Introduction



Area endemic for *Loa loa* filariasis

Loa loa is a nematode that is solely present in the rainforest area of Central and West Africa. Adult *Loa loa* worms are 3 to 7 cm long and 0.5 mm wide. They live 4 to 17 years. The microfilariae appear 6 to 12 months after infection. They measure 230 to 300 µm by 7 µm.

The microfilariae are found in the blood and exhibit periodicity with the highest density

occurring around midday. The adult filaria do not contain a bacterial endosymbiont, as opposed to *Onchocerca volvulus* and *Wuchereria/Brugyia* filaria where *Wolbachia* is endosymbiotic.

Transmission occurs via the bite of female Chrysops flies. They are insects with beautiful and often yellowish-gold iridescent eyes when they are alive (chrysos = gold). Chrysops flies belong to the Tabanidae, which suck blood of mammals and are active during the day. There is no animal reservoir.

Clinical aspects

The adult worms migrate through the subcutaneous tissues. This migration or the intermittent discharge of large quantities of microfilariae causes transient local oedema: Calabar swellings (Calabar is a place in Nigeria close to the border with Cameroon). There is also local redness and itching. Generalized itching is also described.

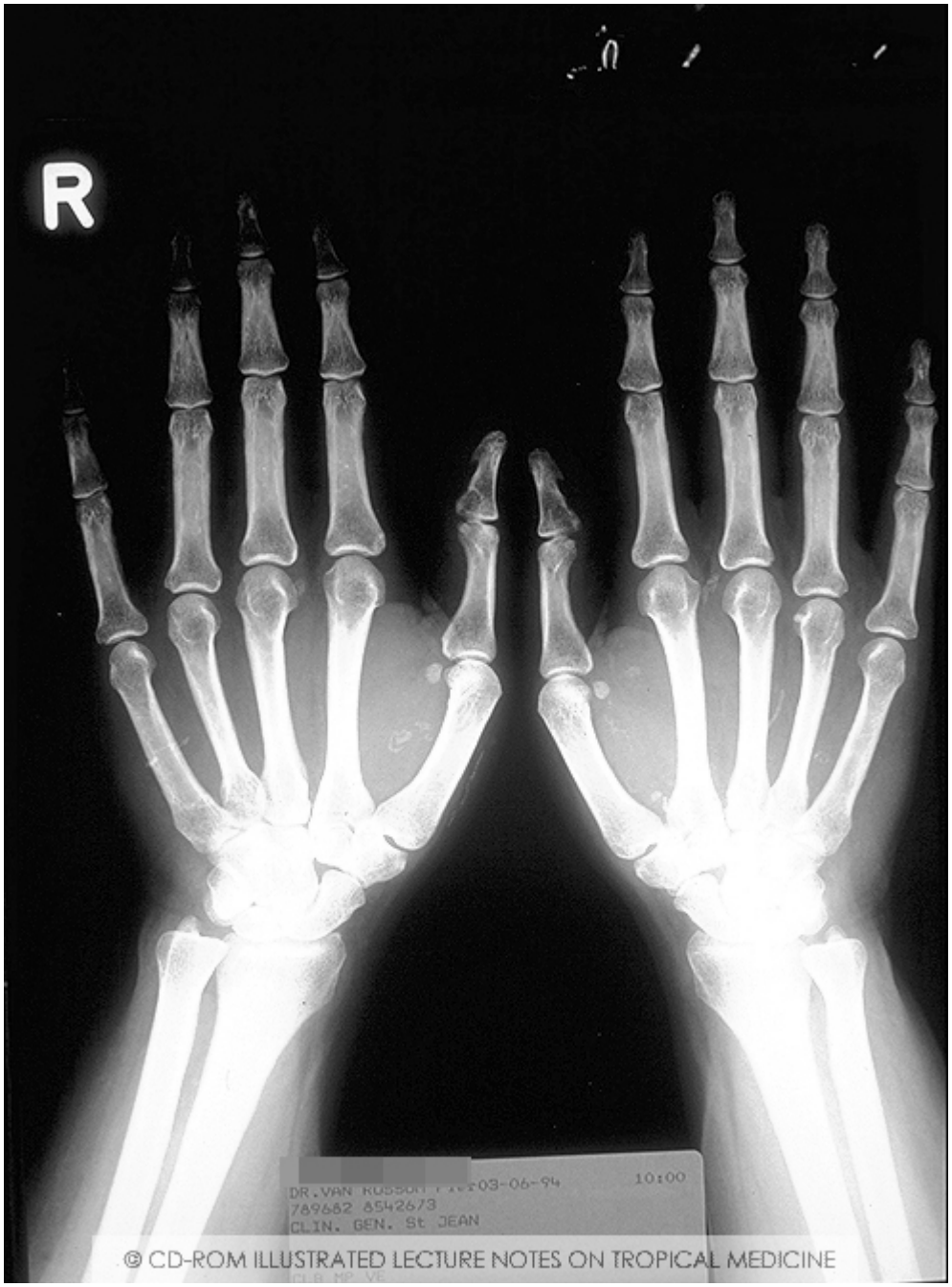
When the worm passes under the conjunctiva, it can be observed and removed (*Loa loa* is for this reason known as the eyeworm). There is no intra-ocular invasion and there is no risk of blindness. The adult worm migrates through the loose-meshed subconjunctival connective tissue. This migration can thus be observed macroscopically, in contrast to the migration of microfilariae of *Onchocerca volvulus*.

