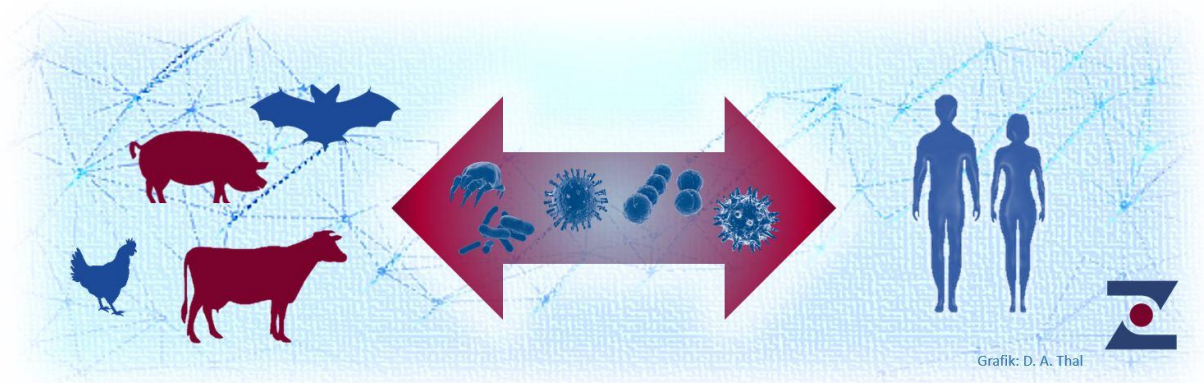

Zoonosis of the month – August 2022

Pathogen profile *Oesophagostomum* spp.

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Further pathogen profiles are available here:
https://www.zoonosen.net/zoonosenforschung/zoonose-des-monats

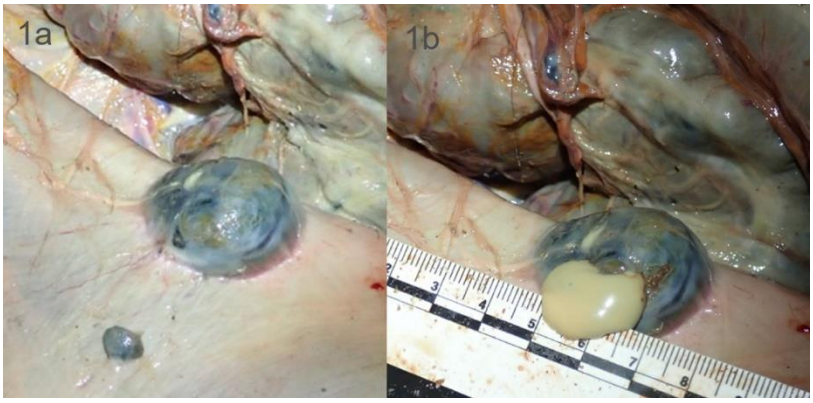

Figure: 1a) Two black-walled abscesses in the abdominal wall of a female adult chimpanzee.
1b) Larger nodule after incision showing liquid beige pus.
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Description

Oesophagostomum sp. is a parasitic nematode within the order Strongyloidae. *O. bifurcum* is the most-common species infecting humans in Africa. Nodular lesions in the abdomen caused by *O. bifurcum* are common in circumscribed areas of Northern Togo and Ghana. Similar lesions (granulomas) containing larvae have been observed in the abdomen of infected pigs, ruminants and primates (chimpanzees, gorillas and baboons) post-mortem. *O. stephanostomum, O. aculeatum* and *O. bifurcum* have all been recorded in humans and non-human primates.

First discovered

Representatives of the genus were first found in humans in 1905 by Émile Brumpt in southern Ethiopia. The parasites found were named after their discoverer *Oesophagostomum brumpti*.

