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LYMPHATIC FILARIASIS IN SRI LANKA

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Introduction

Sri Lanka has had two species of human filariasis caused by the parasites *Brugia malayi* transmitted by Mansonia mosquitoes and *Wuchereria bancrofti* transmitted by the mosquito *Culex quinquefasciatus*. Prior to the World War II, the predominant parasite was *Brugia malayi*, which caused rural filariasis. After 1947, effective control measures considerably reduced the incidence of brugian filariasis, but areas endemic for *Wuchereria bancrofti* became more widespread.

Since 1965, no cases of brugian filariasis have been reported and the subsequent surveys conducted indicated that the brugian filariasis is more or less eradicated from Sri Lanka. The present problem is due to bancroftian filariasis endemic in three provinces, namely the Western, the Southern, and the North Western Provinces, exposing a population of 9.5 million to risk.

Historical Review

Reference to the disease is made in the following historical writings in Sri Lanka[1]:

- *Vinaya Pitaka* (623-543 B.C.)– Which contains rules for ordination of Buddhist priests
- *Saratha Sangrahaya* by King Buddhadasa written in 339 A.D.
- *Besajja Manjusa* by principals of five colleges in 1300 A.D.
- *Yogaratnakara* by poet Vidu dated 1665 A.D.
- *Yoganavaya* by the principal of Mayura Pada Pirivena in 1818 A.D.

Although King Buddhadasa (339 A.D.) described the disease, its prevalence in the country at that time was not known. The earliest scientific information regarding the disease is to be found in the Ceylon Administrative Report of 1879 on cases from Kandy and Matale hospitals and the Ceylon Administrative Report of 1892 on cases reported from Matara hospital.

Historical evidence supports the view that *Brugia malayi* was introduced in the 12th and 13th century A.D. by Malays and *Wuchereria bancrofti* in the 15th century A.D. by the Chinese.[2]

The prevalence and distribution of filariasis was known only after a survey conducted in 1914 by Manson-Bahr.[3] This survey revealed very high microfilaria rates from some areas (26.6% from Toppur, 11.1% from Induruwa and 14.2% from Ambalantota). A subsequent survey in 1933 by Carter at Toppur revealed a microfilaria rate of 52%– the species identified was *Brugia malayi*.[4] The survey carried out by Sweet and Dirckze in 1925/1926 in the Southern province too indicated an average M.F. rate of 5.8%, heavily infected areas being Tangalle, Weeraketiya & Galle.

The surveys carried out by Bahr (1914), Sweet and Dirckze (1925) and Carter (1933) were confined to certain parts of the country .The distribution of filariasis on an island wide basis was not known until 1939 when Dassanayake completed his comprehensive survey for 2 years (1937-39).[5] This survey revealed the

presence of *Brugia malayi* infection in several foci in five of the nine provinces and *Wuchereria bancrofti* infection in the towns of Gal l e and Matara only. He reported the prevalence of brugian filariasis mostly in rural areas. Very high microfilaria rates varying from 38-54% from the Kurunegala district and moderate rates of 17.2% from the Anuradhapura district, 16.9% from the Trincomalee district and 11.6% from the Chilaw district. The corresponding figures for Galle and Matara were 8.9% and 5.1% respectively and the species identified was *Wuchereria bancrofti*. He also noted the existence of brugian infection in association with the water plant *Pistia stratiotes*.

Even though the microfilarial rates had increased very slightly in Matara and Galle, there was no spread of bancroftian filariasis between 1914 and 1939, whereas, the spread of the disease between 1939 and 1947 had been phenomenal and extensive so as to warrant recognition as a special problem by the Department of Health Services. A special campaign was established in 1947 to deal with this problem caused by the new strain of *Wuchereria bancrofti* introduced during the war years in the South Western coastal border.

In 1949, the microfilaria rates for *Brugia malayi* ranged from 1% to 18% and from 2.2 to 9.7% for *Wuchereria bancrofti*. The campaign had to cover an area of 350 square miles for brugian filariasis and 400 square miles for bancroftian filariasis, exposing a population of 0.1 and 1.5 million respectively to the risk of infection. In the case of *Brugia malayi* infection, use of Phenoxylene '30' against the pistia plant, the use of DDT as a residual insecticide in malarial areas and the detection and treatment of cases of microfilaraemia and patients with clinical symptoms with diethyl carbamazine citrate for 7-8 years brought down the microfilaria rate to about 1% in all foci and the campaign against *Brugia malayi* infection was terminated in 1957. In the case of *Wuchereria bancrofti* infection the use larvicides such as fenthion and routine parasite control work carried out in the entire endemic area has resulted in only a moderate reduction in transmission. This is due to rapid unplanned urbanisation that has taken place during this period, which has increased the number of man-made breeding sites thereby increasing vector densities. Surveys carried out during the years 1960-1966 revealed a few cases of brugian filariasis in the Galle District, but a large-scale survey carried out by Gautamadasa during 1981-1986, revealed no cases of brugian filariasis in the country.[6] These findings together with reports from subsequent routine surveys indicate that brugian filariasis has been more or less eradicated from Sri Lanka and that the present problem is due to urban or bancroftian filariasis.

Since 1966, the control measures adopted were mainly directed against the parasite, where mass screening programmes were instituted by subjecting the people living in the endemic area to an annual night blood examination and the positives detected were treated with a two weeks course of diethyl carbamazine citrate and followed up for a further period of two years until they were completely free of infection. In addition night blood examination centres were put up in most of the offices of the Medical Officers of Health where people had easy access to havre their blood examined. Clinically positive patients with symptoms were treated at special clinics.