The subcutaneous passage of the worms can sometimes be perceived as an itchy and rapidly moving linear swelling. Dead worms can calcify and thus be radiologically visible (e.g. in the hands and wrists). In general, loiasis is accompanied by hypereosinophilia. This increases the risk for endomyocardial fibrosis.

Diagnosis

Serology is aspecific, useless and not performed in endemic areas.

Clinically: Calabar swellings and worm passage across the eye may be considered as pathognomonic for the disease and sufficient to establish a diagnosis in the absence of *Loa loa* microfilariae in the blood.



Dead and calcified adult Loa loa filaria, visible on a radiograph of the hands. Copyright ITM

Detection of microfilariae in peripheral blood (during the day) is obtained via a thin blood smear, thick smear or preferably via a concentration technique (Knott or nucleopore filter).

The number of *Loa loa* microfilaria in the peripheral blood can be very high. The higher the

number, the higher the risk of neurological complications, especially when drug treatment is started. In order to diminish the risk apheresis can be performed.

Treatment

Treatment of loiasis is based on administration of DEC for 3 weeks. The dose of DEC should be gradually build up over the course of 4 days, up to 400 mg/day. DEC is both micro- and macrofilaricidal against Loa loa although often several treatments are sometimes necessary.

Before starting with DEC, simultaneous onchocerciasis should be excluded in view of the risk of extremely unpleasant/severe Mazzotti reactions in the patient.

Ivermectin causes a marked but transient reduction in microfilaraemia. One week after administration on average 10% of the original microfilaraemia still persist.

With high microfilaraemia (>2000/ml; especially if >50,000/ml) there is an increased risk of neurological complications (headache, confusion, gait disorders, hypertension, incontinence, encephalopathy, coma) when DEC is administered. In such cases it is advised to associate prednisone 1 mg/kg for 4 days. Hospitalization for 4 days is advised since most side effects of starting treatment occur in this time frame. In very high microfilaremia, even the administration of ivermectin (sometimes used to decrease the microfilariae load before DEC treatment) may be risky. In such a situation apheresis may be necessary although it requires complicated and expensive apparatus and specialised personnel (out of reach of most endemic settings). In low-resource settings, a 3-week course of albendazole can be used instead of apheresis in order to reduce microfilaraemias.

Removal of the adult worms during their migration beneath the conjunctiva (local anaesthesia with cocaine or tetracaine) is possible. But if this is not done, the worm creeps on spontaneously and leaves the eye. While extracting the worm from the eye care has to be taken not to rupture the worm, as this leads to a severe inflammatory reaction.

Prevention

DEC 5 mg/kg, 3 days per month can –rarely- be used as prevention in an endemic region.

DEC 300 mg per week (dose for adults) is also effective. Vector control is problematical as the breeding sites are very diffuse and widespread and the insects bite out of doors.

“Minor” filariasis

- Mansonellosis (*M. perstans, streptocerca, ozzardi*)
- Dirofilariasis (*D. immitis,…*)
- Dracunculiasis (D. medinensis)