

*Lesson of the week***Tetanus in an immunised patient**

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Immunisation with alum absorbed tetanus toxoid is one of the most highly effective preventive measures in medical practice. The estimated failure rate is extremely low. We report a case of severe generalised tetanus in a patient who had been immunised fully.

**Case report**

A previously healthy 34 year old construction worker was admitted to hospital after experiencing what was described as an epileptic fit. Before the fit, the man had had flu-like symptoms for three days. He denied that he had sustained any trauma before the episode, and he had no history of recurrent infections.

Physical examination showed that the patient had a low grade fever (37.6°C). His blood pressure was 120/80 mm Hg and pulse rate was 100 beats/min. He was alert and coherent, and all other physical and neurological findings were normal. Laboratory studies showed a leucocyte count of  $19\,000 \times 10^6/l$  and a haemoglobin concentration of 135 g/l. Serum immunoglobulin values were normal, as were the electroencephalographic findings and computed tomograms of the brain. Examination of cerebrospinal fluid showed no abnormalities.

Phenytoin treatment was started on the first day of admission to hospital. During the following day, however, attempts to talk or get up triggered attacks of risus sardonicus, opisthotonus, and trismus. Tetanus was diagnosed clinically, and the patient was treated with 2000 U of human tetanus immunoglobulin. Treatment with intravenous metronidazole (500 mg thrice daily) was begun, and the patient was transferred to the intensive care unit. The generalised severe muscular spasms continued, and the patient was sedated and an early tracheostomy was performed. He was started on mechanical ventilation and treated with intravenous diazepam (30 mg/hour). During his first 12 days in hospital, repeated attempts to stop the diazepam resulted in recurrence of spasms. Thereafter, we were able to withdraw diazepam, and ventilatory support was stopped on day 15.

The patient's immunisation record showed that he had been immunised against tetanus according to the recommendations of the Israeli Ministry of Health. Furthermore, after sustaining injuries he had been given tetanus booster doses five and two years before the present hospital admission. He received active anti-tetanus vaccination shortly before he was discharged from the hospital. Tetanus antibody titres measured one month later showed a satisfactory response ( $>5.59$  IU).

**Discussion**

Antitetanus immunisation has proved to be one of the most successful preventive measures in medical practice. Since the introduction of immunisation in Israel, the annual incidence of tetanus has fallen from

2/100 000 in the 1950s to 0.1/100 000 in 1988.<sup>1</sup> As in the United States, all reported cases of tetanus have occurred in people who have not been immunised.<sup>2-3</sup>

The accepted protective titre of neutralising antibody is 0.01 U/ml.<sup>4</sup> Although we did not measure the antibody titre in our patient, he had received a full course of four immunisations in childhood together with booster doses, the most recent two years before his admission to hospital. This is considered to be a protective response in the event of exposure to tetanus.<sup>3</sup> In the absence of any evidence that the patient was immunodeficient (that is, normal serum immunoglobulin values and no history of recurrent infections) it seems unlikely that he had not mounted an immune response.

Tetanus has to be diagnosed clinically as there are no specific diagnostic laboratory tests and differential diagnosis of the characteristic features is limited.<sup>5</sup> The development of tetanus despite full immunisation is extremely rare—it is estimated at 4 per 100 million immunocompetent vaccinated subjects.<sup>6</sup> The mechanism of immunisation failure is unclear. Theories include a burden of toxin that overwhelms the host immune defences, antigenic variability between toxin and toxoid, and selective suppression of the immune response.<sup>7</sup>

Contributors: AD and JC looked after the patient in the ward and intensive care unit respectively; ZS and SP were consulted as infectious disease specialists. All authors collected data and wrote the article. SP acts as guarantor.

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**Do not rule out a diagnosis of tetanus in a patient who has been immunised fully**

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**Endpiece**

It is something special to have one's own house, to lock the door to the world not of the room, not of the flat, but right of the house itself; to step out of the door of one's home straight into the snow of the quiet lane. (Franz Kafka writing about 22 Golden Lane, Prague Castle, a street that was once inhabited by alchemists.)

*A Country Doctor*, Franz Kafka. Prague: Vitalis, 1998:99.