Vector control using the larvicide fenthion was confined to a limited areas– mainly municipal council areas. This was because of the temporary benefit received from larviciding and the high cost of larvicides.

Entomological control measures were adopted mainly as a monitoring and evaluating tool. By adopting these measures it was possible to bring down the microfilaria rate to 0.38% in 1997 and the infection and infective rates to less than 0.1%.

Setbacks

Lack of resources– man power, money and vehicles– was a big obstacle to achieving the target. Up to 1989, the maximum coverage that was possible with the then existing manpower was about 20%. Filariasis was not considered a national priority and, therefore, the little recognition given to the importance of the control programme nationally as well as internationally. The civil and communal riots that existed since 1983 from time to time, the establishment of Provincial Councils and subsequent early retirement of trained field officers with no replacement, created several set backs in the control programme; but with all these obstacles, continued efforts at control resulted in bringing down the microfilaria rate to 0.38% in 1997, but low level transmission continues in the entire endemic area.

The Present Problem of Lymphatic Filariasis and the Outlook for its Elimination

World-wide, 120 million people are infected with filarial parasites that cause lymphatic filariasis and around a billion live in areas where they are at risk of infection. Of these, about 44 million show clinical manifestations while a further 76 million have hidden infection, most often with microfilariae in their blood and hidden internal damage to their lymphatic and renal systems.

The disease has a major psychosocial and economic impact and until recently very little could be done to alleviate the suffering and disability caused by the disease. Globally, the infection has been recognised as the second leading cause of permanent and long-term disability. Recent advances in treatment methods both for controlling transmission and for simple approaches to disease control along with new techniques for diagnosing the infection have radically altered this gloomy outlook. This has resulted in an independent, International Task Force for Disease Eradication to identify lymphatic filariasis as one of only six infectious diseases considered to be "eradicable" or "potentially eradicable". The World Health Assembly in 1997 adopted Resolution WHA 50.29, calling for the elimination of lymphatic filariasis as a global public health problem. This initiative is supported by the decision taken in 1998 by the company SmithKline Beecham to collaborate with the WHO in the elimination effort, by donating the drug albendazole, one of the drugs used in the eradication of lymphatic filariasis, free of charge for as long as necessary to ensure success of the elimination programme.

Recent Medical Advances

Recent medical advances that have changed the outlook today encompass four distinct areas:

1. Treatment for interrupting transmission– With the development of new, effective, safe and long lasting microfilaricidal regimens based on once yearly, single dose, two drug treatment, focused on community-wide

treatment of the entire "at risk" population. The two drug treatment includes either albendazole plus diethyl carbamazine citrate or albendazole plus ivermectin. It will need to be continued for a minimum period of 4-6 years i.e. until the adult worm dies. If the coverage is poor, treatment for longer periods will be necessary to interrupt transmission. These methods have replaced the normal "selective treatment" of people with microfilaraemia following routine blood examination.

2. Morbidity control– i.e. to treat the people who are already suffering from clinical manifestations by way of community self-help groups.
3. New diagnostic tools for surveillance and monitoring– Evaluation of antigenaemia using ICT card test or by DNA probe surveys to detect parasite DNA in humans or in the vector.
4. Added benefits of community programmes as deworming programmes– These drugs are effective against intestinal parasites and ecto-parasites e.g. lice, scabies etc

Future Challenges

Single dose mass treatment using DEC only, commenced in February 1997 in the Urban Council area Kotte covering a population 150,000. Coverage was very good but since then, up to 1999 October, single dose treatment introduced in several Medical Officer of Health areas, with a high endemicity, have been carried out in an ad-hoc manner; due to various problems encountered during implementation. The biggest drawback was lack of trained persons to distribute the tablets during a short period of 2-3 days. During the year 1998, a population of 0.7 million out of 9.5 million received the tablets. In early 1999 a population of approximately 0.75 million were also treated, but these areas were selected based on the degree of endemicity and, even though the coverage in each individual area was satisfactory, the question of re-infection from neighbouring areas was unavoidable. Therefore, in October 1999, this programme was conducted as a national programme in most of the endemic areas, during which a population of approximately 0.8 million was covered. Implementation was carried out by visiting homes simultaneously with the polio mopping up operations. The second round as a national programme (after six months) was completed in April 2000 by establishing centres. The coverage varied from 50- 70 % in different MOH areas. Of the 97 MOH areas in the endemic zone, 69 were taken up during this round, but in most instances only a part of the MOH area was covered. In the year 1998, the microfilaria rate for the entire endemic area was 0.21% and the infection and infective rates were 0.56% and 0.05% respectively showing a marked drop in the microfilariae rate, even though the infection rates remain to be static at a low level. During the year 1999, the microfilaria rate was 0.22%,

In 1997 June, a pilot project was carried out at Werahera involving a population of approximately 8000. DEC was given alone during home visits, after conducting a baseline survey. This project was continued for three years by giving DEC every six months with annual monitoring. At the end of the first year i.e. in June 1998 the microfilaria rate as well as the infection and infective rates had come down by 50% and at the end of two years i.e. in June 1999, these rates dropped by another 50%. These data suggest that if the coverage is over 80%, a

zero level of transmission could be reached by implementing the programme for 4-5 years, but if the coverage is inadequate, this period will be longer.

It is proposed to introduce the two drug regimen using albendazole and diethyl carbamazine citrate in future years.

Lack of personnel to implement the programme during a short period of time to achieve a coverage over 80% was a major draw back, therefore, social marketing, communication and advocacy will be the key elements to be pursued before embarking on this major task in future.

If the global goal of eradication is to be achieved at least by the year 2010, the total commitment of the community in support of this effort is essential.

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