RARE CASE OF ASCARIASIS DETECTED BY COLONOSCOPY ON THE BACKGROUND OF ELEVATED LEVELS OF FECAL CALPROTECTIN

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ABSTRACT

Introduction: The causative agents of ascariasis in humans are two species: *Ascaris lumbricoides* and *Ascaris suum*. For diagnosis, a fecal sample is most often examined. In some cases, the parasite can be identified when coming out with the intestinal passage, and very rarely up on colonoscopy.

Aim to present a rare case of ascariasis where the diagnosis was made by colonoscopy on the background of elevated levels of fecal calprotectin (f-CP).

Case presentation: A colonoscopy was performed on a 52-year-old female patient due to elevated f-CP. The patient had no complaints. The colonoscopy did not detect pathological changes of the intestinal mucosa, but documented larval stages of *Ascaris spp*. freely moving in the lumen of the large intestine. The patient was treated with albendazole. Subsequent parasitological examinations of fecal samples were negative.

Discussion: In developed countries, the transmission of *Ascaris lumbricoides* is greatly reduced. On the background of a very limited transmission of *Ascaris lumbricoides*, many authors consider that most of the sporadic cases of ascariasis are due to *Ascaris suum*. In the case described by us, the f-CP levels normalized after the treatment, and for this reason, we cannot categorically reject the relationship between *Ascaris* infection and elevated f-CP levels.

Conclusion: The presented clinical case is of interest due to the unusual way of diagnosi ascariasis. In the absence of clinical symptoms, and pathological changes of blood and biochemical parameters, except for elevated fecal calprotectin, inflammatory colon disease was suspected and was colonoscopy performed on this occasion.

Key words: Ascariasis, *Ascaris lumbricoides*, *Ascaris suum*, faecal calprotectin, colonoscopy

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INTRODUCTION

Human ascariasis is one of the most widespread parasitic infections on a global scale, and belongs to a group of diseases defined by the WHO as Neglected Tropical Diseases. The causative agents are nematodes from the genus *Ascaris*. Due to the specifics of their life cycle, they are also classified as soil-transmitted helminths, and the disease - as soil-transmitted helminth (STH) infections (1). The causative agents of human ascariasis are two species of *Ascaris*: *Ascaris lumbricoides* and *Ascaris suum*, which are genetically very close species, and according to some studies can interbreed and even produce fertile (albeit with reduced fertility) offspring (2).

According to a recent meta-analysis study excluding the non-endemic areas as North America, Europe, Australia and New Zealand, in 2021 732 million people in endemic tropical areas had ascariasis and the total population parasitemia in these areas was 11.01%. The highest levels of prevalence were recorded in Central and South-Eastern Asia (10.01–16.13%), South America and the Caribbean (10.75–14.88%), and Sub-Saharan Africa (10.56–12.81%). The lowest prevalence was found in North Africa and Western Asia (1.47–2.70%) (3).

Of the soil-transmitted helminths (*Ascaris lumbricoides*, *Ancylostoma duodenale*, *Necator americanus*, and *Trichuris trichiura*), only *Ascaris lumbricoides* and *Trichuris trichiura* are locally distributed in Bulgaria (4). On the average, about 700 cases of ascariasis and 100 cases of trichuriasis are registered in the country each year (5). Most of the ascariasis cases are asymptomatic and are mainly diagnosed during prophylactic examinations. The country

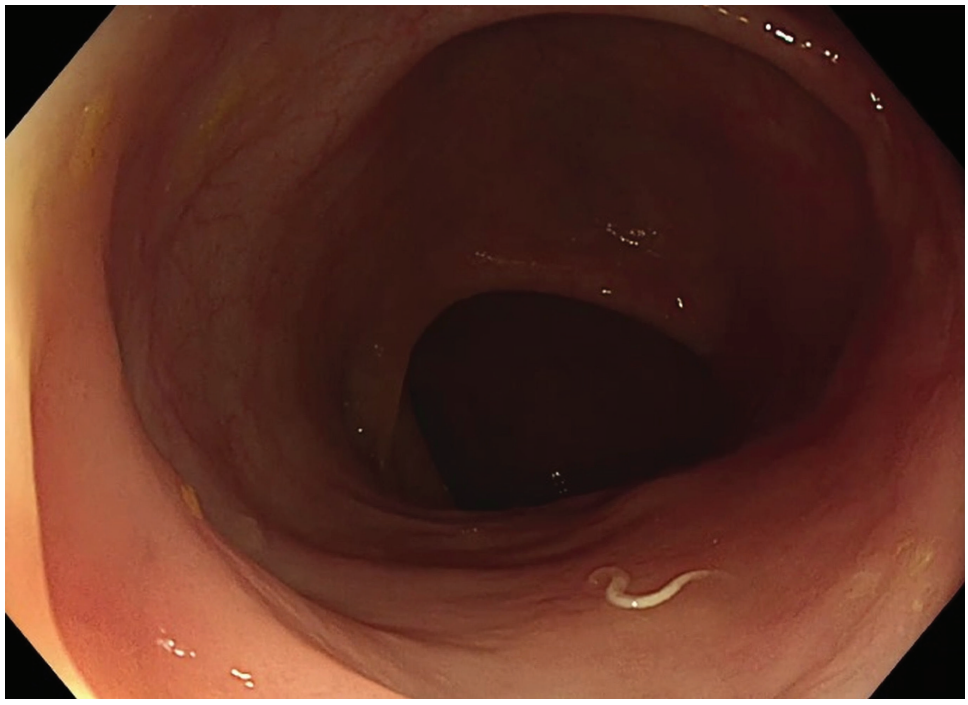

Figure 1. A larval stage of *Ascaris* spp. in large intestine

burden of Bulgaria for ascariasis and trichuriasis is relatively low and preventive chemoprophylaxis with albendazole/mebendazole is not conducted. Calprotectin is a protein that is primarily released by neutrophils cells. Faecal calprotectin (f-CP) is a marker of intestinal inflammation and is used as a biomarker in gastrointestinal disorders (6). In recent years, its use in various enteric infections has been increasing, especially as correlate of clinical severity in the evaluation of bacterial and viral pathogens (7). Our aim was to present a clinical case of Ascariasis, diagnosed by colonoscopy that was performed on the basis of high calprotectin values.

