



A case report of human gastrodiscoidiasis in Nepal

Ranjit Sah^{a,b,*}, Lucrecia Acosta^c, Rafael Toledo^d

^a Department of Microbiology, Tribhuvan University Teaching Hospital, Institute of Medicine, Kathmandu, Nepal

^b Department of Medicine (Division of Infectious Disease), Medanta The Medicity, Gurugram, Haryana, India

^c Área de Parasitología, Departamento de Agroquímica y Medio Ambiente, Universidad Miguel Hernández de Elche, Ctra. Valencia Km 8.7, 03550 San Juan, Alicante, Spain

^d Área de Parasitología, Departamento de Farmacia, Tecnología Farmacéutica y Parasitología, Facultad de Farmacia, Universidad de Valencia, Av. Vicent Andrés Estellés s/n, 46100 Burjassot, Valencia, Spain

ARTICLE INFO

Keywords:

Foodborne trematodes
Gastrodiscoides hominis
Gastrodiscoidiasis
Nepal
Endoscopy

ABSTRACT

Gastrodiscoidiasis is a snail-transmitted zoonotic infection caused by the digenean trematode *Gastrodiscoides hominis*, which is the only species in the genus *Gastrodiscoides* infecting humans. We report a case of human gastrodiscoidiasis in a 66 years-old Nepali man without history of travels outside of Nepal who was admitted in the hospital with pain in upper abdomen for 4 months with history of passage of black-tarry stools, anemia and eosinophilia. During upper endoscopy a living trematode worm was seen in the antrum of the stomach. After isolation, the worm was identified morphologically as *Gastrodiscoides hominis*. Stool analysis of the patient revealed eggs of this parasite. The cause of the infection appeared to be related to the habit of the patient to eat raw watercress. This is the first report of human infection with *Gastrodiscoides hominis* in Nepal. However, the burden of this foodborne trematode infection in Nepal might be underestimated.

1. Background

Gastrodiscoidiasis is a snail-transmitted zoonotic infection caused by the digenean trematode *Gastrodiscoides hominis*, which is the only species in the genus *Gastrodiscoides* infecting humans. Adult of *G. hominis* are large flukes (8–14 × 5.5–7.5 mm) characterized by a short and cylindrical anterior part, large and discoidal posterior part, sub-terminal pharynx, testes lobed and in tandem, a post-testicular ovary, an ascending uterus and a ventral genital pore.

Gastrodiscoidiasis is a foodborne disease associated with the consumption of water plants or even animal products such as snails. The life cycle is not completely known. Adult worms inhabit the caecum and colon of humans, pigs and other mammals.

Unembryonated eggs are laid and in a freshwater environment, the miracidium hatches and infects the first intermediate host. Only the freshwater snail *Helicorbis coenosus* is known to act as the first intermediate host of *G. hominis* [1]. After the development of mother and daughter rediae, the cercariae actively emerge from the snail to encyst in aquatic plants, snails, tadpoles, frogs or crayfish. Definitive host becomes infected after swallowing metacercariae with contaminated vegetables or raw or undercooked crustaceans, molluscs or amphibians [1]. *Gastrodiscoides hominis* infects humans mainly in Asia and sporadically in Guyana, Zambia, Nigeria and the Volga Delta in Russia

[2–8]. Although *G. hominis* is mainly a parasite of pigs, high prevalence in humans has been detected in some areas. For example, Buckley detected a prevalence of 41% in children from Assam (India) [9]. The infection in humans is usually asymptomatic but occasionally it can also cause intestinal problems such as diarrhea, fever, abdominal pain, colic, and an increase in mucus production [4]. Although, human gastrodiscoidiasis has been commonly reported in Southeast Asia, we report herein the first case of human *G. hominis* infection in Nepal.

2. Case report

A 66 years-old male farmer from the village of Kanchan Gaupalika, Rupandehi district in the South-Western Nepal, with no history of travels outside his country, was admitted to the Department of Medicine (gastroenterology) of the Tribhuvan University Teaching Hospital, Kathmandu Nepal. He complained of pain in upper abdomen for 4 months with history of passage of black-tarry stools. He was diagnosed with chronic kidney disease with diabetes, hypertension, anemia and abdominal pain. He also gave a history of consumption of watercress. Hematological tests showed a value of 9.4% of hemoglobin and peripheral blood smear showed eosinophilia (18%). During upper endoscopy, a motile small adult worm was seen in the antrum of the stomach with patchy erythema with multiple granular polyps on D1.

* Corresponding author at: Department of Microbiology, Tribhuvan University Teaching Hospital, Institute of Medicine, Kathmandu, Nepal.
E-mail address: ranjitsah@iom.edu.np (R. Sah).

