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Case Report

Inoculation leprosy and HIV co-infection: a rare case with nerve involvement preceding development of skin patch and type1 reaction as immune reconstitution syndrome following antiretroviral therapy

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The transmission of leprosy has been universally accepted to be primarily, through nasal dissemination from multibacillary patients to the susceptible persons. However, the possibility of leprosy transmission through prolonged skin contact with abraded leprous skin or through skin inoculation can not be ruled out. We report a case of development of a paucibacillary leprosy patch close to the site of a local trauma, after an interval of about 13-14 years, in a HIV positive subject. Also discussed are the various hypotheses in the aetiopathogenesis of leprosy like entry route of lepra bacilli into the body, viability of lepra bacilli in the environment and evolution of skin and nerve lesions of leprosy.

Key words : Inoculation leprosy, HIV co-infection, Type 1 reaction, Antiretroviral therapy

Introduction

The lepra bacilli are primarily transmitted through nasal dissemination from multibacillary patients to the susceptible persons. The susceptibility to acquire leprosy infection is in turn determined genetically as observed in associations with several HLA types and 95-99% of human population is believed to be naturally immune to leprosy acquisition. However, transmission of leprosy through prolonged skin contact with abraded leprous skin or through skin inoculation has been perceived with reluctance, considering it a remote possibility by many. There have been many reports of leprosy development after various sorts of trauma e.g. tattooing (Wade 1948, Ghorpade 2002), vaccination (Sehgal et al 1970, Ghorpade 2007), roadside injury (Mittal et al 1976), after dressing of a wound in a lepra hospital (Brandsma et al 2005), dog bite (Gupta et al 1984) and following injury sustained by a surgeon during operating a lepromatous leprosy patient (Achilles et al 2004). We report a case of development of paucibacillary leprosy plaque close to the site of a local trauma connected through a thickened cutaneous nerve after an interval of about 13 years in a HIV positive subject.

Case Report

A 46 year old HIV positive male factory worker, registered in the antiretroviral treatment (ART) clinic, was routinely examined in the skin department along with his HIV positive wife (who

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was referred to us for drug rash problem due to ART). He had been on ART since April 2005 and on clinical examination, he was found to have an erythematous plaque with definite sensory loss around right knee. The plaque size was about 5x5cm, located just below patella, with well defined edges, dry scaly surfaces and definite sensory impairment to touch, pain and temperature. Also, another lesion, a 2x2 cm size hyperpigmented scar mark was observed on the medial side of patella at a distance of 9 cm from the plaque described above. In the intervening region between the two lesions, a thickened cord like nerve (5-6 mm thick, infra-patellar branch) was present, virtually linking the above two lesions (Figure 1). The patient remembered getting this scar mark as a result of trauma sustained 15-16 years ago (at the age around 30 years). The patient noticed the first described lesion some 3 years ago but definitely before he became aware of his positive HIV status and initiation of HAART. He also remembered this plaque having suddenly gone more erythematous and raised, with subsequent scaling, about 2 months after the HAART was started. For this development, he was advised to apply some ointment in a private clinic. There was no other plaque or patch with sensory impairment/loss or any other thickened nerve observed in any part of the body. The bacteriological index (BI) was zero from the earlobes, eyebrows and the plaque. The skin biopsy from the plaque showed a diffuse epithelioid cell granuloma with a free but narrow papillary zone and dermal oedema. The Fite Faraco stain of the slide was negative and the final diagnosis was borderline tuberculoid (BT) leprosy with type1 reaction (Figure 2).

Other relevant history details include no history of receiving anti-tuberculosis treatment (ATT) and the BCG mark was visible on his left arm. There was no history of leprosy, diabetes mellitus in the family, though patient's mother had received treatment for tuberculosis. Patient is a married man with 4 children (aged 20, 16, 15 and 6 years), all HIV non-reactive and patients wife is HIV positive. Patient gave a history of multiple unprotected heterosexual exposures with sex workers during 1996-1998. He was first diagnosed to be HIV positive in March 2005, the CD4 count at that time was 112 and has been on HAART since then. He had several other dermatological manifestation during this period e.g. Tinea cruris (2006), Herpes zoster (thoracic) in March 2006,

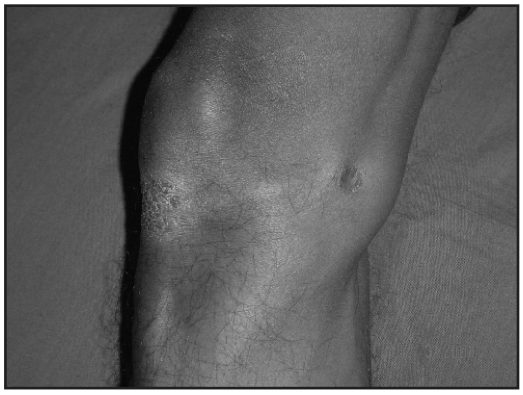

Figure 1 : The Borderline tuberculoid leprosy patch with scaling on the right leg just below the knee. Also visible is the scar lesion of trauma in the remote past on the medial aspect of knee joint and the thickened infrapatellar nerve between the two lesions.

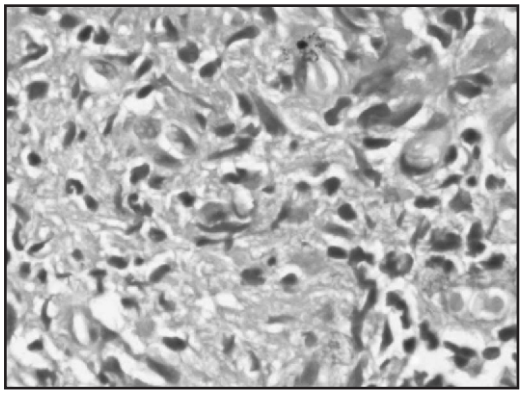

Figure 2 : Borderline tuberculoid granuloma with loose epithelioid cells and oedema in the surrounding dermis (H&E Stain x400).

