the virus of foot-and-mouth disease in the course of their normal work. All samples, tested in parallel with the serum from the patient, were negative (titre less than 1/8) except for one serum from a member of staff which showed a neutralizing titre of 1/22 against virus of type O.

Discussion

It would appear that the patient had in fact contracted an infection by the virus of foot-and-mouth disease. The lesions observed, the high titre of virus recovered from the epithelium, and the rise in antibody titre all indicate the strong probability that he became infected with foot-and-mouth disease between 24 and 31 July 1966. The high initial antibody titre was probably due to the fact that the serum was collected at least five days after the illness was first noted by the patient. The decline in antibody titre at 120 and 154 days from the beginning of the illness agrees well with the observations of Pilz and Garbe (1965).

The absence of any antibody rise in association with the recrudescence of epithelial lesions indicates that these episodes are unlikely to have anything to do with foot-and-mouth disease. But the fact that the cause of the skin condition observed in these episodes, and possibly even in the first, remains undiagnosed suggests that epithelial damage of this nature might have raised the patient's susceptibility to the foot-and-mouth disease virus. His contact with infection was less than that of many people working with infected animals in Northumberland at that time, and it is known that epithelial damage does increase the tendency to the development of lesions in experimental animals, possibly by increasing the phagocytosis of virus by epithelial cells.

The clinical signs shown in the initial illness accord with the appearance of foot-and-mouth disease in susceptible species, though the patient may also have been suffering from a skin condition of unknown origin. No spread to other humans appears to have occurred in this case, and, as the patient did not come into contact with animals either before or after his illness, there is no evidence of spread in this direction. There is, however, a clear case for restriction of movement of a suspected case in an agricultural area and for the treatment of the condition in isolation. Virus was recovered from only one of the samples—that obtained from the patient three days after the initial clinical signs. Throat swabs collected 7, 84, 98, and 106 days after infection were negative, as were epithelial samples taken at 11 and 14 days. It is therefore likely that the disease in man is relatively short-lived and that the period of infectivity is quite restricted.

R. Armstrong, M.B., B.S.,
General Practitioner, Rothbury, Northumberland.
J. Davie, B.SC., M.R.C.V.S.,
R. S. Hedger, M.R.C.V.S.,
Principal Scientific Officers, Animal Virus Research Institute, Pirbright, Surrey.

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Recurrent Tetanus

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The incidence of tetanus reaches endemic proportions in Ceylon. A minimum of one case a week is admitted to any large hospital in the island. However, there is no record of a recurrence or of relapse. The following report is of a patient who had two attacks of unmistakable tetanus within three months of each other.

Case Report

An 8-year-old Sinhalese girl was admitted to hospital on 23 February 1965 with a history of difficulty in opening her mouth and repeated "convulsions" of one day's duration. She also complained of pain in the abdominal wall and severe headache. There was a history of an injury to the left lower limb, nearly a month previously, for which she was treated in the outpatient department. Immunization against tetanus had not been carried out at the time.

On examination she was found to have trismus, risus sardonicus, and rigidity of all four limbs. No spasms were observed. She was afebrile. She had been treated with pethidine 25 mg. intramuscularly on admission, and chlorpromazine 25 mg. by mouth twice a day. Crystalline penicillin 300,000 units twice daily was given by intramuscular injection. Antitetanus serum was given in an initial dose of 100,000 units intravenously, followed by 100,000 units intramuscularly. The latter was repeated daily for six days.

The patient was well enough to be discharged from hospital in 23 days from the date of admission. No active immunization had been carried out at the time. She was quite well after discharge and attended school until 30 May 1965.

On 3 June she was readmitted to hospital with trismus of four days' duration, and "convulsions" for one day. On examination she had severe trismus and a well-marked risus sardonicus. Neck stiffness was very conspicuous. No spasms were oberved. She was treated with pethidine 50 mg. and chlorpromazine 50 mg. intramuscularly six-hourly. This dosage was progressively reduced and "tailed off."

Crystalline penicillin 500,000 units intramuscularly twice daily was started, but had to be stopped on the third day, as she complained of severe itching of the body and developed an urticarial rash in both axillae. Oral tetracycline 250 mg. six-hourly was substituted. Calcium gluconate 5 ml. intravenously was given daily. An intradermal test for sensitivity to antitetanus serum was strongly positive. A weal 4.2 by 2.2 cm. developed after the diluted serum (0.1 ml.) was introduced into an area of 1 sq. cm. Thus we were unwilling to administer serum even in fractional doses. The hospital had run out of toxoid at the time, so this could not be given.

Recovery was uneventful. No spasms were noted at any time. The patient was discharged on 27 June, and was quite well except for some residual trismus. It should be noted that there was no fresh trauma to cause or provoke this second attack of tetanus.

Comment

Standard textbooks of surgery make no mention of cases of recurrent or relapsing tetanus. However, it is stated that there is no immunity conferred on a patient after an attack of tetanus. This must be so, because there are no fewer than eight antigenic strains of *Clostridium tetani* and also because neither the bacillus nor its spores are said to enter the blood stream or be carried to distant sites. Any immunity, active or passive, will be to the exotoxin, which is actively antigenic.

This case illustrates the necessity for active immunization against tetanus after an attack of the disease. This could be done with adsorbed toxoid, three 1-ml. doses at intervals of three to six weeks. A booster dose of 1 ml. of toxoid after an injury likely to produce tetanus would suffice, and is recommended.

S. Y. D. C. Wickramasinghe, M.S., F.R.C.S.,
Consultant Surgeon.
Malinie Fernando, M.B., B.S.,
House-surgeon.
General Hospital, Kandy, Ceylon.