

The Outpatient Management of Bloody Diarrhea in Young Children

About 10% of diarrhea episodes in children under 5 years of age have visible blood in the stool and these cause about 15% of diarrhea-associated deaths in this age group. Compared with watery diarrhea, bloody diarrhea generally lasts longer, is associated with more complications, is more likely to adversely affect a child's growth, and has a higher risk of death.

Bloody diarrhea in a young child is usually a sign of a serious invasive bacterial infection of the bowel. Pathogens that cause bloody diarrhea may also cause diarrhea without visible blood, but such episodes are less severe, generally resembling diarrheal disease caused by non-invasive pathogens. The presence of visible blood is, thus, a convenient and reliable indicator of severity.

The correct treatment of bloody diarrhea includes: (i) giving an antimicrobial that is effective against *Shigella*, (ii) giving oral rehydration salts (ORS) solution or other fluids to prevent or treat dehydration, (iii) continuing to feed the child,

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and (iv) providing follow-up, especially for children at increased risk of serious morbidity or death. When these steps are followed, most episodes of bloody diarrhea resolve rapidly and many serious consequences are avoided.

Definitions

Bloody diarrhea refers to a diarrheal episode in which the stools contain visible red blood. It is the preferred term to describe this problem.

Dysentery has the same meaning as bloody diarrhea. Although sometimes used to describe bloody diarrhea that is associated with fever, abdominal cramps, rectal pain and mucoid stools, these features do not always accompany bloody diarrhea, nor does their presence or absence necessarily define its etiology or determine how it should be treated.

Causes of Bloody Diarrhea

Invasive bacteria

Shigella are the most important cause of bloody diarrhea among young children in developing countries. *Shigella* cause 50% or more of all episodes of bloody diarrhea, a much higher proportion of episodes that are clinically severe, and most of the estimated 370,000 deaths from bloody diarrhea that occur worldwide each year in children younger than five years.

Episodes of bloody diarrhea caused by other bacterial pathogens occur less frequently than shigellosis, are usually less serious, and their cause is often difficult to determine except in research laboratories. These bacteria include:

Campylobacter jejuni, enteroinvasive *Escherichia coli*, enterohemorrhagic *E. coli* and non-typhoid serotypes of *Salmonella*.

Entameba histolytica

Amebiasis is an uncommon cause of bloody diarrhea in young children. A study done in China, India, Mexico, Myanmar and Pakistan involving 3640 children under three years of age with acute diarrhea yielded only 10 cases of probable invasive amebiasis (1.5% of all episodes of bloody diarrhea), but 400 cases of shigellosis (45-67% of all episodes of bloody diarrhea). In Bangladesh, a study of 101 children with bloody diarrhea (mean age 21 months) revealed none with E. histolytica trophozoites in their stool.

Diagnosis

Bloody diarrhea is diagnosed by asking the mother whether the child's stool contains red blood or by looking at the stool. These methods are equally sensitive and precise. However, asking the mother is usually more efficient than waiting for the child to pass a stool.

Culturing the stool is of little value because many invasive bacteria require special culture media, unusual growth conditions, or diagnostic antisera that are often unavailable. Also, attempts to isolate *Shigella* may fail unless the specimen is inoculated immediately and properly transported to the laboratory. Moreover, the results of culture are available only after two or three days, whereas treatment must be decided upon when the child is first seen.

The diagnosis of invasive amebiasis requires that typical trophozoites of *E.*

histolytica containing red blood cells be seen in the stool by a reliable technician. However, even experienced technicians frequently mistake non-pathogenic protozoa, white blood cells, macrophages containing red blood cells or partially digested vegetable matter for amebic trophozoites. *Where the skill of technicians is not confirmed by regular quality control procedures, amebiasis is routinely overdiagnosed and laboratory reports are of little value.* The detection of amebic cysts is not evidence of invasive amebiasis.

Treatment of the Child with Bloody Diarrhea

The key steps in treatment are summarized in *Fig. 1* and described below:

1. *Refer immediately to hospital any child with bloody diarrhea who is severely malnourished.* These are children whose weight-for-age is less than 60%, or weight-for-length is less than 70%, of the National Center for Health Statistics (NCHS) medians. Such children are at very high risk of serious complications and death.

