CASE REPORT

Leprosy and lymphatic filariasis comorbidity: the case for an integrated functional limitation grading system

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Summary Worldwide, both lymphatic filariasis (LF) and leprosy are major causes of morbidity and functional limitation. Despite an abundance of data on the impairment caused by these infections in isolation, there is little data on disability in patients unfortunate enough to be affected by both infections. We present two cases of patients with LF and leprosy comorbidity. Both cases suffer from Grade 2 disability and chronic lymphedema in the same limb (left and right leg, respectively). These morbidities cause significant functional limitation in the patients’ activities of daily living. Both LF and leprosy are endemic in India and their comorbid conditions contribute to functional limitation. However, there is still currently no integrated scale for assessment of interventions for functional limitation in these patients. Investigating and managing impairment and functional limitations individually is the least cost effective and sustainable strategy. Considering the similarities of caring for functional limitations in both diseases and assuming its efficacy, augmentation of LF care services with leprosy referral centres may be beneficial. Integrated approaches have been pilot tested at district level in states in India under the title ‘Integrated Prevention of Deformity project’ (IPoD). Further work is required to identify a reliable, holistic, functional impairment scoring system, which allows for comparison between diseases. This may help promote greater understanding of impairments and functional limitations these cause and allow effective monitoring and evaluation of all aspects, activities and stages of similar programmes.

Introduction

Leprosy is caused by *Mycobacterium leprae* (*M. leprae*) an ancient pathogen with a tropism for Schwann cells of peripheral nerves. Lymphatic filariasis (LF) is caused by three filarial nematodes, the commonest being *Wuchereria bancrofti*. In India, LF and leprosy are both endemic.
Both LF and leprosy still greatly contribute to the global burden of morbidity and functional limitation,\textsuperscript{3,4} which remain following successful treatment of the initial infection. It is estimated that globally, 40 million people live with chronic disability following LF infection.\textsuperscript{5} This makes it the most debilitating neglected tropical disease (NTD) worldwide.\textsuperscript{3} Leprosy still remains one of the leading causes of non-traumatic peripheral neuropathy worldwide\textsuperscript{6} and by 2020 it is estimated that there will be 1 million people living with Grade 2 disability secondary to leprosy.\textsuperscript{4} Grade 2 disability is defined as the presence of visible deformity or damage to the hands/feet or severe visual impairment caused by leprosy.\textsuperscript{7}

Despite augmentation of services caring for both diseases, a scoring system for functional impairment in both is still required to allow comparison. We present two cases of patients who are currently being managed at the Dhoolpet Leprosy Referral Centre (DLRC), Hyderabad.

**CASE 1**

In June 2013, a 56 year old, illiterate, female, Indian housekeeper attended the DLRC clinic. She had been diagnosed and treated for LF in 1994. In 1999, she was diagnosed with multi-bacillary (MB) leprosy after presenting with Grade 2 disability. She described living with symptoms of leprosy for 5 years preceding her presentation. She was treated with Multi-bacillary Multi-Drug Treatment (MB MDT) for 24 months. Since 1994, she has suffered from a chronic pulling and dragging pain in her left leg. On diagnosis of leprosy, in 1999, her husband divorced her. She has been forced to continue to work as a housekeeper to support herself for the past 15 years.

Examination findings from clinic in June 2013 are described in Table 1.

**Table 1.** Comparison of Examination findings from clinic – June 2013

<table>
<thead>
<tr>
<th>Lymphoedema Grade/Stage</th>
<th>Case 1</th>
<th>Case 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 3 of left leg &amp; foot (non-pitting oedema with hypertrophy of the skin)</td>
<td>Grade 2 of the right leg and foot (non-pitting oedema)</td>
<td></td>
</tr>
<tr>
<td>Leprosy Grade</td>
<td>Grade 2 with visible damage of the left foot</td>
<td>Grade 2 with visible damage of the right foot</td>
</tr>
<tr>
<td>Palpation</td>
<td>The lateral popliteal nerves were palpable bilaterally and the posterior tibial was palpable in the left leg</td>
<td>No palpable nerves</td>
</tr>
<tr>
<td>Sensation</td>
<td>Complete sensory loss (Grade E) of the left foot, including the sole</td>
<td>Complete loss of sensation (Grade E) over the tibial boarder of the sole of the right foot. Affecting the great toe and the medial side of the heel</td>
</tr>
<tr>
<td>Corneal Reflex</td>
<td>Intact</td>
<td>Intact</td>
</tr>
<tr>
<td>Muscle Strength</td>
<td>Power in the extensor hallucis longus (EHL) bilaterally scored MRC grade 3/5 on the right &amp; 4/5 on the left</td>
<td>Power in the right EHL MRC grade 3/5</td>
</tr>
<tr>
<td>Visual Acuity</td>
<td>06-Jun</td>
<td>06-Jun</td>
</tr>
<tr>
<td>Skin Condition</td>
<td>Left heel - 3 x 2 cm ulcer extending 1.5 cm deep from the skin with a watery discharge</td>
<td>Right great toe - 1.5 x 1.5 cm ulcer 0.5 cm deep from the skin. No discharge</td>
</tr>
<tr>
<td>Most recent slit skin smear</td>
<td>2011 – absence of M. leprae</td>
<td>2011 – absence of M. leprae</td>
</tr>
</tbody>
</table>
She had been regularly attending the DLRC for the management of recurrent ulcers affecting the left foot for the past 15 years. Despite multiple courses of antibiotics, provision of micro cellular rubber (MCR) footwear, monthly physiotherapy and continued education of correct foot care, the patient suffers from chronic morbidity secondary to these past infections.

