

Royal Society of Tropical Medicine and Hygiene Meeting at Manson House, London, 20 January 2000

Elimination of lymphatic filariasis as a public health problem

Lymphatic filariasis: setting the scene for elimination

D. H. Molyneux^{1*}, M. Neira², B. Liese³ and D. Heymann² ¹Lymphatic Filariasis Support Centre, Liverpool School of Tropical Medicine, Pembroke Place, Liverpool L3 5QA, UK; ²Communicable Diseases, World Health Organization, 1211 Geneva 27, Switzerland; ³African Human Development, The World Bank, 1818 H Street NW, Washington DC 20433, USA

Keywords: lymphatic filariasis, disease control, chemotherapy, ivermectin, albendazole, diethylcarbamazine, public health

Introduction

There is increasing recognition and quantification of the links between health and poverty. GWATKIN *et al.* (1999) have emphasized that investment in infectious disease control for the poorest 20% of the world's poor will provide a proportionately better return on health investment than other interventions. Poor people are some 10 times more likely to die of infectious and communicable disease than the richest 20% (GWATKIN & GUILLOT, 1999).

Over the past decade there have been major advances in our understanding of parasitic diseases. Scientific progress has enabled the development of appropriate strategies for their control, for monitoring and certifying eradication or elimination programmes (WHO, 2000). Generous drug donation programmes from major pharmaceutical companies have permitted the development and implementation of several programmes. The first began in the late 1980s when Merck & Co. Inc. (which incorporates Merck Sharpe & Dohme in many countries outside of the USA) committed themselves to provide Mectizan[®] (ivermectin) for as long as needed, wherever needed, to eliminate onchocerciasis as a public health problem (SAMBA, 1994). Mectizan has become the mainstay of the African Programme for Onchocerciasis Control (APOC) (REMME, 1995) and for tackling residual problems within the Onchocerciasis Control Programme (OCP) area (MOLYNEUX, 1995; MOLYNEUX & DAVIES, 1997; BOATIN *et al.*, 1997). In Latin America Mectizan is distributed through country programmes of the Onchocerciasis Elimination Programme of the Americas (BLANKS *et al.*, 1998).

Lymphatic filariasis elimination strategy

The experiences of the donation of the Mectizan Donation Program (see *Annals of Tropical Medicine and Parasitology*, 1999, supplement) paralleled by the opportunities derived from operational research on lymphatic filariasis supported by the UNDP/World Bank/World Health Organization (WHO) Special Programme for Research and Training in Tropical Diseases (TDR) led to the clear definition of control strategies (OTTESEN *et al.*, 1997; OTTESEN, 2000). The World Health Assembly resolution in 1997 called for the 'elimination of lymphatic filariasis as a public health problem'. The International Task Force for Disease Eradication also considered lymphatic filariasis among 6 eradicable diseases (CDC, 1993). Lymphatic filariasis is recognized as one of the world's most disabling diseases, lowering quality of life, reducing self esteem, stigmatizing and reducing marital prospects, reducing productivity as a result of acute attacks, imposing significant burdens on hospital resources and denying social participation (HADDIX & KESTLER, 2000).

Drug donation

Following the World Health Assembly resolution, and the decision by SmithKline Beecham to donate albendazole for as long as needed for the elimination of lymphatic filariasis as a public health problem, control became feasible on a wide scale. Co-administration of albendazole with other anti-filarial drugs—ivermectin and diethylcarbamazine (DEC)—has been shown in several settings to reduce microfilaraemia for a period of up to 24 months after a single ingestion (OTTESEN, 2000) suggesting that with high coverage, if used on a community basis, the transmission of the disease as determined by infections of infective larvae in mosquitoes will be eliminated (BOCKARIE *et al.*, 1998). In October 1998, Merck & Co. Inc. again responded generously to lymphatic filariasis elimination by agreeing to provide Mectizan for use, in combination with albendazole, in the control of lymphatic filariasis in African countries of endemic onchocerciasis where DEC cannot be used safely. These donations and their safe putative long-term efficacy have provided the foundation for mass drug administration (MDA) for control of filariasis transmission. Further, the role of DEC was re-interpreted in the context of dosage regimen—a single dose of 6 mg/kg being found to be as effective as repeat doses (CAO *et al.*, 1997). The major success of the use of DEC salt in southern China and parts of India in reducing the prevalence of microfilaraemia (WHO, 1992) provides an alternative approach to control.

