [6], while pediatric cases more commonly involve abdominal pain and diarrhea [7], highlighting the diverse clinical presentations of EGE. This heterogeneity complicates the clinical identification, diagnosis, and management of the disease.

Due to its rarity, especially in pediatric cases, data and research on EGE are limited. Herein, one pediatric case of EGE is reported along with literature review, offering valuable insights into the clinicopathological features and pathology of EGE in children. It is hoped that this report will contribute to reducing misdiagnosis rates in pediatric EGE cases.

Case data

A 12-year-old boy presented with paroxysmal abdominal pain. The child experienced paroxysmal abdominal pain without obvious cause 4 days prior to the visit, primarily around and above the umbilical area. One day before the visit, he had a mild cough with no obvious sputum production, fever, or sore throat. On the day

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of admission, the abdominal pain intensified, with frequent hematemesis but without abdominal distension. A routine blood test revealed elevated white blood cells, mainly neutrophils, as well as increased eosinophils and C-reactive protein (CRP). Imaging examination showed a short gas-fluid level in the mid abdomen, with palpable mesenteric lymph nodes and partial enlargement, accompanied by peritoneal effusion. The child was admitted for further diagnosis and treatment. The patient's body temperature (36.5°C), heart rate (92 beats/min), blood pressure (116/64 mmHg), and oxygen saturation (SpO_2) (98%) were normal at admission. He was fully conscious and cooperative during the examination.

After inquiry, the boy was found to have had overall good health in the past, with a history of neonatal hyperbilirubinemia, eczema, hand-foot-and-mouth disease, and right thumb fracture. He denied a history of allergic rhinitis, asthma, congenital heart disease, and febrile convulsions. Additionally, he had no history of, nor contact with, infectious diseases such as hepatitis, tuberculosis, whooping cough, chickenpox, measles, scarlet fever, or influenza. He also reported no contact with sick or dead birds, no history of trauma, drug or food allergies, blood transfusion, poisoning, residence in epidemic areas, or exposure to epidemic diseases. No abnormalities were found in the child's birth, growth and development, vaccination, or family history.

During the physical examination, the patient was fully conscious, with a good mental state, stable breathing, rosy lips, and good skin elasticity. There was no rash, yellow staining, or bleeding spots on the skin, nor was there any enlargement of cervical superficial lymph nodes. Pharyngeal congestion and enlargement of bilateral tonsils (degree: I°) were identified, with no exudation. The lung respiratory movements were symmetrical, with slightly thicker breathing sounds, but no dry or moist rales. The heart rhythm was uniform, and the sounds were strong, without pathological murmurs. The abdomen was flat and soft, with mild tenderness around and above the umbilicus but no tenderness or rebound pain in other areas. There was no palpable mass, nor significant enlargement of the liver and spleen, and active bowel sounds. There were no nervous system abnormalities, and his hands and feet were warm.

Etiology

The child complained of paroxysmal abdominal pain without obvious cause. Consumption of excessively acidic foods was also ruled out.

Laboratory tests

(1) Routine blood tests: The blood testing indicated a white blood cell count of 12.6×10^9/L, a neutrophil percentage of 52.30%, a lymphocyte percentage of 18.00%, an eosinophil percentage of 24.80%, an eosinophil count of 3.12×10^9/L, a hemoglobin concentration of 160 g/L, a platelet concentration of 226×10^9/L, and a CRP concentration of 13.68 mg/L.

(2) Imaging examinations: Plain abdominal X-rays in the standing position showed a short gas-liquid level in the middle abdomen (**Figure 1A**). B-ultrasonography of mesenteric lymph nodes revealed visible mesenteric lymph nodes with partial enlargement and peritoneal effusion (**Figure 1B**).

