

Efficacy and sustainability of a footcare programme in preventing acute attacks of adenolymphangitis in Brugian filariasis

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Summary

Lymphatic filariasis is associated with considerable disability related to the intensity and frequency of acute adenolymphangitis (ADL) attacks. The global programme for elimination of lymphatic filariasis emphasizes the need to combine transmission control with alleviation of disability. Footcare aimed at the prevention of secondary bacterial infections is the mainstay of disability alleviation programmes. We evaluated the efficacy and sustainability of an unsupervised, personal footcare programme by examining and interviewing 127 patients who had previously participated in a trial that assessed the efficacy of diethylcarbamazine, penicillin and footcare in the prevention of ADL. During the trial period these patients had been educated in footcare and were supervised. During the unsupervised period, which lasted 1 year or longer, 47 patients developed no ADL, and ADL occurred less frequently in 72.5%. Most patients were practising footcare as originally advised, unsupervised and without cost, which proves that such a programme is sustainable and effective.

keywords Brugian filariasis, acute adenolymphangitis, footcare programme, disability, socio-economic

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Introduction

The global lymphatic filariasis elimination programme relies on the twin pillars of interruption of transmission and alleviation of disability (Seim *et al.* 1999). Repeated attacks of adenolymphangitis (ADL) caused by lymphatic filariasis can result in significant long-term disability by accelerating the progression from oedema to elephantiasis (Pani *et al.* 1995). Acute disease causes considerable short-term disability (Ramaiah *et al.* 1998) resulting in substantial economic loss. For example, a small focus of Brugian filariasis in Alappuzha district alone causes the loss of an estimated 160 000 man-days per year (Sabesan *et al.* 1992). Therefore, the need for effective management of these episodes is very clear.

Adenolymphangitis attacks in patients with Brugian filariasis are precipitated by secondary bacterial infection, which gains entry through broken skin of the affected limb (Shenoy *et al.* 1995). In a study in 1999, we proved that a well-designed footcare programme can

considerably decrease the frequency of acute ADL attacks and contribute to alleviation of disability caused by the disease (Shenoy *et al.* 1999). We found that although ADL episodes were significantly less frequent after 1 year of treatment, it did not stop them altogether, implying that patients with filarial lymphoedema need to be carefully educated and treated for longer periods.

The patients who had completed the study in 1999 were recalled and evaluated after a further period of at least 1 year in order to assess the long-term effects of unsupervised management and the sustainability of the personal footcare programme. The results presented in this paper could have important implications for disability management in Brugian filariasis.

Patients and methods

The study population consisted of patients who had participated in a study that evaluated the role of penicillin,

diethylcarbamazine (DEC) and footcare in the prevention of ADL attacks (Shenoy *et al.* 1999). In that study, 150 patients with lymphoedema of Brugian filariasis who had had two or more ADL attacks in the previous year (based on recall) were taught a comprehensive footcare programme. This required cleaning the affected limb every night with soap and water; keeping the limb dry; applying salicylic acid ointment to the webs of the toes, nails and sides of the feet every night; applying local antibiotic cream when necessary; clipping nails regularly and encouraging regular use of footwear. During the 2-year study period, the study participants' footcare was supervised; afterwards they were instructed to continue the footcare programme on their own to prevent the recurrence of ADL.

These patients were then evaluated at least 1 year after they had begun practising unsupervised personal footcare (i.e. more than 3 years after admission to the 1999 study), to determine the long-term efficacy of this programme in preventing ADL attacks. They were either recalled or enrolled when attending the clinic for treatment of ADL or other unrelated complaints, interviewed and examined to obtain information regarding the efficacy and sustainability of the footcare programme.

The protocols for the original study to evaluate the efficacy and safety of the penicillin/DEC/footcare programme and for the present study to assess the long-term consequences of unsupervised management were approved by the Ethical Committee of T.D. Medical College Hospital, Alappuzha.

