



Right-sided Diverticulitis: An Unusual Presentation of Abdominal Pain in Children

Sheng-Yuan Ho¹, Chang-Chieh Wu², Chang-Hsien Liou³, Hueng-Chuen Fan⁴

Departments of ¹Pediatrics and ³Radiology, Tri-Service General Hospital, National Defense Medical Center, ²Department of Surgery, Division of Colon and Rectal Surgery, Tri-Service General Hospital, National Defense Medical Center, Taipei, ⁴Department of Pediatrics, Tungs' Taichung MetroHarbor Hospital, Taichung City, Taiwan, Republic of China

Acute diverticulitis is a rare and dangerous condition in a pediatric patient. The clinical presentation of right-sided diverticulitis mimics acute appendicitis. Hence, understanding the clinical presentation and treatment of right-sided diverticulitis is important. We report a case of right-sided diverticulitis in a 12-year-old girl and discuss the presentation and diagnosis of this disease.

Key words: Right-sided diverticulitis, acute diverticulitis, appendicitis, right lower quadrant pain

INTRODUCTION

Acute abdominal pain is a common presenting complaint for children seeking emergency care. Although most of these complaints may be caused by self-limiting conditions, the sufferings may herald a surgical or medical emergency and therefore turns into diagnostic dilemma for frontline clinicians.^{1,2} Diverticulitis, a very rare disease in children, may present persistent and intractable abdominal pain. The incidence and prevalence of this disease increased with advanced age because this disease occurs in approximately 60% of the population older than 80 years and 10% of people younger than 40 years.³ The cause can be congenital or acquired. The diverticula in left-sided colonic are usually acquired and multiple while right-sided colonic diverticula are mostly congenital and solitary.⁴ Although patients with this disease may be asymptomatic, dysregulated intrinsic immunity or incompletely digestive food debris clogged inside the outpouching of the bowel wall, thus triggering inflammatory reactions and leading to acute onset abdominal pain. However, it is extremely difficult to differentiate right-sided diverticulitis from abdominal pain due to acute appendicitis. We herein report a 12-year-old girl with a right-sided diverticulitis presented with intractable right-sided lower abdominal pain.

CASE REPORT

A 12-year-old Taiwanese girl was seen in a pediatric emergency department because of intermittent fever and persistent abdominal pain for 2 days. The pain localized over the right lower quadrant (RLQ) without radiating to other regions, increased after eating and drinking, and did not diminish with ibuprofen use. She presented with nausea and poor intake but no vomiting or diarrhea. On physical examination, this girl had a body temperature of 38°C. Her blood pressure, heart rate, and respiratory rate were 117/57 mmHg, 93 beats/min, and 18 breaths/min, respectively. She had no other systemic disease or significant disorder before, except an appendectomy 3 years ago. She had no definite history of trauma, had achieved normal developmental milestones. Her head and neck were normal; her lung breathing sound and heart sound were clear and regular, respectively. The cranial nerve examination was nonspecific. Her abdomen was soft and nondistended, deep tenderness to palpation in the RLQ with vague rebound tenderness and muscle guarding. The results of laboratory studies showed white blood cell count $16.84 \times 10^3/\text{mm}^3$ with 80.4% neutrophils, and C-reactive protein (CRP) level was

Received: April 01, 2016; Revised: April 29, 2016;
Accepted: May 13, 2016

Corresponding Author: Dr. Hueng-Chuen Fan,
No. 699, Section 8, Taiwan Blvd., Wuqi Dist.,
Taichung City, Taiwan, Republic of China.
Tel: 886-4-26581919-73161; Fax: 886-4-26582193.
E-mail: fanhuengchuen@yahoo.com.tw

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Ho SY, Wu CC, Liou CH, Fan HC. Right-sided diverticulitis: An unusual presentation of abdominal pain in children. J Med Sci 2016;36:123-5.

