Travel Medicine and Infectious Disease (2014) 12, 636–649

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevierhealth.com/journals/tmid

REVIEW

Fascioliasis: A worldwide parasitic disease of importance in travel medicine

Keyhan Ashrafi [a,b,*], M. Dolores Bargues [c], Sandra O'Neill [d], Santiago Mas-Coma [c]

[a] *Department of Medical Microbiology, School of Medicine, Guilan University of Medical Sciences, 41996-13769 Rasht, Guilan Province, Iran*
[b] *Research Centre for Fascioliasis and Parasitic Diseases, Guilan University of Medical Sciences, Rasht, Guilan Province, Iran*
[c] *Departamento de Parasitologia, WHO Collaborating Centre on Fascioliasis and Its Snail Vectors, FAO Reference Centre for Parasitology, Facultad de Farmacia, Universidad de Valencia, Av. Vicent Andres Estelles s/n, 46100 Burjassot, Valencia, Spain*
[d] *School of Biotechnology, Faculty of Science and Health, Dublin City University, Glasnevin, Dublin 9, Ireland*

Received 25 April 2014; received in revised form 10 July 2014; accepted 17 September 2014
Available online 28 September 2014

KEYWORDS
Fasciola hepatica;
Fasciola gigantica;
Increasing traveller reports;
Treatment;
Preventive measures

Summary Fascioliasis is a foodborne zoonotic disease caused by the two parasite species *Fasciola hepatica* and *Fasciola gigantica*. This trematodiasis has never been claimed special relevance for travellers and migrants. However, the situation has drastically changed in the last two decades, in a way that fascioliasis should today be included in the list of diseases to be enhanced in Travel Medicine. Different kind of travellers have been involved in human infection reports: business travellers, tourists, migrants, expatriated workers, military personnel, religious missionaries, and refugees. Europe is the continent where more imported cases have been reported in many countries. More cases would have been probably reported in Europe if fascioliasis would be a reportable disease. In the Americas, most of the reports concern cases diagnosed in USA. Relative few patients have been diagnosed in studies on travellers performed in Asia. In Africa, most cases were reported in Maghreb countries. Blood eosinophilia and the ingestion of watercress or any other suggestive freshwater plant in anamnesis are extremely useful in guiding towards a fascioliasis diagnosis in a developed country, although may not be so in human endemic areas of developing countries. Several suggestive clinical presentation aspects may be useful, although the clinical polymorphism may be misleading in many cases. Non-invasive techniques are helpful for the diagnosis, although images may lead to confusion. Laparoscopic visualization should assist and facilitate

* Corresponding author. Department of Medical Microbiology, School of Medicine, Guilan University of Medical Sciences, 41996-13769 Rasht, Guilan Province, Iran. Tel.: +98 1316690921; fax: +98 1316690036.
E-mail addresses: k_fashi@yahoo.com, k_ashrafi@gums.ac.ir (K. Ashrafi), M.D.Bargues@uv.es (M.D. Bargues), sandra.oneill@dcu.ie (S. O'Neill), S.Mas.Coma@uv.es (S. Mas-Coma).

http://dx.doi.org/10.1016/j.tmaid.2014.09.006

procurement of an accurately guided biopsy. Endoscopic retrograde cholangiopancreatography (ERCP) is the first choice in patients in the chronic phase. ERCP and sphincterotomy are used to extract parasites from the biliary tree. Fluke egg finding continues to be the gold standard and enables for burden quantification and establishing of the drug dose. Many serological and stool antigen detection tests have been developed. Immunological techniques present the advantages of being applicable during all periods of the disease, but fundamentally during the invasive or acute period, as well as to other situations in which coprological techniques may present problems. Triclabendazole is the drug of choice at present, although the spread of resistance to this drug is challenging. Prevention mainly concerns measures to avoid individual infection by considering the different human infection sources.

1. Introduction

Fascioliasis is a foodborne and waterborne zoonotic disease caused by two parasite species of the genus *Fasciola*: the liver flukes *Fasciola hepatica* and *Fasciola gigantica* [1]. Animal fascioliasis is of high importance in the veterinary field worldwide. Human fascioliasis, a typically rural distomatosis, was only considered a secondary disease until the 80s [2]. However, human infection by *Fasciola* increased its importance from the 90s, when human endemic areas began to be described and the number of patient reports increased [3—7].

Different pathology studies proved that human infection is not only a serious health problem during the acute phase, but also during the very long chronic period [8—10]. A broad analysis has recently shown that human fascioliasis may be highly pathogenic, including impressive clinical pictures leading sometimes to death or permanent sequelae [11]. The different epidemiological and transmission situations found in human fascioliasis endemic areas add difficulties to the diagnosis [12].

The capacity of fasciolids to induce immunosuppression and immunomodulation, in the invasive phase [13,14] and the chronic phase [15], underlies the usual coinfections with other parasites in human fascioliasis endemic areas [16—21].

Additionally, this disease is projecting concern for the future, due to the effects of climate change and anthropogenic modifications of the environment [22]. A direct cause—effect relationship with man-made environmental modifications was demonstrated [18]. Very recently, climate change has proven for the first time to be linked to human infection [23].

The increasing demand for exotic and raw food is one of the reasons why reports of foodborne infections, especially waterborne parasitoses, have increased in the last years [24]. The plethora of foodborne parasites that could be distributed by globalisation has only recently been acknowledged and will provide challenges for clinicians, veterinarians, diagnosticians, and everyone concerned with food safety [25]. The metacercarial stage of *Fasciola* has a maximum longevity of 48 weeks, and its viability and infectivity in isolates from different livestock species involve a similar potential risk [26]. Such a long viability allows for their survival even during long transport, such as between countries of different continents.

All this present worrying scenario underlies the decisions of the World Health Organization to include fascioliasis in the list of important human diseases [27] and in the recent 2015—2020 roadmap for the control of neglected tropical diseases [28].

Despite of the aforementioned scenario, fascioliasis has never been claimed special relevance for Travel Medicine. This has been due to the following aspects: (i) it is a disease of no obligatory declaration, which explains the numerous patients diagnosed never reported in the literature [29,30]; (ii) the reports in travellers, migrants, etc., have been scattered throughout the broad literature on this disease; (iii) human infection was considered only consequence of accidental infection in animal endemic areas of rural zones; and (iv) no risk for disease spread was considered in view of the almost worldwide distribution of fascioliasis in livestock. However, the situation has drastically changed in the last two decades [1,6,12], in a way that fascioliasis should be included in the list of diseases to be enhanced in Travel Medicine. This need is supported by five main reasons:

- there is an increasing number of fascioliasis reports including travellers and migrants [4,6,31];
- the discovery of the existence of human endemic areas where prevalences and intensities in humans may be very high [5];
- people inhabiting poor rural human endemic areas in developing countries have today an increasing travel affordability related to lower costs and transport facilities; the present situation of a rural protozoan disease such as Chagas disease in tens of thousands of Latin American immigrants in Europe and USA illustrates this phenomenon [32];
- the improvement of diagnostic techniques for human fascioliasis has allowed for an easier and faster diagnosis in developed countries where physicians and health personnel is usually not aware of this disease [12];
- the increasing ruralisation trends everywhere, including urban people visiting rural areas during weekends and/or holidays [30], as well as rural food traditions increasingly imported to urban settings, including distribution of sylvatic vegetables whether directly