CASE PRESENTATION

The report concerns52-year-old woman regularly attending preventive examination. During the last such examination, an elevated level of f-CP was found (361.5 μg/g feces; reference value <50 μg/g). The patient had no complaints. All other tests, including complete and differential blood count, biochemical indicators and urine, were without deviations from reference values. On the recommendation of a gastroenterologist, the patient underwent a colonoscopy. The examination did not reveal any pathological changes in the intestinal mucosa. However, but on one episode of the colonoscopy, lasting about 30 seconds (out of a total of about 20 minutes of recording), an actively moving nematode was visualized in the lumen of the large intestine (Fig. 1).

On this occasion, the patient was referred for a consultation with a medical parasitologist at the National Center of Infectious and Parasitic Diseases, Sofia. The examination of a fecal sample did not prove the presence of *Ascaris* eggs or other parasitic pathogens. Based on the external morphological features and the size of the nematode, it can be reasonably assumed that it is a larval stage of *Ascaris* spp. The patient was prescribed a single dose of 400 mg of albendazole. Two more tests performed 2 weeks apart were also negative. Three months after the first dose of albendazole, the patient was given a second dose. As already mentioned, during all this time she had no subjective complaints. One month after the treatment the faecal calprotectin level was within the reference range.

DISCUSSION

There is nothing unusual about the etiology and clinical presentation of the described case. Although the prevalence of ascariasis in Bulgaria has been reduced to insignificant levels, single cases of infection are registered each year. However, several

questions of interest arise.

The first issue regards the causal parasite species. The high living and sanitary standards, as well as the established personal hygiene in developed industrial countries have significantly limited people's contact with human faecal waste. As a result the transmission of *Ascaris lumbricoides* has been significantly reduced. In most reported cases of ascariasis in these countries, a low infectious burden with development of single specimens is observed, as was in our case: only one exemplar of *Ascaris.* Since most of those countries have also well developed pig farming, many authors consider that the sporadic cases of ascariasis are primarily due to *Ascaris suum* (8, 9).

The classical diagnostic methods for ascariasis are based on the microscopic detection of parasite eggs in a faecal sample or the morphological characteristics of a spontaneously excreted preimaginal or imaginal form (10). The eggs of both species are morphologically indistinguishable, while the adults differ only in the shape of the lips and teeth which can be detected by electron microscopy (11). Because of their morphological similarities, it is currently debated whether *A. lumbricoides* and *A. suum* were the same species (2) or rather - different species, based on genetic evidence (12). Eggs of the parasite can be found in a faecal sample effectively only after the expiration of the pre-patent period, which for *A. suum* is 24 days and for *A. lumbricoides* - 67 days. In early ascariasis, the symptoms related to the migration of the parasite are indicative of the diagnosis. Eosinophillia is observed in the peripheral blood. Sputum examination also reveales eosinophillia and the presence of Charcot-Leyden crystals. Eosinophilic Loeffler infiltrates develop in the lung, and increased levels of total IgG and IgE are found in the serum. In rare cases, such as the one described by us, the diagnosis is macroscopic based on the detection of *Ascaris* is in the intestinal passage during colonoscopy.

Another important question is whether f-CP could serve as a non-specific biomarker of the parasitic disease. There are a few published studies of this kind. To establish the role of faecal occult blood (FOB) and f-CP as potential markers of intestinal morbidity in soil-transmitted helminth infections (trichuriasis, with or without association with ascariasis and/or hookworm infections), Patel et al. (2021) studied a total of 1034 *T. trichiura* infected cases (mostly mild infections) and 157 STH negative controls for f-CP and FOB. No statistically significant relationship was found between *T. trichiura* infection or *Ascaris lumbricoides* co-infection and f-CP concentration (7). The results of another relatively large cross-sectional study in children also did not establish a correlation between STH and f-CP values (13). In contrast, a study by Salman et al. found a significant correlation between some protozoal infections of the gastrointestinal tract and f-CP levels (14). In the present case, f-CP levels normalized after the treatment, and therefore we cannot categorically reject a relationship between *Ascaris* infection and elevated f-CP levels. Moreover, no evidence of bowel inflammation or other co-infection was found, and any subjective complaints were absent. Therefore, additional targeted studies are needed in this area.

Conclusion

The present clinical case is of interest due to the unusual way of diagnosing ascariasis: in the course of colonoscopy performed on the occasion of elevated f-CP values, and in the absence of clinical symptoms, or major blood count and biochemical deviations.

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Conflicts of Interest: The authors declare no conflict of interest.

Ethical considerations: The study was conducted in accordance with the Declaration of Helsinki. Ethical review and approval for this study by the Ethics Committee of National Centre of Infectious and Parasitic Diseases, Sofia, Bulgaria, is not necessary due to it being a retrospective single case report and the absence of any personal data.

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