Clinical assessments

A medical officer asked each enrolled patient about the footcare procedures followed during the unsupervised period, and about the occurrence of ADL attacks in the past year, i.e. their number, intensity, duration, precipitating factors and the treatment received. The participants were clinically examined to determine the current grade of lymphoedema and the condition of the affected skin, to look for evidence of any local entry lesions for bacterial infection and to assess foot hygiene. These data were then compared with those recorded at the time of discharge from the previous study.

Data analysis

Clinical data were analysed by comparing the frequency of ADL attacks, their intensity, duration and their relation to grades of oedema before and after the period of unsupervised management. All statistical comparisons used Student's *t*-test.

Results

Of 150 patients enrolled initially, 140 had successfully completed the 2-year supervised penicillin/DEC/footcare treatment. Thirteen patients were not available for the present study, leaving 127 participants for analysis. The clinical examinations took place approximately 2 years (mean 25 ± 7 months) after the patients had completed the original study. Information relating to the number of ADL attacks, their frequency and severity was obtained from recall, for the year before the interview, and from clinical examination. There were 55 males and 72 females. Their age ranged from 18 to 67 years (median 45).

ADL attacks

Of 127 patients, 47 did not have any ADL during the year of unsupervised footcare. There were three subjects with grade IV oedema who stated that they could not carry out the footcare as instructed because of the enormous size of the swelling and because they had no help in washing their limbs. They had suffered 24, 29 and 42 ADL attacks during the unsupervised year. The remaining 77 patients who practised footcare had between 1 and 12 ADL episodes during the same period. Thirty subjects had 1–2 attacks, 33 had 3–5 attacks, and 14 suffered 6–12 episodes.

There was a significant reduction in the number of ADL attacks (Table 1) during the first year of enrolment to the penicillin/DEC/footcare study (treatment year) compared with all other time points ($P < 0.0001$ for all comparisons). The incidence of ADL increased during the unsupervised year when patients were continuing the foot cleaning programme on their own, compared with the second year of the earlier study when they were under observation. This increase resulted from the high number of attacks in the three subjects who could not carry out the foot hygiene measures unaided. When these three subjects were excluded from the analysis, there was no difference between the number of ADL attacks between these 2 years ($P > 0.1$) among patients who regularly cleaned and treated their feet.

Among the subjects who did not have any ADL during the study period, there were 19 with grade III lymphoedema, 12 with grade II and 8 with grade IV. Four patients each had grade 0 and I oedema (graded according to standard criteria: WHO 1992; Shenoy *et al.* 1999). Patients with higher-grade oedema suffered from ADL more often (Table 1).

About 72.5% of the patients (including the 47 who had no ADL during the previous year) suffered from ADL less frequently than before their enrolment in the footcare programme. One hundred and twenty-one patients (95.3%) stated that after regularly treating their feet they

Table 1 Incidence of adenolymphangitis attacks and their relation to grades of oedema

Description	Pre Rx year	Rx year	Observation year	Unsupervised year
No. of subjects who had ADL (%)	127 (100)	51 (40.2)	81 (63.8)	80 (63)
ADL per year (range)	2–20	1–6	1–12	1–42 *1–12 (with footcare: 77) *24–42 (no footcare: 3)
Mean ADL per year				
In oedema grade I	2.8	0.6	0.4	1.4
In oedema grade II	3.8	0.4	0.8	1.6
In oedema grade III	4.3	0.6	1.6	2.8
In oedema grade IV	6.2	1.7	3.0	4.4
Total	4.7	0.9	1.7	2.8

either had no ADL at all or that episodes were less severe, shortening the period when they could not work.

Entry lesions

The affected limbs of the 47 individuals who had no ADL attacks revealed no entry lesions. Seventy-five of the 80 patients (93.8%) who had ADL had one or more entry lesions in the affected limb: 54 patients (72%) had candidiasis in the interdigital space, either alone (22 patients) or in combination with injury (30 patients) or eczema (two patients). Forty-three participants had minor injuries in the affected limb (57.3%), either alone (in 12 cases) or in combination with candidiasis, eczema or pyoderma (31 cases). Other entry lesions noted were pyoderma, infected insect bite, paronychia and cracks in the feet.

