

TEACHING FILES (GRAND ROUNDS)

PERSISTENT DIARRHEA IN AN INFANT - COULD IT BE ENTEROAGGREGATIVE ESCHERICHIA COLI

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Clinical Problem:

A one and half month-old male child born of non-consanguineous marriage presented in September 2017 with diarrhea for 20 days. He had 20-25 motions per day associated with occasional vomiting. Antenatal and birth history were uneventful with a birth weight of 2.8 kgs. He was on exclusive breastfeeds before the illness but was kept on lactose-free milk for the one week in view of diarrhea but had no improvement. Physical examination revealed pallor, pedal edema with a weight of 4.3 kg. Abdomen had gaseous distension. Other systems were normal. Investigations revealed a white cell count of 14,900 cells/cumm (44% polymorph, 53% lymphocytes), hemoglobin was 8.3 gm% and platelet count of 309000 cells/cumm. C-reactive protein (CRP) was 7 mg/dl. Serum albumin was 1.3 gm/dl with total proteins of 2.7 gm/dl. Other biochemical profile and serum electrolytes were normal. Routine stool examination was normal and stool culture was also negative. The comprehensive Biofire multiplex PCR gastrointestinal panel test results showed the presence of Shiga like toxin-producing *Escherichia coli* and enteroaggregative *E. coli* (EAEC). HIV test and Mantoux tests were negative. Primary immunodeficiency workup was normal. He was started on an elemental diet but had no improvement. Meanwhile, the child developed sepsis in October 2017, severe electrolyte disturbances, hypoalbuminemia and required total parental nutrition with intravenous meropenem for 14 days along with intravenous phosphorus, magnesium, calcium supplements. Blood culture was negative. He continued to have diarrhea and had a weight loss of around 900 grams in a month. Subsequently, he was started on an elemental diet via nasogastric tube feeding along with *Lactobacillus* supplementation. Upper and lower gastrointestinal endoscopy were done in November 2017 which showed features of acute resolving duodenitis and colitis. Gradually child showed improvement in frequency and consistency of stools

with weight gain. After two months of hospitalization, the patient was discharged on nasogastric feeding with elemental diet, probiotics with the recovery of weight back to 4.3 kgs. In December 2017, after 2 weeks of follow-up, he was started on an oral weaning diet with rice and moong dal. His weight in December 2017 was 4.6 kgs.

Were Shiga like toxin producing E. coli and EAEC cause of chronic diarrhea in this child?

Discussion:

Persistent diarrhea is a major cause of morbidity and mortality among pediatric populations in developing countries.¹ Diarrheagenic *E. coli*, particularly Enteropathogenic *E. coli* (EPEC), Enterotoxigenic *E. coli* (ETEC) and EAEC are the main pathogens associated with persistent diarrhea (diarrhea >14 days) in developing countries.² EAEC is an important causative agent of both acute and persistent diarrhea among adults and children worldwide. The pathogenesis of EAEC diarrhea is by the colonization of the intestinal mucosa, followed by the release of proinflammatory cytokines from infected epithelial cells. EAEC increase mucus secretion from the mucosa, trapping the bacterium in a bacterium-mucus biofilm.³ Ikumapayi studied the association of EAEC virulence factors with diarrhea in children less than 5 years and found that plasmid-encoded enterotoxin, aggregative adherence fimbriae were associated with moderate-to-severe diarrhea among children <12 months old.³ Contaminated food appears to be the main source of EAEC.⁴ Our patient was on exclusive breastfeeds and was only 1½ months of age at the time of presentation, hence food contamination seems unlikely, it is more likely to be due to improper hand hygiene of the caretakers. The antibiotics recommended for Enteroinvasive *E. coli* (EIEC) and EPEC are TMP-SMX, quinolones.⁵ Antibiotics for EAEC and STEC are not recommended and the risk of HUS is higher if antibiotics are used for *E. coli* O118:H2.⁵ Similarly, in our patient, antibiotics were used only because of sepsis, however, he did not develop HUS. The use of probiotics in prolonged diarrhea like *Lactobacillus* spp. and *Saccharomyces boulardii* show improvement in children with persistent diarrhea.⁶ Many children show deficiencies in vitamins and trace elements especially Zinc and vitamin A which need to be supplemented.⁵ Similarly, in our patient, he

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had severe macro and micro malnutrition which needed supplements parenterally.

Compliance with ethical standards

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