

PARASITIC and BACTERIAL INFECTIONS OF THE GUT IN INTERNATIONALLY ADOPTED CHILDREN: SHOULD WE WORRY?

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Parasitic Infections of the Gut

The thought of parasitic infections often congers up visions of worms, malnourished children, and one-celled "hairy" creatures in our childrens' gastrointestinal tract. In fact, most parasitic infections also occur in North America and are easily treatable.

Several studies published within the last three years have indicated that 7-11% of children adopted from Asia have parasites in their stool.

Internationally adopted children should have one or two stools for parasitic identification performed after arrival. The stool sample should not be mixed with any urine since this can kill the parasites prior to identification. A small amount of fresh stool (less than one teaspoon) should be mixed with the preservative fluids present in special "ova and parasite" container which your physician or laboratory will supply for you. The most common parasites that are seen in internationally adopted children are *Giardia lamblia*, *Dientomeba fragilis*, and *Ascaris lumbricoides*. Less commonly hookworm, tapeworms, and others can be seen, identified and easily treated.

Pathogens and Non-pathogens

Many of these little creatures do cause illness (pathogens) while others do not cause illness and are considered non-pathogens. The laboratory technologists usually report all the different parasites and it is usually up to the physician to decide whether they are non-pathogens or not. A list of some of the common non-pathogens is as follows: *Entamoeba coli*, *Endolimax nana*, *Hymenolepis nana*, *Chilomastix mesnili*, *Entamoeba hartmanni*. One other one, *Blastocystis hominis* is probably also a non-pathogen, however physicians will treat if the child has symptoms of bloating, cramps or diarrhea. Finding these parasites in the stool usually indicates that the child has at some point eaten dirt (as every child has!) probably on a fruit or vegetable. These are also common parasites found in North America and should not be a cause for alarm or treatment.

Intestinal Pathogens

The following three pathogens are the most common ones seen in internationally adopted children from Asia.

Giardia lamblia is a one-celled little creature which lives in the upper part of the small intestine. By attaching itself to the wall of the intestine it can damage some of the absorptive surface of the intestine and over a long period of time can cause difficulty with absorption of iron, vitamins and other nutrients. Because of the problem of absorption in someone who has had *Giardia* for a long time, these children may have intermittent or foul-smelling chronic diarrhea or present with failure to gain weight. Other non-specific symptoms may be cramps and bloating.

The parasite is shed intermittently and therefore it may take many specimens to diagnose the infection. They are very fragile and susceptible to drying, therefore it is important that proper collection procedures be carried out to correctly identify them. Specimens should be taken every two days and stored in a cool place.

This parasite does not enter into the blood stream and therefore is easy to treat with a simple medication called metronidazole. The medication is, however, difficult to take in a suspension as the taste is not very palatable. We recommend giving this medication with strong flavoured food such as chocolate syrup, chocolate ice cream or mixed with grape jelly.

Giardia lamblia is also the most common parasite among children attending childcare centres in North America. It can also be spread to other family members by contaminated hands or soiled toys. It is recommended that stools from other children in the family also be tested if the adopted child is positive. If adults however, are not symptomatic, it is probably not necessary to test the adults in family.

Dientamoeba fragilis is also transmitted via the fecal/oral route. It is thought that this organism may be associated with the acquisition of pinworm eggs. Up to one half of individuals infected with *D. fragilis* have no symptoms, however others may complain of abdominal pain, diarrhea, nausea or lack of appetite. Diarrhea may also occur initially, however abdominal pain often predominates. Up to three fresh samples of stools are usually required to detect this parasite.

Treatment with the drug called iodoquinol is recommended as treatment for individuals with symptoms. The treatment duration however, is 21 days. Nausea may be one of the side effects of treatment with this drug.

If other family members are symptomatic or have any diarrhea, stools for ova and parasite should also be sent as this parasite is also communicable.

