A Survey of Intestinal Parasites in Rural Children

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A study was undertaken to determine the prevalence of intestinal parasites in a group of rural, economically disadvantaged children. Thirty-four percent of 108 children were found to have a clinically significant parasite. The most common organism was Giardia lamblia (22 percent). Those children with Giardia were significantly (P=.05) smaller than those with negative stool examinations. Even in areas with a low overall prevalence of intestinal parasites, certain high-risk groups may have significant levels of infection.

Intestinal parasites, while often representing asymptomatic infestations, may cause serious acute or chronic disease in children. This is more likely in the poorly nourished and those with multiple illnesses. These parasites are ubiquitous in the United States; however, clinical index of suspicion is rarely high outside areas of high prevalence.

Intestinal parasites are not generally considered a significant health problem in West Virginia. The *Intestinal Parasite Surveillance, Annual Summary, 1978* by the Center for Disease Control lists positive stool rates for the three most common organisms in West Virginia, Giardia lamblia, Ascaris lumbricoides, and Trichuris trichiura, as 3.7 percent, 3.0 percent, and 0.8 percent, respectively.[1] Although rates for the entire state are low, high-risk groups exist, warranting increased clinical suspicion. These high-risk groups usually consist of children in low socioeconomic settings. Often, medical care is rendered in these areas without facilities offering stool examination for ova and parasites.

The prevalence of intestinal parasites in a high-risk group was determined and measurements of stature in infested and non-infested children were compared. The study population consisted of 108 children in a maternal-child health project in Lincoln County in southern West Virginia. As participants, the children and a parent attend a regional center. Mothers receive homemaking instruction. Children receive preschool instruction and stimulation. Both receive hot meals. This is an isolated and economically deprived area. The county ranks 48 out of 55 in the state in per capita income. Forty percent of housing units in the county do not have indoor plumbing facilities.[2] Geographically, the area consists of low, heavily forested mountains.

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Table 1. Comparative Incidence and Clinical Findings for Intestinal Parasites								
Class	Number	Sex Distribution Male	Female	Age (years)	Height (T Value)	Weight (T Value)	Hematocrit	Eosinophils
Positive Stool	37	18	19	3.4 ± .9	47.2 ± 8.3	48.3 ± 8.8	34.9 ± 2.6	5.9 ± 5.9
Negative Stool	71	35	36	3.4 ± 1.0	48.9 ± 11.7	52.3 ± 10.4	35.9 ± 1.9	4.5 ± 5.0
Giardia	24	12	12	3.5 ± .9	44.0 ± 8.9	47.1 ± 9.4	35.0 ± 3.0	6.3 ± 5.7
Ascaris	17	8	9	3.3 ± 1.0	52.8 ± 8.0	50.8 ± 8.8	34.5 ± 2.4	7.0 ± 7.3
Trichuris	3	2	1	2.7 ± 1.2	47.2 ± 16.0	45.9 ± 16.9	33.0 ± 4.6	11.3 ± 11.4
Total	108	53	55	3.4 ± 1.0	48.3 ± 10.7	51.2 ± 9.9	35.5 ± 2.1	4.7 ± 4.8

Methods

History and physical examination, stature measurement, hematocrit, white blood cell count, and peripheral smears for differential white blood cell count were obtained on each child. An attempt was made to obtain at least two stool specimens on different days. Only a single stool specimen was obtained in 44 children. A total of 229 stool examinations were made. Stool examinations were performed at the West Virginia State Hygienic Laboratory. Standard Formalin ether concentration method was used. No attempts were made to identify pinworm ova. Heights and weights were converted to a T-scale using standards by Pomerance.[3] Means of the t values were calculated for each subgroup in the study. Tests for significance at .05 level were performed in comparing subgroups.

Results

One hundred eight children, aged one to six years, were included in the study. In 37 (34 percent), a clinically relevant intestinal parasite was diagnosed. Giardia lamblia (24/108), Ascaris lumbricoides (17/108), and Trichuris trichiura (3/108) were recovered and accounted for all organisms found except for a single subject with multiple (6) organisms (Table 1).

Stature did not differ significantly in infested vs non-infested subjects except in the case of Giardia. Giardia infested patients had significantly lower means of height (P=.05) and weight (P=.05) than non-infested subjects. There were no significant differences in hematocrit, peripheral eosinophils, age, or sex distribution between infested and non-infested patients.

Discussion

The children in this study were at high risk for intestinal parasite infection. Low socioeconomic status leading to poor sanitary facilities and resultant poor personal hygiene, little exposure to preventive education, and marginal access to safe water are probably responsible. Day care status, in itself, seems to predispose, at least to giardiasis.[4] Statewide estimates of prevalence for intestinal parasites are not accurate in predicting infection in such groups. In this case, a tenfold difference exists between figures from the Center for Disease Control and these findings.

High-risk groups such as this one are not uncommon in central Appalachia, and health care providers in such areas should maintain a high index of suspicion for the problem.

Ascaris lumbricoides is a common and usually benign parasite. Its potential for causing life threatening disease on rare occasions in central Appalachia has been well described previously.[5] Ascaris is effectively and inexpensively treated by a number of preparations. It is difficult to eradicate the organism from the community even with the best of public health efforts, because the egg is so hardy, and most infestations are inapparent.

Trichuris was a rare finding in this study (3 cases), and West Virginia probably approaches its northern boundary. The egg is not nearly so tolerant of climatic conditions as that of Ascaris. Total effective parasite load in this area is probably small and although it is a blood and body-fluid consuming organism, most infections in this locale are probably benign. It is effectively treated by mebendazole. Good preventive measures such as hand washing, nail cleaning and trimming, proper waste disposal and food preparation, and effective treatment of cases might eradicate this organism in this area.

Giardiasis has been shown to cause chronic malabsorption in children.[6] The cases represented in this study were largely asymptomatic, but decreased stature was noted in Giardia infested children. Since decreased host defenses seem to predispose to giardiasis, it is not known whether this represents selective susceptibility of smaller, possibly more poorly nourished children or a causal relationship due to chronic malabsorption. Studies are under way to attempt to answer this question.

Prevention is by the methods mentioned above for trichuris. The assurance of an uncontaminated water supply is especially important. Water used in cooking and making ice, as well as for drinking, should be boiled for ten minutes. Finding and treating asymptomatic cyst passers is especially important in children. Quinacrine is very effective for giardiasis but is often poorly tolerated by children.[7] Furazolidone is almost as effective and better tolerated. It has the advantage of a liquid preparation. Metronidazole is often used, and is effective. It remains unlicensed for giardiasis in this country.

In summary, even in areas of low prevalence, children at high risk for intestinal parasites should be screened by stool examination, if possible. Giardiasis should be vigorously treated, even if asymptomatic, because of possible chronic malabsorption.

References

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