Bancroftian Filariasis
An Autochthonous case in Zambia.

By P.R. Hira, B.Sc. (S.A.), Ph.D. (Ibadan), M.Sc., Med. Para. (Lond.), M.I. Biol.,
Senior Lecturer in Medical Parasitology, Department of Pathology and Microbiology,
School of Medicine, University of Zambia, P.O. Box RW. 110, Lusaka, Zambia.

(Received for Publication: 5th April, 1976.)

SUMMARY
The first report of an autochthonous case of Wuchereria bancrofti in Zambia is presented. Observations are made on the diagnostic features of the microfilariae particularly in relation to their periodicity and agglutination in sequestrinated blood. The criteria used to identify the worms in section and the problems in diagnosis are outlined. Though imported cases have also been diagnosed it is considered that bancroftian filariasis is probably endemic. Further comprehensive investigations are recommended in ecologically transmissible areas.

INTRODUCTION
The World Health Organisation (1974) estimates that almost 250 million people are infected with lymphatic filariasis due to Wuchereria bancrofti and Brugia malayi. The latter is not known from man in Africa and though W. bancrofti is an established infection in many parts of the continent (Hawking, 1974), its occurrence and endemicity has yet to be defined in Zambia (Hawking, personal communication).

A perusal of the literature shows that the microfilariae of Wuchereria bancrofti have been reported from the blood of patients originating from Zambia. Such sheathed microfilariae were observed in a Zambian resident in Rhodesia for several months but it was not clear where he had acquired the infection (Blackie, 1932). Buckley (1946) found 3 such cases at Lusaka, Ndola and Kasama respectively; in each instance though, none had been permanently resident in the country. He further mentions two such references in the Annual Medical Reports of 1938 and 1943 but again the history and movements of the infected individuals did not rule out the possibility of their having contracted the infection in some neighbouring country. In a survey of night blood films from the Luangwa basin, no W. bancrofti microfilariae were found (Barclay, 1971).

Definite clinical evidence of filariasis due to W. bancrofti is also lacking. The condition known as "thick leg", "Serenje leg" or "Feira leg" is a form of elephantiasis which is believed to be non-filarial in origin and is said not to resemble closely the elephantiasis of W. bancrofti (Buckley, 1946). Fisher (1941) described cases of acute thrombophaelebitis on the Copperbelt and suggested that this disease is widespread in the country and one of the principal causes of thick leg.

The communication reports inter alia, the finding of numerous microfilariae of W. bancrofti in the blood of a Zambian and adult parasites in a biopsy specimen; discusses the differential diagnostic features of the microfilaria and adults in section; and highlights significant aspects of the transmission.

CASE REPORT
The patient, a 25 year old male Zambian, was seen at the clinic in Shimunguwo and later at Mpanshya Mission Hospital in the Central Province of the country. However, his village is Chavununga which is across the Luangwa River 5 miles upstream from the bridge approximately 30° 13' East Longitude and 14° 56' South Latitude. He presented with an extremely tender swelling in the right inguinal fossa which was not reducible and extended into the right scrotum. The right testis was definable and normal. No cough impulse was elicited. The abdomen was soft and no masses were discernible; bowel sounds were normal and no rectal masses were present. His ankles were swollen. He complained of earlier episodes of onset of pain lasting for a few days each for the past three years.

On examination of the blood collected during the day in sequestrine the haemoglobin was 14.8% gm%; the nucleated cell count 4,700 cu.mm. and the differential cell count (percent) 44 neutrophils, 6 eosinophils and 50 lymphocytes.

Thick and thin blood films were stained in giemsa and haematoxylin. Smooth, gracefully curved microfilariae were observed (figure 1). The body nuclei were discrete, round, uniform in size, evenly spaced and two to three abreast. The tail was sharp and pointed and free of nuclei. With haematoxylin, the sheath stained clearly but with giemsa, prolonged staining was required before it was recognizable.

The length of the microfilariae (in microns) ranged from 275 to 295 and the breadth 4 to 6. The microfilarial density was two per 20 cu.mm.

Several clumps of microfilariae were observed congregated into "medusa-head" configurations (figure 2) which some authors believe are diagnostic of W. bancrofti.
FIG. I

Microfilaria of W. bancrofti showing clearly the sheat (S) and tail (T) free of nuclei. Haematoxylin.

The patient was eventually referred to the surgical unit of the University Teaching Hospital and a diagnosis of indirect, incarcerated, right, inguinal hernia was made. The sac within the inflamed narrow hernia was found, ligated and resected. The biopsy specimen was 7 x 1 x 1 cm; greyish in colour with an abscess on the cut surface.

Sections stained in haematoxylin and eosin showed an abscess surrounded by a zone of granulation tissue. Sections of the worm were surrounded by polymorphonuclear neutrophils and eosinophils. An adult in transverse section showed a smooth, thin cuticle and was 110μ in diameter, a dimension consistent with a male worm. The tube with a single layer of columnar cells was identified as part of the digestive system. The adjacent worm in cross-section was identified as a female on the basis of the size (approximately 200μ) and by the presence of the characteristic double uteri which though were empty. (figure 3). Another worm in tangential section showed the digestive tract clearly but the double uteri were barely identifiable and anyway, were empty.

