

## GIARDIASIS IN A 20-DAY-OLD NEWBORN

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The causative agent of giardiasis, *Giardia lamblia*, is a flagellated protozoa parasite that inhabits the upper small intestine of vertebrate hosts. Neonatal giardiasis is very rare. The aim of this report was to present one such case. A female, 20-day-old newborn was admitted with a history of diarrhea with frequent mucous and bloody stools. The diagnosis of giardiasis was established due to the detection of trophozoites and cysts in a stool sample. The patient was treated with metronidazole. The newborn recovered quickly and her stool examination was negative on three occasions. Adequate nutrition and hydration are important features in clinical treatment of giardiasis. Early diagnosis, evaluation and treatment can lead to healing without complications.

**Key words:** Giardiasis ■ Newborn

### Introduction

Parasitosis still remains a significant pediatric health problem, despite improving hygienic conditions and social awareness. *Giardia* is a genus of intestinal flagellates that infects a wide range of vertebrate hosts (1). *Giardia lamblia* (synonymous with *Giardia intestinalis*, *Giardia duodenalis*) is a cosmopolitan microorganism that commonly causes diarrheal disease throughout the world. *Giardia* possesses several unusual characteristics, including the presence of two similar, active diploid nuclei, the absence of mitochondria and peroxisomes and a unique attachment organelle: the ventral sucking disc (2). *Giardia lamblia* is the only species within the genus *Giardia* that infects humans, although it is also found in other mammals, including pets, livestock and wild

animals (3). The parasite exists in two forms: 1. the infective cyst form resistant to many environmental factors, and 2. the vegetative binucleate trophozoite form which colonizes the lumen of intestine but does not invade the mucosa (4).

In humans, *Giardia spp.* mostly colonize the duodenum and jejunum, although trophozoites can occasionally be found in the ileum, colon, stomach, and bile ducts (5). The injury is mediated by the activated T lymphocytes of the host. Pathophysiological activation of lymphocytes is secondary to *Giardia*-induced disruption of epithelial tight junctions, which in turn increases intestinal permeability. Loss of epithelial barrier function is a result of *Giardia*-induced enterocyte apoptosis (6).

Infection with *Giardia lamblia* is one of the most common human infections, particularly in developing countries, and it affects mainly preschool children and school children. Giardiasis affects persons in all age groups; the number of reported cases is highest among children aged 1–9 years (7). A higher prevalence exists among children 2–5 years old, more in poorer communities, and slightly more in males than in females (8). Infection in the neonatal period is very rare (9).

*Giardia lamblia* may cause infections that range from asymptomatic cyst passage and acute diarrhea, to severe diseases or chronic diarrhea syndrome, weight loss and malabsorption or allergic diseases (10, 11). This is a major health problem in children because infection with this parasite can affect growth and development, as it contributes to nutritional deficiencies in children (12). Both host factors (e.g. nutrition, immunity, co-infection with other agents) and pathogen factors (e.g. strain, infectious dose) are thought to contribute to the clinical severity of giardiasis (13). Factors associated with the host, such as age in our newborn, represent risk factors for *Giardia lamblia* infection due to the extreme sensitivity of the neonatal period. Natural barriers and

the inborn immunity have limited capacities for an adequate immune response.

### Case presentation

A 20-day-old, breastfed female newborn infant was admitted with a history of diarrhea - frequent mucous and bloody stools. The disease started two days before admission, with stools occurring more frequently and of liquid consistency. The night before admission the stools became lumpy with a touch of mucus and intermittent blood. The entire time the patient had a stuffy nose and some difficulty with sucking but no associated vomiting, convulsion or fever. She was exclusively breastfed. The remainder of the medical history provided data showing she was the third child from the 5th controlled and maintained pregnancy (after two miscarriages in the third month). Childbirth was a normal vaginal delivery, with the birth weight 3700 g. The patient had a high vitality rating (Apgar score 10) and was dismissed from the maternity hospital after 3 days. Neither the mother nor other family members displayed any similar symptoms. No data of any problems with parasitic diseases were present for this family.

Epidemiological data show that the newborn comes from a multi-member rural family working in agriculture. They have several other, healthy children under the age of ten. They have a controlled water supply but the issue of the wastewater system at home and environment is inadequately resolved, using uncontrolled septic tanks. They own livestock as well as pets.

On examination, the newborn was moderately dehydrated and her vital signs were normal. Except intertriginous dermatitis changes in the ano-genito-gluteal region, other systemic physical examinations and investigations were normal.

The complete blood count and differential blood count were normal, serum mea-

surements of urea, creatinine, glucose, total protein, albumin, globuline, the liver function test, serum transaminases, serum alkaline phosphatase, electrolites and alkaline reserve were in the range of normal values. Bacteriological examination and stool culture did not confirm the presence of enteropathogenic bacteria. Stool samples were tested for intestinal parasites. The diagnosis of giardiasis was confirmed by the detection of *Giardia lamblia* in stool specimens, via routine diagnostic services. The test for *Campylobacter* was not performed.

