

# The Effect of Hygiene-Based Lymphedema Management in Lymphatic Filariasis-Endemic Areas of Bagalkot.

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**Abstract—Background:** Lymphedema of the leg and its advanced form, known as elephantiasis, are significant causes of disability and morbidity in areas endemic for lymphatic filariasis (LF), with an estimated 14 million persons affected worldwide.<sup>1</sup> Lymphatic filariasis (LF) is endemic in 83 countries and territories, with more than a billion people at risk of infection. In view with the global elimination, mass drug administration (MDA) with single dose of diethylcarbamazine and albendazole tablets was carried out for the eligible population in Bagalkot districts.<sup>2</sup>

**Index Terms—**Filariasis, Evaluation, lymphatic, National Filaria Control Program (NFCP), microfilaremia

## I. INTRODUCTION

Filariasis has been a major public health problem in India. The disease was recorded in India as early as 6th century B.C. by the famous Indian physician, Susruta in his book 'Susruta Samhita. National Filaria Control Program (NFCP) was launched in the country in 1955 with the objective of delimiting the problem and to undertake control measures in endemic areas. The manifold increase in filariasis during last four decades reflects failure of filariasis control programs. Currently there may be up to 31 million microfilaraemics, 23 million cases of symptomatic filariasis, and about 473 million individuals potentially at risk of infection in the country. Lymphatic filariasis (LF) is a major impediment to socioeconomic development (estimated loss \$1 billion per year) and is responsible for immense psychosocial suffering among the affected. Considerable progress has been

made in diagnosis and treatment of filariasis in the last decade and new strategy for filariasis elimination aims at transmission control through mass drug administration (MDA) and at disease control through individual patient management. Annual single-dose co-administration of two drugs (ivermectin + diethylcarbamazine (DEC) or albendazole) reduces blood microfilariae by 99% for a full year while a single dose of one drug (ivermectin or DEC) administered annually can result in 90% reduction.

## II. OVERVIEW OF FILARIASIS

Lymphatic filariasis (LF), commonly known as elephantiasis, is a neglected tropical disease. Infection occurs when filarial parasites are transmitted to humans through mosquitoes. Infection is usually acquired in childhood and causes hidden damage to the lymphatic system. The painful and profoundly disfiguring visible manifestations of the disease lymphoedema, elephantiasis and scrotal swelling occur later in life and can lead to permanent disability. People affected by LF are not only physically disabled, but suffer mental, social and financial losses contributing to stigma and poverty. In 2023, 657 million people in 39 countries were living in areas that require preventive chemotherapy to stop the spread of infection. The global baseline estimate of people affected by lymphatic filariasis was 25 million men with hydrocele and over 15 million people with lymphoedema. At least 36 million people remain with these chronic disease manifestations. Eliminating lymphatic filariasis can prevent unnecessary suffering and contribute to the reduction of poverty