Treatment course

Upon admission, acute mesenteric lymphadenitis (bacterial infection) and incomplete intestinal obstruction were considered. Therefore, 2.0 g of Ceftriaxone Sodium (Rocephin, National Medicine Approval Number H10983036) was administered intravenously once a day for anti-infection and fluid replacement treatment. The abdominal pain of the child was not relieved, and the ascites gradually increased. An ascitic puncture revealed haemorrhagic fluid (**Figure 2**), suggesting the possibility of tuberculosis infection, tumors, hematological diseases, etc. Therefore, additional tests such as ascites sediment smear, bone marrow puncture smear, and gastroscopy were performed. The results confirmed a special type, with significant eosinophil presence observed in the ascites smear, bone marrow, and eosinophil infiltration in the lamina propria of the gastric mucosa (**Figure 2**). Accordingly, the patient was given oral anti-inflammatory and anti-allergic treatment with Singulair (Merck, National Medicine Approval Number: HJ20181187) and cetirizine tablets (Guangdong BIDI Pharmaceutical Co., Ltd., National Medicine Approval

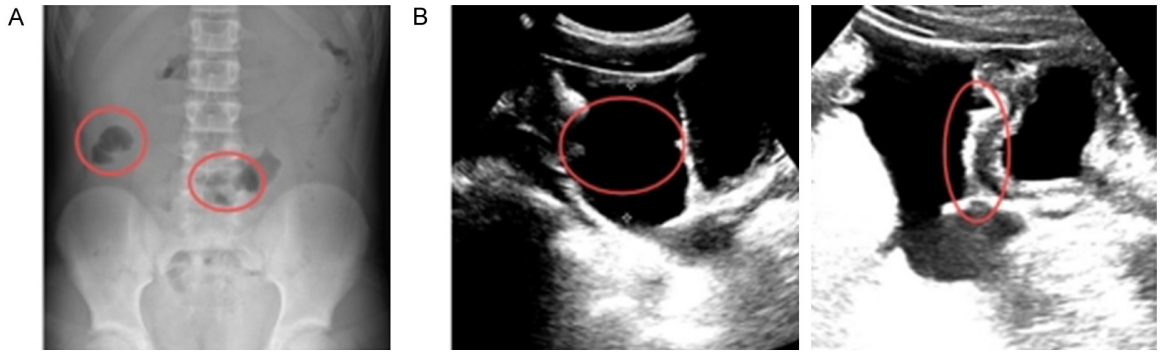

Figure 1. Imaging evidence of the child with eosinophilic gastroenteritis (A: Plain abdominal X-rays in the standing position; B: Abdominal B-ultrasonography).

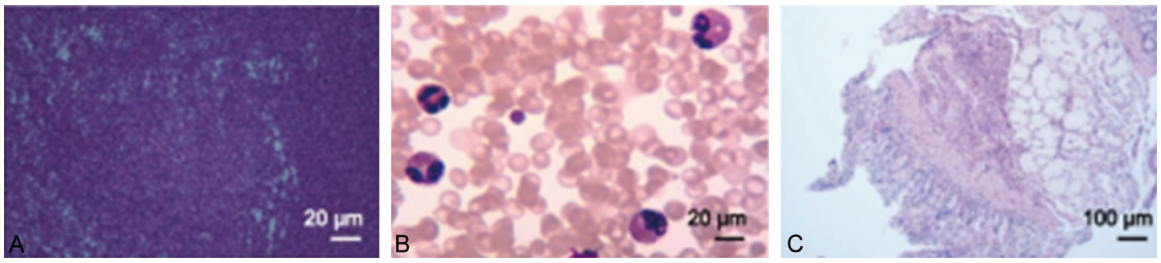

Figure 2. Eosinophil ascites sediment smear (A: 200X), bone marrow puncture smear (B: 100X), gastroscopy pathological examination (C: 40X).

Number: H20103387), as well as anti-inflammatory treatment with prednisone tablets (dosage: 15 mg, frequency: three times a day, Huazhong Pharmaceutical Co., Ltd., National Medicine Approval Number: H42021526). Following this treatment, the condition was improved with reductions in eosinophil percentage, visible mesenteric lymph nodes, and ascites. The entire intestinal mucosa was endoscopically observed as smooth after treatment.