CASE 2

A 55 year old, male, Indian, school teacher presented to clinic in June 2013. In 1983, he had presented with Grade 2 disability. He was diagnosed with MB leprosy and treated with MB MDT for 24 months. In 2011, he had presented to the clinic with a chronic ulcer of the right great toe. At this time, swelling of the right leg and foot was noticed and further investigated. In early 2012, the patient was diagnosed with LF with Grade 2 lymphedema and treated with diethylcarbamazine (DEC). Since 2012, he has suffered recurrent attacks of acute dermatolymphangioadenitis (ADLA) which are characterised by fever with pain and erythema of the right leg. These were managed with DEC, paracetamol and anti-inflammatories. The patient continues to work for the government and is married with 8 children.

Examination findings from clinic in June 2013 are described in Table 1. He has regularly attended clinic for the past 3 years for management of his comorbidities. Despite multiple courses of antibiotics, monthly physiotherapy, weight loss (140kg from 165kg in 2011), and continued education of correct foot care, the ulcer and lymphedema have been difficult to treat. MCR footwear can not be provided due to the extent of the lymphedema of the foot making it impossible to find a sandal that fits the right foot (Figure 1).

Discussion

We present two patients who suffer from Grade 2 disability and persistent lymphedema secondary to leprosy and LF infections in the same leg (left and right, respectively). Both of these patients have chronic ulcers in the same leg, which are resistant to conventional management approaches. Despite an abundance of data on morbidity and functional impairment caused by these diseases in isolation, there is little data on functional impairment in patients unfortunate enough to be affected by both conditions. This may partly be due to the lack of a robust functional impairment scoring system to allow for comparison.

The WHO International classification for functioning, disability and health (ICF) describes function and disability as an interaction between health conditions of an individual and their environment. Therefore, one must consider both, impairment of the body structure or system, as well as the functional limitations on activities of daily living (ADL) or social involvement. Impairment alone does not make a person disabled. Disability occurs when the impairment limits a person’s ability to perform ADL or interact with society.

In leprosy, the WHO disability grading system is the most commonly used system for grading impairment. While this has been shown to be a reliable method, it also has a level of subjectivity. There are concerns that the brief guidelines and definitions for grading systems allow for interpretive differences between sites based on individual interpretations.

In LF, a number of generic disability measurement tools have been trialed. These include, the ICF, World Health Organization Disability Assessment Schedule (WHODAS),
and World health Organization Quality of Life (WHOQOL). Zeldenryk and colleagues suggest that while generic measurement tools allow for comparison of disability between different diseases they are not specific or sensitive enough to the specific problems encountered in LF. They also fail to measure impairments or functional limitations, only measuring disability. Therefore, specific measurement tools for accurate reporting of the impact of impairment and functional limitations in LF may be beneficial.

Investigating and managing functional impairment caused by comorbidity requires a holistic approach. Leprosy and LF are two major neglected tropical diseases with progressive functionally limiting conditions attached to chronic manifestations, affecting health, social and economic status of the people affected. There are many similarities between both conditions. The hands and feet are commonly affected and detection of early warning signs and treatment helps prevent complications. Management requires daily skin care and customised footwear. Stigma, prejudice, discrimination and deprived human rights are common issues, which must be addressed along with disability care.

Individually investigating and managing impairment and functional limitations is the least cost effective and sustainable strategy. This isolated approach has been a major criticism of past attempts at investigating the impact of disability. Considering the similarities of caring for functional limitations in both diseases and assuming its efficacy, augmentation of LF care services within leprosy referral centres may be beneficial. This is supported by the WHO’s report on morbidity management and disability prevention in LF, who discuss
“multi-interventional package’s” of care. Such an integrated approach was pilot tested at district level in Odisha, Bihar and Andhra Pradesh states in India. This was done under the title ‘Integrated Prevention of Deformity project’ (IPoD).

Further work is required to identify a reliable, holistic, functional impairment scoring system, which allows for comparison between diseases. This must take into account scenarios where comorbidity is present. This may help promote greater understanding of impairment and functional limitations these cause and allow proper monitoring and evaluation of all aspects, activities and stages of similar programmes.

References