### III. CAUSE AND TRANSMISSION

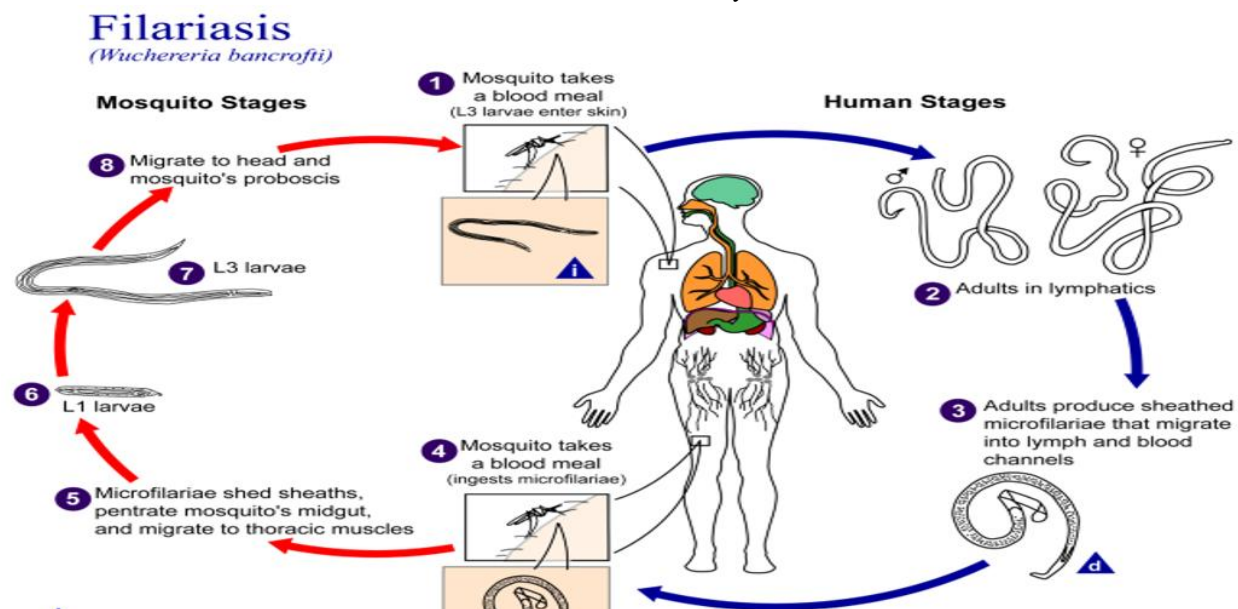
Lymphatic filariasis is caused by infection with parasites classified as nematodes (roundworms) of the family Filariodidea. There are 3 types of these thread-like filarial worms:

- *Wuchereria bancrofti*, which is responsible for 90% of the cases
- *Brugia malayi*, which causes most of the remainder of the cases

- *Brugia timori*, which also causes the disease.

Adult worms nest in the lymphatic vessels and disrupt the normal function of the lymphatic system. The worms can live for approximately 6–8 years and, during their life time, produce millions of microfilariae (immature larvae) that circulate in the blood.

Lymphatic filariasis is transmitted by different types of mosquitoes, for example by the *Culex* mosquito, widespread across urban and semi-urban areas, *Anopheles*, mainly found in rural areas, and *Aedes*, mainly in endemic islands in the Pacific.



The parasite that causes lymphatic filariasis attacks an infected person's lymph system. This system maintains the body's fluid balance and fights infections. Most people with lymphatic filariasis never develop any symptoms of the disease. These asymptomatic infections still cause damage to the lymphatic system and the kidneys and alter the body's immune system.

system, making it difficult for their bodies to fight germs and infections.

These longer-term signs and symptoms may include

- Lymphedema, a swelling of the legs (severe cases are sometimes known as elephantiasis), arms, breasts, or genitalia.
- Hydrocele, or swelling in the scrotum in men.
- Hardening or thickening skin.
- Persistent coughing, wheezing or shortness of breath.

Secondary bacterial infections of the skin or lymph system. These secondary infections occur in people with chronic swelling and poor function of the lymph

### IV. TREATMENT

Elimination of lymphatic filariasis is possible by stopping the spread of the infection through preventive chemotherapy. The WHO recommended preventive chemotherapy strategy for lymphatic filariasis elimination is mass drug administration (MDA). MDA involves administering an annual dose of medicines to the entire at-risk population. The medicines used have a limited effect on adult parasites but effectively reduce the density of microfilariae in the bloodstream and prevent the spread of parasites to mosquitoes.

The MDA regimen recommended depends on the co-endemicity of lymphatic filariasis with other filarial diseases. WHO recommends the following MDA regimens:

- albendazole (400 mg) alone twice per year for areas co-endemic with loiasis;
- ivermectin (200 mcg/kg) with albendazole (400 mg) in countries with onchocerciasis;

The impact of MDA depends on the efficacy of the regimen and the coverage (proportion of total population ingesting the medicines). MDA with the 2-medicine regimens have interrupted the transmission cycle when conducted annually for at least 4–6 years with effective coverage of the total population at risk. Salt fortified with DEC has also been used in a few unique settings to interrupt the transmission cycle.

