

Fecal Occult Blood Screening in Children with Severe Malnutrition

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We screened 50 consecutive severely malnourished children for evidence of gastrointestinal tract blood loss. Malnutrition was graded as per WHO recommendations. Gastrointestinal blood loss was detected using fecal occult blood test (FOBT) kit. Thirty (60%) of the study population were documented to be FOBT positive. This simple and rapid test is recommended as a routine screening procedure among severely malnourished children for the detection and timely treatment of occult blood loss, contributing to anemia and related complications.

Key words: *Children, Malnutrition, Occult blood, Stool.*

Severe malnutrition in children is associated with increased susceptibility to infection, severe illness, and higher mortality (20-30%)(1). Anemia contributes to the overall illness in such children and very often the conditions leading to gastrointestinal blood loss remain undiagnosed, the management being correction of nutritional disturbances.

Gastrointestinal tract (GIT) blood loss leading to anemia in children with severe malnutrition may occur as a result of *H. pylori* infection, helminthic infections (hookworm, *Trichuris trichura*) or consumption of whole cow milk or formula feed. Often, an attempt to diagnose conditions like GIT polyps, colitis and diverticulitis, *etc.* is unyielding (2). An empirical antibiotic or antihelminthic therapy, however, has been suggested for severely malnourished children by WHO. Nevertheless, ignorance of these factors that may be responsible for occult blood loss, besides infection, may delay the improvement of the clinical condition. It is, therefore, necessary to identify the subset of severely malnourished children with occult gastrointestinal blood loss. This may even serve as an indicator to identify children at higher risk of mortality in this vulnerable group. This preliminary

study was carried to detect the presence of occult blood in severely malnourished children.

Subjects and Methods

We included 50 consecutive children admitted with severe malnutrition (WHO criteria) and 30 age matched healthy controls (attending the immunization clinic). The diagnosis of severe acute malnutrition was based on estimation of weight for height (WHO criteria)(3). Children weighing less than 60% for age with edema, severe dehydration, diarrhea, hypothermia, shock, systemic infection, jaundice, bleeding, persistent loss of appetite or congestive heart failure were admitted. Of admitted children, 50% (n = 25) had diarrhea as the presenting complaint.

Stool specimens of these children were examined for the presence of helminthic eggs, protozoan cysts and bacterial pathogens as per standard laboratory techniques(4); viral etiology could not be investigated. Specimens were tested for the presence of occult blood (INSTANT-VIEW FOB test, Fecal Occult Blood-Cassette, Alfa Scientific Designs Inc. Poway, CA-USA) following the manufacturer's instruction. Hemogram profile and other routine investigations were also done wherever indicated.

Results

Fecal occult blood test (FOBT) was found positive in 30/50 (60%) children with severe malnutrition while none were positive in the control group. The stool samples were also processed for detection of etiological agents, if any. Parasitic infection was detected in 14/50 (28%) children; of these, 12 were FOBT positive. Bacterial agents were isolated in 18/50 (36%) children and amongst them, 13 had evidence of GIT blood loss. Etiology could not be determined for the remaining 18 children; of these 5 were FOBT positive. *Vibrio cholerae* was isolated in 6 children; of these 4 were positive for fecal occult blood. Co-existing infection with ETEC and hookworm was documented in 1 and 2 of these 4 children respectively. Other etiology is documented in Table I.

Among FOBT positive severely malnourished children (n = 30), 20 (66.67%) were found to be moderately anemic (Hb below 8 g/dL). Most of these children were breast fed (n = 16); others were being fed with cow's milk (n = 11) or formula milk (n = 3).

Discussion

Fecal occult blood test (instant view) is a rapid test, specific to human hemoglobin which is based

on a one step lateral flow chromatographic immunoassay. It is a qualitative and sensitive test (detects 50 µg hHb/g feces) and highly accurate (98%) to detect low levels of human fecal occult blood. As observed in our study, 60% of severely malnourished children were FOBT positive. Gastrointestinal tract blood loss in high risk children is an added source of concern, and under such conditions, FOBT can be routinely utilized for supportive evidence of the presence of any GIT pathology. Positive result should be followed up with additional diagnostic procedures to determine the exact cause and source of the occult blood in the feces.

Cow's milk *per se*, does not appear to be responsible for GI blood loss(5), as FOBT positivity was uniformly observed in children on cow's, breast or formula milk. In 5 FOBT positive infants, where no etiological agent could be identified, an allergic reaction (Type III) causing vasculitis and local inflammatory responses leading to gastroduodenitis and intestinal bleeding could be a possibility; however, other advanced investigations were not carried out in the present study to identify other causes of GI bleeding.

Qualitative measurement of fecal occult blood can aid in evaluation and timely treatment of

TABLE I—Etiological Agents of Gastrointestinal Infection in Severely Malnourished Children

Etiological agent	Total number of isolates = 32 No.	Fecal occult blood test	
		Positive	Negative
Bacterial			
<i>Vibrio cholerae</i>	6	4	2
<i>Salmonella typhi</i>	2	0	2
Shigella	6	6	0
<i>Escherichia coli</i>	4 (1 ETEC*)	2 + 1*	1
Parasitic			
	No.	Positive	Negative
<i>Giardia intestinalis</i>	8	7	1
<i>E. histolytica</i>	3	3	0
Ascaris	2	1	1
Taenia	0	0	0
Hookworm	2*	2*	0
Trichuris	1	1	0

* indicates concomitant infection along with *V. cholerae*.

What this Study Adds

- Fecal occult blood test, a simple and rapid test, is recommended as a routine screening procedure among severely malnourished children for the detection and timely treatment of occult blood loss.

severely malnourished children at highest risk of mortality. However, it needs a multivariate logistic approach to evaluate the utility of this test as an additional supplement to age, sex, visible severe wasting, shock, infection, *etc.*; responsible for increased morbidity and mortality. It would be also worthwhile to determine the positive predictive value (PPV) of the test of a larger sample size versus evaluation of clinical signs of visible severe wasting and other anthropometric indices, as an indicator of increased mortality amongst hospitalized children.

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REFERENCES

1. Gupta P, Shah D, Sachdev HPS, Kapil U. National Workshop on Development of Guidelines for Effective Home Based Care and Treatment of Children Suffering from Severe Acute Malnutrition. *Indian Pediatr* 2006; 43: 131-139.
2. Raj SM. Fecal occult blood testing on Trichuris infected school children in north-eastern peninsular Malaysia. *Am J Trop Med Hyg* 1999; 60: 165-166.
3. World Health Organization. Severe Malnutrition. *In: Management of the Child with a Serious Infection or Severe Malnutrition: Guidelines for Care at the First Referral Level in Developing Countries*. Geneva: World Health Organization. 2000; p 80-91.
4. Forbes BA, Sahm DF, Weissfeld AS. *Bailey & Scott's Diagnostic Microbiology*. 11th edn. St Louis, Missouri: Mosby, Inc. 2002; p. 133-162, 606-698.
5. Coello-Ramirez P, Larrosa-Haro. Gastrointestinal occult hemorrhage and gastroduodenitis in cow's milk protein intolerance. *J Pediatr Gastroenterol Nutr* 1984; 3: 215-218.