needed them. Marital problems, isolation or estrangement from the extended family, poor communication, and underlying personality disorder all increased a couple's difficulties. It is part of human nature to be able to cope with death and bereavement. When coping fails we should not turn away or offer only symptomatic treatment. Rather we should look for a cause, and help the couple to overcome it, relieving unnecessary suffering so that the natural adjustment can proceed and equilibrium be restored.

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The Six Diseases of WHO

Lymphatic and other filariases

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The three parasites, *Wuchereria bancrofti*, *Brugia malayi*, and *B timori*, all of which produce disease in the lymphatic vessels, are the most widespread and abundant of all the human filarial worms.

Epidemiology

Well over 250 million people dwelling in the tropics are exposed to infection with these parasites. By far the greatest numbers of patients with *W bancrofti* are found in India, but the disease is also found in many other Asian countries (Sri Lanka, Bangladesh, Burma, Thailand, Malaysia, Indonesia, China, Philippines, and New Guinea); in tropical parts of Africa and adjacent islands; in Egypt; in many Pacific islands; and to a less extent in parts of Central and South America and the West Indies. Infections with *B malayi* are more restricted. They are most numerous in Indonesia (where *B timori* also occurs) as well as in Malaysia, India, China, Thailand, Vietnam, Philippines, and South Korea.

Although a high proportion of infections may be clinically silent, there are many millions of people with patent microfilaraemia, who are capable of spreading the parasite, and probably almost as many who suffer intermittently or permanently from some pathological manifestation of the parasite—acute and subacute manifestations of adenolymphangitis and filarial fever or chronic manifestations of hydrocoele, elephantiasis, chyluria, etc.

The immature and adult worms of all three species (4-10 cm long) live in the lymphatic vessels and nodes and are responsible for almost all the pathology of the infection. They produce microfilariae that invade the blood and which, when ingested by appropriate mosquitos, may develop over 10-12 days to infective larvae, transmissible when the insect bites again. The microfilariae are not normally pathogenic, but their sudden death in large numbers at the onset of chemotherapy may cause fever; and their presence in the lung of sensitised individuals may be

responsible for the condition known as tropical pulmonary eosinophilia.

W bancrofti exists in two main forms. The nocturnally periodic (largest number at night, few if any during the day) form is most widespread, having microfilariae that appear in the peripheral blood at night. It is transmitted in rural environments mainly by *Anopheles* mosquitos and in urban areas, where it is becoming an increasing problem, by *Culex* mosquitos. In the more easterly Pacific islands the microfilariae are diurnally subperiodic (largest number during the day and an appreciable number during the night) and the vectors are day-biting *Aedes* mosquitos. Many of the epidemiological features of the infection vary from place to place according to the habits of the particular vector mosquito.

B malayi also occurs in two forms. One is a nocturnally periodic infection confined to man and spread by anophelines and *Mansonia* mosquitos. The other is the nocturnally subperiodic form, which has an animal reservoir, and is transmitted by *Mansonia* mosquitos.

Clinical features

Acute manifestations may occur at any age after the first or subsequent inoculation of infective larvae. They may be more severe in people first exposed in adult life, such as short-term visitors to the tropics, and they may appear as early as three months after the person is bitten by infective mosquitos. They are characterised by recurrent episodic attacks of fever and adenolymphangitis, usually in a superficial lymph node and its vessels. The lymphangitis is typically retrograde, and there may be considerable oedema of the limb or part affected. Bancroftian filariasis affects especially the lymphatics in the spermatic cord and testis giving rise to funiculitis, epididymitis, and orchitis; or it may affect the legs or arms. In Brugian filariasis the inguinal region is most affected, the arms to a less extent, and the genitals are spared.

Recurrent acute attacks, with the residual swelling subsiding less and less each time, may eventually lead on to hydrocoele, elephantiasis, chyluria, etc. Such manifestations are becoming increasingly rare as a result of earlier treatment of the acute manifestations. They are likely to be encountered only in people born, bred, and living for a long time in the endemic area.

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Treatment with diethylcarbamazine citrate (DEC-C) is usually effective in destroying most of the adult worms and the microfilariae. It must be given before irreparable damage has been done to the lymphatics and their valves. More than one course of treatment may be needed to achieve a complete cure.

Recent advances

Mass campaigns with DEC-C have been carried out in many countries for control of lymphatic filariasis. Where they have been thoroughly executed, and where the co-operation and confidence of the people have been obtained by adequate health education, they have successfully lowered the incidence of disease and reduced transmission. The chief drawback to this use of DEC-C is that many asymptomatic infected people suffer severe reactions to the death of parasites during treatment. Particularly in India this has generally proved an insurmountable obstacle to such campaigns.

Recent work indicates that relatively low-dose short-term treatment given at intervals of three to 12 months may be better tolerated, and in the long term may be more effective than the previously accepted standard course at 6 mg/kg/day for six to 12 days. Campaigns relying on 0.3% DEC-C medicated salt distributed for a year or more have also been successful where the salt supply can be controlled.