#### Preventing man-vector contact

1. Mass chemotherapy brings down the microfilaremia to very low levels in the treated population so that transmission of the parasite in the community by the biting mosquito is reduced. There are very effective methods available now for this purpose.

- Annual single doses of DEC 6mg/kg.
- Annual single doses of ivermectin 200 or 400ugm/kg.
- Annual single doses of combination of the above two drugs.
- Annual single doses of combination of albendazole 400mg with either ivermectin 200ugm/kg or DEC 6mg is recommended for the global elimination program.
- DEC medicated salt (0.2%) to replace normal cooking salt.

All these methods are useful for sustained lowering of the microfilaria levels in the population thereby reducing the chances of transmission of the disease. Their use should be continued for many years in the population, due to the long fecundic life of the adult worm.

### V. FUTURE PERSPECTIVES

The recent availability of drugs to prevent transmission of the disease and simple, low-cost treatment modalities which offer relief to person with evident disease, herald a brighter future in tackling this potentially eradicable disease. Mass administration of single annual doses of albendazole 400 mg along with DEC 6 mg/kg body weight is the recommended strategy to prevent transmission of filariasis for India. This has the added benefit of clearing the intestinal helminths in the community.

Goals toward the elimination of lymphatic filariasis will be achieved if affected people have access to the following essential package of care:

- Treatment for episodes of adenolymphangitis (ADL);
- Guidance in applying simple measures to manage lymphoedema to prevent progression of disease and debilitating, inflammatory episodes of ADL;
- Surgery for hydrocele; and
- Treatment for infection.

#### Vector control

Mosquito control is a supplemental strategy supported by WHO. It is used to reduce transmission of lymphatic filariasis and other mosquito-borne infections. Depending on the parasite-vector species, measures such as insecticide-treated nets, indoor residual spraying or personal protection measures may help protect people from infection. The use of insecticide-treated nets in areas where *Anopheles* is the primary vector for filariasis enhances the impact on transmission during and after MDA. Historically, vector control has in select settings contributed to the elimination of lymphatic filariasis in the absence of large-scale preventive chemotherapy.

#### WHO response

World Health Assembly resolution WHA50.29 encourages Member States to eliminate lymphatic filariasis as a public health problem. In response, WHO launched its Global Program to Eliminate Lymphatic Filariasis (GPELF) in 2000.

WHO's strategy is based on 2 key components:

- stopping the spread of infection through large-scale annual treatment of all eligible people in an area or region where infection is present; and
- alleviating the suffering caused by lymphatic filariasis through provision of the recommended essential package of care.

### VI. DISCUSSION

Increasingly required. Valid and reliable information regarding the number of people affected in each of the most frequent clinical expressions, the treatment approach instituted, the structure of care services offered, responses to treatments, disability and the

impact of disease, and patient and community needs are important in the assessment and planning in endemic areas to ensure the best management for the prevention and alleviation of lymphatic filariasis-related disability. As a strategy for use in structuring the assistance of filarial morbidity, the GPELF suggests the identification of the number of individuals affected by the disease in areas where MDA is implemented.

Male urogenital disease (hydrocele and lymph scrotum) and lymphoedema (including ADLA and elephantiasis). Due to the non-uniformity of the methodologies used in the addressed studies, comparison of the data was limited and, therefore, we chose to present the information in similar topics referring to these manifestations.

## VII. CONCLUSION

A characteristic feature of all parasite infections is that complete elimination of all parasites is rarely achieved, presumably since sterilizing immunity might necessitate host deleterious immune responses. Therefore, immune-mediated pathology is often associated with disease manifestation in many parasitic infections. The optimal host response is one that balances parasite control at levels at which the parasite load can be tolerated and leads to maintenance of immune homeostasis without irreparable tissue damage. Filarial infections are a classical example of host-parasite interactions resulting in an immune system-parasite homeostatic balance, which can fail (albeit rarely). However, in the rare instances of failure, the effects are of a debilitating and devastating nature, in large part due to exuberant host immune responses.

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