CASE REPORT

Borderline Hansen complicated by a metastatic cold abscess

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Accepted for publication 1 June 2015

Introduction

Simultaneous occurrence of cutaneous tuberculosis and leprosy is rare, even in endemic countries. A review of sporadic reports of their concurrence in the past, mostly from India revealed absence of BCG scar in all of them.

Case report

An 18 year old male presented to our dermatology outpatient department complaining of multiple light coloured lesions all over his body for 1 year and a large pear shaped swelling on the right side of his chest for 4 months duration. Initially the patient noticed an asymptomatic, coin sized, light coloured flat lesion on his trunk a year ago and subsequently multiple such lesions appeared on his chest, abdomen, back, thigh and upper limbs which gradually enlarged to their present size. Eight months after the appearance of hypopigmented lesions, a single pea sized swelling appeared on the right side of his chest, which gradually expanded and was associated with mild pain. There was no complaint of fever, productive cough, evening rise of temperature, weight loss or any other constitutional symptoms. The patient also denied any previous history of leprosy or tuberculosis in himself or family members.

On examination multiple, well defined, hypo-pigmented macules and plaques were present on his chest, abdomen, back, thigh and upper limbs. These lesions varied in size from the smallest 0.5 cm × 0.5 cm lesion on his back to the largest of a 5 cm × 5 cm lesion on his...
abdomen. The plaques were well defined, irregular in shape and associated with a dry surface in addition to loss of appendages. The lesions were distributed asymmetrically on the anterior trunk with a tendency to symmetry on his back (Figure 1).

Examination revealed sensory loss to temperature, fine touch and pin-prick sensation on the lesions as compared to normal skin. Motor-sensory examination of hands and feet was within normal limits and cranial nerve examination revealed no abnormality. Bilateral greater auricular nerve, left ulnar and bilateral posterior tibial (R > L) were enlarged. A single large fluctuant swelling of size 6 cm × 4 cm was present on the lower right side of his chest (Figure 1). It was non-tender, oval in shape with ill-defined margins, and the overlying skin was normal. There was no lymphadenopathy and a BCG scar was absent. A provisional diagnosis of borderline lepromatous leprosy with a metastatic cold abscess was kept.

A skin biopsy from the smallest hypopigmented lesion on the back revealed the presence of multiple epitheloid cell granulomas around adnexal structures (Figure 2). Fite-faraco stain for AFB was negative in the histopathology section. A slit skin smear from smallest lesion showed solid acid fast bacilli (AFB) with 1+ positivity on Ridley-Jopling scale and was negative from his ear and normal skin. FNAC from the fluctuant swelling on his chest reported caseous necrosis with absence of AFB. Chest X ray showed in-homogenous opacities in the right upper lobe, linear fibrotic opacities in the right middle lobe and blunting of right costophrenic angle (Figure 3).

![Figure 1.](image-url) Multiple, well defined, hypo-pigmented macules and plaques on chest, abdomen and back. Left greater auricular nerve is visibly enlarged. A pear shaped fluctuant swelling of size 6 cm × 4 cm present on lower right side of the chest.
An early morning sputum sample for AFB was negative on two occasions. X-ray and MRI of the dorso-lumbar spine and ultrasound abdomen were normal. ESR was 25mm in the first hour and the patient was sero-negative for HIV. Other hematological and biochemical investigations were within standard limits. A diagnosis of pulmonary TB along with metastatic cold abscess and concomitant BT Hansen was made. The World Health

Figure 2. (a) Section showing transdermal lymphohistiocytic aggregates and a single granuloma in the papillary dermis. (H&E, ×40). 2(b) The dermal appendage shows an epitheloid cell granuloma (H&E, ×40). 2(c) High power view showing epitheloid cells surrounded by few lymphocytes (H&E, ×200).

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Organization (WHO) Directly Observed Therapy Short course (DOTS) category I anti-tubercular therapy (ATT) along with multibacillary multidrug therapy (MBMDT) for leprosy (except the monthly supervised dose of rifampicin) was prescribed. The metastatic cold abscess (gumma) gradually disappeared after 4 months of therapy with ongoing fading of hypo-pigmented lesions (Figure 4).