Where does the pathogen occur?
Oesophagostomum spp. are widely distributed wherever livestock is raised, but more common in the tropics and subtropics. The highest incidence in humans is in the northern regions of Togo and Ghana, where *O. bifurcum* (primarily seen as a monkey parasite) appears to cycle naturally in the human populations. Sporadic cases in humans have also been recorded in Brazil, Malaysia, Indonesia, French Guiana, and other parts of West Africa. In animals, *Oesophagostomum* spp. infections have been recorded all over sub-Saharan Africa, and rarely in Asia (Indonesia, Malaysia, China) and Brazil.

Affected animal species, reservoir
Affected species are humans, non-human primates (monkeys and apes), ruminants (sheep, cows, goats), and pigs. The reservoir is presumed to be mainly non-human primates. However, in the endemic parts of northern Ghana and in northern Togo, human-to-human transmission is common, mostly occurring during or shortly after the rainy season.

How can humans get infected? Are there any groups especially at risk?
Humans can get infected via oral ingestion of infective larvae (L3). Young children and women appear to have a higher prevalence (of eggs in stool).

What kind of disease symptoms do infected animals and humans show?
Though in many cases infestation is asymptomatic, nodular lesions (granulomas caused by migrating larvae) can occur in the abdomen (small and large intestine and abdominal wall). This can be unimodular ('Dapaong tumour'), or multinodular (up to hundreds of smaller nodules).
Acute abdomen is the most-common manifestation in humans. A low-grade fever and tenderness in the lower-right quadrant are the most-common symptoms; vomiting, anorexia, diarrhea and weight loss are less-common. Intestinal obstruction may also occur. Patients may also present with large, painless cutaneous masses in the lower abdominal region.

Are there drugs or a vaccine available?
Uncomplicated oesophagostomiasis ca be treated by a single 400-800 mg dose of albendazole (adult humans). For complicated cases, surgery and excision (or incision and drainage through the skin) may be necessary.

How good is the surveillance system for this pathogen?
No current surveillance system as such is known. Eggs can be detected in the stool, and identified by PCR or coproculture and microscopic identification of larvae. Large nodules can be detected by ultrasound. Finding an intact worm during surgery or in a biopsy specimen can provide a definitive diagnosis.

What are current questions and priorities in research?
It is interesting to know why *O. bifurcum* causes clinical signs in humans in only a small geographical area, while the species is carried by non-human primates in a much larger area. Is it purely because there is a genetically distinct strain in this area that allows for both human-human transmission as well as the more serious pathological changes, or do environmental factors play a role, too?

Nodules in chimpanzees have been confirmed to be caused by *O. stephanostomum* in a few cases. Is this the only species which causes nodules in non-human primates, or might *O. bifurcum* (which has been confirmed in chimp stool samples) also cause nodules? To which extent do *O.*

stephanostomum and *O. bifurcum* cause clinically relevant pathology in non-human primates and which factors affect the pathogenicity?

What are the control strategies against the pathogen?

Repeated mass treatment with albendazole (400 mg) in the endemic areas is effective in significantly reducing prevalence of infection in humans. Poor sanitation and unhygienic conditions prevailing in the endemic areas may constitute major risk factors to acquiring new infections. Therefore, improving the hygienic conditions in endemic areas could be an effective control strategy.

What are future challenges?

Control of soil transmitted helminthiasis by population-based mass treatment tends to be jeopardized by rapid re-infection because of the persistence of reservoirs of infection in untreated subjects and immigrants. Furthermore, long survival of eggs or larvae in the environment complicate the control of the pathogen. Also, poor cure rates of the drugs used and low patient compliance during treatment are challenges to be addressed.

Miscellaneous

https://www.cdc.gov/dpdx/oesophagostomiasis/index.html

GASSER, R., GRUIJTER, J., & POLDERMAN, A. (2006). Insights into the epidemiology and genetic make-up of Oesophagostomum bifurcum from human and non-human primates using molecular tools. *Parasitology, 132*(4), 453-460.
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