Scabies (November 2005), besides other features like diffuse scalp alopecia, lipodystrophy.

Discussion

Transmission of leprosy via entry of lepra bacilli through skin is an issue, debated considerably for long (Girdhar 2005). It has been reported to have occurred after instances of tattooing, vaccination, roadside injury, after dressing of a wound in a lepra hospital, dog bite and following injury sustained by a surgeon during operating a lepromatous leprosy patient. The role of fomites in transmission also seems to be a possibility wherein lepra bacilli could be transported to the open wounds as has been observed in the case of leprosy developing 4 years after dressing of injury wound in a leprosy hospital. The present case under report, throws light on several aspects of aetiopathogenesis of leprosy and lepra reactions:

1. Lepra bacilli have a predilection for nerves. These affected nerves are either dermal (cutaneous) or nerve trunks, invariably situated in cooler and trauma prone sites. Often these two factors coincide and our case is not exceptional in this regard. The neural involvement is seen either in absence of dermal lesions, designated as pure neuritic leprosy (PNL) or in some of such neuritic leprosy cases, dermal lesions may appear sometime later. In a prospective study of 17 pure neuritic leprosy cases followed up to a period of 2 years, 4 patients developed skin lesions (Pannikar et al 1983). In another study in a series of 182 PNL patients, 29 developed visible skin lesions during follow-up of 2-4 years (38% had single lesion and 28% two lesions) (Suneetha et al 2005). In the present case, the sites of trauma and the development of single leprosy patch along with the presence of thickened connecting the two sites relates well the evolution of the initial nerve and later skin lesions. It is clear that following trauma there was inoculation of lepra bacilli with primary involvement of nerve leading to its thickening and secondarily the patch developed later, at a distance of 8-9 cm from the site of trauma.
2. The location of single lesions of leprosy has predominantly been found over the sites of body prone to trauma. In the study of 182 cases discussed above (Suneetha et al 2005), over three-quarters of the lesions were on the limbs (47% lower limb and 29% on upper limb). Another study by Bedi et al (1975) has described the distribution of single lesions of tuberculoid leprosy located significantly over extensor aspects, the sites more prone to trauma (as compared to those over flexor aspects). The development of leprosy lesion after local trauma in the present case also supports the hypothesis that direct skin inoculation of lepra bacilli is a possibility that can not be ignored. In a retrospective case report like this one, it is not usually possible to prove the exact mode of transmission of the causative agent. The history of local trauma 15-16 years ago and the development of neural lesion (thickened nerve) exactly at the site of trauma, coupled with development of cutaneous lesion at the terminal end region of the nerve, is sufficient to deduce the evolution of skin and nerve lesions in the present case. The period of development of lesions (about 13 years, in this case) also falls within the known incubation period for the disease. This is further supported by the fact that this was the single lesion, present for the past over 3 years. There was no other skin or nerve lesion anywhere else in the body.
3. Lepra bacilli are discharged in large quantities from multibacillary leprosy patients, from upper respiratory tract, abraded skin and reportedly even from intact skin (Job et al 1999). Persistence of viable lepra bacilli in the environment has been reported to be for a period of around 5-6 months (Desikan and Sreevatsa 1995). It is

also evident in the present case, as the patient sustained the injury with a sharp wooden object. There was no history of leprosy patient in his family or in the neighborhood obviously either the wooden object might have harbored lepra bacilli for long time or the lepra bacilli entered into the body through the trauma site from contaminated floor, dressing material or clothing/ fomites.

4. Incubation period of leprosy is difficult to determine and widely differing opinions exist. It probably ranges from 6 months to 40 years or longer, the mean incubation period is believed to be 4 years for tuberculoid leprosy and 10 years for lepromatous leprosy (LL). (Felisa et al 2008). It was 4 years in the case report cited above (Brandsma et al 2005) and about 14 years in the present case.

5. The immune reconstitution inflammatory syndrome (IRIS) in leprosy is a frequently reported and widely recognized phenomenon now (Lawn et al 2003, French et al 2004, Narang et al 2005). It presents as an upgrading (reversal) type1 reaction in leprosy HIV co-infection, following initiation of HAART. Clinically and histopathologically, it is indistinguishable from that occurring after anti-leprosy multidrug treatment (MDT). Some authors are of the view that the term IRIS in leprosy HIV co-infection should exclusively be used for the type1 reaction occurring after HAART and not occurring after MDT (Kaur and Singh 2006). In the present case, as per the patient's history, though the skin patch was present before the initiation of HAART, the type1 reaction occurred about 2 months after initiation HAART with the patch showing more redness followed by scaling. This report does not imply that HIV had any role in development of leprosy lesions. The reference to HIV interaction with the leprosy lesion has only been to the extent, that the lesion became reddish, raised and scaly, a few weeks after the ART was started. This was coupled with rise of CD4 counts from 112 to 245.

Acquisition of leprosy infection occurs commonly not only through nasal route but could also occur through direct inoculation following local trauma as well. Once lepra bacilli acquired, the further course depends upon the natural susceptibility and inherent lepra immune status of the individual, whether if at all he is going to develop the disease and what form of leprosy he is likely to develop. Evolution of limited (paucibacillary) form of leprosy states in favor of inoculation hypothesis of leprosy transmission.

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