**Figure 3.** Chest X ray (PA view) showing in-homogeneous opacities in right upper lobe, linear fibrotic opacities in right middle lobe and blunting of right costophrenic angle.
Discussion

Leprosy and tuberculosis (TB) are endemic in India and a cause of major public health concern. The relationship between the two infections has been quite enigmatic. The reported incidence of pulmonary tuberculosis in patients with known leprosy has ranged from 2·5% in India\textsuperscript{1} to as high as 13·4% in South Africa\textsuperscript{2} and was reported throughout the leprosy spectrum.

Figure 4. After four months of treatment, the swelling on chest subsided with decrease in erythema and infiltration of plaques of leprosy.
This association is reported when cases of leprosy are examined but is not detected when cases of tuberculosis are examined. The high incidence of pulmonary tuberculosis in leprosy patients reported in older literature could have been coincidental or that it may actually reflected common environment denominators predominating at that time. The worldwide prevalence of these two infections has decreased drastically over the last few years and thus the co-infection has hardly been reported in the last decade. Although India is still endemic for TB, the estimated TB prevalence in India has decreased from 2.3% in the 1980’s to 0.22% in 2012. India achieved leprosy elimination in 2005 and the national prevalence rate of leprosy was 0.068/10,000 in 2014.

Mycobacterium leprae is a more prevalent cause of cutaneous infections as compared Mycobacterium tuberculosis. Although both belong to the same family of organisms, their co-existence in skin is a rare entity. The reasons for this are many:

- The competitive-exclusion principle of population biology states that two species cannot coexist indefinitely if they occupy (or compete for) the same environmental niche.
- Etiological, immunological, morphological and chemotherapeutic similarities between tuberculosis and leprosy seem to provide cross immunity. They are both gram-positive acid-fast mycobacteria, characterized by chronic granulomatous diseases that manifest in a spectrum of clinical and histopathologic features reflecting the host’s immune response to the infective agents.
- M. leprae grows at 30–33°C, with a doubling time of 12 days while the same is 20 hours for TB bacilli. The incubation period in leprosy varies 3–5 years or longer, whereas in the case of tuberculosis it is only 4 weeks. The principal means of transmission of both leprosy and tuberculosis is by aerosol spread and the transmission dynamics favour the easy spread of tuberculosis.
- The immunological defect in leprosy is quite specific and does not predispose to any other mycobacterium infection.

The duration of gap between the development of leprosy and cutaneous TB in reported literature has varied from 15 days to 12 years (Table 1).

All cases of multibacillary cutaneous tuberculosis developed within 1 year of the onset of leprosy. A endogenous focus of TB was present in these cases which could have been activated by decreased immunity. No correlation was noted between the duration of the onset of leprosy and paucibacillary type of cutaneous tuberculosis. Since the systemic focus of tuberculosis was not isolated in these patients, they could have become infected by exogenous inoculation of TB bacilli in incubating/manifested leprosy. A BCG scar was present in a single case of cutaneous co-infection (reported from our institute), absent in four other cases, not commented upon in five and one case was induced by vaccination. BCG vaccination appears to protect against concurrent leprosy and cutaneous tuberculosis (Table 1). The cause of concomitant infection despite vaccination in a single case reported might be due to decreased protection in the elderly, possibly because of waning immunity and co-morbidity.

Previous reports of concomitant cold abscesses with leprosy were associated with lower pole (low immunity-BL, LL) of the Ridley-Jopling classification and had received corticosteroids for their reaction episodes. Our case developed a tuberculosis cold abscess with pulmonary involvement, 4 months after the onset of skin lesions of upper pole (high immunity-TT,BT) of leprosy. He had never received steroids, was serologically negative for HIV and did not have a BCG scar.
Table 1. Reported concomitant associations of leprosy with cutaneous tuberculosis