The diagnosis of giardiasis was established and due to the direct detection of trophozoites and cysts in a stool sample, the microscopic examination used a trichrome staining method. Immediately after admission we started intravenous rehydration and probiotic bacteria application (*Lactobacillus bifidus*). After receiving the results of the stool examination, metronidazole therapy in doses of 17.5mg/kg body weight/24 h in 3 doses *per os* for 10 days was initiated. The therapy resulted in appropriate formation of stools in the next 3 days. The recovery of the patient was confirmed through negative findings in three stool samples.

## Discussion

We present a case of giardiasis in a 20-day old infant, born healthy with no previous illnesses according to the medical records. The reason for admission was moderate dehydration and frequent and liquid stools that became lumpy with a touch of mucus and intermittent blood. Although rare in newborns, giardiasis is a common infection in childhood worldwide with reported prevalence, sources and modes of transmission varying among children from different geographic locations (14). The prevalence of *G. lamblia* infection is strongly associated with a variety of risk factors, including host, sociodemo-

graphic, environmental and zoonotic factors (14). Transmission of *Giardia* via the fecal-oral route, is the most commonly identified mode of acquisition, either indirectly through contaminated water or food, or directly from person to person (mother to newborn in this case, probably). The prevalence of Giardiasis varies between rural and urban areas depending on each country's economic level and social status. Poor sanitary conditions and low socioeconomic status favor the high prevalence of infections with intestinal parasites, among them *Giardia lamblia* (8).

We have no data whether the region from which the patient comes is a localized hyperendemic or endemic locus for giardiasis but there is reasonable doubt considering the unresolved sanitary question as well as numerous livestock and the presence of pets (that are not under veterinary supervision). Our patient lives in rural environment, in multi-member family with several other children under the age of ten. The family has a controlled water supply but is of a lower socioeconomic status and have poor sanitary conditions that most likely favored the infection. Mother and the family members refused stool examination for intestinal parasites and *Giardia*. Even though the potential source of exposure has not been discovered and the means of transmission not proven, numerous risk factors (socioeconomic, environmental, sanitary and zoonotic) for *Giardia lamblia* infection were present.

The child was exclusively breastfed. The role of breastfeeding has been well documented for providing protection against the *Giardia lamblia* infection in young children. Several studies have shown that infants who were not breastfed were at a higher risk of giardiasis than infants who were breastfed. The beneficial effect of breastfeeding on *Giardia* infection in children is seen in both reduced infection rates and mitigated clinical symptoms (15, 16). Tellez et al., 2003, (17)

reported data that anti-*Giardia* immunoglobulin A in milk prevents infection. Children born to naive mothers are at a significantly higher risk of acquiring *Giardia* infection in their first months of life and developing giardiasis with more severe symptoms compared to children of immune mothers (17). Even though our newborn patient had been exclusively breastfed, the mother's milk could have had a protective influence which resulted in mitigated clinical features and a favorable course and disease outcome.

Symptoms of *Giardia lamblia* infection are usually associated with diarrhea but can be either asymptomatic or responsible for a broad clinical spectrum, with symptoms ranging from acute to chronic. Diarrhea occurs with or without the malabsorption syndrome; nausea, vomiting, and weight loss; pruritis and urticaria; uveitis; sensitisation towards food antigens; synovitis. Children may suffer more serious consequences, like retarded growth and development of poor cognitive function (18, 19, 20). In our case stools were occurring more frequently and were of decreased consistency. One night before admission the stools become lumpy with a touch of mucus and intermittent blood. There was no associated vomiting or fever. The diagnosis of *Giardia lamblia* infection was established on the basis of anamneses data and clinical features – both pointed to diarrhea syndrome. Diagnosis was confirmed by the detection of *Giardia lamblia* by microscopical observation of slides and the detection of trophozoites and cysts. Genotypes of *Giardia lamblia* were not explored. The stool samples were stained by modified acid-fast trichrome to exclude *Cryptosporidium* infection.

Metronidazole has been the drug of choice for the treatment of giardiasis. It has been reported however that secnidazole in a single

dose is effective in eradication of giardiasis (21). Our treatment was effective for *Giardia lamblia* infection. A recent study shed light for the first time on the mechanism behind the inhibitory effect of probiotic bacteria. *Lactobacillus johnsonii* La1 and its main metabolic product, lactic acid, mediates protective effects *in vivo*. The anti-Giardial effect is probably due to mediators that modulate immune response. These results can be extended to the prevention of parasitic infection (22). Rehydration required the replacement of the initial deficit of fluid and ongoing losses and daily needs with isotonic fluid 4:1 to restore euvolemia. Adequate nutrition and hydration are important features in the treatment of *Giardia lamblia* infection that lead to healing without complications.

## Conclusion

Although rare in the neonatal period, giardiasis may constitute the causative agent of neonatal diarrhea in breastfed newborn. Early diagnosis, evaluation and treatment with adequate nutrition and hydration lead to healing without complications. Prevention of giardiasis in children through continuous health education is one solution to resolve the problem by increasing awareness about food and water contamination and proper personal hygiene.

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