Discussion

The incidence of eosinophilic gastroenteritis (EGE) is approximately 5-28 cases per 100,000, with an overall increase in prevalence over the past two decades [8]. EGE is a rare inflammatory disease that presents with different non-specific gastrointestinal symptoms, which greatly increases the difficulty of clinical diagnosis. In this study, the patient experienced paroxysmal abdominal pain 4 days prior to the visit. Abdominal pain is a common symptom in pediatric EGE [7]. Idiopathic allergies and drug reactions are commonly reported as potential triggers for EGE [9]. However, after inquiry, the patient had no allergic history or other obvious triggers. Laboratory and imaging findings showed significant inflammation and enlarged mesenteric lymph nodes, initially suggesting acute mesenteric lymphadenitis and incomplete intestinal obstruction. Treatment was initiated based on this presumed bacterial etiology, yet the condition persisted, indicating that the inflammation was not due to a bacterial infection-induced mesenteric lymphadenitis.

After the failure of initial treatment, the patient's ascites gradually increased, and the ascites puncture revealed bloody fluid. This is an uncommon finding that raises suspicion for conditions such as tuberculosis infection, tumors, hematologic diseases. Therefore, the child was tested by abdominal ultrasound, abdominal computed tomography (CT), ascites sediment smear, bone marrow aspirate smear, and gastroscopic pathological examination. We observed a large number of eosinophils in both ascites smear and bone marrow samples, along with a significant elevation in peripheral blood eosinophils. The mucosal lamina propria also showed obvious eosinophilic infiltration, aligning closely with characteristics of the sero-

Table 1. Literature on eosinophilic gastroenteritis

Study	Symptom	Treatment
El ray et al. (2021) [11]	Mild right pleural effusion; moderate abdominal distention (palpation); shifting dullness (percussion) suggestive of moderate ascites; moderate ascites; increased eosinophils in peripheral blood and ascitic fluid	Corticosteroids
He et al. (2022) [12]	Abdominal distention and ascites; increased eosinophils in ascites, bone marrow, and peripheral blood	Prednisone treatment
Sequeira et al. (2022) [13]	Ascitic fluid with a clear predominance of eosinophils	Suspending the oral iron the supplements
Tian et al. (2021) [14]	Symptom: extensive intestinal wall edema thickening; ascites in the abdominal cavity; eosinophilic infiltration in the mucous layer of the transverse colon, with ≥ 50 eosinophils/high power field	Steroid therapy

sal subtype of EGE. EGE is classified into three subtypes, mucosal, muscular, and serosal, with the mucosal subtype being the most reported and the serosal subtype the least [1]. The serosal subtype presents diagnostic challenges due to its variable symptoms, and endoscopy may not yield definitive diagnosis [10]. Recent reports, however, suggest that the serosal subtype may present with eosinophilic ascites, a characteristic symptom of the mucosal subtype. Case reports have noted that patients with the serosal subtype often present with ascites, accompanied by markedly increased eosinophils in the ascitic fluid (**Table 1**) [11-14]. In addition, peripheral eosinophilia is significantly higher in patients with the serosal subtype than in the other subtypes [13, 15]. Based on these findings, EGE was considered a likely diagnosis for this patient.

In EGE, eosinophilic ascites is a rare pathologic manifestation that is easily overlooked in early diagnosis. In particular, this case presented with hemorrhagic ascites, initially prompting clinicians to consider liver involvement, tuberculosis infection, tumors, and hematologic diseases rather than EGE. Abdominal ultrasound, abdominal CT, ascites sediment smear, bone marrow puncture smear, and gastroscopy are essential in the diagnosis of EGE and should be performed in suspected cases.

In addition, this case also suggests the possibility of EGE serosal subtype in children. Previous case reports have mainly involved adults aged 20 to 37, with limited documentation in children [11-14, 16]. The patient in this study was only 12 years old, suggesting that serosal EGE may also occur in children.

Conclusions

EGE with hemorrhagic ascites is rare, and the scarcity of typical cases limits clinical diagnostic efficiency, thereby increasing the risk of misdiagnosis and delaying effective treatment. This study presents special pathological images and imaging data from a pediatric case, providing valuable reference for subsequent diagnosis.

