



General review

Human pentastomiasis in Sub-Saharan Africa

Les pentastomoses humaines en Afrique subsaharienne

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Abstract

Pentastomiasis is a rare zoonotic infection but it is frequently observed in Africa and Asia. Most human infections are caused by members of the *Armillifer armillatus* species. They are responsible for visceral pentastomiasis in Western and Central Africa. Humans may be infected by eating infected undercooked snake meat or by direct contact with an infected reptile. An increasing number of infections are being reported in Congo, Nigeria, and Cameroon. Despite an occasionally high number of nymphs observed in human viscera, most infections are asymptomatic and often diagnosed by accident during surgery or autopsy. The clinical presentation of pentastomiasis is quite varied and depends on infected tissues. The liver, lungs, and pleura are most frequently involved. Abdominal emergencies have been reported. Diagnostic delays always occur and diagnosis focuses on the patient's lifestyle and living environment. It is mainly based on the morphological description of the parasite's calcified cuticle, the site of the lesion, and the parasite's region of origin. Most patients do not require any treatment. Personal measures such as avoidance of contact with snake droppings are recommended to prevent transmission. Imported pentastomiasis has been observed in African migrants.

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Keywords: Pentastomiasis; *Armillifer armillatus*; Central Africa; Western Africa

Résumé

La pentastomose est une zoonose rare mais fréquemment observée en Afrique et en Asie. L'espèce la plus documentée chez l'homme est *Armillifer armillatus*, responsable de pentastomose viscérale en Afrique de l'Ouest et centrale. La pentastomose à *Armillifer armillatus* est observée chez l'homme consommateur de viande de serpent infectée insuffisamment cuite ou en contact avec le reptile infecté. Le nombre croissant d'infections est le plus souvent signalé au Congo, Nigéria et Cameroun. En dépit du nombre important de nymphes qui peuvent être trouvées dans les viscères humaines, les infections sont habituellement asymptomatiques et la pentastomose est de découverte fortuite lors d'une intervention chirurgicale ou d'une autopsie. La symptomatologie clinique n'est pas spécifique et dépend des tissus infectés. Le foie, les poumons ou la plèvre sont les organes les plus impliqués. Des urgences abdominales ont été décrites, comme dans la récente découverte taxonomique au Cameroun. Le diagnostic est toujours retardé et se fonde sur une attention particulière aux habitudes de vie du patient et à son environnement. La description morphologique de la

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cuticule calcifiée, la distribution anatomique de la lésion et la provenance régionale sont les composants clés de l'orientation diagnostique. Dans la plupart des cas, aucun traitement n'est nécessaire. Pour prévenir la transmission, des mesures personnelles comme l'évitement avec les excréments de serpents doivent être proposées. Des cas de pentastomose humaine importés ont été rencontrés chez des migrants originaires d'Afrique.
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Mots clés : Pentastomose ; *Armillifer armillatus* ; Afrique centrale ; Afrique de l'Ouest

1. Introduction

Pentastomiasis is an endemic zoonotic infection (porocephalosis) observed in tropical countries. It is caused by obligate parasites known as pentastomes, belonging to the Pentastomida subclass [1]. Pentastomiasis is a rare and unknown infection that is often diagnosed by accident. Nevertheless, severe presentations may occur. Visceral and nasopharyngeal pentastomiasis are most frequently observed. Pentastomes are sometimes considered as a subclass of vermiform maxillopod crustaceans [2,3] or as a specific class within arthropods [4,5]. They are even sometimes considered as a distinctive phylum [1,6]. The results of recent molecular studies focusing on the classification of two species of *Linguatula* highlight the difficulties of clearly defining this group of parasites [7]. Among the four orders [1], human parasites are observed in two families of the Porocephalida order: Porocephalidae with the *Armillifer* genus responsible for visceral pentastomiasis in Western and Central Africa, and Linguatulidae or cosmopolitan linguatules whose main genus is *Linguatula*. Within these families *Armillifer armillatus* (Wyman, 1845) and *Linguatula serrata* (Frölich, 1789) are mostly responsible for human pentastomiasis [8,9].

2. Pathophysiology

Armillifer armillatus (Fig. 1) was first reported by Wyman in 1845 in Western Africa. The first human case of pentastomiasis

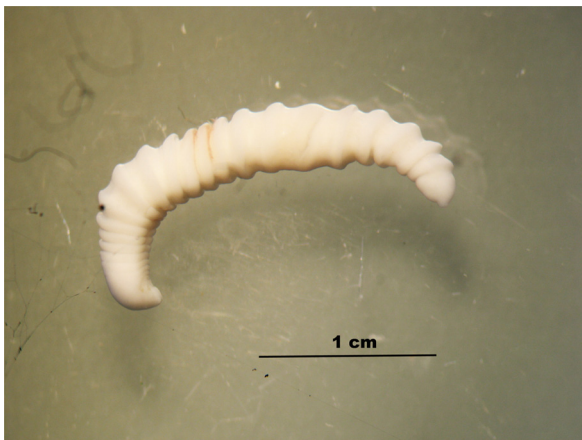


Fig. 1. *Armillifer armillatus* larva isolated from the mesentery of a Cameroonian man.

Larve du parasite *Armillifer armillatus* extraite du mésentère d'un homme camerounais.

Resources: personal image, Philippe Le Gall; IRD (institut de recherche pour le développement), UR BEI-072, BP1857 Yaoundé, Cameroon. 18- to 20-mm larva with 20 to 22 spiral rings.

was reported by Pruner in 1847 in Egypt [1]. The following year, Wyman identified the adult pentastome in the nasopharynx of an African rock python (*Python sebae*) (Fig. 2) [10].

L. serrata, also known as “tongueworm”, most frequently occurs in South-East Asia, South America, and in the Middle East [11]. Herbivorous animals act as intermediate hosts (African wild dogs, foxes, and wolves) and harbor the parasite in their upper respiratory tract. *A. armillatus* is most frequently observed in Western and Central Africa, with the exception of a few cases reported in Malaysia. Usual hosts of *A. armillatus* are African snakes such as pythons and vipers, where the parasite is usually isolated from their lungs. Human infections caused by *Armillifer* spp. have recently been reported in China and Malaysia [12–14].

Human pentastomiasis is rarely reported in Sub-Saharan Africa. The authors of some studies reported it in 22% of autopsies performed in the Democratic Republic of Congo (DRC), 33% in Nigeria, and 8% in Cameroon [15]. Most case patients observed in Central Africa were from Nigeria and the Congo Basin [16–18] (Table 1). Most were diagnosed in northern countries in African migrants who suffered a great deal from misdiagnoses [16,19–22] (Table 2). Only one case patient was reported in Cameroon in 1985: a 34-year-old man from the Banka-Bafang region hospitalized for acute peritonitis [23]. A more recent case of pentastomiasis has been reported in Yaoundé in a 30-year-old man. The patient did not report any contact with snakes but used to live in a rural area for several years (Eastern and Central regions). He had a several-month history of refractory ascites complicated by peritonitis.

Humans may act as aberrant definitive hosts or as accidental hosts in the biological cycle of pentastomes. The biological cycle



Fig. 2. *Python sebae*; Cameroon: usual definitive host of *A. armillatus*.
Python sebae ; Cameroun : hôte définitif habituel de *A. armillatus*.

Resources: personal photo, Matthew Le Breton.

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