

***Dibothriocephalus latus*: a case report in Southern Brazil**

***Dibothriocephalus latus*: um relato de caso no Sul do Brasil**

DOI:10.34117/bjdv7n1-437

Recebimento dos originais: 15/12/2020

Aceitação para publicação: 15/01/2021

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ABSTRACT

Diphyllobothriosis, an infection caused by an adult parasite of the genus *Dibothriocephalus*, is associated with the intake of raw or undercooked fish. This disease is worldwide in distribution and present sporadic outbreaks. A few cases of *Dibothriocephalus* infections have been reported in Brazil. This report aims at presenting the case of a male patient from Southern Brazil (Rio Grande do Sul) who was suffering from chronic diarrhea, tested positive for fecal occult blood and upon anamnesis reported eating sushi recently. A parasitological stool test was conducted using the spontaneous sedimentation technique and the microscopic analysis revealed the presence of typical structures of *Dibothriocephalus latus*. Due to the association between the consumption

of raw fish such as salmon and diphyllbothriosis, it is extremely important to consider this infection among the symptomatic population who eats raw or undercooked fishes.

Keywords: Diarrhea. Diphyllbothriosis. Fecal occult blood test. Undercook fish.

RESUMO

A difilobotriose, uma infecção causada por um parasita adulto do gênero *Dibothriocephalus*, está associada à ingestão de peixe cru ou mal cozido. Esta doença está em distribuição mundial e apresenta surtos esporádicos. Alguns casos de infecções por *Dibothriocephalus* foram relatados no Brasil. Este relatório visa apresentar o caso de um paciente masculino do sul do Brasil (Rio Grande do Sul) que sofria de diarreia crônica, testado positivo para sangue oculto fecal e sobre anamnese relatada comendo sushi recentemente. Um teste parasitológico de fezes foi realizado utilizando a técnica de sedimentação espontânea e a análise microscópica revelou a presença de estruturas típicas do *Dibothriocephalus latus*. Devido à associação entre o consumo de peixe cru como salmão e diphyllbothriosis, é extremamente importante considerar esta infecção entre a população sintomática que come peixe cru ou mal cozido.

Palavras-chave: Diarreia. Dipilobotriose. Teste de sangue oculto fecal. Peixe cru ou mal cozido.

1 INTRODUCTION

The parasite *Dibothriocephalus latus*, known as fish tapeworm, causes diphyllbothriosis through the intake of raw or undercooked fish infected with adult worms of the parasite [1]. Therefore, a zoonosis transmitted by fish, common in areas surrounded by lakes or rivers, frequently found in Europe, Russia, Asia and North America is considered. In South America, some cases have been reported in Argentina [1], Brazil, and Chile only, with *Diphyllbothrium latum* (now *Dibothriocephalus latus* [2]) being the etiological agent of the parasitosis [3]. *Dibothriocephalus* infections are often asymptomatic, but the present study describes the report of a rare parasitic disease (diphyllbothriosis) that occurred in a symptomatic patient in Southern Brazil in 2018, with a brief review of the literature.

2 CASE REPORT

35-years-old male patient living in Southern Brazil. In March 2018 he mentioned persistent abdominal pain, diarrhea and heartburn, which lead him to sought medical help. Upon anamnesis, he reported eating sushi recently; but could not remember exactly when or where due to his constant work-related travels. When evacuating his stools were dark brown and slightly diarrheal. Three samples of fecal material were collected every other

day and sent to a regional clinic analysis laboratory for fecal occult blood test. The three samples tested positive. In addition, the last stool sample was also processed using the spontaneous sedimentation technique and evaluated under a microscope (magnification of 400x). Oval structures (eggs) with operculum and protuberance at the end opposite the operculum were observed, measuring approximately 65 x 45 µm, featuring a yellowish-brown color typical of *Dibothriocephalus latus* (Fig 1). Due to the unusual finding of a *D. latus* in the sedimentation test, the stool sample was sent to a collaborating laboratory to be evaluated by a second professional, where its diagnosis was confirmed. After receiving the diagnosis, the patient did not return for a follow up.

Fig 1 *D. latus* eggs seen with Lugol, magnification of 400x



3 DISCUSSION

Among the species causing diphyllobothriosis, *D. latus* [2] is endemic in lakes in the Northern Hemisphere while *Adenocephalus pacificus* is found in South America [3]. In Argentina, Patagonia and Chile, mainly in the Lake District in the south of those countries, the parasite has already been associated with the consumption of a raw fish, the ceviche [1].

The epidemiology of *D. latus* indicates that it can be found in both salt and freshwater fish. Birds, carnivorous and fish-eating mammals are the definitive hosts for this parasite; with human beings occasionally becoming infected [4]. It develops and reaches sexual maturity in the hosts' intestine tract. *D. latus* is a cestode of long and wide morphology that can reach from 2 to 10 meters long. The immature eggs are released in the hosts' feces and around a week after they meet water, coracidia hatch out of their eggs

and are eaten by crustaceans such as *Cyclops* and *Diaptomus*, which then mature into procercoid larvae. Fishes end up ingesting these crustaceans and, this way, plerocercoid larvae infect their body [5].

