YERSINIA ENTEROCOLITICA COLITIS WITH PERITONITIS IN A CHILD WITH BETA–THALASSEMIA MAJOR

Ahmed H. Al-Salem, FRCSI, FACS, FICS; Ali M. Elbashier, MD, DCP, FRC;
Mona Al Nazer, MD, KFUF

Yersinia enterocolitica is a gram-positive, facultative, anaerobic coccobacillus, a member of the entero-bacteriaceae family. It is a well-known cause of a mild self-limiting gastroenteritis in children and adolescents.[1,2] Recently, however, it has been described with increasing frequency as causing a large number of acute enterocolitis, terminal ileitis, mesenteric lymphadenitis, pseudo-appendicular syndrome as well as extraintestinal manifestations, including erythema nodosum and arthritis.[3-5] Occasionally, it can lead to fulminant infection in the form of peritonitis and septicemia.[6-9] Most reported cases, however, have been in patients with iron overload, those receiving the iron-chelating agent desferoxamine, or patients whose host defenses are compromised by underlying illness, including liver disease and human immunodeficiency virus (HIV). We report a case of *Yersinia enterocolitica* colitis with peritonitis in a Saudi child with beta-thalassemia major.

Case Report

A seven-year-old male child, a known case of beta-thalassemia major on chronic blood transfusion and desferoxamine therapy, presented to the hospital with abdominal pain, vomiting and fever of about 6 hours duration. There was no history of diarrhea. On examination, he was found to be pale and sick looking. His temperature was 38°C, his pulse was 145/min., and his blood pressure was 110/65 mm Hg. Abdominal examination revealed generalized tenderness with guarding and rebound tenderness, which was more prominent in the upper abdomen. His abdominal x-ray revealed no gas under the diaphragm. His CBC showed Hb = 8.5 g/dL, WBC = 15.1×10^9/l with 57% polymorphs, 14% band cells and 26% lymphocytes, and platelets = 265×10^9/l. He was started on triple antibiotics (ampicillin + gentamycin + metronidazole) and prepeared for emergency laparotomy.

From the Departments of Surgery (Division of Pediatric Surgery), Pathology & Laboratory, Qatif Central Hospital, Qatif, Saudi Arabia

Address reprint requests and correspondence to Dr. Al-Salem: P.O. Box 61015, Qatif 31991, Saudi Arabia.

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On exploration, there was a lot of turbid fluid in the peritoneal cavity, as well as localized acute inflammation with thickening affecting about 15 cm of the transverse colon. There was no perforation and the spleen was enlarged. A swab from the peritoneal fluid was sent for culture and sensitivity. Localized resection of the affected part of the transverse colon was done; the right end of the colon was brought out as an end colostomy and the left end was brought out as a mucous fistula. Postoperatively, the patient did well and was discharged home on the 14th postoperative day. The swab taken from the peritoneal fluid grew *Yersinia enterocolitica* which was sensitive to amikacin, gentamycin, doxycyclin, cefotaxime and cotrimoxazole but resistant to ampicillin, and because of its sensitivity to aminoglycosides no change was made in the antibiotics regimen. Histology of the resected colon showed marked acute inflammation. There was also edema of the submucosa accompanied by polymorphs infiltration within the mucosa, submucosa, muscularis and serosa. The colostomy was closed two-and-a-half months later.

Discussion

Yersinia enterocolitica is an increasingly recognized cause of morbidity and mortality, and although it commonly causes intestinal infection in the form of mesenteric lymphadenitis and enterocolitis, the clinical picture nevertheless is quite variable.[1,2] An acute abdominal emergency in the form of acute gastroenteritis, colitis, or pseudo-appendicitis due to acute terminal ileitis are the most important manifestations of the disease, but at times it causes extraintestinal manifestations in the form of arthritis and erythema nodosum.[3-5] Occasionally, it can also lead to fulminant septicemia and peritonitis.[6-9] Interestingly, the majority of reported infections have been in patients with iron overload,[6,7,9] those receiving desferoxamine,[3-5] or in those whose host defenses are compromised, including those with HIV[10] and liver disease.[7] In a review of 12 cases of *Yersinia enterocolitica* peritonitis, Reed et al. found that six (50%) of them had iron overload.[6] Among the patients susceptible to *Yersinia enterocolitica* are those with homozygous beta-thalassemia.[5]

