VIRGINIA
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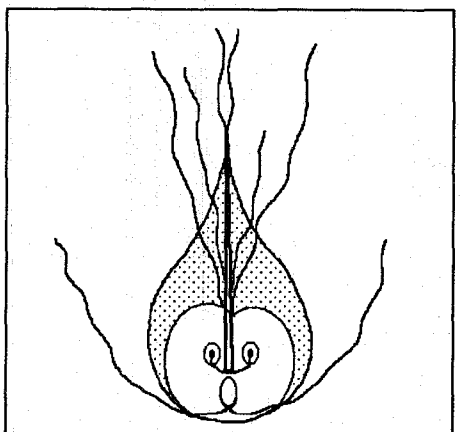
Treatment of Children with Asymptomatic and Nondiarrheal *Giardia* Infection*

It is generally agreed that persons with symptomatic *Giardia lamblia* infection should receive antimicrobial therapy.[1] However, the indications for treating children with asymptomatic giardiasis remain controversial. The case against treatment has been strongly argued[2,3] and is based on observations that *Giardia* infections are apparently well-tolerated in the absence of diarrhea[2]; that available antimicrobial agents are expensive, potentially toxic and perhaps only 70 to 85% effective[1,3-6]; and that in certain settings reinfection is likely to occur.[2,3,7] For asymptomatic children in good health, therefore, the risks of treatment may outweigh the potential benefits.[2,3] On the other hand physicians and public health officials have suggested that antimicrobial therapy may be of benefit to children with mildly symptomatic infections and may be necessary to control outbreaks of giardiasis, particularly in child day-care centers.[8,9]

In the Report of the Committee on Infectious Diseases, the American Academy of Pediatrics states that "the benefits and risk of treating asymptomatic carriers are not well defined" but recommends that asymptomatic *Giardia* infections not be treated.[10] No exceptions to this rule are mentioned and it is unclear whether the term "asymptomatic" refers to the absence of all symptoms or merely the absence of diarrhea. Although the American Academy of Pediatrics recommendation may be appropriate as a general rule for the practicing pediatrician, we suggest that treating children with nondiarrheal or asymptomatic giardiasis may be warranted in certain situations. We use the term "asymptomatic" to indicate the absence of all gastrointestinal symptoms.



Giardia lamblia trophozoite.
Length ~14µm

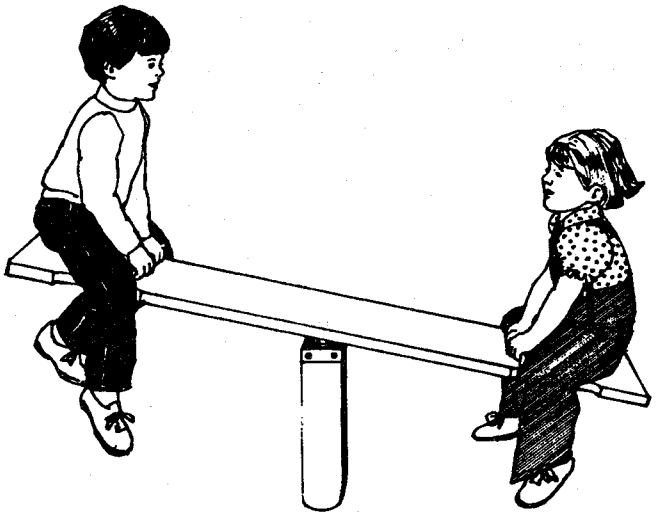
Treatment of the infected child who does not have diarrhea: individual health considerations

Because diarrhea is a common symptom of giardiasis, *Giardia* infection in the absence of diarrhea is often considered to be asymptomatic. However, other symptoms of giardiasis, including flatulence, foul smelling stools, nausea and abdominal pain may occur more frequently than diarrhea[11,12] and are often of more concern to the patient. A careful history may be required to reveal the presence of these nonspecific gastrointestinal symptoms in an infected child who does not have diarrhea. Such a child may benefit from antigiardial therapy. Therefore for cases of apparent asymptomatic giardiasis, clinicians should inquire about nonspecific gastrointestinal symptoms; if present, treatment should be considered for relief of these symptoms (Table 1).[12]