2. *Treat all cases promptly with an oral antimicrobial known to be effective against most local Shigella strains.* Provide enough to last five days and instruct the mother how to give it (*Table 7*).

The antimicrobial susceptibility of local *Shigella* strains should be monitored regularly and the results used to develop, or modify, national treatment guidelines. Unfortunately, resistance to ampicillin is now widespread and resistance to contrimoxazole is increasing. Nalidixic acid, formerly used as a "backup" drug to treat resistant shigellosis, is now the drug of choice in

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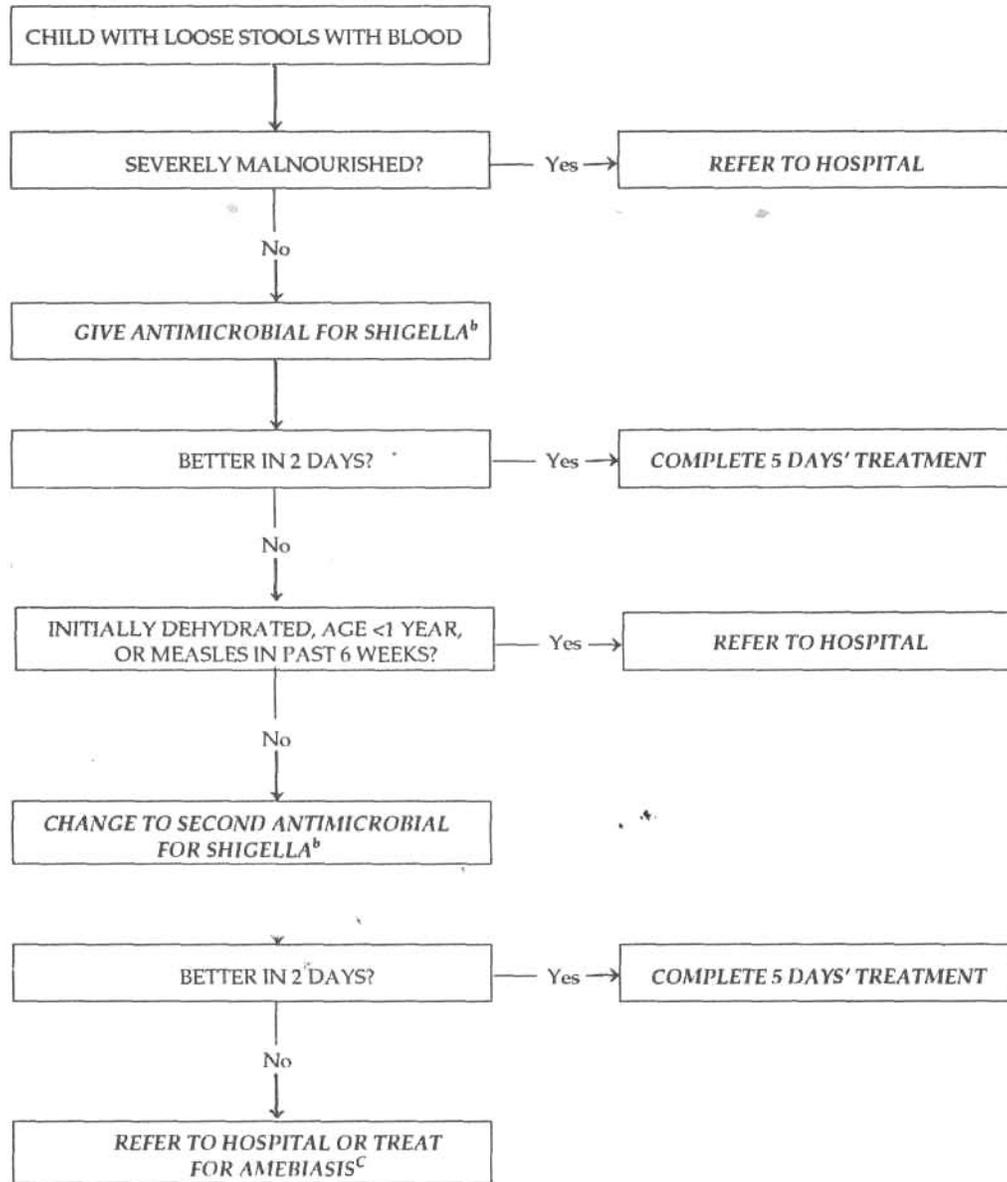


Fig. 1. Outpatient management of bloody diarrhea in children below 5 years of age (Treatment should also include (i) oral rehydration therapy to treat or prevent dehydration, and (ii) continued frequent feeding, including breastfeeding).