Right-sided diverticulitis in children

10.24 mg/dL. Urine analysis was all in the normal range. Plain film of the abdomen did not reveal abnormality. Ultrasound of the abdomen was requested for further investigation, but the result was normal. As her abdominal pain was off and on and occasionally intractable, she was admitted. A pediatric surgeon was consulted and a surgical condition could not be ruled out. A contrast-enhanced computed tomography (CT) scan of the abdomen and pelvis demonstrated segmental wall thickening over the ascending colon with several outpouching air-filled or wall-calcified nodules and surrounding fat stranding. Several enlarged nodes with short axis <1 cm over the mesentery of RLQ of the abdomen were also seen [Figure 1a and b]. All CT findings confirmed the diagnosis of right-sided diverticulitis. After 4 days rest, fasting, intravenous hydration, and antibiotics administration, including ampicillin 1 g every 6 h, metronidazole 500 mg every 8 h, and ceftriaxone 1 g every 12 h, her abdominal pain dramatically improved. She was discharged with 10 days course of oral metronidazole 250 mg three times a day. One month follow-up double-contrast barium enema study showed several diverticula over the right-sided colon [Figure 1c].

DISCUSSION

Colonic diverticular disease is a common disorder in the elderly. The prevalence of diverticulitis is mainly age-dependent. The prevalence increases to 50–70% in those aged over 80 years and is rare in those under the age of 40.^{5,6} Diverticulitis is very rare in children, and literature regarding

pediatric cases is scarce.^{4,7,8} Right-sided diverticulitis is very dangerous because it is frequently misdiagnosed as acute appendicitis, and a correct diagnosis is only in 6–14% of patients.^{9,10} Owing to rarity and unfamiliarity, approximately 70–100% of patients with this disease had received unnecessary surgery.^{4,7,9} Our case is an exception because she had an appendectomy before this episode. Although the result of abdomen ultrasound was normal, the contrast-enhanced abdominal CT clearly indicated the outpouchings.

Sonography of the abdomen was suggested for patients with suspicious diverticulitis because diverticula can be seen in up to 50% of cases.¹¹ Changes in pericolic fat, enlarged fluid-filled loops of bowel, hyperechoic areas within the lumen, and an abscess that presents a cystic mass with hyperechoic debris are also key sonographic features of acute diverticulitis.¹¹ However, surgeon's skills, patients' conditions, and size of diverticula may account for the low percentage of correct diagnosis by sonography. Helou *et al.* reported no statistically significant difference in sensitivity of sonography (92%) versus CT (94%).¹¹ According to the present findings, CT is better for the diagnosis of this disease. Double-contrast barium enema study is the best tool for evaluation of colon diseases and is contraindicated in acute diverticulitis due to the risk of perforation and peritonitis. Therefore, the diagnosis in this case was made by abdominal CT instead of barium enema study. After her condition became stable, the follow-up double-contrast barium enema study substantially demonstrated the diverticula over the ascending colon.

The present patient is a Taiwanese female. The prevalence of colonic diverticular disease is more common in males.⁸ The incidence of right-sided diverticulitis is higher in Asians than in the Western population.^{3,4,7,8} In Western countries, colonic diverticular disease tends to affect the sigmoid and descending colon.¹² In Asians, like the present case, colonic diverticular disease involves more often the cecum and ascending colon. The incidence of right-sided colonic diverticular disease in the Chinese population ranges from 55% to 71%.^{3,13} There is no report regarding the incidence of pediatric right-sided diverticulitis. Lesions involved the cecum and ascending colon are thought to reflect a genetic predisposition.¹⁴ Interestingly, her parents denied any disease related to gastrointestinal tract. However, her uncle (mother's side) had similar symptoms as hers, but he refused any further investigation. Her symptoms, including intermittent abdominal pain, occasionally intractable, alleviated after fasting and intravenous hydration.