Treatment may also be indicated if an infected child exhibits signs of malabsorption or impaired growth, even in the absence of gastrointestinal symptoms. Poor weight gain, changes in intestinal mucosa and malabsorption have been well-documented in persons with giardiasis who had diarrhea.[13-15] Changes in intestinal mucosa, mild malabsorption and lactase deficiency have also been described in infected children who did not have diarrhea.[16,17] Although the long-term effect of these physiologic changes is generally considered to be minimal, laboratory studies of experimentally infected mice have demonstrated impaired weight gain, villous atrophy of the small intestine and brush border enzyme deficiencies,[18] even in the absence of diarrhea.[19]

In This Issue:

Clinical and epidemiologic studies, which have been reviewed in detail elsewhere,[20] are inconsistent regarding the impact of nondiarrheal or asymptomatic giardiasis on nutritional status. In cross-sectional studies of preschool children in New Delhi and West Virginia, infected children had lower weights and heights, respectively, than uninfected children of the same age.[21,22] Two prospective studies from rural Guatemala support these findings. In the first, *Giardia* infection was independently associated with reduced weight gain velocity, particularly during the second year of life.[23] In the second, preschool children receiving two courses of metronidazole experienced an 8-fold reduction in the prevalence of *Giardia* infection during a 6-month period and significantly greater increases in height and weight than children not receiving the drug.[24]



By contrast no adverse effects on child growth or nutritional status were detected in cross-sectional studies of preschool children in Quebec[25] and India[26] or in three prospective studies conducted in day-care centers in the United States[2] and Israel.[17,27] In fact the two studies from Israel suggest that infected children may have higher weight- and height-for-age indices than uninfected children; these observations remain unexplained although the authors hypothesized that children who were healthier and more active may have been at increased risk of infection.[17]

Interpreting these conflicting findings is difficult because few investigators have carefully collected information on clinical signs or symptoms (particularly nondiarrheal symptoms) or adequately controlled for other factors associated with either giardiasis or nutritional status.[20] However, as a group the studies suggest that nondiarrheal or asymptomatic *Giardia* infection probably has little if any adverse effect on growth and development of well-nourished children. Therefore for the vast majority of children in the United States, including those attending child daycare centers, nondiarrheal infection would not be expected to result in impaired growth or development. However, the data also indicate that *Giardia* infection may contribute to poor nutritional status in malnourished children, even in the absence of frank diarrhea or other obvious gastrointestinal symptoms. Antigiardial drugs should therefore be considered for malnourished children who are infected with *Giardia*.

Treatment may also be indicated for certain children with nondiarrheal giardiasis who have received several courses of antibiotics for otitis media but for whom such treatment was ineffective.[28] Laboratory and clinical data presented by Craft et al.[28] suggest that *Giardia* can contribute to treatment failures for infectious diseases such as otitis media by interfering with absorption of a number of commonly prescribed antibiotics, including ampicillin, amoxicillin, penicillin, cephalexin and erythromycin. In several cases poor absorption of antibiotics was apparently reversed after antigiardial therapy in well-nourished children with mild or asymptomatic giardiasis.

Treatment of the asymptomatic infected infant or toddler: public health considerations

Outbreaks of giardiasis in day-care centers, which occur frequently in the United States, can be difficult to control.[29] The immediate public health objectives in the outbreak setting are to decrease *Giardia*-related diarrheal morbidity, limit further spread of the organism and reduce the likelihood of reinfection. Preventive measures typically include education, improvement of handwashing and diapering practices, exclusion or separation of ill children and treatment of all infected children with diarrhea. Treating infected children who do not have diarrhea remains controversial, in part because the efficacy of this strategy in controlling outbreaks has not been demonstrated. Eradicating the organism from day-care centers and other *Giardia*-endemic environments does not appear to be a realistic goal[7,29,31]; the parasite may be readily reintroduced by new enrollees or by infected children who had negative diagnostic tests for *Giardia* or for whom treatment was ineffective. Furthermore in *Giardia*-endemic environments, children who are successfully treated may be reinfected outside the center.

Steketee et al.[29] recently described a series of outbreaks in a Wisconsin day-care center in which all children, regardless of symptoms, were tested for *Giardia*. Those who were positive were treated and excluded from the center until three subsequent stool specimens were negative. Although *Giardia* prevalence was significantly reduced in the short term, the beneficial effect of these stringent policies was only temporary. Similarly in a recent study evaluating intervention strategies in *Giardia*-endemic day-care centers, Bartlett et al.[30] concluded that a single attempt to screen and treat children with asymptomatic infection was no more effective in decreasing the prevalence of *Giardia* than treating only those who were symptomatic.