<https://doi.org/10.1016/j.parint.2019.03.014>

Received 9 October 2018; Received in revised form 14 March 2019; Accepted 25 March 2019

Available online 26 March 2019

1383-5769/© 2019 Elsevier B.V. All rights reserved.

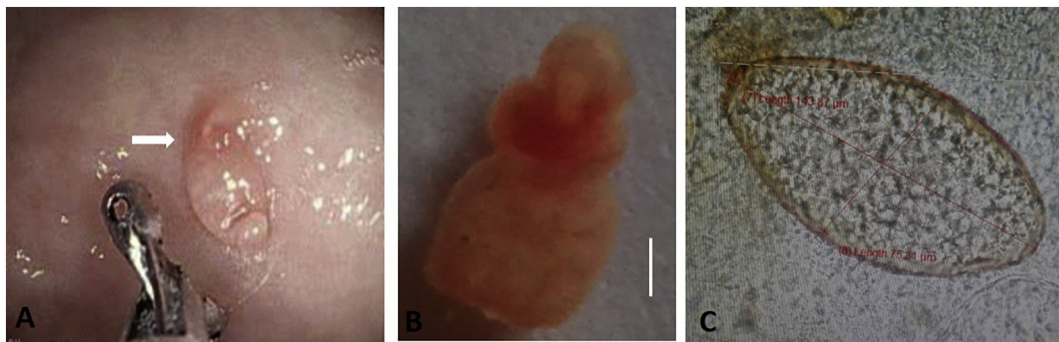


Fig. 1. (A) Image of the upper endoscopy showing the living specimen of *Gastrodiscoides hominis* (arrow); (B) Adult worm of *Gastrodiscoides hominis* collected from the antrum of the stomach of the patient (scale bar: 10 mm); (C) egg of *Gastrodiscoides hominis* isolated in the stools of the patient.

The worm was flat leaf-shaped and measuring 6 mm by 4 mm. It was bright pink in colour (Fig. 1A, B). It had short and cylindrical anterior end with large and discoidal posterior end, identified morphologically as *Gastrodiscoides hominis*.

Microscopical examination of stool samples revealed a yellowish, oval operculated egg measuring $140 \times 70 \mu\text{m}$ (Fig. 1C) characteristic of *G. hominis*. The size of the detected eggs was measured using cell sensation software version 1.12 for DP73 camera installed to the Olympus BX53 microscope used for the microscopy [10,11]. For further confirmation of the identity of the adult worms detected, the photographic images of the worm were sent to CDC, Atlanta and was confirmed as *G. hominis*. The patient was treated with praziquantel, 3 doses (25 mg/kg each) in one day followed by purgatives. The status of the patient markedly improved and, after 3 months follow-up, the abdominal pain had disappeared. Eggs of *G. hominis* in stool examination were not detected and the granular polyps and anemia became resolved.

3. Discussion

Gastrodiscoides hominis is an amphistome trematode that is normally parasite of pigs. Human gastrodiscoidiasis is found mainly in countries such as India, Pakistan, Myanmar, Vietnam, the Philippines, Thailand, China, Kazakhstan [1,4,5]. The present finding constitutes the first report of human with *G. hominis* in Nepal. This is surprising, as Nepal is an endemic area for a number of other foodborne trematode infections [10–12] and, moreover, human gastrodiscoidiasis is common in the neighboring country of India, especially in the Ganges river basin [2] and the district of the patient is at the border to the India. The consumption of aquatic plants, which is the main risk factor for the infection with *G. hominis*, is common in Nepal. In fact, the case presented herein appears to be related to the habit of the patient to eating watercress from ponds and rivers. It is possible that the absence of symptoms or even the symptoms of other concomitant pathologies conceal other cases of infection with *G. hominis* in Nepal. The symptomatology of human infections is not well known. Human gastrodiscoidiasis is commonly asymptomatic, but heavy infections may induce headache, epigastric pain and diarrhea that may be a reaction to metabolites released by the parasite [1,2]. In this study, the most relevant symptoms were pain in upper abdomen, blood in feces, eosinophilia and anemia. Although this symptomatology could be also due to the concomitant pathologies, anemia appears to be a common feature in human infections with *G. hominis* [8,9].

Probably, one of the most relevant features in this case is the location of the parasite within the intestine of the patient. Adult worms of *G. hominis* commonly inhabit the caecum and colon, though in the present study, the parasite was detected in the antrum of the stomach by upper endoscopy. The absence of eggs in the uterus and the general morphology and the size of the worm detected suggest that it was a juvenile worm newly excysted in the stomach. The eggs detected in the stools of the patient can be attributed to adult worms present in their

normal habitat.