Diagnosis

The development of a simple diagnostic, based on adult worm circulating filarial antigen detection, for detection of bancroftian filariasis provides a more appropriate diagnostic tool usable in particular for evaluation and monitoring (WEIL *et al.*, 1997), hence removing the need for night-blood films. The development and availability at cost by the company (AMRAD ICT) for endemic countries of this immunochromatographic test (ICT) is a major breakthrough for mapping distribution of lymphatic filariasis.

Community participation

In parallel with the recognition that transmission control was possible with MDA of co-administered drugs, assuming high coverage and adherence over recent years, community-directed treatment (ComDT) strategies for Mectizan distribution have been developed in the APOC and OCP programmes and community-directed approaches to lymphatic filariasis programmes in Africa have been evaluated (WHO, 2000), demonstrating that ComDT can effectively be implemented through public health services. Such a delivery approach achieved high coverage compatible with elimination of transmission whilst coverage with health services themselves was poor, particularly if facilities were more than 5 km from the district (WHO, 1996, 2000). Within APOC, over 50 projects have started in 12 countries where the endemicity of onchocerciasis has been mapped

* Author for correspondence; phone +44 (0)151 708 9393, fax +44 (0)151 709 0354, e-mail fahy@liv.ac.uk

The Society acknowledges support for the meeting from SmithKline Beecham, Merck & Co. and AMRAD

using rapid epidemiological assessment and a rapid mapping technique (REMO) to identify areas of hyper- and meso-endemicity (NGOUMOU *et al.*, 1994). Similar approaches to rapid mapping to define areas of endemicity of lymphatic filariasis are under evaluation such as the use of questionnaires to key informants, assessment of hydrocoele and lymphoedema prevalence, and the use of ICT card tests, to define prevalence within the implementation unit for drug distribution allied to spatial analysis to determine contours of prevalence (WHO, Report of Mapping Meeting, unpublished). The 'implementation unit' will be variable depending on the local epidemiology, health systems and geography but it will usually be the district or its equivalent level, around which planning and implementation will take place. Information obtained from mapping will be integrated into geographical information systems (GIS) similar to those used for onchocerciasis, guinea-worm and other diseases using the WHO/UNICEF HealthMap.

Symptomatic treatment

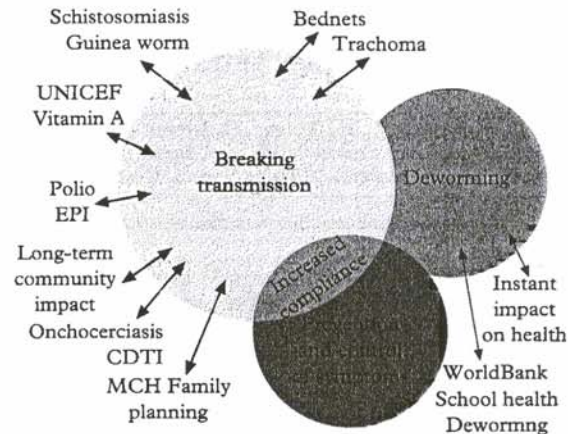
Recent studies on symptomatic treatment of lymphatic filariasis, particularly lymphoedema, also provide hope that the alleviation of symptoms based on regular washing of skin with soap and water, limb elevation, topical application of antibiotics and anti-fungal cream (ADDISS & DREYER, 2000) will not only assist patients, but enhance adherence to MDA. Such activities should be introduced early in the programme.

Overall public health benefits

Over the past year, WHO and its partners in the Alliance for the Elimination of Lymphatic Filariasis have completed the assessment of the safety data for co-administration of albendazole with Mectizan and DEC, developed manuals for programme managers in programme implementation, launched 11 country programmes and defined the methodology of lymphoedema management — all major steps signifying progress for the Alliance. The conceptual basis of the programme is illustrated in the Figure. The challenge for the next years as the programme rolls out on a global scale relates to financing, to achieving a regional approach and ownership (given the significant differences in global epidemiology), and to increasing advocacy for a disease often forgotten but concentrated in poor communities where those infected become less productive and are often stigmatized (HADDIX & KESTLER, 2000).