In some outbreak situations, however, improving hygienic practices and treating only infected children who have diarrhea may be inadequate to interrupt continued transmission.[8] Several investigators, including those who oppose routinely treating asymptomatic children,[3] have recommended that when other measures are ineffective in controlling an outbreak, close contacts of infected children in the day-care center should be tested and those who are infected should be treated whether or not they have diarrhea.[3,9,29] In Wisconsin, public health officials recommend screening all asymptomatic children in the center if 20% of diapered toddlers have symptomatic *Giardia* infection.[29] The rationale of treating the asymptomatic carrier is not to eradicate the organism from the environment but to identify and reduce the number of potential reservoirs and to decrease the prevalence of *Giardia* to a point where transmission, and therefore diarrhea, is less likely to occur. Advocates of this strategy emphasize that treatment should be used in addition to, and not as a replacement for, other preventive measures such as improved hygiene.[3]

Outbreak investigations have demonstrated that infants and young children infected with *Giardia* can transmit the infection to household members and other close contacts.[9,32,33] Although most of the children in these studies can be assumed to have had diarrhea, transmission of *Giardia* from asymptomatic children to adult food handlers has been implicated in several food-borne outbreaks.[34-36] From a public health perspective treatment of infants and toddlers with asymptomatic giardiasis may be indicated to prevent transmission to close contacts who are at risk of developing severe giardiasis or for whom treatment may be contraindicated. Persons with cystic fibrosis or hypogammaglobulinemia, for example, may be more likely than others to develop severe or chronic giardiasis.[37-39] Avoiding *Giardia* infection may also be particularly important for pregnant women and for persons with a previous episode of severe giardiasis or a history of intolerance to antigiardial drugs. In pregnancy treatment of giardiasis is complicated by the lack of a safe and effective drug approved for this indication.[40] The degree to which giardiasis in high risk persons can be prevented by treating their asymptomatic infected infant and toddler contacts is unknown. However, on a case by case basis, it would seem reasonable to consider treatment of these contacts in situations where prevention of *Giardia* infection in the high risk individual is an important objective (Table 1).

Table 1. Indications for Considering Treatment of Children with Nondiarrheal or Asymptomatic *Giardia* infection.

Individual health indications

Infected child does not have diarrhea but has one or more of the following:

- Nonspecific (persistent or intermittent) gastrointestinal symptoms
- Evidence of malabsorption, impaired growth or failure to thrive
- Otitis media with a history of repeated antibiotic treatment failures

Public health indications

1. Outbreak control:

Asymptomatic infected infant or toddler attends day-care center in which other outbreak control measures have failed to reduce the number of cases of diarrhea caused by *Giardia* infection, particularly if child is in the same room or play group with other children who have giardiasis

2. Prevention of household transmission:

Asymptomatic infected infant or toddler has close contact with (e.g. is diapered by) one or more of the following persons:

- A pregnant woman
- A person who has hypogammaglobulinemia or cystic fibrosis
- A person who has a history of intolerance to antigiardial drugs
- A person with a previous episode of severe giardiasis

Conclusions

For well-nourished children living in the United States, the current American Academy of Pediatrics recommendation against treating children with asymptomatic *Giardia* infection seems reasonable as a general rule for the practicing pediatrician. However, a careful history may be required to distinguish infected children with nondiarrheal illness from those who are truly asymptomatic. Children with nondiarrheal giardiasis may benefit from treatment. Treatment of asymptomatic infected infants or toddlers may be indicated when other preventive measures are ineffective in controlling day-care-related outbreaks of giardiasis or for preventing infection in persons at increased risk of severe or chronic giardiasis (Table 1). In these situations the potential risks and benefits of treatment should be carefully assessed to determine the appropriateness of treatment. Because these risks and benefits remain inadequately defined, additional data on which to base clinical and public health decisions are urgently needed.

