

# A case report of infant with gastric perforation caused by *Candida albicans* infection

Min Zhang, MD\*

## Abstract

**Rationale:** Spontaneous gastric perforation in young children is rare, and gastric perforation caused by *Candida albicans* infection is even rarer.

**Patient concerns:** A 4-month-old infant presented with frequent retching. The results of X-rays showed obvious pneumoperitoneum but gastric vacuole was not seen.

**Diagnosis:** The infant was diagnosed as spontaneous gastric perforation caused by *C albicans* infection based on blood culture, peritoneal fluid culture, and postoperative histopathology.

**Interventions:** An emergency exploratory laparotomy was performed and a gastric perforation repair was done. The infant received antishock, antiinfection, and intravenous nutrition treatment.

**Outcomes:** After operation and antiinfective symptomatic treatment, the infant recovered.

**Lessons:** This case emphasized the rare *C albicans* infection as a cause of the gastric perforation in infant. The *C albicans* infection should always be thought of as an etiology for the gastric perforation in infant, to reduce the significant mortality. The early detection is necessary to treat *Candida* infections.

**Abbreviations:** AB = Alcian blue, cm = centimeter, HE = hematoxylin-eosin, PAS = periodic acid-Schiff, pH = hydrogenion concentration.

**Keywords:** *Candida albicans* infection, gastric perforation, infant

## 1. Introduction

Neonatal gastric perforation is rare, and the mortality rate is very high, about 35% to 72%.<sup>[1]</sup> In children outside the neonatal period, spontaneous gastric perforation caused by *Candida albicans* infection is even rarer. The disease is often poorly recognized. The reason of spontaneous gastric perforation in children is not clear.<sup>[2]</sup> The hypothesis mainly includes: birth trauma,<sup>[3]</sup> mechanical injury,<sup>[4]</sup> idiopathic,<sup>[5]</sup> hypoxia, and increased intraluminal pressure.<sup>[6]</sup> By the time of diagnosis, the use of antifungal drugs has lagged, and the mortality rate is quite high.<sup>[7,8]</sup> Here, we present a case of 4-month-old infant with spontaneous gastric perforation caused by *C albicans* infection.

Editor: N/A.

Informed written consent was obtained from the patient for publication of this case report and accompanying images.

The authors have no funding and conflicts of interest to disclose.

Department of Pediatric Surgery, Maternal and Child Health Care Hospital affiliated to Nantong University, Nantong, Jiangsu, China.

\* Correspondence: Min Zhang, Maternal and Child Health Care Hospital affiliated to Nantong University, 399 Shijidadao Road, Nantong, Jiangsu 226018, China (e-mail: 13861900994@163.com).

Copyright © 2019 the Author(s). Published by Wolters Kluwer Health, Inc. This is an open access article distributed under the terms of the Creative Commons Attribution-Non Commercial License 4.0 (CCBY-NC), where it is permissible to download, share, remix, transform, and buildup the work provided it is properly cited. The work cannot be used commercially without permission from the journal.

Medicine (2019) 98:22(e15825)

Received: 22 November 2018 / Received in final form: 12 April 2019 / Accepted: 29 April 2019

<http://dx.doi.org/10.1097/MD.00000000000015825>

After operation and antiinfective symptomatic treatment, the infant recovered.

## 2. Case report

The guardian of patient has provided informed consent for publication of the case. The infant, male, 4 months old, was breastfeeding after birth. There was a history of diarrhea and adding banana food supplement since 2 days before the onset. The infant presented frequent retching and low fever for 12 hours. His white blood cell count was  $12.31 \times 10^9/L$  with neutrophil 81.4%, and he received oral treatment with cefaclor, bifidobacteria, and acetaminophen but still frequent retching. The infant was crying, sputum, and high fever 1 hour before admission to the hospital, and the results of X-rays showed obvious pneumoperitoneum and gastric vacuole was not shown (Fig. 1). The infant was diagnosed as digestive tract perforation, shock, metabolic acidosis, and immediately received antishock, antiinfective treatment. Four hours after admission, an emergency exploratory laparotomy was performed and a gastric perforation repair was done (Fig. 2A). During the operation, gray-brown exudate was found in the abdominal cavity, and there was a longitudinal irregular rupture (about 4 cm long) from the greater curvature to the cardia on the posterior wall of the stomach. A little banana content was attached around the perforation, and the broken stomach wall was pink (Fig. 2B). The infant was given metronidazole for antiinfection after operation. Postoperative histopathology showed *C albicans* infection in the resected perforated marginal gastric tissue (Fig. 3). On the 4th day after operation, the culture of peritoneal fluid and blood showed *C albicans* infection, and voriconazole 6 mg/kg was added to resist infection. On the 6th day after operation, the