The cliché 'window of opportunity' is relevant for the elimination of lymphatic filariasis. Donated drugs with the power of Mectizan and albendazole provide huge synergistic health benefits. In many areas of Africa, co-endemicity of lymphatic filariasis and malaria involves the same *Anopheles* mosquitoes—*An. gambiae*, *An. arabiensis* and *An. funestus* (WHO, 1995), and malaria control using bednets is now being widely promoted (LENGELER, 1998). Bednet re-impregnation provides an opportunity for Mectizan and albendazole distribution which could also be aligned with other interventions such as de-worming. Non-governmental development organizations (NGDOs) as well as the traditional public and private sector partners need to be involved to assist lymphatic filariasis projects, providing the necessary additional entry points to communities and leadership in best practice. Albendazole is also effective against hookworm (OTTESEN *et al.*, 1999) and hence has a significant impact on anaemia; any improvement in anaemia status will contribute to alleviation of problems of pregnancy-related malaria and will improve birth-weight—low birthweight being a major cause of neonatal infant malaria-related mortality (BRABIN *et al.*, 1999). Hence the impact of MDA for lymphatic filariasis transmission is only a part of the overall health benefit provided by those donated products; deworming, head lice and scabies control, improved nutritional status, reduced problems of anaemia all are benefits that can

- Impacting on poor people; poor families; poor communities
- Providing short-term benefit by deworming
- Medium-term symptom alleviation
- Long-term elimination of disease



Bold arrows = Synergistic entry points

- Patient oriented, resulting in the improved compliance through community involvement
- Providing a bridge between medical paradigm and community health
- Unique alliance compatible with new global health policy statements
- Building cross-sectoral linkages
- Involving NGDOs
- Integrating with other cost-effective sustainable health interventions
- Alleviating poverty
- Enhancing partnerships

Figure. Concepts and framework of lymphatic filariasis in a total health package. EPI, Expanded Programme on Immunization; CDTI, Community Directed Treatment with Ivermectin.

flow from donated drugs. Improvement of anaemia status may be a measurable indicator of the success of lymphatic filariasis control where combined with bednets, using re-impregnation as an entry point; the community health benefits would be expanded and would ensure adherence and community acceptance of health programmes.

Concluding remarks

The challenges of improving health status and eliminating those diseases vulnerable to effective interventions remain, but targeted and well-managed drug-donation programmes provide significant opportunities beyond the focus of the original donation. The programmes involve partnerships at all levels, improved health systems management, enhanced NGDO interest providing a significant platform for an effective alliance between NGDO and the government health sector through National Task Forces. They strengthen community support for interventions, enhance drug distribution systems, ensure appropriate monitoring and reporting systems, create national research and health management capacity and foster inter-country and sub-regional alliances. The donation of albendazole and Mectizan for lymphatic filariasis control in the onchocerciasis-endemic areas of Africa likewise provides an opportunity to expand Mectizan programmes to hypo-endemic areas of onchocerciasis, thereby bringing the prospect of the elimination of onchocerciasis as a public health problem closer whilst reinforcing the gains of the

OCP through support to country drug distribution and surveillance systems.

In the context of health sector reform and financing via sector-wide approaches (CASSELLS, 1997), programmes such as lymphatic filariasis elimination could be viewed as anomalous because of their distribution systems at the community level; lymphatic filariasis elimination is however time limited. This provides a rationale for distribution systems in Sector Wide Approach Policy as justifiable and a one-off disease elimination effort. The challenge of the lymphatic filariasis global elimination programme, unlike other drug-donation programmes, is magnified by the need for MDA; however, the benefits extend well beyond lymphatic filariasis. If we fail to support countries in initiating successful programmes with free drugs, how can we invest resources in the development of more costly interventions! The benefits of the donated drugs, Mectizan and albendazole, and the philosophy behind the donation are health messages which reflect new approaches to health and development—development targets that are shared by all, contributing to poverty alleviation targets through committed partnership of many, each bringing different strengths. Initiation of new country programmes with strong commitment from Ministries of Health and the strengthening of existing country programmes in Asia and Egypt are in place. The 2 'OCPs' in Africa will also provide a bridge into lymphatic filariasis control with wider implications for sustainability of onchocerciasis control. As with the launch and execution of the smallpox eradication programme it is essential to begin interventions when such an opportunity exists; had we not eradicated smallpox before HIV became widespread, smallpox eradication would now be a much greater challenge because of the occurrence of fatal generalized vaccinia in HIV-infected persons vaccinated with the smallpox vaccine.

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Received 13 July 2000; accepted for publication 25 July 2000