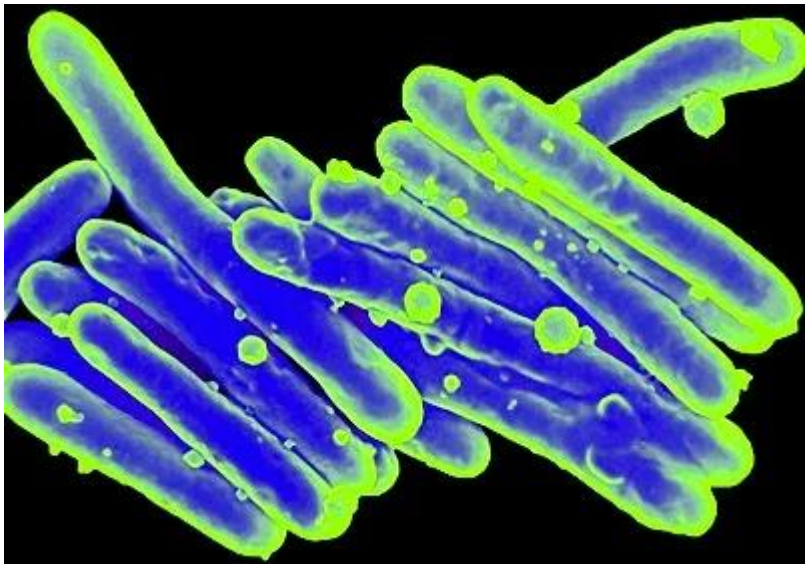
The BNT162b2 (Pfizer- BioNTech) and mRNA 1273 (Moderna) vaccines were the first messenger RNA (mRNA)-based vaccines ever approved. In both vaccines, an mRNA sequence determines the structure and assembly of the immunogen, the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) spike (S) glycoprotein. In this retrospective study, the authors from the United Kingdom investigated the number of individuals diagnosed with leprosy or immune-mediated complications known as leprosy reactions within 3 months following COVID-19 vaccination. They included all individuals with leprosy who attended the Leprosy Clinic at the Hospital for Tropical Diseases in London, in 2021. The researchers also presented two cases of new-onset leprosy or leprosy reaction associated with COVID-19 vaccination from their clinical practice.

Leprosy is caused by *Mycobacterium leprae*. The clinical presentation depends on the immune response of the infected person. Tuberculoid and borderline tuberculoid leprosy is characterized by a Th1-type immune response with granuloma formation in the presence of CD4+ T-cells and few or no bacteria identifiable in tissues. The characteristics of lepromatous leprosy are high bacterial load, poor granuloma formation, and a predominance of CD8+ T-cells.

Individuals diagnosed with leprosy can develop immune-mediated complications known as leprosy reactions. Type 1 response is a delayed hypersensitivity reaction to antigens of *Mycobacterium leprae,* characterized by edema, inflammation in pre-existing leprosy skin lesions and nerves, pain, and loss of function. Type 2 response or erythema nodosum leprosum is a multisystem complication characterized by painful cutaneous nodules, fever, arthralgia, arthritis, and neuritis. The initiation of muti-drug therapy, infections, stress, trauma, pregnancy, and vaccination may trigger these leprosy reactions.

The authors emphasized that no individuals acquiring leprosy in the United Kingdom have been reported since 1954, but, individuals who have migrated from or lived for extended periods in countries with endemic leprosy continue to be diagnosed.



Mycobacterium Leprae

About the study

This retrospective study included individuals with leprosy who in 2021 attended the Leprosy Clinic at the Hospital for Tropical Diseases, London, a national referral center for tropical and infectious diseases in the UK. The authors investigated the number of individuals diagnosed with leprosy or immune-mediated complications known as leprosy reactions within 3 months following COVID-19 vaccination.

A leprosy-associated adverse event was defined as the onset of leprosy or a leprosy reaction, and/or neuritis, within 3 months following the administration of a COVID-19 vaccine in an individual with no previous history of these conditions.

Results

52 individuals with leprosy attended the clinic in 2021. Five of them were newly diagnosed. Most patients (71%, 37/52) were male, and the median age was 48.5 years (ranging from 27 to 85 years).

Almost all individuals with leprosy who attended the clinic in 2021 were vaccinated (98%, 49/52).

Regarding clinical presentation, 44% of leprosy patients (23/52) were diagnosed with lepromatous leprosy, 27% (14/52) with borderline tuberculoid leprosy, 17% (9/52) with borderline lepromatous leprosy, 4% (2/52) with pure neural leprosy, 2% (1/52) with

tuberculoid leprosy, and 2% (1/52) with borderline leprosy.

Two cases of leprosy associated with COVID-19 vaccination

The authors also presented two cases that met the criteria for a new onset of leprosy or leprosy reaction, as an adverse event associated with COVID-19 vaccination. They have reported before that 14 cases of leprosy adverse events were associated with COVID-19 vaccination from leprosy endemic and non-endemic settings. Ten cases of leprosy adverse events experienced a leprosy adverse event after the first COVID-19 vaccination, three after the second, and one after the third COVID-19 vaccination.

Case 1

A man aged 80 years who had been living in the UK for 49 years was diagnosed with borderline tuberculoid leprosy one week after the second dose of the BNT162b2 COVID-19 vaccine. The disease was manifested with red skin lesions, reduced sensation, and thickened peripheral nerves. The diagnosis was confirmed by skin biopsy showing peri-neural and peri-adnexal granulomatous inflammation with infiltration and destruction of dermal nerves.

Anti-microbial therapy improved the skin lesions and nerve thickening within eight weeks. There was no recurrence of plaques or nerve signs after 12 months.

Case 2

A man aged 27 years developed red plaques and tender thickened nerves consistent with type 1 leprosy reaction 56 days after receiving the BNT162b2 COVID-19 vaccine. He was vaccinated with two doses of the CoronaVac vaccine three months earlier. A skin biopsy supported the diagnosis, showing non-necrotizing destructive granulomatous neuritis, edema, and epidermal findings consistent with a type 1 response.

Prednisolone therapy improved the skin lesions and tender nerves without recurrence after 12 months.

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Journal Reference

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