Iron is known to be an essential growth factor for most bacteria, and in order for bacteria to obtain iron, they

release siderophores which bind, solubalize iron and re-enter the bacteria via surface receptors.[11,12] *Yersinia enterocolitica* is an unusual bacteria from this aspect as it lacks siderophores, yet it has receptors for them.[13]

In humans, *Yersinia enterocolitica* is a normal inhabitant of the intestines, and its low virulence is thought to be due to its inability to obtain iron readily. In children with beta-thalassemia, not only does iron become readily available, but also the use of desferoxamine as a chelating agent enhances the virulence of *Yersinia enterocolitica* by easily providing iron as a siderophore for their growth. Thus, the increased susceptibility of children with beta-thalassemia to *Yersinia enterocolitica* infection is two-fold; systemic iron overload is known to lead to defective immunological function, and the use of desferoxamine increases bioavaliability of iron to *Yersinia enterocolitica* leading to increase in their growth. In addition to this is the fact that most patients with beta-thalassemia who are on chronic blood transfusion therapy will eventually undergo splenectomy because of increased transfusion requirement.

Splenectomized children are well known to be at increased susceptibility to infections because of immunological abnormalities and poor production of specific antibodies. This, however, is not a prerequisite for the increased susceptibility to *Yerisinia enterocolitica* infection as happened in our patient. There are reports of *Yersinia enterocolitica* infections both in splenectomized and unsplenectomized children with beta-thalassemia.[5,8] Children with beta-thalassemia are usually on chronic blood transfusion, and although autologous blood transfusions are now safe with respect to transmission of HIV or hepatitis B and C infections, the risk of blood transfusion-aquired bacterial septicemia must always be considered. In *Yersinia enterocolitica*, the portal of entry is usually via the intestine leading to mesenteric adenitis to start with, followed by subsequent spread of infection, but there are now increasing reports of *Yersinia enterocolitica* septicemia following autologous blood transfusion. This must always be kept in mind in patients with beta-thalassemia who are on chronic blood transfusion therapy.[14] To our knowledge, this is the first report of *Yersinia enterocolitica* infection in a Saudi child with beta-thalassemia.

Physicians caring for these children should be aware of this complication, as early recognition, temporary withholding of desferoxamine and antibiotic therapy will lead to rapid clinical improvement, and obviate the need for emergency laparatomy in the majority of cases.[3] It is well known that continuing desferoxamine administration will lead to exacerbation of the illness by encouraging the systemic spread of *Yersinia*. In our patient, it was a difficult descision not to operate, because he had signs of peritonitis, but retrospectively, if *Yersinia enterocolitica* was diagnosed preoperatively, colon resection could have been avoided since there was no perforation and the area of inflammation was localized affecting about 15cm of the transverse colon.

In conclusion, *Yersinia enterocolitica* infection should be considered in children with iron overload who present with abdominal symptoms, and once the diagnosis is suspected, desferoxamine should be discontinued temporarily and antibiotics started. *Yersinia enterocolitica* is usually susceptible *in-vitro* to a variety of antibiotics including aminoglycoside, chloromphenicole, tetracycline, cotrimoxazole, third-generation cephalosporines and fluoroquinolones, as well as imipenem and aztreonam.[15] Clinically, the use of broad-spectrum cephalosporin, often in combination with an aminoglycoside, has resulted in a successful outcome in patients with extraintestinal *Yersinia enterocolitica* infection. Fluroquinolones alone or in combination have also proven efficacious in the treatment of both intestinal and extra intestinal *Yesinia enterocolitica* infections.[15,16]

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