In summary, herein we report the first case of human gastrodiscoidiasis in Nepal, which has been determined by upper endoscopy. This finding raises questions about the real extent of the foodborne trematode infections in Nepal. It is possible, as suggested by Devleeschauwer and co-workers [12], that the social-environmental background of the rural areas of the country may be a suitable scenario for the emergence of human gastrodiscoidiasis and other foodborne trematode infections. Nation-wide research can help to understand the current epidemiology of these infections in Nepal and to assess its impact on public health.

Conflict of interest statement

The authors declare that they have not conflict of interest.

Ethics approval and consent to participate

There is no need for ethical approval for a case report according to the local ethical guidelines.

Acknowledgements

We would like to thank DPDx Diagnosis team (Parasitology) of CDC, Atlanta GA, USA for the confirmation of our diagnosis. Work was supported by the Projects BFU2016- 75639-P from the Ministerio de Economía y Competitividad (FEDER), and No. RD12/0018/0013, Red de Investigación Cooperativa en Enfermedades Tropicales – RICET, IV National Programme of I + D + I 2008–2011, ISCIII – Subdirección General de Redes y Centros de Investigación Cooperativa and FEDER from the Ministerio de Sanidad y Consumo.

Thanks are given to Dr. Shushila Khadka, Dr. Samikshya Neupane, Dr. Sagar poudyal, Dr. Rabin Hamal, Dr. Mohan Khadka, Dr. Ranjana Sah, Dr. Sanjit Sah and Niranjan Prasad Sah for their support.

References

- [1] S. Mas-Coma, M.D. Bargues, M.A. Valero, Gastrodiscoidiasis, a plant-borne zoonotic disease caused by the intestinal amphistome fluke *Gastrodiscoides hominis* (Trematoda: Gastrodiscidae), *Res. Rev. Parasitol.* 66 (2006) 75–81.
- [2] S. Mas-Coma, M.D. Bargues, M.A. Valero, Fascioliasis and other plant-borne trematode zoonoses, *Int. J. Parasitol.* 35 (2005) 1255–1278.
- [3] R. Toledo, J.G. Esteban, B. Fried, Current status of food-borne trematode infections, *Eur. J. Clin. Microbiol. Infect. Dis.* 31 (2012).
- [4] R. Toledo, C. Muñoz-Antoli, J.G. Esteban, Intestinal trematode infections, *Adv. Exp. Med. Biol.* 766 (2014) 201–240.
- [5] J.Y. Chai, E.H. Shin, S.H. Lee, H.J. Rim, Foodborne intestinal flukes in Southeast Asia, *Korean J. Parasitol.* 47 (2009) S69–S102.
- [6] T. Fürst, J. Keiser, J. Utzinger, Global burden of human food-borne trematodiasis: a systematic review and meta-analysis, *Lancet Infect. Dis.* 12 (2012) 210–221.
- [7] T. Fürst, S. Sayasone, P. Odermatt, J. Keiser, J. Utzinger, Manifestation, diagnosis, and management of foodborne trematodiasis, *BMJ.* 344 (2012) e4093.
- [8] H.O. Dada-Adegbola, C.O. Falade, O.A. Oluwatoba, O.O. Abiodun, *Gastrodiscoides*

- hominis* infection in a Nigerian - case report, West Afr. J. Med. 23 (2004) 185–186.
- [9] J.J.C. Buckley, Observations on *Gastrodiscoides hominis* and *Fasciolopsis* in Assam, J. Helminthol. 17 (1939) 1–12.
- [10] R. Sah, S. Khadka, M. Khadka, D. Gurubacharya, J.B. Sherchand, K. Parajuli, N.P. Shah, H.P. Kattel, B.M. Pokharel, B. Rijal, Human fascioliasis by *Fasciola hepatica*: the first case report in Nepal, BMC Res. Notes. 10 (2017) 439.
- [11] R. Sah, S. Khadka, P.J. Lakhey, S. Pradhan, N.P. Shah, Y.P. Singh, S. Mas-Coma, Human case of *Fasciola gigantica*-like infection, review of human fascioliasis reports in Nepal, and epidemiological analysis within the South Central Asia, Acta Parasitol. 63 (2018) 435–443.
- [12] B. Devleeschauwer, A. Ale, P. Torgerson, N. Praet, Ch. Maertens de Noordhout, B.D. Pandey, S.B. Pun, R. Lake, J. Vercruysse, D.D. Joshi, A.H. Havelaar, L. Duchateau, P. Dorny, N. Speybroeck, The burden of parasitic zoonoses in Nepal: a systematic review, PLoS Negl. Trop. Dis. 8 (2014) e2634.