Clinical and Other Notes.

A CASE OF PARAPLEGIA FOLLOWING ANTI-RABIC VACCINATION.

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Neurological complications following anti-rabic vaccination, though fortunately rare, are well recognized and when they occur, may be of a particularly distressing type as the following case illustrates.

History.—On December 10, 1942, an officer, aged 40, in excellent health and with no history of previous disease, while walking along a street in a Middle Eastern city, was bitten by an unidentified dog. Before disappearing in the crowd, the dog also bit several other people. The officer immediately went to the anti-rabic centre where he received fifteen daily injections, each of 10 c.c. of killed phenolized vaccine, the course being completed on December 28, 1942. Apart from considerable local discomfort at the site of injection he experienced no ill-effects. On December 30 he complained of what he regarded as rheumatic pains in the shins and in the lumbar region. They were not severe however and he returned to the desert.

On January 24, 1943, twenty-nine days after the last dose of vaccine, he felt out of sorts, was fevered and noticed some numbness in both legs, especially the left; he also had fairly severe pains in both legs and in the lumbar region. The legs rapidly became weak and he had difficulty in walking though he could stagger a few steps up to January 31. He also noticed a sensation of numbness around the anus and defecation and micturition became increasingly difficult. There was a sense of constriction about the level of the xiphisternum and he felt, to quote his own words, as "though a cord were tied around his middle." He was admitted to hospital on February 6, 1943, when his condition was as follows:—

Condition on Admission.—A thin man of healthy appearance. The dog bite had completely healed. He lay flat on his back with legs extended and was unable to sit up in bed without assistance. He was perfectly alert mentally and the heart, lungs and urine were normal.

Examination of the cranial nerves, the arms and the upper part of the trunk revealed no abnormality. Breathing was not laboured. The abdominal muscles were very weak especially below the umbilicus and the abdominal reflexes were not elicited. All muscles of both legs showed gross though not absolute loss of power. All forms of sensation were greatly diminished, though not entirely absent, up to the level of the xiphisternum, the muscle-joint and vibration senses in the legs being most severely affected. The knee and ankle jerks were just elicited on both sides; the right plantar response was flexor, the left was equivocal. There was considerable difficulty in initiating micturition and the performance of the act was inefficient.

Lumbar puncture yielded a clear fluid under normal pressure. Cells 8 lymphocytes per c.mm., protein 60 mg. per cent, chlorides 780 mg. per cent; Kahn test negative.

Progress.—The dysuria increased and on February 9 complete retention occurred. Constipation was absolute. A low grade bronchopneumonia developed and his general condition deteriorated. Though consciousness was never lost he became stuporose and disorientated and later he stated that he remembered nothing of this period of his illness. Catheterization was performed for a few days but the bladder became infected and suprapubic cystostomy was carried out on February 16. The infection of the bladder rapidly subsided. Manual emptying of the rectum was required at this period.

On February 19 the bowels moved and a little urine was passed during a fit of coughing. The other neurological signs showed little change except that the left plantar response was now extensor while the right was still flexor.

By February 24, seventeen days after admission, his general condition had improved and he was once more alert mentally though rather querulous. There was slight increase in power in the legs and the bowels moved almost daily though he had no control over defection. The urine was now passed entirely per urethram, 5-6 ounces at a time, and he had approximately thirty seconds warning before the act occurred though he could not inhibit or control it. The suprapubic cystostomy was completely closed having been in operation for just under one week. The cystitis had almost entirely cleared up.

By March 3 there was further increase in the muscular power of the legs which were now spastic with brisk knee and ankle jerks and with slight knee and ankle clonus on both sides. Both plantar responses were equivocal but tended to be extensor. Bladder function was almost completely automatic, about 10 ounces of urine being voided at a time with a slightly longer warning period. There was no change in the sensory manifestations. During the ensuing weeks slow improvement was maintained. On April 20 he was taken out of doors on a trolley and on April 30 in a wheeled chair.

Re-education of the ataxic muscles was commenced at an early stage, at first by simple exercises in bed, later, by increasingly complicated movements and finally by lessons in walking. By August 18 he was able to walk across his room with the aid of a wheeled support and early in September he commenced to use crutches. His performance was fair but he had to be assisted to the erect posture owing to the great weakness of the glutei which were extremely atrophied and showed reactions of degeneration. When last seen on October 17, 1943, his general condition was good, he was cheerful and alert mentally and was studying Arabic. The bowels moved somewhat irregularly but sphincter control was good. Bladder
function was still largely automatic though there was some power of inhibition and some degree of bladder sensation was present. On a normal fluid intake, micturition occurred every two to three hours and up to 12 ounces of urine were passed at a time. He could initiate the act by pressing on the weak lower abdominal muscles with his hands and breathing deeply. The remainder of the clinical picture at this time may be summed up as a spastic paraplegia with almost complete loss of muscle-joint and vibration senses in the legs and with gross blunting of touch, pain and temperature sensibility up to the level of the xiphisternum. The lower abdominal muscles and the glutei appeared to exhibit a lower motor neuron type of paralysis. Repeated clinical examination revealed no evidence of any other disease and X-ray examination of the spine showed no abnormality.