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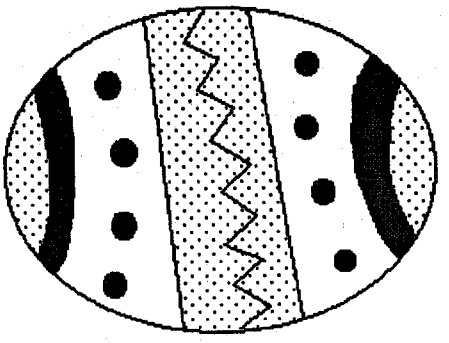
A Word About Easter Eggs*

Hard-cooked eggs that are to be hidden for an egg hunt and subsequently eaten must be prepared with care to prevent cracking the shells. They should be hidden in places that are protected from dirt, pets, and other sources of bacteria. The total time for hiding and hunting the eggs must not be more than 2 hours. The found eggs must be re-refrigerated until they are eaten.



Hard-cooked eggs will eventually spoil if not refrigerated and should not be eaten if they are exposed to room temperatures for more than 2 hours. Since cooking will remove some of the protective oil coating that processors have sprayed on the shells, bacteria can enter the egg through the pores or cracks in the shells.

**Reprinted with permission from: Texas State Department of Health. A word about easter eggs. Texas Preventable Disease News. 1990;50(4):2.*

Fifth National Forum on AIDS, Hepatitis, and Other Bloodborne Diseases

The National Foundation for Infectious Diseases, in collaboration with CDC and the National Institute of Allergy and Infectious Diseases, will cosponsor the Fifth National Forum on AIDS, Hepatitis, and Other Bloodborne Diseases March 29-April 1, 1992, in Atlanta. The forum will emphasize the integration of scientific knowledge with public and health-care policy in three major areas: 1) epidemiology of bloodborne diseases and their agents; 2) occupational and patient safety—risk assessment and prevention of bloodborne infections; and 3) diagnostic, therapeutic, and preventive approaches to bloodborne diseases.

Additional information is available from the forum secretariat: SYMEDCO, Two Research Way, Princeton, NJ 08540; telephone (609) 452-7100, ext. 287; fax (609) 452-1564.

Meningococcal Disease in Areas of Ontario, Quebec, and Prince Edward Island, Canada*

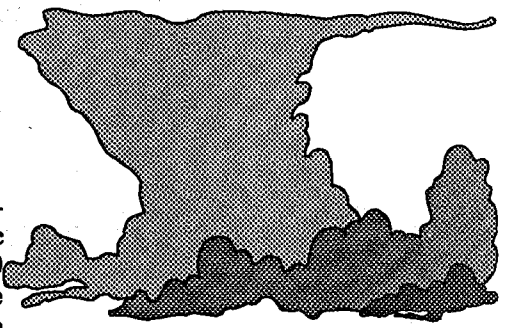
Between December 1, 1991, and January 8, 1992, an increased number of cases of meningococcal disease were reported to the Laboratory Centre for Disease Control (LCDC) in Ottawa from several areas in eastern Canada. The affected areas include the Ottawa-Carlton area, the Laurentides region north of Montreal, the Lanaudiere region, the Outaouais area in West Quebec, and Prince Edward Island. Most ill persons were of high-school age; rates of disease for that age group were approximately 18 cases per 100,000 population about twenty times the usual rate. Group C meningococcus has been isolated from many of the patients. As a preventive measure, a program of vaccination with the meningococcal polysaccharide vaccine is being instituted for children in those areas.

The risk of disease for travelers is very low. No precautions are needed for those traveling to the affected areas for most activities, such as, for example, skiing or shopping. However, because the number of cases among school-aged children is substantially above that seen previously in these areas, vaccination should be considered for 1) children 2 through 19 years of age traveling to the affected areas when the children will be in very close physical contact with local school-aged children (for example, members of school athletic teams), and 2) children 2 through 19 years of age who will be staying more than three days and who expect to have social contact with local school-aged children.

In older children and adults, serogroup C meningococcal vaccine has an efficacy of 85%-95% for at least one year. Vaccination is not contraindicated for children under 2 years of age; however, efficacy studies suggest that this vaccine does not protect most children in this age group. The quadrivalent A, C, Y, W-135 vaccine is available in single or multi-dose vials. Adverse reactions are limited to local erythema or soreness. Ideally, the vaccine should be administered at least 10 days before travel. It can be obtained from local distributors or by calling Connaught Laboratories, Inc., A Pasteur Merieux Company, at 1-800-822-2463.

