Answer to Dermacase *continued from page 55*

3. Tuberculoid leprosy

This case demonstrates the need for family physicians to take a closer look at insensate lesions and consider leprosy in the differential. Leprosy has potentially disfiguring and disabling sequelae. It is underdiagnosed in nonendemic areas, so it is not surprising that the diagnosis was missed by multiple physicians in this case.

Leprosy is a chronic granulomatous infection caused by *Mycobacterium leprae;* it predominantly affects the skin and the peripheral nervous system.[1] Transmission occurs via the nasal discharge of infected lepromatous (LL) individuals. Incubation is very long, averaging 2 to 5 years for tuberculoid (TT) disease and 8 to 12 years for LL disease.[2] Leprosy has infected or disabled an estimated 4 million people worldwide. In 1991 the World Health Organization passed a resolution to eliminate leprosy as a public health concern; since then, the prevalence of the disease has decreased by about 90%. Most newly reported cases occur in India, Brazil, and Indonesia, but a number of other East-Asian and African countries are noteworthy contributors.[3]

Five subtypes of leprosy comprise the spectrum of the disease: TT, borderline tuberculoid (BT), borderline (BB), borderline lepromatous (BL), and LL. These classifications might not apply in the early stages, when indeterminate leprosy is recognized.[4] The main features of the subtypes are summarized in **Table 1.**[4]

Presentation depends on an individual's degree of cell-mediated immunity (CMI) toward *M leprae*. High levels of CMI result in the TT form of the disease, in which the body is able to contain the infection to a single or a few sites. On the other hand, lack of CMI means the bacteria can multiply and disseminate throughout the body, resulting in the widespread disease found in LL. Borderline classes of leprosy describe the disease within the continuum of an individual's CMI response. Other variants of leprosy exist, however, including indeterminate, pure neuritic, histoid, and Lucio leprosies.[2]

Diagnosis

Diagnosis of leprosy requires demonstration of acid-fast bacilli in skin lesions or can be made clinically based on 2 of the following 3 signs[2]:

- anesthesia of the skin lesion, the distribution of a peripheral nerve, or the dorsal surfaces of the hands or feet;
- thickened nerves, especially posterior tibial, ulnar, median, lateral popliteal, facial, and peripheral nerve trunks; and
- typical skin lesions.

The lepromin test (analagous to the tuberculin test used in tuberculosis) is performed by intradermal injection of a heat-killed preparation of *M leprae* bacilli. It is not used in clinical practice because of its low sensitivity.[5]

Subtypes of leprosy have varying presentations:

Early (indeterminate) leprosy.

- This form most commonly presents as an area of skin numbness or a poorly defined hypopigmented patch.
- Lesions are often found on the face, extensor surfaces of the limbs, buttocks, and trunk.

Tuberculoid leprosy.

- Plaques are copper or purple with hypopigmented centres and well-demarcated, raised borders.
- Lesions are typically hairless, dry, and insensate due to the destruction of sensory and autonomic nerves.
- A thickened nerve trunk can often be palpated in the vicinity of the lesions (**Figure 1**).*
- Symptoms might be limited to pain and swelling of the affected nerve, followed by sensory or motor impairment.

Table 1. Clinical subtypes of leprosy and their salient characteristics

	LESION CHARACTERISTICS				
SUBTYPES OF LEPROSY	TYPE AND CIRCUMSCRIPTION	NUMBER	DISTRIBUTION	SENSATION	PRESENCE OF BACILLI
Indeterminate	Macules, usually hypopigmented and often poorly defined	1 or few	Variable	Impaired	Usually not detectable
Lepromatous	Vague, diffuse infiltration of macules, papules, and nodules	Innumerable	Bilateral symmetric	Not affected early in the disease; later affected in a symmetric, diffuse manner	Numerous and often in clumps (globi)
Borderline lepromatous	Macules, plaques, papules, and nodules, with poorly defined borders	Numerous	Somewhat symmetric	Diminished	Many
Borderline	Plaques and dome-shaped lesions; poor definition and bizarrely shaped bands	Many	Asymmetric	Diminished	Many
Borderline tuberculoid	Well-defined, infiltrated plaque	>5 lesions or a single mark with satellite lesions	Well-defined and asymmetric	Absent over plaques and diminished in the distribution of affected nerves	Few, if any, detected
Tuberculoid	Well-defined, sharply demarcated plaque	1 or few (< 5)	Localized, often unilateral	Absent over plaques and diminished in the distribution of affected nerves	Not detectable

Adapted from Ramos-e-Silva and Ribeiro de Castro.[4]

- Facial sensory loss can be difficult to demonstrate owing to the presence of overlapping nerve endings.[2]
- Results of slit-skin smears or skin biopsies are rarely positive for acid-fast bacilli in TT because of the paucibacillary nature of this subtype.
- Histologic examination reveals tuberculoid granulomas situated primarily around nerve sites.

Lepromatous leprosy.

- Early nerve involvement is asymptomatic.
- Dermal symptoms characteristically present first as macules, diffuse papules, infiltrations, or nodules:
  - macules are small, come in multiples, and are shiny—possibly erythematous or faintly hypopigmented with ill-defined borders; and
  - papules and nodules are usually skin-coloured.
- Systemic symptoms include nasal stuffiness and discharge, epistaxis, and leg edema due to capillary stasis and increased permeability.
- When neural involvement becomes clinically apparent, the longest peripheral sensory nerve fibres are affected first, causing anesthesia of the dorsal aspects of the hands and the feet, which spreads to the extensor surface of the legs and arms in a "glove and stocking" distribution. Palm and sole sensation is usually preserved.
- Infection of the corneal nerves raises susceptibility to corneal infection, injury, and subsequent blindness.
- Untreated disease can lead to deepened forehead furrows, thickened skin, thinned eyebrows and eyelashes, thickened earlobes, nose disfiguration, hoarse voice, and loss of upper incisor teeth. Thickened leg skin can ulcerate when nodules break down.
- Slit-skin smears or skin biopsies reveal acid-fast bacilli.

Borderline leprosy.

- These forms describe the clinical manifestations that fall between TT and LL.
- Skin lesions are intermediate in number and can take the form of plaques, annular lesions, and bizarrely shaped bands.

Natural course

Fluctuations in the host immune response to leprosy lead to "reactions," which can be an important source of morbidity (**Table 2**).* They usually occur during the first few months of treatment or can be precipitated by pregnancy, concomitant infection, and other triggers.

In long-standing leprosy, without treatment, nerve damage leads to anesthesia, muscle weakness, joint contractures, and autonomic dysfunction. Inadvertent trauma due to anesthesia can lead to cellulitis, osteomyelitis, disfigurement, and severe disability (**Figure 2**). Blindness from ocular involvement is one of the more dreaded sequelae.[6,7]

Treatment

Multidrug therapy is recommended because *M leprae* is highly resistant. Medications for leprosy are covered by the World Health Organization as part of the worldwide eradication program. Regimens for TT (paucibacillary) leprosy include monthly doses of rifampin along with daily doses of dapsone for 6 months, and follow-up scheduled after 2 years. Lepromatous lesions are treated with a combination of rifampin, dapsone, and clofazimine for 12 months and are followed for 5 years.[2,3]

In addition to pharmacotherapy, patients must be educated on how to reduce the risk of injury from sensory impairment. Patients might also experience psychological symptoms due to the social stigma attached to the diagnosis; therefore, appropriate support should be considered.

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Acknowledgment

We thank **Anna Kalisiak** for her help creating the graphic art for this manuscript.

Competing interests

None declared

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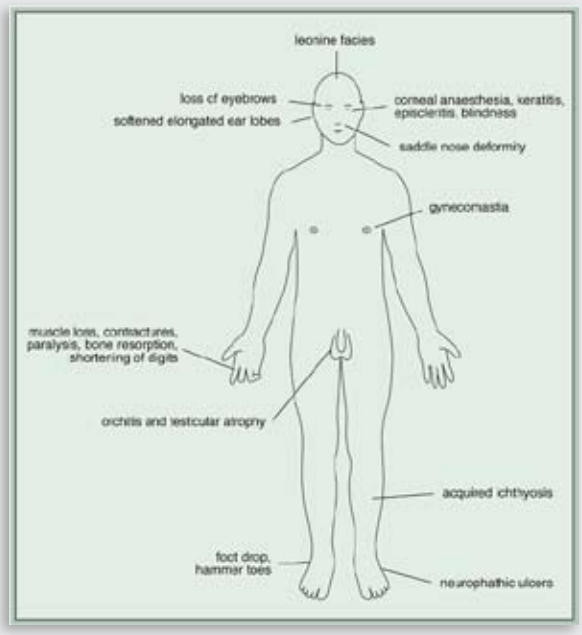
Figure 2. Sequelae of long-standing leprosy without treatment



Adapted from Bolognia, Jorizzo, and Rapini.[4]