**COMMENT.**

The incidence of neuroparalytic accidents following anti-rabies vaccination is small and varies with the method of inoculation adopted. Available statistics show a relatively higher incidence (1:2-3,000) after methods employing desiccated cord preparations, whereas after killed phenolized vaccine it is low (1:10,000). The etiology, classification and pathology of these accidents are still not clearly elucidated. It would appear that there are four main views as to their etiology.

1. That they represent a form of rabies caused by street virus, acquired when bitten by a rabid dog or other animal, the virus involved being antigenically different from the virus fixe of the vaccine used.
2. That they are due to virus fixe present in the vaccine.
3. That they are caused by some constituent of normal nervous tissue, as yet unidentified, present in the vaccine.
4. That they are produced by a neurotropic virus present in the body and activated by some constituent of the vaccine.

General opinion favours the view that the majority of neuroparalytic accidents following anti-rabies vaccination are either due to rabies virus, in which case they represent a form of rabies, or to some constituent of normal nervous tissue present in the vaccine.

**CLASSIFICATION.**

Though exact classification of these conditions has not yet been achieved, five main types of paralytic phenomena may occur:—

1. Landry Type. Here the onset is usually towards the end of, or shortly after, a course of vaccine. The clinical features are flaccid paralysis of the legs and retention of urine and feces. The paralysis frequently spreads to the arms. Mortality is about 30 per cent and recovery, when it occurs, is usually rapid.
2. Lumbo-dorsal Paralytic Type.—This, the commonest type, is characterized by a febrile onset associated with weakness of the lower limbs, which later become more or less completely paralysed; there is also diminished sensation and sphincter disturbances occur. The upper limbs are rarely involved and the underlying lesion is said to be a myelitis of the lumbar-dorsal region of the cord. The mortality is about 30 per cent and recovery is stated to be in general rapid.
3. Neuritic Type.—Characterized by temporary paralysis of one or more nerves.
4. Gordon’s syndrome which is essentially a meningo-encephalomyelitis.
5. Paralytic Rabies which is a form of rabies unprevented by vaccination or which may be due to the virus fixe of the vaccine. This condition shows the usual rabies incubation period and there are some hydrophobic manifestations. It is always fatal.

**PATHOLOGY.**

Here again there is no uniformity of description. Widespread degeneration of ganglion cells appears to be the rule. Some observers have described demyelination as a prominent feature whereas in other cases it has been entirely absent. Perivascular cuffing and lymphocytic infiltration are also described in some cases. In paralytic rabies, it may be possible to isolate the virus from the nervous tissue and Negri bodies may be present.

In the present case there are certain noteworthy features. The period between the last dose of vaccine and the onset of paralysis was long, namely twenty-nine days. Certain,
possibly irritative, symptoms did occur as early as four days after the last dose. From the
time when weakness of the legs was first noted it was a further nine days until the paralysis
reached its maximum. The incompleteness of the paralysis and of the sensory loss with most
severe involvement of the muscle-joint and vibration senses in the legs was notable as was the
rapid recovery of bladder function.

The case resembles most closely the description of the lumbo-dorsal type. Much more
recovery appears unlikely and indeed the improvement so far observed has been largely due
to the re-education of the muscles. Some further improvement may occur as re-education
progresses but the weakness of the glutei and lower abdominal muscles is a serious handicap.
The excellent mental attitude of the patient to his disabilities and his determination to over­
come them were potent factors in his progress.

SUMMARY.

A case of paraplegia following anti-rabies vaccination is described and brief reference
is made to the nature of such paralytic phenomena.

Owing to Service conditions reference to the literature has not been possible but an exhaus­
tive review of neuroparalytic accidents following anti-rabies vaccination is given in "Virus
Diseases in Man," by C. E., van Rooyen and A. J. Rhodes, London, Humphrey Milford, 1941,
to which full acknowledgment is made.

LESIONS OF THE SEMI-LUNAR FIBROCARTILAGES:
A STUDY OF THE TYPES, POSITIONS AND PATHOLOGICAL CHANGES.

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In a series of 800 consecutive knee cases that one had treated in military hospitals it was
found that 241 patients had lesions of the fibrocartilages or menisci and it is possible the num­
ber should be somewhat higher as several doubtful cases were excluded. Accurate records'
of the types and positions of the cartilage lesions were made at the time on all cases operated
upon and the excised cartilages, together with a portion of synovial membrane, were sent for
pathological examination. The findings are summarized below.

The cartilage lesions were distributed as follows: 176 patients with internal cartilage
tears, 73 per cent; 40 patients with external cartilage tears, 17 per cent; 23 patients with
cystic cartilages, 9 per cent; 2 patients with discoid cartilages, 1 per cent (percentages
calculated to nearest whole number).

Five patients had tears of both internal and external cartilages in the same knee; the
diagnosis was confirmed at operation.

Operative findings supplied details about the type and position of the tear in 138 internal
and 33 external cartilage cases and in all 25 of the cystic and discoid group. Eight other
operations were performed for the removal of posterior horns which were causing persistent
trouble, following previous operations elsewhere, but these are not included in the
following calculations.

The types of lesion encountered varied from an incomplete transverse tear to almost com­
plete longitudinal shredding of the fibrocartilage with every intermediate variety imaginable.
An elaborate classification could be devised but, for simplicity, they can be divided into four
main groups:—

(1) Transverse: Where the cartilage is torn across the direction of its fibres.
(2) "Bucket-handle" or Longitudinal: Where the cartilage is torn along the line of its
fibres.