OTHER CASES

Five other cases of W. bancrofti were diagnosed in the recent past; four of these were heavy-duty truck drivers plying between Dar-es-Salaam and Lu-
saka and were of Somali or Tanzanian origin. The fifth was a Zairean.

DISCUSSION

The shape, the size, the staining reactions of the sheath, the distribution of the nuclei in the body and their absence from the pointed tail are diagnostic of the microfilariae of W. bancrofti.

However a few features need clarification especially since this is the only report thus far of an autochthonous case in the country. The first relates to differentiation of such sheathed microfilariae from those of Loa loa, the other filarial parasite of man common in Africa; this is especially pertinent since the blood was collected during the day. Morphologically, the differentiation present no problems in that unlike W. bancrofti those of L. Loa have the body nuclei large, oval and irregularly crowded while the tail is blunt and nuclei reach the tip.

Aside from L. loa, it is now believed that another sheathed microfilaria, that of Meningonema peruzzi, a parasite of the talapoin monkey, Cercopitheus (Miopithecus) talapoin may also be found in the blood of man in this endemic zone (Orihel and Esslinger, 1973). The size, the nature of the sheath, distribution of nuclei in the body and the tail though
FIG. II


FIG III

A filarial abscess with a male (M) and a female worm (F), the latter with the double uteri (arrowed). The granulation tissue (G) on the left. H & E.
are clear distinguishing features.

The second point that need clarification is the periodicity; unlike the microfilariae of L. loa which are diurnal, those of W. bancrofti are nocturnal, the peak density in peripheral blood being between 22.00 hours and 02.00 hours. However, this does not imply that the periodicity is absolute. In a bancroftian filariasis foci in neighbouring Zaire Fain et al (1974) have shown clearly that among 50% of the parasitized per-riasis foci in neighbouring Zaire Fain et al (1974) have shown clearly that among 50% of the parasitized persons, microfilariae were present in diurnal blood though always less abundant than at night. The low mean microfilarial density observed in the present case is thus not unusual and emphasizes that in arriving at a correct diagnosis all the characteristics in combination are more important than depending on just a single feature which could be misleading.

The agglutination of the microfilaria around leukocytes and platelets in heparinized blood is claimed to be diagnostic of W. bancrofti (Yoelli, 1956; Galindo, 1971). This appears no longer valid as this same "medusahead" configuration has been noted in L. loa microfilariae (McQuay and Schumtzer, 1966). Furthermore, though it is claimed by these authors that the microfilariae always lie with their tails inward and thus peculiar, this may not always be a feature as in the present case microfilariae were also observed with the head inward (figure 2). The reasons for this rosette — formation is not known though it has been hypothesized that there is physico-chemical attraction between fibrin mats and the microfilariae or alternatively this may be antigen-antibody reaction.

The identification of W. bancrofti in tissues is most reliably based on the characteristic double uteri since only the short vagina and outer segment are single, the remainder of the genitalia being paired. There were such sections, that of probably degenerate worms, but the double uteri were empty. The males, in a better state of preservation, were identified as such on the basis of the diameter only since the other features are not known to be solely characteristic of W. bancrofti.

Presentation with an inflamed hernial sac or gross enlargement of the inguinal glands are findings characteristic of W. bancrofti infection in endemic areas (Galindo, 1971); oedema of the ankles may also appear as an early sign of infection. Thus the clinical presentation is consistent with the parasitological findings.

This is unlikely to be an isolated report. Many persons are known to have "Feira leg" in this area and in fact Buckley (1946) suspected this area as a possible focus. The local medical officer (Hegarty, personal communication) has also remarked on the number of sheathed microfilariae seen in persons presenting with hydrocoele. Furthermore, at a village on the Rhodesian side where the borders of Zambia and Mozambique also meet, 17% of the population examined harboured the parasite (Roberts et al, 1973). Certainly, a more wide ranging investigation in this area is called for.

Whether imported infections could be a local source of transmission is a moot point. Certainly, there does not appear to be any adverse ecological factors that could militate against such transmission, at least in some parts of the country. However, it is unlikely that the present case is the result of such a phenomenon as the routes into the country from Tanzania and Zaire are geographically delimited from the Feira district.

Whether foci exist in other parts of the country is conjectural. The favoured ecological niche of W. bancrofti described in neighbouring Zaire may be relevant; Fain et al (1974) have remarked on the occurrence of the parasite in the valleys of the big rivers. Perhaps a similar phenomenon is not unlikely in Zambia.

The entomological aspects of the transmission of bancroflian filariasis are not known. In a review of the mosquito vectors, Haman et al (1967) list the presence of Culex pipiens fatigans and C.p. pipiens in the country, the urban vectors in other parts of Africa. Whether Anopheles gambiae and A. funestus are also involved in the rural transmission of the infection needs to be established.

ACKNOWLEDGEMENTS

I thank Dr. A. Hegarty, for the clinical details and helpful discussions; Dr. R. Muller of the WHO Reference Centre for Filaroidea for confirming the identification; Dr. F. Hawking for his comments on the geographical distribution; Mr. M.A. Ansary for the photomicrography.

REFERENCES