Although RLQ pain is a common symptom in patients with right-sided diverticulitis, nausea and vomiting are not (26.7–31%).^{4,8} Right-sided colon diverticulitis is associated with a higher incidence of pain without rebound tenderness.⁴ In this case, nausea without vomiting was seen; however,



Figure 1: (a) Contrast-enhanced transverse section of abdominal computed tomography showing segmental wall thickening over the ascending colon with outpouching diverticula (arrow) and surrounding fat stranding. (b) A coronary section of abdominal computed tomography showing several diverticula (arrowhead) over the ascending colon, consistent with acute diverticulitis. (c) One month follow-up double-contrast barium enema study showing several diverticula (arrow) without irregular mucosal pattern over the right-sided colon

it is impossible to differentiate surgical conditions from right-sided diverticulitis by symptoms analysis alone. Shin *et al.*⁴ proposed that the levels of leukocytosis, the percentage of segmented forms, and CRP were slightly lower in patients with right-sided diverticulitis in comparison with patients with acute appendicitis. In this case, leukocytosis and elevated CRP were seen. Therefore, to differentiate acute appendicitis from right-sided diverticulitis by laboratory analysis is also unreliable.

Most patients with right-sided diverticulitis respond well to conservative treatment, including bowel rest and antibiotics to cover Gram-negative, and anaerobic pathogen was suggested^{9,10} in patients with uncomplicated diverticulitis. If a patient shows no response to these treatments, while complications, failed percutaneous drainage of an abscess, recurrent episodes, peritonitis, bowel obstruction, and fistula occur, aggressive treatment with surgery may be considered.¹⁵ However, surgery for acute colonic diverticulitis may cause significant morbidity and mortality.

CONCLUSION

The clues of right-sided diverticulitis can always be obtained from a careful history taking, astute physical examination, laboratory tests, imaging, and in particular, a high level of suspicion. This case highlights that when a patient is presented with an unusual RLQ pain, apart from the possible surgical conditions, right-sided diverticulitis should be considered.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Lin KC, Wu HP, Huang CY, Lin CY, Chang CF. Discriminant analysis of serum inflammatory biomarkers which differentiate pediatric appendicitis from other acute abdominal diseases. *Acta Pdiatr Taiwan* 2007;48:125-30.
2. Erkan T, Cam H, Ozkan HC, Kiray E, Erginoz E, Kutlu T, *et al.* Clinical spectrum of acute abdominal pain in Turkish pediatric patients: A prospective study. *Pediatr Int* 2004;46:325-9.
3. Chan CC, Lo KK, Chung EC, Lo SS, Hon TY. Colonic diverticulosis in Hong Kong: Distribution pattern and clinical significance. *Clin Radiol* 1998;53:842-4.
4. Shin JH, Son BH, Kim H. Clinically distinguishing between appendicitis and right-sided colonic diverticulitis at initial presentation. *Yonsei Med J* 2007;48:511-6.
5. Tursi A. Mesalazine for diverticular disease of the colon – A new role for an old drug. *Expert Opin Pharmacother* 2005;6:69-74.
6. Ferzoco LB, Raptopoulos V, Silen W. Acute diverticulitis. *N Engl J Med* 1998;338:1521-6.
7. Bogue CO, Mann EH. Imaging findings in right-sided diverticulitis in a child. *Pediatr Radiol* 2008;38:1125-7.
8. Markham NI, Li AK. Diverticulitis of the right colon – experience from Hong Kong. *Gut* 1992;33:547-9.
9. Schmit PJ, Bennion RS, Thompson JE Jr. Cecal diverticulitis: A continuing diagnostic dilemma. *World J Surg* 1991;15:367-71.
10. Arrington P, Judd CS Jr. Cecal diverticulitis. *Am J Surg* 1981;142:56-9.
11. Helou N, Abdalkader M, Abu-Rustum RS. Sonography: First-line modality in the diagnosis of acute colonic diverticulitis? *J Ultrasound Med* 2013;32:1689-94.
12. Stollman NH, Raskin JB. Diverticular disease of the colon. *J Clin Gastroenterol* 1999;29:241-52.
13. Yap I, Hoe J. A radiological survey of diverticulosis in Singapore. *Singapore Med J* 1991;32:218-20.
14. Beranbaum SL, Zausner J, Lane B. Diverticular disease of the right colon. *Am J Roentgenol Radium Ther Nucl Med* 1972;115:334-48.
15. Regenbogen SE, Hardiman KM, Hendren S, Morris AM. Surgery for diverticulitis in the 21st century: A systematic review. *JAMA Surg* 2014;149:292-303.