Importation of seven cases of an unusual helminthic infection into Singapore and assessment of the risk of local transmission

L S U Lee, N I Paton

ABSTRACT

Singapore remains vulnerable to the introduction of infectious diseases from other countries due to the high traffic of migrant labour and other visitors. We describe seven cases of migrant workers from West Africa who entered Singapore carrying loaisis, a helminthic infection. The clinical presentation, treatment using single dose ivermectin, potential for transmission, and the need for screening of this infection in Singapore are discussed.

Keywords: Chrysops, disease transmission, helminths, loa loa, parasitic infection

Singapore Med J 2004 Vol 45(5):227-228

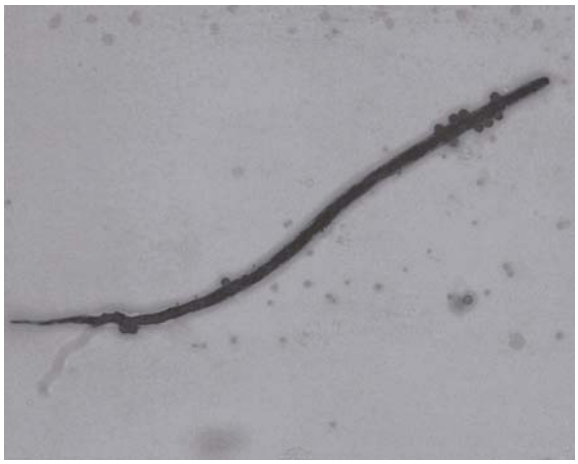

Fig. 1 Microfilaria in the blood film of one of the patients.

INTRODUCTION

Singapore is relatively-free from vector-borne parasitic infections that afflict many other tropical countries. This is due, in large part, to the eradication of the human or animal reservoirs of infection. However, in many cases, the vector of transmission still persists. The potential for transmission of such infections hence remains, should they be imported into Singapore. With the large traffic of migrant labour and visitors, Singapore remains vulnerable to the introduction of infection from outside. For example, there remains the occasional outbreak of malaria related to importation of asymptomatic gametocyte carriers from overseas, followed by transmission by the local Anopheles mosquito[1,2]. In this report, we describe migrant workers from West Africa carrying a helminthic infection that provide an unusual example of the potential for disease transmission in Singapore.

CASE SERIES

Seven migrant workers from Equatorial Guinea were referred to the Communicable Diseases Centre, Tan Tock Seng Hospital in September 2002, following detection of an unusual parasite on a blood film during a routine employment examination. All of them were men aged between 22 and 43 years old. They were in Singapore for a few months undergoing training at the Keppel Shipyard. The medical history was obtained in Spanish by a Spanish-speaking interpreter. Most of the carriers were asymptomatic.

Two of the carriers gave a history of swelling of the hands and arms, itching and pain in the eyes, and had seen a worm going across the eye. Another had mild swellings on both hands that lasted a week. He had been diagnosed as having a parasitic disease and had been treated in his home country. Another had swelling in the leg ten years earlier. Two of the carriers had splenomegaly with a spleen tip 3cm to 4cm below the costal margin, and one of them also had hepatomegaly. Physical examination was otherwise normal in all the cases.

Full blood counts showed eosinophilia in all the seven cases, with the percentage of eosinophils ranging from 8.9% to 33%, and absolute counts ranging from 495 to 2,540 x 10^6/L. Blood films demonstrated the presence of sheathed microfilariae with flexures in the tail end resembling a cockscrew appearance, consistent with a diagnosis of loa loa infection (Fig. 1). In all the carriers, the parasite load was less than 1,000 per ml of blood. The rest of the blood counts and routine biochemical tests were otherwise unremarkable.

All the carriers were treated as outpatients with a single dose of ivermectin at a dose of 200 micrograms/kg, except for one who had recent treatment in Equatorial Guinea. All the carriers tolerated the

Department of Infectious Diseases
Tan Tock Seng Hospital
Moulmein Road
Singapore 308433

L S U Lee, BSc, MBBS, MRCP
Registrar

N I Paton, MD, FRCP
Consultant and Head

Correspondence to:
Dr Lawrence Lee Soon U
Division of Clinical Pharmacology
Department of Medicine
Johns Hopkins University
Baltimore, MD 21205, USA
Tel: (1) 410 955 3100
Fax: (1) 410 614 9978
Email: llee3@jhsph.edu

treatment well. None developed neurological sequelae. Blood films performed two weeks after treatment did not reveal any microfilariae.

