Case report
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A case of hemolytic uremic syndrome preceded by intussusception

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Hemolytic-uremic syndrome (HUS) is the most common cause of acute renal failure in young children. It is classically characterized by the triad of microangiopathic hemolytic anemia, thrombocytopenia, and uremia. Further, not only is intussusception one of the differential diagnoses of HUS but it may also become a complication during disease progression. We report a case of HUS preceded by intussusception in a previously healthy 17-month-old boy. The patient presented at the emergency department with bloody stools that developed the day after reduction of intussusception. HUS was diagnosed 4 days after the reduction of intussusception. The patient was provided only supportive care and his laboratory test findings were normal at discharge.

Key words: Hemolytic uremic syndrome, Intussusception, Child

Introduction

The onset of hemolytic uremic syndrome (HUS) is usually preceded by gastroenteritis, characterized by fever, vomiting, abdominal pain, and diarrhea that is initially watery but then becomes bloody. These prodromal symptoms may mimic acute abdomen, appendicitis, inflammatory bowel disease, and intussusception. Intussusception may be a gastrointestinal (GI) complication during the course of HUS[1, 2]. Although intussusception is one of the differential diagnoses of HUS, HUS may present with intussusception[3-7]. Here, we report a case of HUS preceded by intussusception in a 17-month-old boy.

Case report

A 17-month-old, previously healthy boy presented at the emergency department with a 2-day history of blood-tinged stools and a 1-day history of worsening irritability. On abdominal examination, no mass was palpable. Intestinal sonogram revealed findings compatible with intussusception. An air enema reduced intussusception successfully without complications. He was observed for 6 hours in the emergency department and discharged without symptoms. The next day, he showed bloody diarrhea and revisited the emergency department with more than 20 episodes of mucoid hematochezia, abdominal pain and low-grade fever. Intestinal sonogram did not identify intussusception and laboratory tests were normal including prothrombin time and partial thromboplastin time. He was admitted to the general ward

for further treatment. On hospital day (HD) #2, bloody diarrhea and irritability persisted but his vital signs were normal. Laboratory results showed hemoglobin (Hb) 10.6 g/dL, platelets (PLT) 61,000/μL, blood urea nitrogen (BUN) 33.1 mg/dL, serum creatinine (Cr) 1.26 mg/dL, and lactate dehydrogenase (LDH) 3,425 IU/L. On HD #3, he showed edematous eyelids, mild pretibial pitting edema, and slightly decreased urine volume. Laboratory tests showed Hb 9.0 g/dL, PLT 41,000/μL, BUN 40.6 mg/dL, Cr 1.71 mg/dL, and LDH 3,678 IU/L. A peripheral blood smear showed findings compatible with microangiopathic hemolytic anemia. He was diagnosed as HUS but *Escherichia coli* O157:H7 was not isolated in stool culture. Diet history was retaken and revealed no history of eating contaminated food. He was transferred to Seoul National University Children's Hospital due to rapid aggravation of serum BUN/Cr level. On HD #5, he developed melena and gross hematuria. Melena resolved the next day, whereas gross hematuria persisted for 3 days. Laboratory tests showed Hb 7.2 g/dL, PLT 43,000/μL, BUN 77 mg/dL, Cr 3.62 mg/dL, LDH 2,192 IU/L, complement 3 126 mg/ dL (reference, 70−150), and complement 4 21 mg/dL (reference, 10−35). On HD #7, polymerase chain reaction of enterohemorrhagic *Escherichia coli* (EHEC) proved to be negative. On HD #8, his urine output increased to more than 1,000 mL/day and was maintained thereafter. On HD #11, thrombocytopenia resolved. On HD #14, laboratory results were normalized except for microscopic hematuria (5-9/HPF). Supportive care, including strict fluid balance and red blood cell transfusion, was the main treatment. No hemorrhagic complications were observed. Azotemia showed aggravation until HD #5 (serum Cr 3.62 mg/dL) and improved spontaneously thereafter. He was discharged on HD #14 and followed as an outpatient.

Discussion

HUS is the most common cause of acute renal failure in previously healthy infants and young children, and is a substantial cause of acute mortality and morbidity in these patients[2]. The incidence in children younger than 3 years is higher than that in older children and adolescents[8-10]. Although HUS is usually a self-limiting disease with spontaneous recovery, a high index of suspicion and early recognition are essential for better outcomes, especially in children aged <3 years.

Infection with Shiga/Shiga-like toxin-producing *Escherichia coli* (STEC) O157:H7 precedes >80% of HUS cases in developed countries but other strains, which are more difficult to detect, have also been implicated[2,11]. Unlike most O157:H7 isolates, the majority of non-O157:H7 STEC strains cannot be isolated using media such as sorbitol MacConkey agar[11]. In Korea, O157 is not the most commonly isolated serotype of STEC in patients with HUS and reports of HUS by non-O157 STEC strains are increasing steadily[12-15]. In cases of HUS with negative cultures, detection of anti O-type specific lipopolysaccahrides Ig M antibodies is useful for diagnosing possible causative EHEC[16]. Although the presentation of our patient was unusual with no related food history and negative stool cultures for HUS, early recognition of HUS and meticulous maintenance of fluid balance seemed to prevent acute exacerbation and dialysis.

Hemorrhagic colitis is the most common and widely recognized GI manifestation of HUS[7]. Although intussusception is one of the differential diagnoses of hemorrhagic colitis and HUS, cases of HUS preceded by intussusception are rare. Our patient showed a 2-day history of GI symptoms prior to diagnosis of intussusception and others reported mostly a 1-week history of GI and respiratory symptoms. Air enema was successful in this case but all the reported cases underwent laparotomy to resolve intussusception. HUS was diagnosed 4 days after reduction of intussusception in this patient while others needed 1-6 days for final diagnosis[3-7]. In Korea, there have been no previous reports with a similar history, although one case of HUS preceded by ischemic colitis has been reported[17].

In our case, the etiology of HUS preceded by intussusception was not identified. HUS and thrombotic thrombocytopenic purpura are the classical diseases associated with thrombotic microangiopathy (TMA)[18]. Gianantonio et al.[19] reported extrarenal pathology in autopsy cases of the acute stage of HUS. The colonic wall was the most severely affected and, microscopically, hemorrhage and necrosis with mucosal ulceration were significant in the cecum and the ascending colon[19]. These findings may account for a potential leading point for an ileocolic or colocolic type of intussusception in HUS.

In summary, persistent bloody stools after reduction of intussusception may suggest HUS. Exclusion of recurrence of intussusception, close monitoring of urination and laboratory tests including disseminated intravascular coagulation profile are warranted for early detection of HUS in younger children. To our knowledge, this is the first case report of HUS preceded by intussusception in Korea.

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