Disclosure of conflict of interest

None.

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References

[1] Li K, Ruan G, Liu S, Xu T, Guan K, Li J and Li J. Eosinophilic gastroenteritis: pathogenesis, diagnosis, and treatment. Chin Med J (Engl) 2023; 136: 899-909.

[2] Marasco G, Visaggi P, Vassallo M, Fiocca M, Cremon C, Barbaro MR, De Bortoli N, Bellini M, Stanghellini V, Savarino EV and Barbara G. Current and novel therapies for eosinophilic gastrointestinal diseases. Int J Mol Sci 2023; 24: 15165.

[3] Low EE and Dellon ES. Review article: emerging insights into the epidemiology, pathophysiology, diagnostic and therapeutic aspects of eosinophilic oesophagitis and other eosinophilic gastrointestinal diseases. Aliment Pharmacol Ther 2024; 59: 322-340.

[4] Ben-Baruch Morgenstern N, Shoda T, Rochman Y, Caldwell JM, Collins MH, Mukkada V, Putnam PE, Bolton SM, Felton JM, Rochman M, Murray-Petzold C, Kliewer KL and Rothenberg ME. Local type 2 immunity in eosinophilic gastritis. J Allergy Clin Immunol 2023; 152: 136-144.
[5] Kuzminski A, Rosada T, Przybyszewska J, Ukleja-Sokolowska N and Bartuzi Z. Eosinophilic gastroenteritis - a manifestation of an allergic disease in the gastrointestinal tract? Part 1. Epidemiology and diagnosis. Prz Gastroenterol 2023; 18: 43-46.
[6] Reed C, Woosley JT and Dellon ES. Clinical characteristics, treatment outcomes, and resource utilization in children and adults with eosinophilic gastroenteritis. Dig Liver Dis 2015; 47: 197-201.
[7] Kobayashi S, Tsunoda T, Umetsu S, Inui A, Fujisawa T and Sogo T. Clinical features of pediatric eosinophilic gastroenteritis. Pediatr Int 2022; 64: e15322.
[8] Qvarfordt PG, Reilly LM, Mark AS, Goldstone J, Wall SD, Ehrenfeld WK and Stoney RJ. Computerized tomographic assessment of graft incorporation after aortic reconstruction. Am J Surg 1985; 150: 227-231.
[9] Ness TE, Erickson TA, Diaz V, Grimes AB, Rochat R, Anvari S, Hajjar J and Weatherhead J. Pediatric eosinophilia: a review and multiyear investigation into etiologies. J Pediatr 2023; 253: 232-237, e231.
[10] Ferreira AA, Barbosa SM, Oliveira S, Ramada J and Silva A. Subserous eosinophilic gastroenteritis: a rare cause of ascites. Eur J Case Rep Intern Med 2017; 4: 000586.
[11] El Ray A, Montasser A, El Ghannam M, El Ray S and Valla D. Eosinophilic ascites as an uncommon presentation of eosinophilic gastroenteritis: a case report. Arab J Gastroenterol 2021; 22: 184-186.
[12] He YJ, Sun JY, Wang P, Wang JK, Li B and Yu XH. Plasma membrane lesion type total intestinal eosinophilic enteritis: a case report. Transpl Immunol 2022; 71: 101547.
[13] Sequeira M, Cruz D, Abecasis F, Santos H and Delerue F. Eosinophilic ascites: an infrequent presentation of eosinophilic gastroenteritis. Cureus 2022; 14: e24303.
[14] Tian XQ, Chen X and Chen SL. Eosinophilic gastroenteritis with abdominal pain and ascites: a case report. World J Clin Cases 2021; 9: 4238-4243.
[15] Havlichek D 3rd, Choung RS and Murray JA. Eosinophilic gastroenteritis: using presenting findings to predict disease course. Clin Transl Gastroenterol 2021; 12: e00394.
[16] Cuko L, Bilaj F, Bega B, Barbullushi A and Resuli B. Eosinophilic ascites, as a rare presentation of eosinophilic gastroenteritis. Hippokratia 2014; 18: 275-277.