CASE REPORT

Inoculation indeterminate leprosy localised to a smallpox vaccination scar

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Summary  A single, indeterminate leprosy lesion localised exclusively to a smallpox vaccination scar in a 32-year old Indian male is reported. The diagnosis was confirmed by histopathology. This is the second published report of a leprosy lesion occurring at the site of a smallpox vaccination.

Introduction
The exact mode of transmission in leprosy is unclear and the skin has been considered as one potential route of its transmission.1–3 The occurrence of a single leprosy lesion localised to a smallpox vaccination scar is a pointer towards the importance of the skin as a portal of entry for Mycobacterium leprae.

Case report
A 32-year old Indian male, a resident of Bhilai, presented with an asymptomatic skin lesion on his right upper arm which had been present for 5 months. It had started over a smallpox vaccination scar and gradually spread to involve the surrounding skin. As the vaccination was done in a village during early childhood, the details of the procedure and aseptic precautions were not known. There was no family history of any skin lesions. There was no history of any apparent preceding immune suppression or trauma prior to the development of the skin lesion.

Cutaneous examination showed an ill-defined, hypopigmented, hypoaesthetic patch localised over and around the scar of a smallpox vaccination over the right upper arm, measuring about 4 cms × 3.2 cms in size (Figure 1).
There were no other skin lesions or systemic complaints. Histopathological examination of a biopsy taken from the arm lesion showed peri-appendageal lymphohistiocytic infiltrate, which was arranged in a linear fashion along the nerves at a few places. No acid-fast bacilli were detected in the section after Ziehl-Neelsen staining. There was no thickening and/or tenderness of any peripheral or local cutaneous nerve. Slit skin smears from routine sites were negative. A diagnosis of indeterminate leprosy was made. He was put on paucibacillary multi-drug treatment (dapsone 100 mg daily and rifampicin 600 mg once a month). The skin lesion showed remarkable improvement after 8 months of treatment.

Discussion

The development of leprosy lesions at the site of tattooing, wounds or minor abrasions suggests the skin as a possible portal of entry for *M. leprae*.1–7 Another pointer to this route is the site of the single leprosy lesion, which is mostly seen over the trauma-prone exposed body part.8,9

The development of a leprosy lesion in this patient after, and at the site of vaccination, and its exclusive localisation to that site, suggests that this could be a case of inoculation leprosy. However, inoculation alone or subsequent infection of the vaccination wound may not be the only factors responsible for the leprosy lesion, as the incubation period was long. *M. leprae* might enter the body primarily through the upper respiratory tract, and could be subsequently drawn to the site of injury to produce skin lesion(s) depending on the local factors, local

![Figure 1. Irregular hypopigmented patch over and around the smallpox vaccination scar.](image-url)
temperature and possibly local factors intrinsic to a wound. In a recent report of indeterminate leprosy developing at a traumatic site, the authors suggested the likelihood of contamination of the wound with \textit{M. leprae} in the leprosy hospital environment, or through the flies attracted to the wound site. The report of a surgeon from a non-endemic area acquiring leprosy accidentally from a patient during an operation is interesting. Therefore, it seems more likely that multiple factors might be contributing to the development of a leprosy lesion after the initial exposure to the organism.

That the first lesion in the artificial infection of armadillos appears at the site of inoculation, gives credence to the theory of skin transmission of leprosy. There is a single report of tuberculoid leprosy developing at the site of a smallpox vaccination after 6 months in a young Indian lady, where the authors even conjectured that tuberculoid leprosy with one or two skin lesions should be considered as inoculation leprosy. The published reports mentioned above, the present case, and a recent demonstration of \textit{M. leprae} inside the epidermis of an Indian leprosy patient, substantiates the role of skin in leprosy transmission.

Cutaneous inoculation of \textit{M. leprae} may be important, not only because occasionally this may give rise to disease, but also it may lead to resistance against \textit{M. leprae} infection or modify the response to a consequent infection, for instance after airborne contact. It has been proposed that a balance between host responses elicited by different routes of infection, inoculum size and its spacing could determine the clinical and immunological features of the disease, while genetic factors and environmental micro-organisms may modulate these responses.

References