^b Give enough of the antimicrobial to last 5 days.

^c If trophozoites of *E. histolytica* are seen in stools at any time by a reliable technician, treatment for amebiasis should be given.

TABLE I—Current Options for Antimicrobial Therapy of Shigellosis in Young Children

Drug	Cost	Resistant organisms	Dose
Ampicillin	Inexpensive	Most <i>S. dysenteriae</i> type 1; many other <i>Shigella</i> species	25 mg/kg 4 times a day for 5 days
Trimethoprim-Sulfamethoxazole (TMP-SMX; also called cotrimoxazole)	Inexpensive	Many <i>S. dysenteriae</i> type 1; variable among other <i>Shigella</i> species	TMP 5 mg/kg and SMX 25 mg/kg twice a day for 5 days
Nalidixic acid	Inexpensive	Increasing among <i>S. dysenteriae</i> type 1; uncommon among other <i>Shigella</i> species	15 mg/kg 4 times a day for 5 days
Pivmecillinam	Expensive	Rare among all <i>Shigella</i> species	20 mg/kg 4 times a day for 5 days
Ceftriaxone	Expensive	Rare among all <i>Shigella</i> species	20 mg/kg IV twice a day for 5 days

TABLE II—Antimicrobials That are not Effective Against *Shigella*

* Metronidazole	* Nitrofurans
* Streptomycin	(e.g., nitrofurantoin, furazolidone)
* Tetracyclines	* Aminoglycosides
* Chloramphenicol	(e.g., gentamicin, kanamycin)
* Sulfonamides	* First and second generation cephalosporins
* Amoxicillin	(e.g., cephalexin, cefamandole)

some areas, but resistance to it is also appearing. Health facilities should try to stock more than one locally effective antimicrobial for *Shigella*.

Antimicrobials that are *not effective* for shigellosis are listed in Table II.

These include: (i) agents to which *Shigella* are usually resistant, and (ii) those to which *Shigella* are sensitive *in vitro*, but which penetrate poorly the intestinal mucosa where invasive *Shigella* must be killed. Treatment of shigellosis with any of these agents, or an antimicrobial to which resistance has developed, is ineffective.

3. *Treat and prevent dehydration with oral rehydration therapy.* Assess the child for dehydration. If dehydration is detected, it should be corrected at a health facility. Children without evident dehydration should be given increased fluids, preferably including ORS solution, at home.

4. *Continue to give food and breastmilk.* Appetite usually improves after 1-2 days of effective antimicrobial therapy. Advise the mother to: (i) breastfeed as

often and as long as her child wants, (ii) give frequent small meals with familiar, nutritious foods, (iii) encourage her child to eat, and (iv) give an extra meal each day for at least two weeks after diarrhea stops, to help the child recover any weight lost during the illness.

5. *Re-evaluate all high-risk children after 2 days.* These include children: (i) below 12 months of age, (ii) who present with signs of dehydration, or (iii) who have had measles during the past 6 weeks. Any such child who is not definitely improved (*i.e.*, fewer stools, less blood in the stool, less fever, improved appetite, more active) should be referred to hospital.

6. *Also advise mothers to bring back any child who does not show definite improvement after 2 days.* Stop giving the first antimicrobial and give a second one to

which most *Shigella* in the area are sensitive. If there is still no improvement after 2 days of treatment with the second antimicrobial, it should be stopped and the child referred to hospital or treated empirically for amebiasis with metronidazole.¹ Children who are improving, however, should continue the treatment for 5 days.

7. *Treat for amebiasis only when typical trophozoites containing red blood cells are seen in the stool or there is no response to antimicrobial therapy for shigellosis.* Metronidazole is the drug of choice for amebiasis.¹ Metronidazole has *no efficacy*, however, against *Shigella* or other invasive bacteria and *should not be given as routine initial treatment of bloody diarrhea.* It may have serious side-effects and its use makes treatment unnecessarily expensive.

¹10 mg/kg 3 times a day for 5 days (or 10 s for severe disease).