A NEW ZOONOSIS OF THE CEREBROSPINAL FLUID OF MAN PROBABLY CAUSED BY Meningonema peruzzii, a filaria of the central nervous system of Cercopithecidae


Summary:
A female fourth stage larva of Meningonema, probably of M. peruzzii Orihel et Esslinger, 1973, was recovered in Cameroon, from the cerebrospinal fluid of a patient harbouring Loa loa, but without any neurological signs. This observation is the first human case of Meningonema (Filarioidea Splendidofilariinae) which usually parasitizes the central nervous system of African Cercopithecinae. However, as indicated by Orihel and Esslinger, it seems probable that the perstans-like microfilariae described in cases of cerebral filariasis in Zimbabwe belonged to the same species.

KEY WORDS: zoonosis, Meningonema peruzzii, Splendidofilariinae, cerebrospinal fluid, Cameroon.

INTRODUCTION

Studies aiming at assessing the prevalence of side effects in patients infected with Loa loa and treated with ivermectin have been carried out in Cameroon for several years (Chippaux et al., 1992). One such study conducted in Central Hospital, Yaounde, demonstrated that microfilariae (mf) of Loa loa can be found 3-4 days after ivermectin treatment in the cerebrospinal fluid (CSF) of patients harbouring initially high Loa loa microfilarial loads in their blood (Chippaux et al., 1994). These results led us to undertake a study aimed at comparing the Loa loa mf loads before and three days after ivermectin treatment in the CSF of patients with high microfilaraemia of Loa loa before treatment. Eleven adult volunteers were involved in the study. A nematode macroscopically visible was found in the CSF obtained during the pretreatment lumbar puncture of one of the patients. This parasite is described in the present paper.

CASE REPORT

The patient, Mr ATA..., is a 46 year old farmer, belonging to the Eton ethnic group. He lives in Nkollep, a village located about 20 km north of the town of Yaounde in an area of degraded forest. He had not received any filaricide treatment during the five previous years.

The study patients were selected according to age, state of health, and the results of skin and blood mf counts. One standardized thick blood smear was made between 10 a.m. and 4 p.m., using 30 µl of blood taken by capillary from a fingerprick, and the blood smear was stained with Giemsa’s stain. All mf were counted under a low power microscope. Two skin snips (one at each iliac crest) were taken with a 1.5mm Holth corneoscleral punch, and immediately placed in saline. After incubation for 24 hours, the emerged mf were counted under a microscope.

Patients eligible for the study and who signed an informed consent form, were hospitalized in the Department of Medicine of the Central Hospital in Yaounde.

Venous blood was obtained before ivermectin treatment from all patients for haematological and biochemical examinations comprising complete blood cell counts, protein electrophoresis, and determination of plasma electrolytes, glucose, creatinin, proteins, trans-
Fig. 1. — Meningonema peruzzii

Fig. 2. — Meningonema peruzzii.
Adults from the meninges of a talapoin from Gabon.
Scales : A : 100 μm; B, C, D, E : 50 μm; F : 30 μm.
aminses (SGOT and SGPT) and C reactive protein (CRP). The pretreatment lumbar puncture was performed after a fundus examination. Biochemical, cytological, bacteriological, and parasitological examinations were carried out on the collected CSF.

Three ml of CSF (one ml in each of three tubes) were collected from Mr ATA... The CSF was quite clear. Examination of one of the tubes revealed the presence of a mobile nematode measuring 8.7 mm long. The two other tubes were sent to laboratories of Centre Pasteur, Yaounde, in order to perform standard examinations. The collected nematode was fixed in hot ethanol (70%) and preserved in the MNHN collection Paris, n° 179 HS. No ivermectin treatment was given to Mr ATA...

Mr ATA... did not complain of any neurological symptoms, nor did the clinical examinations reveal any neurological signs.

The patient harboured 1903 Loa loa mf per 30µl blood, and no Mansonella perstans mf. Only one Onchocerca volvulus mf was recovered from the two skin snips.

Haematological examinations showed only high eosinophil counts (630 per µl, corresponding to 7.8% of the leucocytes), low haematocrit (36.8 %), and a microcytosis (red cell corpuscular volume : 66.9 fl). Blood biochemical parameters were normal, except a slight increase of plasma proteins (89 g/l) and of C reactive protein (9.9 mg/l).

All biochemical and cytobacteriological examinations of CSF were normal (308 red cell/mm3; leucocyte counts : <1 per mm3; no bacteria after direct examination and after culture).

No mf was found in the CSF.

IDENTIFICATION OF SPECIMEN

The nematode recovered from the CSF was not, as expected, Loa loa. The specimen is a female fourth stage larva (vulva closed, genital tracts appearing as a solid cord) and can be easily identified as belonging to the genus Meningonema Orihel et Esslinger, 1973 (Splendidofilariinae) on the base of the following characters : presence of four uteri, cuticle smooth and thin, muscular body wall very thin, large pseudocoel, tail long, rounded and without lappets. (Fig.1).