In humans, adult worms reside in the jejunum, ileum or duodenum. Immature eggs, released by proglottids, are excreted in the feces from 30 to 45 days after the infection, caused by the intake of raw fish containing plerocercoids. Commonly, salmon is the fish that transmits diphyllbothriosis, but trout may also be involved in the transmission [5].

According to the literature, the earliest cases of diphyllbothriosis occurred in 1911 in Argentina where a Russian immigrant was diagnosed after arriving in the country [6]. But it was not until 1982 that the first autochthonous case was reported [6].

The earliest case documented in North America occurred in 1930 and affected a small fish population from Lake Winnipeg, Manitoba (Canada). Thereby, the high levels of plerocercoids seen in fish implicated in this food being rejected in that country's market, directly affecting the funding of the local fishing industry [7].

In 1980, there was an outbreak caused by the intake of salmon and tuna sushi in Los Angeles (USA). At the time, the number of prescriptions of the anti-parasitic drug niclosamide arriving at the Center for Disease Control and Prevention (CDC) grew significantly. In the epidemiological context, it was verified that more than 80% (32/39) of the affected individuals reported the consumption of raw salmon before the onset of symptoms [8].

In Brazil, the first cases were reported in 1915 [9]. From that time until 2003 no sporadic cases or outbreaks were reported in the country. However, cases reemerged in 2004 in the states of São Paulo, Rio de Janeiro, Minas Gerais, Bahia and Rio Grande do Sul, according to the Foodborne and Waterborne Disease Surveillance System (DDTHA) [10].

According to the official data from DDTHA, the total number of cases of diphyllbothriosis occurring between 2004 and 2008 in São Paulo was 68, distributed as follows: 16 cases in 2004; 39 in 2005; 9 in 2006; 1 in 2007; and 3 in 2008. In addition to those numbers, in the same period, official bodies recorded 1 case in Salvador, 1 case in Ribeirão Preto (São Paulo), 13 cases in Rio de Janeiro, 5 cases in Porto Alegre (Rio Grande do Sul), 1 case in João Pessoa (Paraíba), 2 cases in Vitória (Espírito Santo), and 1 case in Brasília (Federal District), coming to a total of 92 cases between 2004 and 2008 in Brazil⁸. It is worth mentioning that either these people were infected while eating

contaminated fish at an endemic country or while ingesting import fish from a said country, such as Chile [11, 12]. Between the years 2009 and 2012 there were no reported cases of diphyllbothriosis in Brazil [10].

Dibothriocephalus infections are often asymptomatic, but flatulence, abdominal distension, stomach pain, nausea, anorexia, asthenia, vomiting, weight loss and diarrhea may occur about 10 days after the consumption of raw or undercooked fish. At laboratory level, the blood test shows eosinophilia and the presence of microcytic and megaloblastic anemia.

New outbreaks of *Dibothriocephalus latus* human infection have emerged, including in countries with a high standard of medical care. In Brazil, since 2004, reports of diphyllbothriosis have become more common, due to factors that favor its transmission [13]. Among these, it is the great coastline of Brazil which contributes directly to the higher supply of fish through industrial and artisanal fisheries. In addition, ethnic, cultural and socioeconomic diversities result in different fish consumption patterns in Brazil, and the habit of eating raw fish is the main risk factor related to the development of diphyllbothriosis.

In Southern Brazil, in 2006, the first case of *D. latus* infection related to the consumption of raw fish was reported [14]. The present study reports the second case of this rare parasitosis in the South of the country in more than 10 years, warning against the commercial and consumption conditions of food made from raw and/or undercooked fish. As prophylaxis it is recommended to train restaurant owners and food handlers through educational campaigns focused on the visual inspection of the parasite in fresh food, since it is not possible to see the larvae (plerocercoids) in frozen products [8]. To prevent infections, fish should be properly cooked or preserved by freezing them and fish inspections must be carried out systematically. In addition, it is imperative to allocate human excreta properly, thus minimizing any risk of contamination [14].

Parasitological exams conducted in regular consumers of sushi and sashimi are essential to promote and preserve their health, considering that the increasing intake of these foods in the country can contribute directly to the epidemiological modification of diphyllbothriosis. Furthermore, it is stressed that the screening of occult blood in stool samples is a relevant indicator of gastrointestinal tract abnormalities. In the present study, both lab tests made the solid diagnosis of diphyllbothriosis possible.

Finally, it is important to note that the proper treatment after the diagnosis of diphyllbothriosis is essential. Its goals are to prevent the spread of *D. latus*, stop the

development of the parasitic infection into pernicious anemia due to B12 deficiency [5]. Individuals who are not treated or are treated improperly will continue to eliminate the agent through their feces and cause a new cycle to start.

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