Ascaris lumbricoides is a common worm infection of humans world wide. Children usually acquire this infection by ingestion of the eggs that have been deposited in soil. The eggs may then hatch in small intestine creating worms that can cause obstruction of the bowel and be carried to others parts of the body. If

the worms are located just in the intestine, the usual symptoms are abdominal pain. If the worms grow larger however, this may cause obstruction and perforation of the bowel.

The migration of the larvae can also cause lung inflammation and symptoms such as cough, shortness of breath and wheezing. Chronic *Ascaris* infection is also associated with malnutrition due to the prevention of absorption of the nutrients and vitamins.

The diagnosis of *Ascaris* infection is done by examining the stool of the child for the characteristic eggs. The presence of any of these eggs or worms mandates treatment. Fortunately, treatment with a drug such as mebendazole twice a day for three days is very effective for the treatment of this infection. Pyrantel pamoate may be a suitable alternative if the child is very young, however there is more experience with mebendazole and this would likely be the first drug of choice. If there are symptoms of bowel obstruction this should be dealt with in a hospital situation.

Enterobius vermicularis also popularly known as 'pinworms' is also common in young children and may be more easily transmitted in a group setting such as orphanages or child care centres. In young children this may manifest as restlessness at night or even urinary tract infections or vaginitis in young girls.

Transparent adhesive tape applied to the skin around the anus at the time of waking and viewed under the microscope for the presence of eggs is the most reliable method of diagnosing the infection. Alternatively, examining the area around the rectum at night or in the early morning may also yield the diagnosis of very small pin sized white worms. Therapy with mebendazole given once and then two weeks later is an effective treatment.

In summary then, up to 10% of internationally adopted children can harbour parasites in the intestine. Stools for ova and parasites should be sent upon arrival into the home. Standard hand disinfection after diapering or bathing and cleaning children will help to prevent spread within families.

Bacterial Infections of the Gut

Some of the most common bacterial infections of the intestines are *Shigella*, *Campylobacter* and *Salmonella*. Other causes such as *Yersinia*, and *Escherichia coli* O157:H7 are less common but may also cause diarrheal illness. Infection with these bacteria reflects contact with food or water that has been contaminated with feces. In the case of *Salmonella typhi* children are usually very sick and require antibiotics. All three others however, can cause a spectrum of symptoms ranging from mild watery diarrhea causing dehydration to frank bloody diarrhea mimicking colitis.

Generally speaking these are all diagnosed with appropriate stool cultures sent to the microbiology laboratory. The yield is obviously highest when the child is symptomatic with acute diarrhea. Sometimes these organisms are cultured when the child has minimal or no symptoms. This may indicate that an infection has occurred in the preceding months and the children are simply 'carriers'. This carrier state can last from weeks to months but causes no ill effects. During this time however, the bacteria can be transmitted to other family members or individuals caring for this child through fecal-oral spread.

Salmonella types causing typhoid fever and severe colitis, should be diagnosed by a physician and be treated promptly. For infections with non-typhoidal *Salmonella* and *Campylobacter* treatment with antibiotics is not recommended unless the child is very young, or very sick. Treatment with antibiotics for the latter two may increase the time that the child carries the bacteria in her/his intestine. This will increase the risk of secondary infection in other family members or in other children at child care centres.

Shigella is one of the most communicable forms of diarrhea caused by bacteria. It is very easily transmitted between persons, particularly in families. It primarily affects the lower bowel causing destruction of the lining leading to ulcers and severe diarrhea with excessive fluid loss. Children also may develop vomiting and electrolyte imbalances.

Treatment of any *Shigella* related diarrhea requires aggressive replacement of fluids and electrolytes. As well, most physicians will recommend treatment with an antibiotic for *Shigella*. The most common drug prescribed to patients with *Shigella* is cefixime given twice a day for five days. It is important not to prolong the antibiotic therapy as this can lead to resistance.

Internationally adopted children who have diarrhea should have stools cultured for bacteria on arrival. It is best not to ascribe the symptoms to a change in diet. Those who do not have diarrhea do not require stools to be cultured for bacteria. As with all children, proper hand disinfection procedures using water/soap and/or alcohol rubs will prevent much of the potential transmission within families.

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