Two of the three subjects with grade IV oedema who could not practice footcare unaided had candidiasis along with chronic paronychia in one and repeated minor injuries in the other. The third patient, who had suffered 42 ADL episodes in the previous year, had eczema on the affected limb which often got infected, resulting in acute attacks. He was advised to take oral penicillin daily and did not have any ADL on further follow-up.

Discussion

The most conspicuous and incapacitating aspect of lymphatic filariasis because of *B. malayi* is the recurrent acute ADL involving the affected limbs. It is not unusual to have several episodes per year in higher grades of oedema (Shenoy *et al.* 1998, 1999). Each ADL attack prevents the patient from working for at least 1 week, causing considerable economic loss. ADL attacks also increase the lymphoedema, which in turn makes the individual prone to more such episodes, thus setting up a

vicious cycle. It is therefore important that ADL attacks are adequately treated and measures adopted to prevent their recurrence.

Patients with previous lymphatic damage caused by the filarial parasite are prone to secondary bacterial infections especially with streptococci, which play an important role in the aetiology of ADL attacks (Shenoy *et al.* 1995, 1998, 1999; Olszewski *et al.* 1997). The local lesions that facilitate entry of these bacteria can be discerned in the affected limb during most acute attacks; usually they are minor injuries, candidiasis, pyoderma, eczema or fissures in the sole of the foot.

The mainstay in the management and prevention of ADL attacks is local care of the affected limbs (Shenoy *et al.* 1998, 1999). The legs are to be kept raised when the patient is recumbent. Care should be taken to prevent injuries or infections in the affected limb and proper footwear should be used. Local antibiotic or antiseptic creams may be used in cases where there is an injury or local infection.

Disability control is an important aspect of the lymphatic filariasis elimination programme, which in Brugian filariasis is best achieved by preventing or reducing the number of the ADL attacks. As this disease is more prevalent in the economically handicapped regions of the tropics and more often infects the poorer sections of the population, measures to prevent ADL attacks have to be simple, easy to adopt and cheap.

The results of this study demonstrate the sustainability of the personal footcare programme, an easy and affordable procedure that helps reduce or prevent ADL in lymphoedema, even in unsupervised field situations. The strong motivation of patients who had lymphoedema and recurrent episodes of ADL is reflected in the fact that 127 of the 140 who completed the original study could be recalled after a gap of nearly 2 years. All could recollect the instructions given for local hygiene, and most had no

difficulty in practising these measures regularly although some patients with higher grades of oedema found it uncomfortable to keep the legs raised while sleeping. Only three patients could not clean and treat their feet because of the enormous size of the limbs and nonavailability of help in washing.

The efficacy of the programme is certain as it reduced the frequency of ADL episodes in 72.5% of patients who practised footcare. While 47 patients did not have any ADL during the period of assessment, the severity of attacks was greatly decreased even among those who continued to experience them. The three patients who could not look after their feet had the highest number of acute attacks.

Adenolymphangitis episodes increased during the unsupervised period compared with the year under supervision (Table 1). This could be because of diminished adherence to the self-care programme over time when patients were not under observation, implying that if footcare skills were periodically reinforced by patient education, the self-care programme probably could have achieved even better long-term results.

The findings of this study have important implications for the global lymphatic filariasis elimination programme. Educating the patients in footcare and its importance in preventing ADL attacks in the early stages of the disease would help alleviate morbidity in the long run.

Acknowledgements

We thank Dr Eric A. Ottesen, previously Project Leader, Filariasis Elimination, TDR/WHO, and Dr Oladele O. Kale, previously Manager, Task Force on ComDT, TDR/WHO, for their encouragement and valuable advice. We gratefully acknowledge the help received from Dr Anil John and Dr S.R. Arun (Clinical), Mrs P.V. Jaykala and Ms V. Sunitha (sociological), Mrs S. Bindhu Thomas (laboratory) and Mrs S. Sindhu (secretarial). Our thanks are also due to the Principal and Superintendent of T.D. Medical College and Hospital for their support and encouragement. This study was supported by the UNDP-

World Bank/WHO Special Programme for Research and Training in Tropical Diseases.

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