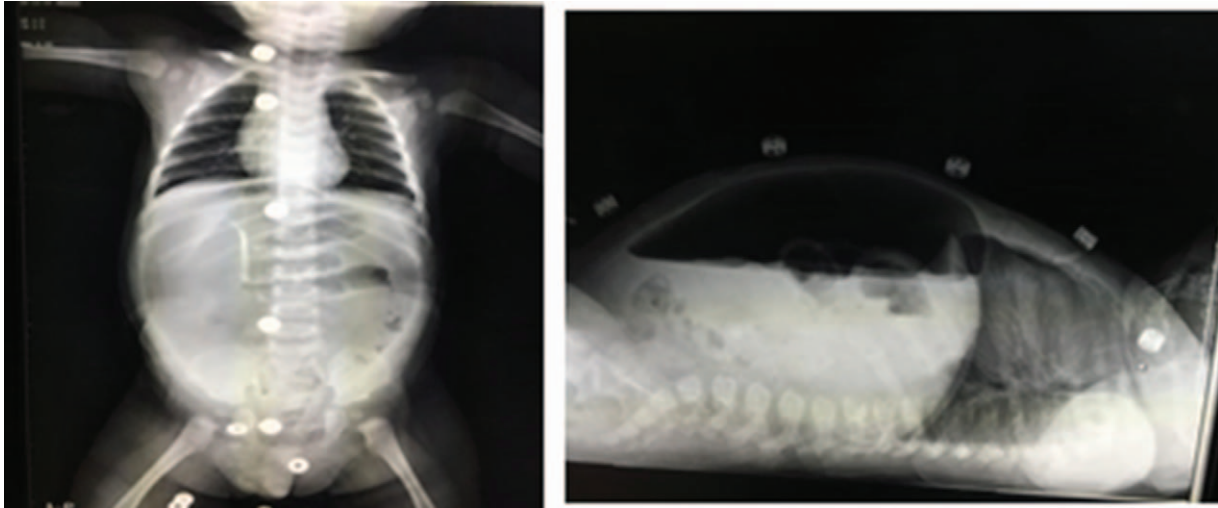


Figure 1. Abdominal X-ray film shows a large amount of gas in the peritoneal cavity.

infant presented abdominal distension, and the shallow incision in the abdominal wall was opened. The result of ultrasound detection showed a small amount of fluid in the intestinal gap, and then the infant was transferred to the superior hospital. After transfer, vancomycin, meropenem, ornidazole, and voriconazole were combined to fight infection. On the 7th day after operation, the abdominal wall incision was opened and surgical exploration was done, a small amount of exudate in the abdominal cavity was found, then suture treatment of the abdominal wall was done, and the above-mentioned antiinfective treatment was continued. In addition, the infant received intravenous nutrition, plasma albumin and gamma globulin treatment. After 13 days, the infant was transferred to the general ward. After 1 month, the infant was discharged from the hospital and continued to be treated with voriconazole for 3 months, then the infant recovered.

### 3. Discussion

In children outside the neonatal period, spontaneous gastric perforation caused by *C albicans* infection is very rare, and the

disease is often poorly recognized. By the time of diagnosis, the use of antifungal drugs has lagged, and the mortality rate is quite high.<sup>[7,8]</sup> If the gastric perforation can be diagnosed early, early surgery, early combined with effective antiinfection, the mortality rate may be greatly reduced.

This infant in the case had no history of trauma or hypoxia during birth. There was a history of frequent retching before the onset of the disease. Frequent retching increased the pressure on the stomach wall and probably caused the perforation. Blood culture, peritoneal fluid culture, and postoperative histopathology indicated that the infant had *C albicans* infection. *C albicans* is usually found in the oral cavity, upper respiratory tract, intestines, and vagina of normal people. It is a conditional pathogenic fungus. The suitable growth environment for *C albicans* is pH 5.5. The pH value in the newborn's stomach is about 5. The infant in this case was 4 months old, and the pH value in his stomach may also be about 5, which was suitable for the growth of *Candida*. The infant had a history of hypothermia and diarrhea before the onset of the disease, considering the possibility of fungal infection before. However, the infant had no