The measurements are the following : body length 8.7 mm, maximum width in the anterior region 180 µm, nervous ring at 150 µm from apex, buccal cavity 6 µm long, oesophagus 600 µm long, vulva at 680 µm from apex, impaired ovjector 600 µm long, tail 300 µm long.

DISCUSSION

Meningonema peruzzii Orihel et Esslinger, 1973, is the only species described at present in the genus. This parasite has been found in the central nervous system of the Cercopithecidae Cercopithecus (Miopithecus) talapoin in Equatorial Guinea, and was recovered again in the same host in Gabon (see below). As suggested by Orihel and Esslinger, this filaria seems to be the same as that found in 1928 by Peruzzi in a Cercopithecus sp. trapped in Uganda. As the filaria we recovered from the CSF of a Cameroonian individual was a 4th stage larva, it is impossible to warrant the identification at the specific level. However, the similarity of some unusual characters, such as the presence of an oesophago-intestinal torsion, strongly suggests that the filaria found in Cameroon is the same than those previously recovered from monkeys.

One Miopithecus talapoin which was maintained at the CNRS Biology Station of Makokou (Gabon) and was found to harbour Hepatocystis and sheathed microfilariae, has been splenectomized on 16.07.1976 and shipped by Professor Irène Landau to the MNHN Laboratory in Paris.

The talapoin monkey from Gabon was necropsied on 07.12.1976, and two adult females and one adult male of M. peruzzii were recovered from the peribulbar meningeal spaces (n° 231 JE MNHN collection. Paris). The specimens showed the same characters than those reported in the original description. Additional morphological data on the male’s cloacal papillae and the cephalic structures are given in Figure 2 : eight pairs of cloacal papillae can be seen in ventral view, the left papillae being located more posteriorly. The mouth, the buccal cavity, and the oesophageal lumen are stretched on the lateral plane. The buccal cavity, 5 µm long, is constricted halfway by an internal undulating edge. The cuticle of oesophagus is thick and swollen in the median plane. The four cephalic papillae are only slightly prominent and irregularly arranged.

Two microfilariae (from blood and stained with Meldolan blue) were 135-138 µm long and 4 µm wide; excretory cell, inner body, RI cell and anal pore respectively at 55-50 µm, 85-82 µm, 98-93 µm and 115-113 µm from apex. Head with a hook on the left side and three cuticular points on the right side.

Among the Splendidofilariinae, Meningonema is one of the few genera which was found to parasitize mammals, whereas the other ones are parasites of birds and reptiles. Splendidofilariinae are more often transmitted by Ceratopogonidae than by Culicidae. A
number of *Calicoides nubeculosus*, *C. variepennis* and *Aedes aegypti* were allowed to get blood meals from the talapoin monkey from Gabon in September and November 1976. No development of filariae was found in the two latter species. In *C. nubeculosus* six of the 20 dissected females were positive up to the 9th day post engorgement, and some larvae showed a beginning of development in the thoracic muscles. One of these larvae was 95 µm long, 8 µm wide; RI cell was enlarged (Fig. 1K). None reached the 2nd larval stage.

The identification, certain at the level of genus, and probable at the level of species, of *Meningonema peruzzii* from a human, reveals the existence of a new zoonosis. The fact that this species may, indeed, parasitize humans was already suspected by Orihel and Esslinger when they described the parasite recovered from talapoin monkeys. Based on the clinical observations and the description of microfilariae reported by Dukes et al. (1968), Orihel and Esslinger (1973) and Orihel (1973) pointed out that the *M. perstans*-like microfilariae recovered from patients with cerebral filariasis in Zimbabwe seemed to correspond to mf of *Meningonema* and not to *M. perstans*.

The presence of this species has been demonstrated in Cameroon, Gabon, and Equatorial Guinea, three contiguous countries of Central Africa. It is difficult at present to affirm that the same species exists in more southerly countries. However, this possibility may be supported by the description, in Zimbabwe, of mf which, though resembling those of *M. perstans*, have been distinguished from the latter by the presence of a sheath and of an elongated caudal nucleus. At present, the prevalence of the zoonosis cannot be evaluated owing to the fact that *Meningonema* mf can be readily confused with those of *M. perstans*, and therefore may escape notice. Moreover, although numerous mf have been observed in the blood of monkeys parasitized with *Meningonema*, there is no evidence that mf of this species are found in the blood of humans. In the proven human case described here no *Meningonema* mf were found on the blood smear, possibly due to the fact that the recovered female was not mature. In the two other probable cases reported in Zimbabwe, although mf were recovered in the CSF, they were also not observed in the blood of the patients. Chambon (1933) has also reported the presence of mf in the CSF of one patient from Nguele Bengono (Cameroon). This author considered they were *M. perstans* mf. As the patient harboured blood mf, Chambon suggested that meningeval lesions due to trypanosomiasis may have allowed blood mf to enter in CSF, an hypothesis which may be considered as plausible.

In conclusion, careful examinations of blood smears with mf resembling *M. perstans* might reveal that *Meningonema* infection is a relatively frequent zoonosis. Alternatively, mf of this species might not be able to reach human blood, and the direct diagnostic of this infection in human might only be possible from examination for mf in the CSF.

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REFERENCES


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