CASE REPORT

Giardiasis Combined with Sepsis and DIC in a Chinese Child from Ganzi Tibetan Autonomous Prefecture

Ling Xu 1, 2, Jie Li 1, 2, Zhengqiang Hu 1, 2

1 Department of Laboratory Medicine, West China Second University Hospital, Sichuan University, Chengdu, Sichuan, China
2 Key Laboratory of Birth Defects and Related Diseases of Women and Children (Sichuan University), Ministry of Education, Chengdu, Sichuan, China

SUMMARY

Background: We reported a rare case of combined Giardiasis, sepsis, and DIC in a Tibetan Chinese male in this study.

Methods: Multiple fecal routine examinations, blood routine examination, blood culture, coagulation screening, and biochemical tests were done after August 1st, 2022.

Results: The child had intermittent diarrhea. Giardia cysts were found in his stool mounts. Sepsis, disseminated intravascular coagulation, fever with blood routine decreasing, low proteinemia, hyperlactemia and hypocalcemia were also found in this case.

Conclusions: It is suggested that improving the resistance, immunity, and personal hygiene is particularly important for children from remote ethnic minority areas of China.


Correspondence:
Zhengqiang Hu
Department of Laboratory Medicine
West China Second University Hospital
Sichuan University
Renmin Nanlu No. 20, Section 3
Chengdu, Sichuan
China
Phone: +86 18-011520187
Fax: +86 28-85503201
Email: huzhengqiang1234@163.com

KEYWORDS

Giardia lamblia, Giardiasis, sepsis, disseminated intravascular coagulation, ethnic minority

INTRODUCTION

Giardia lamblia is one of the most impressionable intestinal parasitic protozoa in children [1]. G. lamblia parasitizes the human small intestine, gallbladder, mainly in the duodenum, causing diarrhea, vomiting, abdominal pain, and indigestion-based symptoms [2,3]. G. lamblia is a flagellate that does not invade epithelial cells and reproduces asexual only by binary division. They produce resistance stages (Giardia cysts) and are released into the environment as a mode of infection [3]. G. lamblia exhibits a biphasic lifestyle, i.e., dormant cysts or reproductive trophozoites, which propagate by the dichotomy of the trophozoites. Trophozoites can be found in cases of diarrhea, and cysts was often found in stools with normal hardness. Meanwhile, G. lamblia is a zoonotic intestinal parasitic protozoan that may be transmitted from animals to humans [4,5].
About 200 million people worldwide are infected with *G. lamblia* annually, with a high incidence among tourists [6]. Most of the infected persons of *G. lamblia* are mainly distributed in developing countries [7]. Moreover, *G. lamblia* is often co-infected or opportunistically infected with HIV patients or immunodeficiency populations [1,8]. However, the cases of ethnic minorities with giardiasis in Sichuan province of China have rarely been reported. This report was to introduce a case with Giardiasis, sepsis, and DIC in a Chinese child from Ganzi Tibetan Autonomous Prefecture, Sichuan Province of China [9].

**CASE PRESENTATION**

A 7-year-old Tibetan Chinese male, who had complained that “The left ankle was swollen for 10+ days, and the abscess incision was accompanied by fever for 2 days, visited the outpatient department of pediatrics of the West China Second University Hospital, Sichuan University on August 1st, 2022. He had intermittent diarrhea, and multiple fecal routine examinations, blood routine examination, blood culture, coagulation screening, and biochemical tests were done from August 1st to August 14th, 2022. Special examination showed that he had: 1. sepsis; 2. disseminated intravascular coagulation (DIC); 3. left ankle cellulitis with abscess formation; 4. fever with blood routine decreasing in two lines, which was suspected as leukemia reaction? 5. intestinal infection (*Giardia lamblia*? Figure 1); 6. low proteinemia; 7. hyperlactatemia; 8. left fibula fracture?; 9. acute osteomyelitis?; 10. postoperative drainage of the left ankle abscess; 11. hypocalcemia. Giardium cysts and kinetic Giardium trophozoites were presented in Figure 1. Based on the results of the patient's chief complaint and repeated routine stool examination, the patient was diagnosed with Giardiasis on August 10th, 2022, and was treated with metronidazole at 15 - 20 mg/kg/day, three times/day, and treated for 7 consecutive days. Symptomatic and supportive treatment was also given to this patient. After a course of treatment, the patient was automatically discharged on August 17th, 2022, abandoning follow-up treatments.