<table>
<thead>
<tr>
<th>Authors</th>
<th>Patient Profile</th>
<th>Leprosy</th>
<th>Intervening duration</th>
<th>Cutaneous tuberculosis</th>
<th>BCG scar</th>
<th>Systemic involvement/focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kulkarni et al.</td>
<td>25 Y/M</td>
<td>Borderline lepromatous leprosy</td>
<td>1 year</td>
<td>Multiple Cold abscesses</td>
<td>Not Commented</td>
<td>Joint/lymph node involvement</td>
</tr>
<tr>
<td>Patki AH</td>
<td>35 Y/F</td>
<td>Borderline Lepromatous Leprosy</td>
<td>4.5 years</td>
<td>Multicentric lupus vulgaris</td>
<td>Absent</td>
<td>Absent</td>
</tr>
<tr>
<td>Dixit et al.</td>
<td>60 Y/F</td>
<td>Lepromatous Leprosy</td>
<td>8 months</td>
<td>Multiple cold abscesses and scrofuloderma</td>
<td>Not Commented</td>
<td>Bone/lymph node tuberculosis</td>
</tr>
<tr>
<td>Pinto J et al.</td>
<td>36 Y/M</td>
<td>Borderline Tuberculoid leprosy</td>
<td>12 years</td>
<td>Tuberculosis verrucosa cutis</td>
<td>Not commented</td>
<td>Absent</td>
</tr>
<tr>
<td>Inamadar AC</td>
<td>23 Y/M</td>
<td>Tuberculoid Hansen</td>
<td>15 Days</td>
<td>Scrofuloderma</td>
<td>Absent</td>
<td>Pulmonary miliary TB</td>
</tr>
<tr>
<td>Kumaran MS</td>
<td>33 Y/M</td>
<td>Lepromatous leprosy</td>
<td>Not mentioned</td>
<td>Lichen scrofulosorum</td>
<td>BCG induced</td>
<td>Absent</td>
</tr>
<tr>
<td>Ravindra K et al.</td>
<td>10 Y/M</td>
<td>Borderline tuberculoid Hansen</td>
<td>1 year</td>
<td>Tuberculosis verrucosa cutis</td>
<td>Not commented</td>
<td>Absent</td>
</tr>
<tr>
<td>Rao GR</td>
<td>17 Y/M</td>
<td>Borderline tuberculoid leprosy</td>
<td>6 months</td>
<td>Lupus vulgaris</td>
<td>Not commented</td>
<td>Absent</td>
</tr>
<tr>
<td>Das et al.</td>
<td>65 Y/M</td>
<td>Multibacillary Hansen</td>
<td>4 months</td>
<td>Scrofuloderma</td>
<td>Absent</td>
<td>Lymph node tuberculosis</td>
</tr>
<tr>
<td>Ghunawat et al.</td>
<td>70 Y/M</td>
<td>Borderline tuberculoid Hansen</td>
<td>1 year</td>
<td>Scrofuloderma</td>
<td>Present</td>
<td>Bone tuberculosis</td>
</tr>
<tr>
<td>Present case</td>
<td>18 Y/M</td>
<td>Borderline tuberculoid Hansen</td>
<td>8 months</td>
<td>Metastatic cold abscess</td>
<td>Absent</td>
<td>Pulmonary involvement</td>
</tr>
</tbody>
</table>

Borderline Hansen complicated by a metastatic cold abscess.
BCG vaccination administered at birth or in the first year of life has been known to provide partial protection against leprosy for at least three decades. The 65 kilodalton antigens of *M. bovis, M. leprae* and *M. tuberculosis* display greater than 95% homology in amino acid sequence as evidenced by the conversion of both lepromin and tuberculin intradermal tests after injection of bacillus CalmetteGuerin (BCG).

In the disease spectrum of leprosy, interactions and coincidental associations with other diseases can be expected to occur from time to time, especially if sought meticulously. Review of the literature reveals absolutely no antagonism between the two mycobacterial diseases. Poor host resistance can be blamed for the co-existence of leprosy and multibacillary cutaneous TB while co-infection with paucibacillary cutaneous TB may actually reflect common environmental denominators. Their co-incidence was recently attributed to the inability of peripheral blood mononuclear cells to upregulate the IL-12 receptor expression. Even though the efficacy of the BCG vaccine is often questioned, it does seem to provide cutaneous immunity in preventing mycobacterial co-infections. Repeated BCG vaccination may serve as an immunoprophylaxis to decrease the incidence of leprosy in endemic countries and should be considered in their national programmes.

References