Mass DEC-C campaigns need to be followed up by improved health education, so that people learn to recognise the early signs of acute filarial infection and are taught to seek DEC-C treatment immediately. In this way the development of chronic disabling and disfiguring lesions may to a great extent be prevented.

Recent work in monkeys also suggests that DEC-C has a causal chemoprophylactic action against the infective larvae and early immature stages of *B. malayi*. The same may well be true for *W. bancrofti* although this has not yet been established. It may well, therefore, be possible to use DEC-C as a chemoprophylactic to protect uninfected individuals who are obliged to pay relatively short visits to areas where lymphatic filariasis is endemic.

DEC-C treatment may need to be supplemented by measures to control vector mosquitos or to reduce human exposure to their bites. Antimosquito measures tend to be costly and have to be maintained for a long time but, where anophelines are the vectors of bancroftian filariasis, an antimalarial vector campaign may be important in controlling the former disease, whose transmission can much more easily be interrupted. Again, measures to reduce the contact between man and mosquito can be most effective. Use of bed-nets, mosquito-screening of houses, clearing up of man-made small-container breeding sites in the vicinity of villages—all these community participation measures have a beneficial effect in reducing the risk of infection.

Future progress

Unpleasant reactions to treatment with DEC-C undoubtedly reduce the acceptability of this drug in the treatment of lymphatic filariasis. Part of the reaction is due to its microfilaricidal properties and part to its effect on the adult worms. Unfortunately the action on adult worms is not always wholly effective, and this is another disadvantage of DEC-C. A more effective macrofilaricide having no coincidental action on the relatively short-lived microfilariae would therefore be advantageous in the large-scale treatment of lymphatic filariasis. Such a drug might be more acceptable in the Indian context, which is the big problem area for control.

A more specific problem concerns the control of the sub-periodic strain of *B. malayi*. This infection has a reservoir in monkeys, other wild animals, and domestic cats, and it cannot therefore be completely controlled by mass DEC-C treatment campaigns. New means need to be found to deal with this infection, especially since its vector mosquitos (*Mansonia*), whose larvae attach themselves to the roots of floating water plants and

inhabit vast areas of swamp forest, are particularly difficult to control.

A final requirement in lymphatic filariasis is a simple, specific, and sensitive serodiagnostic test that could show active infection in individuals who are amicrofilaraemic. Such a test, capable of being done in the field on finger-prick blood, would avoid the current inconvenience and low sensitivity of looking for microfilariae in night blood surveys.

Other human filarial parasites

LOIASIS

Loiasis, infection with *Loa loa* from the west and central African forest regions, is not uncommonly acquired by people working in areas where the parasite is transmitted by "red flies" of the genus *Chrysops*. This filarial worm gives rise to fugitive subcutaneous "Calabar" swellings or occasionally, and more dramatically, an adult worm may wriggle slowly across the conjunctiva of the eye. The infection can usually be eliminated by treatment with DEC-C, but care must be taken if there is a high degree of microfilariemia.

TETRAPETALONEMA PERSTANS AND MANSONELLA OZZARDI

Microfilariae of these species are commonly found in the blood of people returning from sojourn in the appropriate areas of the tropics. These infections are generally asymptomatic and of little import.

TETRAPETALONEMA STREPTOCERCA

T. streptocerca is a small subcutaneous filariid whose microfilariae are occasionally found in the skin of patients from west and central Africa. Occasionally it can give rise to an itchy rash. It responds well to DEC-C.

DIROFILARIA SPP

Zoonotic infections with *Dirofilaria* spp from dogs, cats, and racoons in temperate and tropical countries sometimes develop partially in man. They present as fibrous lumps containing the encapsulated parasite. If subcutaneous their nature will be discovered on biopsy and histological examination. They often occur, however, in the lung, forming a shadow on x-ray films that may only be distinguishable from a bronchial carcinoma after a lobectomy. A specific and sensitive serological test, which could be relied on to make the differential diagnosis with certainty, might avoid this tragedy.

Do tranquillisers have an antiepileptic action?

Several groups of drugs that are used mainly as tranquillisers also have an anticonvulsant effect. In the past barbiturates were widely used as sedatives, and all can inhibit convulsions, though phenobarbitone is most effective and is specifically used when treating grand mal epilepsy. Benzodiazepines also have an anticonvulsant effect, but only diazepam and clonazepam are in common use. Intravenous diazepam is the treatment of choice in status epilepticus. Conversely, some major tranquillisers, such as chlorpromazine and haloperidol, lower the convulsive threshold. These drugs must be avoided in the untreated epileptic and in patients undergoing withdrawal from central nervous system depressant drugs, such as alcohol and barbiturates.—GILLIAN SANDERS, senior registrar in clinical pharmacology, Newcastle upon Tyne.