DISCUSSION

Loa loa infection is endemic in West and Central Africa. The disease is most often asymptomatic, especially in indigenous inhabitants who show considerable tolerance to the presence of many worms[3]. The most common symptom is that of episodic Calabar swellings, evanescent localised areas of angioedema, and erythema developing mainly in the extremities. Another common symptom is caused by the subconjunctival migration of the adult worm. Splenomegaly is not common, although it has been reported in the literature[4]. The presence of splenomegaly in our patients was more likely due to previous exposure to malaria, which is also endemic in Equatorial Guinea.

Diagnosis of loa loa is made by finding microfilariae in the blood. These can be demonstrated in the blood, especially in a diurnal pattern, between 0800 to 2000 hours. In patients who have a low microfilaria load (<400 per ml), a single dose of ivermectin is effective therapy for loa loa, killing the microfilariae but not the adult worms[5]. However, when the microfilaria load is higher, multiple doses may be necessary[6]. Treatment is generally well-tolerated but serious reactions, in particular acute encephalopathy, can occur. This has been postulated to be due to formation of micro-emboli in small brain vessels as a result of massive paralysis of loa microfilariae in the blood. The relative risk of developing serious reactions is much higher when the loa loa parasite load exceeds 8,000 microfilariae/mL[7]. All our patients had low parasite loads and none developed any reactions to the treatment.

Loa loa is transmitted by the deerfly of the genus *Chrysops*. These flies are found primarily in the rain forest canopies of Western and Central Africa. The *Chrysops* species exists in Singapore, although in low numbers. In Singapore, these flies are known to bite animals and can potentially bite man as well. It has been shown that *Chrysops atlanticus*, an American species of deerfly collected along the Mississippi Gulf Coast, will support the development of the microfilaria of human loa loa to the infective stage. Development takes place in the fat body of the fly, and requires nine to 10 days of development. *Chrysops atlanticus* will support the development of large numbers of loa loa to the infective stage, without apparent ill effects to the fly[8].

There is a theoretical risk of transmission of this disease in Singapore. We attempted to investigate this further by obtaining some of these flies and inducing them to bite some of our carriers to determine if these flies could incubate loa loa to the adult infective stage. The National Environmental Agency in Singapore performed two field trips to catch these flies, but were unsuccessful. Ivermectin treatment reduces the microfilaria load and this has been shown to lower the risk of transmission[9]. Our patients were thus allowed to remain in Singapore following their treatment. There were no subsequent cases reported in the local population. Our case series serve to remind us of the continued need for vigilance against imported diseases, and the need for routinely screening workers from endemic areas for the presence of transmissible parasites through blood film examinations on entry into Singapore.

ACKNOWLEDGEMENTS

We acknowledge the help of Dr P Kuperan and the staff of the Department of Pathology and Laboratory Medicine, Tan Tock Seng Hospital, for permission to reproduce pictures of the microfilariae. We also acknowledge the help of the Dr Andrew D Giger at the Environmental Health Institute, National Environmental Agency, for assistance in providing information about the vector and attempting to conduct the experiment as described above.

REFERENCES

1. Ooi PL, Goh KT, Lee KM. Local transmission of Plasmodium vivax malaria in Singapore. Ann Acad Med Singapore 1997; 26:588-92.
2. Chiam PTL, Oh HML, Ooi EE. Localised outbreak of falciparum malaria in Singapore. Singapore Med J 2003; 44:357-8.
3. Manson-Bahr PEC, Bell DR, eds. Manson's Tropical Diseases. London: Balliere-Tindall, 1987.
4. Burchard GD, Reimold-Jehle U, Burkle V, Kretschmer H, Vierbuchen M, Racz P, et al. Splenectomy for suspected malignant lymphoma in two patients with loiasis. Clin Infect Dis 1996; 23:979-82.
5. Gardon J, Kamgno J, Folefack G, Gardon-Wendel N, Bouchite B, Boussinesq M. Marked decrease in loa loa microfilaremia six and twelve months after a single dose of ivermectin. Trans R Soc Trop Med Hyg 1997; 91:593-4.
6. Kombila M, Duong TH, Ferrer A, Perret JL, Marion MC, Nguiri C, et al. Short- and long-term action of multiple doses of ivermectin on loaisis microfilaremia. Am J Trop Med Hyg 1998; 58:258-60.
7. Gardon J, Gardon-Wendel N, Demanga-Ngangue, Kamgno J, Chippaux JP, Boussinewsq M. Serious reactions after mass treatment of onchocerciasis with ivermectin in an area endemic for loa loa infection. Lancet 1997; 350:18-22.
8. Orihel TC, Lowrie RC Jr. Loa loa: development to the infective stage in an American deerfly, Chrysops atlanticus. Am J Trop Med Hyg 1975;24:610-5.
9. Chippaux JP, Bouchite B, Boussinesq M, Ranque S, Baldet T, Demanou M. Impact of repeated large scale ivermectin treatments on the transmission of loa loa. Trans R Soc Trop Med Hyg 1998; 92:454-8.