REVACCINATION OF AN ARMY UNIT

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In the description of vaccination in most standard textbooks of medicine little is said of the reaction to be expected on revaccination. It is very important, however, to distinguish the case in which a revaccination has "taken" with a minimum of reaction because of previous immunity from the case in which it has failed because of faulty technique. In a recent pamphlet issued by the Medical Directorate, G.H.Q., India (1942), this matter was emphasized, and it was pointed out that it is very rare even in the revaccination of persons successfully vaccinated several times previously for a reaction to fail to appear. The reaction is, however, evanescent, and might be missed if inspection of the vaccinated area is delayed until the sixth day. The pamphlet describes two types of reaction to be observed in the revaccination of previously immune persons: the "accelerated" reaction, in which a papule appears after about 36 hours, is maximum on the fourth day, and is subsiding on the sixth day; and the "immediate" reaction, in which the papule appears after 24 hours and is maximum in 48 hours. The following account of a case of smallpox which occurred in a British Army unit shortly after arrival in India, and of the subsequent revaccination of the whole unit, illustrates the points made in this pamphlet, and may therefore be of interest.

Sequence of Events

On arrival at the port in India the troops were given shore leave, returning to the ship for the night. The next day they disembarked straight into a waiting troop train, in which they remained for the four-day journey to their new station. Twelve days after the shore leave a private soldier complained to his companions that he felt ill. The next morning he reported sick and was admitted to hospital with vomiting, pains in the limbs, and fever. Three days later a definite diagnosis of smallpox was made, and seven days after his admission to hospital he died from haemorrhagic smallpox. There had been no cases of smallpox or chicken-pox on the ship, so it is evident that he contracted the disease during the period of shore leave. He had not been vaccinated in infancy, but his records showed that he was vaccinated in the Army in 1940. No mark of this vaccination could be found.

The soldier was moving freely within the unit for about 18 hours from the time he first felt ill to the time of his removal to hospital. The entire unit of 938 men were regarded as possible contacts; the more probable contacts, however, were the 129 men of the man's own company, who all lived together in one barrack block. Precautions taken were the isolation of the company concerned, disinfection of all fomites, and the revaccination of all contacts. All the men of the company were revaccinated on the day notification of the case of smallpox was received—i.e., four days after the man first complained of feeling ill—and on the following day the rest of the unit were revaccinated. No further cases of smallpox occurred.

Vaccination State of the Unit on Disembarkation

According to their documents all the men had been vaccinated within the previous five years—47 men in 1939, 713 in 1940, 56 in 1941, and 122 in 1942. They had arrived in the unit from many different parent units over a period of three years; thus their vaccination had been carried out by many different medical officers in many different stations.

Response observed to Revaccination

As vaccination had been carried out within five years the full classical response to vaccination was not expected to occur in many cases. The arms were therefore inspected at 48 hours, 96 hours, and 6 days after vaccination. The results of a total of 938 vaccinations are given below.

In 656 cases (70%) the sequence of events was as follows: After 48 hours there was already quite a definite reaction. The region of the insertion showed a slight yellow exudate, surrounded by a red area about a quarter of an inch across. In 96 hours the red area was well marked, with a dried yellow exudate over the insertion but no true vesiculation. On the sixth day the reaction was fading rapidly, and in many cases all that then remained was a small dried-up exudate over the insertion. This is the "immediate" reaction described in the pamphlet. In a further 204 cases (22%) no definite reaction was observed after 48 hours, but the reaction had become quite definite after 96 hours, and was of the type described above.

It was fading rapidly by the sixth day, and never showed the classical response. This is the "accelerated" reaction described in the pamphlet. In 31 cases (3%) there was never at any time a very definite response, though even in these cases an area of erythema was observed after either 48 or 96 hours. These cases were regarded as giving a doubtful response, and vaccination was repeated.

Finally, inspection on the sixth day showed that 47 cases (5%) went on to the full classical response to vaccination. These had well-marked vesiculation going on to pustulation, a wider area of surrounding erythema, and axillary adenitis. Of these cases 18 developed a mild fever and had to be excused duty for a few days, though in no instance did any serious symptoms occur. The time taken for the classical response to develop was interesting. On examination after 48 hours, out of 47 cases which later gave the classical response only 11 (22%) were showing the signs of reaction, whereas out of 860 cases which gave the modified reaction 656 (76%) were already showing signs of reaction. Thus the modified response develops more rapidly and fades more rapidly than the classical response.

Discussion

The value of vaccination in protecting a community from smallpox was once again demonstrated. The occurrence of a fatal case in a man apparently vaccinated three years before was unexpected and disappointing; on the other hand, the man was walking about freely among his companions, in the close conditions that barrack life entails, for 18 hours during the prodromal stage of virulent smallpox, yet no further cases occurred.

The number of completely negative responses to revaccination in a community previously vaccinated within five years was found to be small (3%). But in order to observe this it was necessary to inspect arms at 48 hours and 96 hours after vaccination as well as after 6 days. It is safer, therefore, to regard non-appearance of reaction as evidence of faulty technique, and to repeat vaccination, than to regard it as evidence of a solid immunity. Even after a large number of vaccinations the number of such repetitions will be small.

The proportion of cases which showed the classical response (5%) seemed surprisingly high. Presumably this meant that these cases were relatively non-immune. To what extent this was due to an abnormal rapid fall of immunity since the previous vaccination or to a faulty technique at this vaccination it is difficult to say. It suggests that on entry into an area in which smallpox is endemic it might always be advisable to revaccinate, whatever the record of previous vaccinations.

REFERENCE

Medical Directorate, G.H.Q., India (1942). *A Note on Vaccination.*

Nova et Vetera

EDWARD TYSON, M.D., F.R.S.: 1650-1708

A MODEL BIOGRAPHY

Dr. Edward Tyson has had to wait a long time for his biography, but he now has his reward.¹ If it be, as his biographer maintains, that the monograph he presented to the Royal Society on the anatomy of the chimpanzee in the summer of 1688 set a new model for anatomists, then it is only just that the Life now written should be a model for all medical biographers in the future. It is a model biography that has come from the pen of Prof. Ashley Montagu, who is anatomist at Hahnemann College, Philadelphia, and has made many contributions to his subject, particularly to the comparative anatomy of man and ape. Ashley Montagu, however, is much more than an anatomist. He is a man of letters, with a vivid pen and a love of books; he has enthusiasm and industry. He has searched the records of the Tysonian period for every scrap of information.

Tyson, who died a bachelor, was born in Bristol, spent ten years at Oxford University, took his M.D. at Cambridge, and came to London to practise medicine in 1677. Two years later he was elected to the Royal Society, in the proceedings of which he took a very active part, his contributions being chiefly medical and anatomical. At the age of thirty-four (1684) Dr. Tyson was appointed to two offices: he became reader in anatomy at Surgeons' Hall and was appointed physician to Bethlehem and to Bridewell

¹ Edward Tyson, M.D., F.R.S., 1650-1708, and the Rise of Human and Comparative Anatomy in England. A Study in the History of Science. By M. F. Ashley Montagu. With foreword by George Sarton. (Pp. 488. \$5.00.) Philadelphia: The American Philosophical Society, Independence Square. 1943.