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EDITORIAL OPEN ACCESS

Fascioliasis in Yemen: A Long Track of Neglect despite Reports of Existence

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ABSTRACT

Fascioliasis is one of the most neglected tropical diseases in Yemen and is viewed as a zoonotic disease of sporadic nature. However, recent reports of human cases, well-documented published literature on animal and human fascioliasis and environmental evidence on the contamination of freshly eaten vegetables necessitate an understanding of the disease eco-epidemiology in the country. To improve case detection in clinical settings, laboratory technicians should be trained well on the detection of *Fasciola* species. From an epidemiologic perspective, serosurveys for anti-*Fasciola* antibodies are recommended to map the distribution of infection among communities in suspected geographic areas. In parallel, the burden of animal fascioliasis and environmental contamination of freshly eaten vegetables and water should also be assessed. On the other hand, freshwater bodies should be surveyed for potential snail hosts. In fact, it may be premature to discuss the prevention and control strategies while the epidemiologic status of fascioliasis in the country is still unclear.

Keywords: *Fasciola*, Neglected tropical disease, Yemen

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1. Fascioliasis: Neglected globally, but forgotten locally

Fascioliasis, a zoonotic foodborne trematodiasis caused by *Fasciola hepatica* and *Fasciola gigantica* liver flukes and transmitted by freshwater snails, has gained global attention because of its veterinary impact but is one of the neglected tropical diseases (NTDs) among humans (1). Apart from its great impact on the global animal wealth, fascioliasis has emerged as an important zoonotic NTD over the past two decades (2), with estimates of at least 2.4 million infected and more than 90 million at-risk people in more than 70 countries (3, 4). This editorial highlights the importance of looking backward to published literature to step forward in assessing the burden and distribution of fascioliasis in Yemen, particularly with the emergence of cases recently reported by clinical laboratories in Sana'a city (Dr. Walid Al-Dubai, personal communication, 2018; Figure 1).

Figure 1. Egg of *Fasciola* species in an unstained wet mount, 100x (Courtesy: Dr. Walid Al-Dubai)

In August 2017, the World Health Organization (WHO) held a workshop in Sana'a to review the spread of some NTDs across the country because of the ongoing conflict, including leprosy, trachoma, schistosomiasis, onchocerciasis, lymphatic filariasis, leishmaniasis, dengue, chikungunya, rabies and scabies (5). However, fascioliasis was not discussed as an important public health problem in the workshop. The neglect could be attributed to the sporadic nature of the cases that cannot be felt as being a major public health concern. In addition, emerging outbreaks of cholera and diphtheria during the complex situation in Yemen drew attention to the containment of such diseases and trivialized the consideration of other, essentially forgotten, health problems. However, no one knows whether there are any endemic "hot spots" of the disease in the country due to the lack of assessment and mapping studies. In addition, the disease has not been surveyed for the sake of targeted chemoprevention in such settings. According to the Fascioliasis Partnership between WHO and Novartis Pharma AG for the donation of triclabendazole for the treatment of fascioliasis in endemic countries (6), Yemen was one of the countries listed for receiving the donated drug through this agreement. Steps should be taken to benefit from this partnership to make the drug available in health facilities for clinical use as well as for targeted chemoprevention of the disease in endemic areas following the implementation of reasonable mapping activities.

2. Fascioliasis in Yemen: Invisible epidemiology of a visible fluke

Although several earlier reports have documented the presence of *Fasciola* species in animal and human populations, fascioliasis is neglected and remains one of the parasitic infections with unclear epidemiologic status in Yemen. *Fasciola* species eggs were first documented in a 5-year-old girl from Wesab El-Ali in the early 1960s (7). Fascioliasis existence in the country was then confirmed after the recovery of adult *F. hepatica* from a 12-year Yemeni boy with obstructed common bile duct by choledochotomy and cholecystectomy in 1970 (8). Recovery of the eggs and adult flukes from infected children provides evidence of the indige-

nous transmission of the parasite in the country. In 1985, two Yemeni *Fasciola*-infected cases with hepatomegaly living in Assir, Saudi Arabia were suggested to have acquired the infection in Yemen (9). On a community scale, a prevalence rate of 0.5% based on the examination of 37,000 stool samples was reported for the first time among the general population routinely examined for parasites in 1985 (10). Furthermore, acute fascioliasis was found to be a major cause of eosinophilia among Yemeni patients, where about a third of eosinophilic patients were seropositive for specific anti-*Fasciola* antibodies (11). More recently, *Fasciola* species eggs have been detected among rural children from a number of Yemeni governorates (12); however, the rate of infection was not reported.

Although ovine fascioliasis was reported in the Inter-Montane Plains of the Highlands in the early 1980s (13), the lack of eco-epidemiologic studies makes it difficult to assess the role of sheep in transmitting the infection to humans through contaminating water bodies with the eggs passed in their excreta. Of different kinds of slaughtered animals in Taiz, only cattle (5.5%; 17/311) and goats (3.1%; 20/636) were found to be infected with *Fasciola* species with absence of infection in sheep and camels (14). It is worth mentioning that fascioliasis is no longer considered as being merely a secondary zoonosis but an important anthroponosis (15). In Yemen, there is a lack of studies on the infection and distribution of snail intermediate hosts despite the confirmed documentation of snails that could potentially serve as vectors for *Fasciola* species (16).

Aquatic vegetation and drinking water contaminated with encysted metacercariae of the parasite are the vehicles that transmit the infection to humans practicing poor food hygiene. In this context, 2.9% (3/104) of fresh leafy vegetables collected from farms in Dhamar city were found to be contaminated with *Fasciola* eggs (17). Of particular interest, khat in Yemen and African Horn has been suggested to serve as a medium to transmit *Fasciola* species metacercariae, especially in cases where banana leaves are used for its storage, and outbreaks associated with khat chewing have also been reported elsewhere (18-20). As part of a one-health approach, there is a need to assess the infection status among people, herbivores and snails as well as the environmental contamination of vegetables and water.

3. Concluding remarks and insights

In Yemen, human fascioliasis should be given more attention in light of the recently reported cases as well as earlier documentation of cases among human and animal populations. Laboratory technicians should be trained well on the copromicroscopic detection of *Fasciola* species eggs because unfamiliarity with this type of infection can lead to many infections being overlooked. From an epidemiologic perspective, serosurveys for anti-*Fasciola* antibodies are recommended to map the distribution of infection among communities in suspected geographic areas. In parallel, the burden of animal fascioliasis and the environmental contamination of freshly eaten vegetables and water should also be assessed. On the other hand, freshwater bodies, such as wadis, brooks and ponds, should be surveyed for potential snail hosts of *Lymnaea* species.

In fact, it is premature to discuss the prevention and control strategies while the epidemiologic status is still unclear. However, triclabendazole should be available in health centers to treat diagnosed cases at this stage. In addition, mapping and control of animal fascioliasis in endemic areas have to be undertaken by the Ministry of Agriculture to augment the efforts for fascioliasis elimination from the country.

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Competing interests

The author declares that he has no competing interests associated with this article.

Ethical approval

Not required.

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