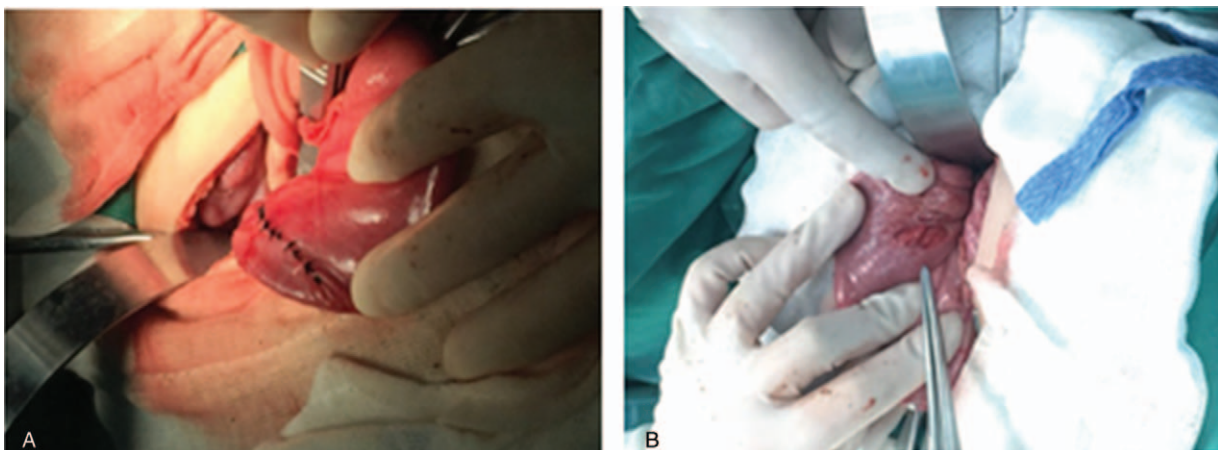
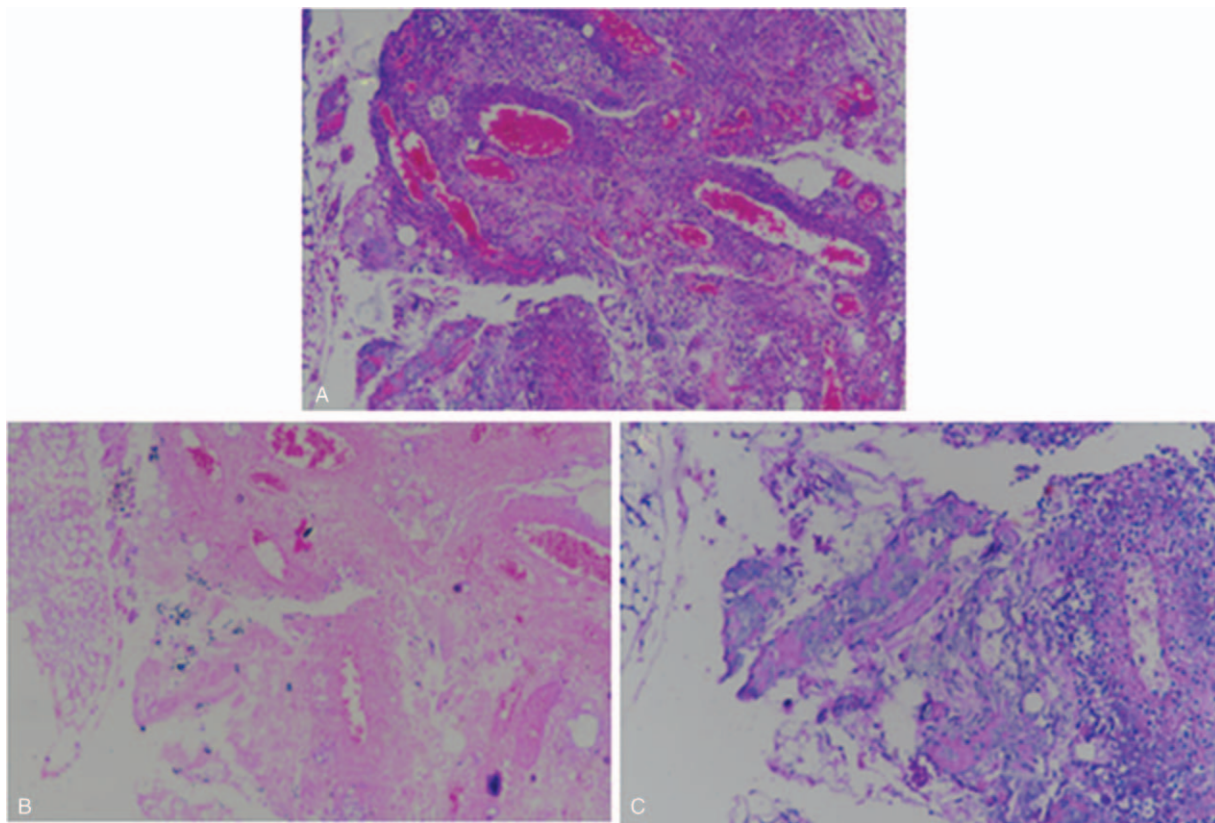


Figure 2. (A) A gastric perforation repair was done. (B) A little banana content was attached around the perforation, and the broken stomach wall was pink.