**The DIC clinical course and blood routine decreasing in two lines of this case**

The DIC clinical course and blood routine decreasing in two lines of this case was presented in Table 1. From Table 1, we found that the patient's fibrinogen (FIB) gradually increased after treatment, and it returned to normal after 3 days. The D-dimer (DDI) gradually decreased to normal but never fully normalized. The fibrinogen degradation products (FDP) were severely elevated at the beginning of the disease, but returned to normal upon discharge. The patient's anti-thrombin III (ATIII) activity was elevated to normal, but was reduced upon discharge. The changes of FIB, DDI, FDP, and ATIII indicated that there was a severe DIC course during the Giardiasis progress. From Table 1, we also found that due to the occurrence of DIC, the platelets (PLTs) of this case were consumed in the early stage of the disease, so the PLTs were severely reduced. With the development of the treatment, the PLTs gradually increased to normal. By the time of being discharged, the PLTs had basically returned to normal. At the same time, as the DIC caused massive bleeding, the patient's hemoglobin (HGB) and red blood cells (RBCs) was significantly lower throughout the disease. The HGB and RBCs did not normalize until the case was discharged. Finally, the PLTs, HGB, and RBCs all first decreased and then gradually increased, which indicated the effects of bleeding and PLT consumption on two lines of blood routine.

**DISCUSSION**

We reported this rare case with Giardiasis, sepsis, and DIC for 3 major reasons. First, Giardiasis is relatively rare in China, but it occurs in more remote areas or ethnic minority areas. Second, owing to the low immunity and resistance, in addition to suffering from Giardia, patients also suffer from a variety of metabolic disorders, DIC, sepsis, and other cachexia symptoms. So, this case was very rare. Third, how to treat the patients with such low resistance and low immunity is still a challenging medical problem, and any simple treatment for the symptoms of this disease is of no overall significance. In our study, the Tibetan child had intermittent diarrhea and multiple stool routine examinations. Except the giardiasis, severe DIC, hypoproteinemia, two lines of blood routine reduction and hypocalcemia of this case were all improved after symptomatic treatment. With the analysis of life history and impressionable reasons of this case, the pathogenicity of giardiasis was related to health conditions, cultural level, economic status and unclean eating habits in the ethnic minority area of China, as well as related to the animal husbandry that the local residents mainly engaged in [10]. People are infected mainly by ingestion of food and water contaminated with cysts. Without washing hands before and after meals, improper management of human and animal stools and lack of awareness of epidemic prevention constitute important risk factors for *G. lamblia* infection [11].

**CONCLUSION**

Children with giardiasis often discharge cysts or trophozoites off and on, which easily cause repeated infections. So, repeated screening of *G. lamblia* infection is necessary. Children should be encouraged to develop good personal hygiene and decrease the risk of fecal-hand-mouth-oral transmission. Moreover, in addition to...
Table 1. The data of DIC screening, PLT, HGB and RBC changes of this case.

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Notes:
1. Underlined font indicates that the data is above the reference range.
2. The reference range: FIB: 200 - 40 mg/dL, DDI: < 0.55 mg/L, FDP: < 5 mg/L, ATIII: 75 - 125%.
3. The reference range: PLT: 100 - 450 x 10^9/L, HGB: 110 - 150 g/L, RBC: 3.80 - 5.10 x 10^12/L.

Figure 1. Cysts and trophozoites of G. lamblia (400 x).
Note: Figure 1A is the saline wet smear with fluorescent screen background; Figure 1B is the iodine-stained wet smear. White arrowheads indicate *Giardia* cysts, and red arrows show *Giardia* trophozoites.
improving resistance, immunity is particularly important to these children. A total of 11 clinical diagnoses were found from this case, and the Giardiasis may be due to his poor hygiene and lower immunity. Although the Giardiasis of this case was treated seriously, we regretted that the patient was automatically discharged and abandoned follow-up treatments. More care should be shown to the children from such remote areas of China by society, so that they can get better treatments. This is also the limitation of this case report.

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Ethical Approval:
In our study, the written informed consent to publish these details and to participate in the study was all obtained from this case and the privacy rights of participants were also preserved. All procedures and protocols are in accordance with the Helsinki Declaration as revised in 2013. The study protocol (Medical Research 2019, No. 15) was approved by the Institutional Review Board (IRB) of the West China Second University Hospital, Sichuan University on May 22, 2019 before study initiation.

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Declaration of Interest:
The authors report no conflict of interest.

References:


