Leprosy in the UK

Leprosy is a chronic granulomatous disease caused by *Mycobacterium leprae*. The slow-growing nature of the acid-fast bacillus, and the inability to culture it in vitro, hinders full understanding of its pathogenesis (Renault and Ernst, 2010). Transmission mainly occurs through nasal secretions. The immune response is crucial in determining the outcome of infection. Notably, the infectivity is very low, and most patients are not infectious.

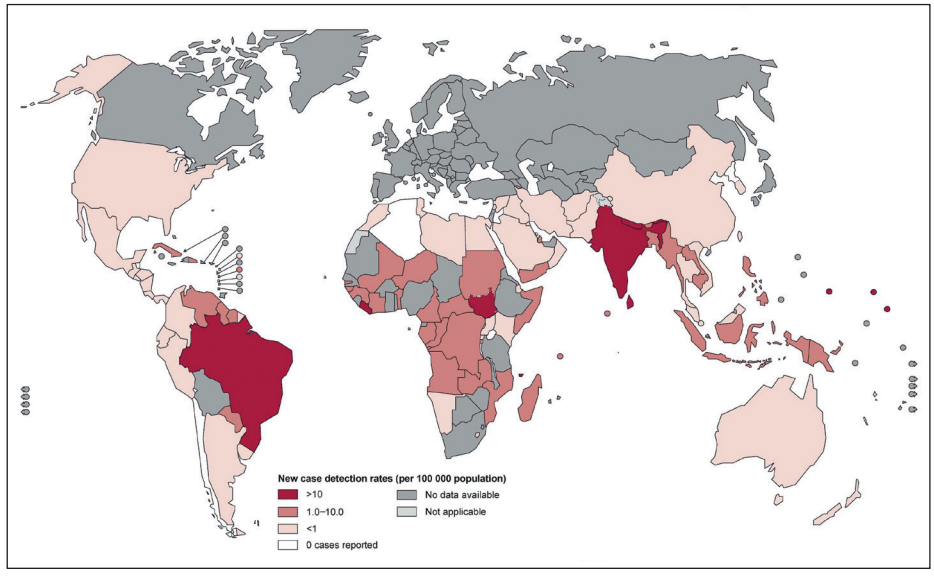
Leprosy is still endemic in several countries (see below), and in the UK approximately 10 cases are diagnosed per year (Renault and Ernst, 2010; Lockwood et al, 2014). The hallmark of clinical features includes peripheral neuropathy and skin lesions. Importantly, it is readily treatable, and early diagnosis significantly reduces nerve damage.

Epidemiology

The global incidence of leprosy is 232 857 new cases per year (*Figure 1)* (World Health Organization, 2012). It is endemic in many countries, with the highest incidence in India, Brazil and Indonesia. In England and Wales, 1533 cases have been registered since 1951, and the incidence has shown a gradual decline (*Figure 1*; Public Health England, 2013). Long-term residence in endemic areas is a risk factor. Patients presenting in the UK in the last 14 years have been from 32 different countries. Diagnostic delays are common, and associated with a lack of knowledge among health-care professionals and patients (Gill et al, 2005; Public Health England, 2013). Delays in treatment increase the risk of disability.

The incubation period is long – 2–5 years for tuberculoid and 5–20 years for lepromatous leprosy (Lockwood and Beeching, 2014). It affects young and middle-aged adults with a male preponderance.

Figure 1. Global new case detection rates. From World Health Organization (2012).



Clinical presentation and findings

Patients present with skin lesions, peripheral neuropathy or the consequences of neuropathy (*Figures 2–4*). Skin lesions may

Figure 2. Close-up of the back of a 22-year-old male patient with leprosy that has caused a loss of skin colour (hypopigmentation).

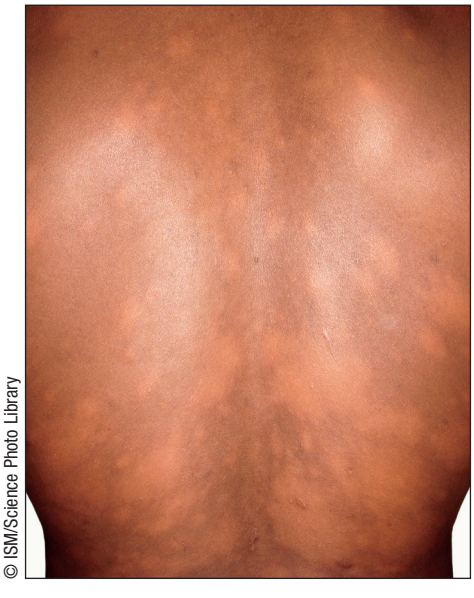


Figure 3. Close-up of the foot of a 77-year-old female patient with lepromatous leprosy, showing the change in surface colour (macules).

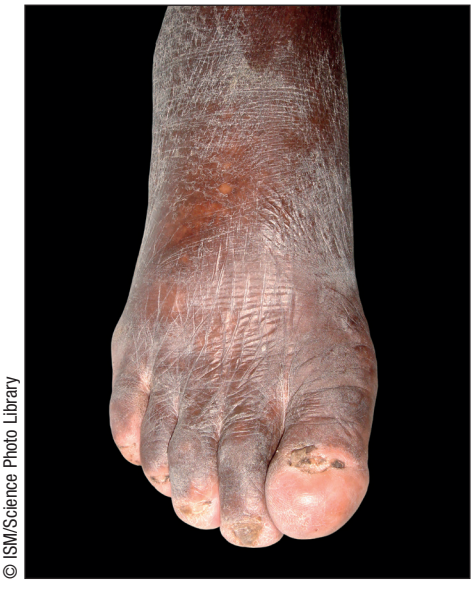


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Figure 4. Leprosy affecting the face of a man.

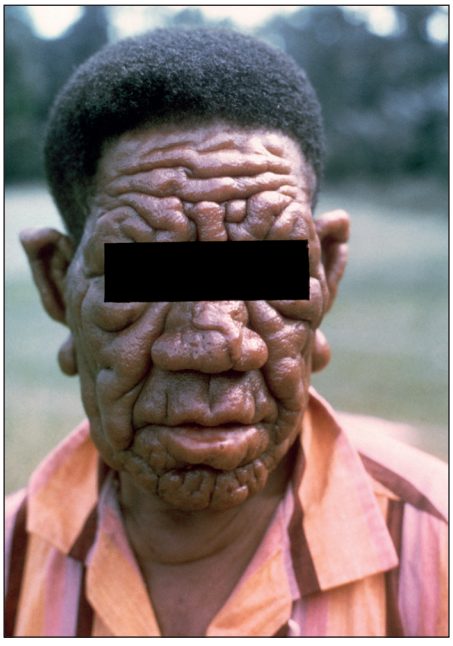

Table 1. Ridley–Jopling classification

WHO classification	Paucibacillary		Multibacillary		
	←	→	←	→	
Bacteriological index	0	0–1+	1–3+	3–5+	5–6+
Type of leprosy	Polar tuberculoid	Borderline			Polar lepromatous
Ridley–Jopling classification	TT	BT	BB	BL	LL
Skin lesions	Increasing number of skin lesions →				
Nerve lesions	Increasing number of enlarged nerves and nerve involvement →				
Stability	Stable	Unstable – may develop reactions and new nerve damage			Stable

be hypo-pigmented (*Figure 2*), erythematous or infiltrative (Lockwood and Beeching, 2014). These are often diagnosed as chronic common skin lesions that have responded poorly to standard treatments (Lastória and Abreu, 2014). Further, they may report weakness, sensory loss, neuropathic pain, peripheral nerve thickening or ulcers. Less common features include arthritis, erythema nodosum leprosum, orchitis and acute uveitis (Public Health England, 2013).

The type of leprosy that a patient develops is determined by his/her immune response to *M. leprae*. The Ridley–Jopling classification (*Table 1*) looks at clinical and immunological features, and has a spectrum ranging from tuberculoid from patients with a robust cell-mediated immune response (tuberculoid, paucibacillary) to patients with a specific anergy for *M. leprae* (lepromatous, multibacillary). This helps predict prognosis and reactions.

Diagnosis is essentially clinical, and depends on history and examination (*Table 2*). This includes history of residence in an endemic area, contacts, occupation, examination of the entire skin, palpation of peripheral nerves, motor and sensory examination. The documentation of a neurological examination is essential as a baseline for assessing response or progression.

Criteria pertinent to diagnosis include:

1. Previous residence in leprosy endemic area
2. Clinical features
3. Microscopy showing acid-fast bacilli
4. Histological findings consistent with leprosy (skin biopsy or sometimes peripheral nerve biopsy).

Microscopy depends on slit skin smears, a small incision through the epidermis, taken from the earlobes, eyebrows and edges of active lesions. Dense material is scraped out and smeared onto the glass slide. This provides an assessment of bacterial load, and is important in determining the Ridley–Jopling classification. Investigations involving serology and polymerase chain reaction detecting DNA are currently of limited use because they require technical expertise, have high costs and have limited viability in detecting bacteria.

Management

A multidisciplinary team approach is essential, including patient education, rehabilitation and psychological support. The chemotherapeutic regimen is determined by the Ridley–Jopling classification and bacterial load (*Table 3*). Patients with an initial bacteriological index above 4 need

Table 2. Differential diagnosis

Skin lesions	Macular rash (TT) – differential diagnosis: tinea versicolor, vitiligo, pityriasis alba, burns, injury or steroid treatment
	Reversal reaction in a macular lesion (type 1 lepra reaction) (TT) – differential diagnosis: psoriasis, lichen planus, cutaneous leishmaniasis
	Nodular lesions (LL) – differential diagnosis: syphilis, leishmaniasis, yaws, sarcoidosis, lupus vulgaris, leukaemic infiltration, neurofibromatosis
	Leonine facies (LL) – differential diagnosis: amyloidosis, acromegaly, sarcoidosis, mastocytosis
	Erythema nodosum leprosum (LL) (type 2 lepra reaction) – differential diagnosis: infections (streptococcus, tuberculosis, mycoplasma), drugs, inflammatory bowel disease, vasculitis, sarcoidosis
	Ulceration and mutilation of the extremities (LL) – differential diagnosis: leishmaniasis, skin malignancy, clofazimine-induced red skin discolouration
Thickened nerves	Neurofibromatosis, hereditary sensory motor neuropathy, amyloidosis, acromegaly and vasculitis. However, different nerves are affected
Peripheral neuropathy	Diabetes mellitus, alcohol, uraemia, nutritional deficiencies, vitamin B_{12}, uraemia (as above, and numerous other causes)

KEY POINTS

- Leprosy is a chronic granulomatous disease caused by *Mycobacterium leprae*.
- Transmission is by respiratory droplets.
- Skin lesions and peripheral neuropathy, with anaesthesia or thickened peripheral nerves, are the key clinical manifestation.
- Patients from the Indian sub-continent, Brazil and Nigeria still present with leprosy.
- Patients may present decades after moving to the UK.
- Discuss all potential cases with a leprologist.
- Treatment involves multidrug regimens for 6–12 months, and is effective in over 95% of newly diagnosed cases.
- Prevention of disability depends on early recognition and treatment.

24 months of treatment. Further, patients presenting with nerve damage for less than 6 months require a course of steroids for 24 weeks.

USEFUL INFORMATION

The Leprosy Mission www.leprosymission.org.uk/

Lepra www.lepra.org.uk

International Federation of Anti-Leprosy Associations www.ilepfederation.org/

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Table 3. Drug treatment

Paucibacillary	Monthly rifampicin and daily dapsone	6 months
Multibacillary	Monthly rifampicin and daily clofazimine and dapsone	12 months

Patient education includes reassuring patients that they are not infectious, that the treatment is highly effective with good compliance, and of the need to attend follow ups and seek medical attention within 24 hours if there are any deterioration. The stigma attached to a diagnosis of leprosy is frequently underestimated, and this must be acknowledged and addressed early (De Groot et al, 2011).

It is advisable to discuss all cases, including potential relapses, with an experienced leprologist (see *Useful information*) to advise on and perform appropriate investigations and treatment.

Reactions and nerve damage

Immune-mediated reactions and nerve-damage can occur before, during and after drug therapy.

Type 1 reactions are caused by a delayed hypersensitivity response, usually in the first 2 months of treatment. They present as erythema, swelling and tenderness of skin lesions, tenderness of peripheral nerves, as well as sensory and motor signs (Lockwood and Beeching, 2014). Treatment depends on commencing steroids, as well as timely physiotherapy.

Erythema nodosum leprosum reactions or type 2 reactions present as a systemic illness with malaise, fever, arthritis, neuritis, iritis, orchitis, and raised white cell count and erythrocyte sedimentation rate. The onset is usually in the first year of treatment; however, patients may relapse after this. High dose steroids, thalidomide or other immunosuppressants are used as treatment.

New nerve damage may also occur during or after treatment. At every clinical assessment, it is essential to document the motor and sensory examination.

Prevention of disability

Nerve damage produces skin dryness, anaesthesia and muscle weakness (Srinivasan, 1993). These three factors have a functional impact on the limbs, leading to ulceration, infection and, ultimately, severe deformity. Preventing disability depends on regular monitoring of the nerve function and functional impairment (Lockwood and Beeching, 2014). Patients needing self-care should be identified. All patients need education and support, and may also need surgical referral. After a reaction is treated a patient is at increased risk of experiencing neuropathic pain and this needs to be appropriately managed.

Outcomes

Antimicrobial treatment is highly effective, with rapid response rates and minimal toxicity (Lockwood and Beeching, 2014). There are very low rates of relapse, between 1–3 per 100 000. Aside from reactions, over 60% of patients presenting with nerve damage at diagnosis are at risk of developing further nerve damage during and after treatment. **BJHM**

Conflict of interest: none.

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