**Figure 3.** Postoperative pathology suggested that the resected perforated marginal gastric tissue fungus stained for *Candida albicans* infection. (A) Hematoxylin-eosin (HE) staining showed there were eosinophils in mucus secretions ( $\times 100$ ). (B) Alcian blue (AB) staining showed the blue bacterial cell ( $\times 100$ ). (C) Periodic acid-Schiff (PAS) staining showed the red bacterial cell ( $\times 100$ ).

immunodeficiency and no long-term history of antibiotics or antacids. Before the onset, there was a history of eating bananas. In India, a literature reported that neonatal gastric perforation occurred after feeding of bananas, and the age of infants with gastric perforation was 7 and 21 days,<sup>[9]</sup> whether bananas have a certain effect on the occurrence of gastric perforation needs further study.

Common clinical manifestations of neonatal gastric perforation include sudden abdominal distension, refusal of breastfeeding, apathetic, and lethargy, but vomiting is rare.<sup>[10]</sup> The main clinical manifestation of this infant was retching. Diagnosis of gastric perforation is not difficult, mainly based on clinical manifestations and X-rays results. After the perforation occurs, a large amount of gas enters the abdominal cavity, causing the diaphragm to rise, affecting the gas exchange in the lungs, and at the same time, the toxin is absorbed, the whole-body condition is rapidly deteriorated. When the infant came to the hospital, he presented acidosis and shock manifestations. Therefore, preoperative preparation is essential, and the overall condition of the child should be improved. Surgery can significantly reduce the mortality of neonatal gastric perforation.

There are few reports on spontaneous gastric perforation in infants and few experiences in diagnosis and treatment. The causes and prognosis need further clinical studies. We have the following experiences in the treatment of this infant: If the infant has frequent retching without inducement in the early stage, it is alert to the possibility of gastric perforation. Once diagnosed, active antishock, acid correction, and early surgery may help the

prognosis of the disease. Early detection of fungal infections and antifungal treatment can improve the prognosis. Raman spectroscopy can be used to diagnose fungal infections within 12 to 24 hours, cell smear and antifungal staining can also be used to diagnose fungal infections. Once the fungal infections are clear, the antifungal drug should be used in sufficient amounts, and a sufficient amount of antibiotics should be used in combination. The surgical incision should be reinforced with relaxation suture as much as possible to prevent cracking.

### Author contributions

Writing – original draft: Min Zhang.

Writing – review & editing: Min Zhang.

### References

- [1] Albo R, De Lorimier AA, Silen W. Spontaneous rupture of the stomach in the adult. *Surgery* 1963;53:797–805.
- [2] Bayatpour M, Bernard L, McCune F, et al. Spontaneous gastric rupture in the newborn. *Am J Surg* 1979;137:267–9.
- [3] Pendergrass EP, Booth RE. Report of a case of ruptured stomach in an infant 3 days old. *Am J Roentgenol Radium Ther* 1946;56:590–3.
- [4] Stein FE, Wright LT. Rupture of hollow and solid viscera in the newborn: an analysis of twenty-five cases. *Harlem Hosp Bull* 1953;6:32–57.
- [5] Castleton KB, Hatch FF. Idiopathic perforation of the stomach in the newborn. *AMA Arch Surg* 1958;76:874–81.
- [6] Shaker IJ, Schaefer JA, James AE Jr, et al. Aerophagia, a mechanism for spontaneous rupture of the stomach in the newborn. *Am Surg* 1973;39:619–23.

- [7] Nafatalewa DK, Misenga JB, Musapudi EM, et al. Spontaneous neonatal gastric perforation: about a case [in French]. *Pan Afr Med J* 2018;30:72.
- [8] Chen TY, Liu HK, Yang MC, et al. Neonatal gastric perforation: a report of two cases and a systematic review. *Medicine (Baltimore)* 2018;97:e0369.
- [9] Mathew A, Wanshnong L, Longtrai S, et al. Bananas and neonatal gastric perforation. *J Indian Assoc Pediatr Surg* 2012;17:88–9.
- [10] Gupta N. A rare cause of gastric perforation-*Candida* infection: a case report and review of the literature. *J Clin Diagn Res* 2012;6:1564–5.