All recipient physicians, health departments, travel agencies, airlines, and shipping companies are requested to notify prospective travelers of this information.

**Source: Advisory Memorandum No. 99, Division of Quarantine, Nat. Ctr for Prevention Svcs, CDC, January 22, 1992.*



Coccidioidomycosis in California's Great Central Valley

Physicians are advised to consider the possibility of coccidioidomycosis in the differential diagnosis of patients with a compatible illness and exposure to recent, heavy dust storms in California. There were tremendous dust storms right after Thanksgiving that caused zero visibility in central California (and a 150-car pile-upon Interstate 5, which is the main route between Los Angeles and San Francisco). Heavy winds kicked up again in late December, and California epidemiologists are now receiving reports of patients with coccidioidomycosis who were exposed to those dust storms. This situation is not without precedent. A similar situation occurred in 1977 when severe duststorms caused hundreds of cases of coccidioidomycosis in California in areas downwind (actually, "downwind" at the time was northwesterly and cases occurred even in non-endemic areas such as San Francisco, and even involved a gorilla at the San Francisco Zoo). (See Flynn et al. An unusual outbreak of wind-borne coccidioidomycosis. N Engl J Med 1979; 301:358-61). In recent years approximately 500 cases of coccidioidomycosis per year have been reported in California. For calendar year 1991, more than 1200 cases were identified. About 75 percent of them were reported from Kern County (where Bakersfield is the county seat). Although coccidiomycosis is not an officially reportable disease, if you confirm the diagnosis in one of your patients who had recently traveled in California (the usual range in incubation periods is 1 to 4 weeks), the Office of Epidemiology would be interested in hearing of such a case. Contact Les Branch at (804) 786-6261.

Cases of Selected Notifiable Diseases, Virginia, January 1 through January 31, 1992.

Disease	Total Cases Reported This Month						Total Cases Reported to Date in Virginia		
		Regions							
	State	NW	N	SW	C	E	This Yr	Last Yr	5 Yr Avg
AIDS	52	5	21	0	8	18	52	38	31
Campylobacter	41	5	8	7	15	6	41	23	34
Gonorrhea*	2030	-	-	-	-	-	2030	1198	1378
Hepatitis A	7	0	1	1	1	4	7	4	10
Hepatitis B	11	1	3	0	1	6	11	13	22
Hepatitis NANB	2	1	0	0	0	1	2	2	2
Influenza	16	1	1	0	2	12	16	248	359
Kawasaki Syndrome	4	0	2	0	0	2	4	1	
Legionellosis	1	0	1	0	0	0	1	1	1
Lyme Disease	5	2	2	1	0	0	5	0	1
Measles	0	0	0	0	0	0	0	0	1
Meningitis, Aseptic	11	0	4	1	1	5	11	8	11
Meningitis, Bacterial~	8	1	1	2	0	4	8	9	9
Meningococcal Infections	3	0	0	1	0	2	3	1	5
Mumps	3	0	0	3	0	0	3	5	6
Pertussis	0	0	0	0	0	0	0	1	3
Rabies in Animals	9	3	2	0	1	3	9	7	14
Reye Syndrome	0	0	0	0	0	0	0	0	0
Rocky Mountain Spotted Fever	0	0	0	0	0	0	0	0	0
Rubella	0	0	0	0	0	0	0	0	0
Salmonellosis	57	4	16	11	11	15	57	75	79
Shigellosis	9	1	3	1	2	2	9	8	23
Syphilis (1° & 2°)*	68	1	6	6	21	34	68	68	46
Tuberculosis	8	0	1	2	1	4	8	7	19

Localities Reporting Animal Rabies: Augusta 1 cat; Fairfax 1 raccoon; Frederick 1 skunk; Hanover 1 fox; Isle of Wight 1 raccoon; Loudoun 1 skunk; Newport News 1 raccoon; Spotsylvania 1 skunk; York 1 raccoon.
Occupational Illnesses: Asbestosis 18; Carpal Tunnel Syndrome 60; Coal Workers' Pneumoconiosis 19; Dermatitis 1; Loss of Hearing 13; Mesothelioma 1; Repetitive Motion Disorder 1.

*Total now includes military cases to make the data consistent with reports of the other diseases.
~Other than meningococcal

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