CEPHALIC TETANUS.

BY

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WE wish to record the following case of head tetanus as it is an uncommon condition, not often reported, and consequently not well known to the profession.

CLINICAL NOTES OF CASE.

A well-developed boy, aged 12 years, was referred on December 15th, 1927, with the following history. A week previously he had been struck with a cricket bat on the right side of the face. The cheek and side of the nose had been bruised, and an irregular wound caused. This had discharged freely, and a splinter of wood had appeared three days after the accident. Five days after the injury facial paralysis appeared on the right side, and the next day he noticed that the jaws were stiff and he could not open his mouth. He rapidly appeared to become very ill, and the rigidity of the jaws had become extreme.

On examination his general appearance suggested an overwhelming toxæmia. He was of a greyish colour, restless, and emotional, and his respiration was slightly laboured, with a rattle due to mucus collecting in his respiratory tract. There was complete facial paralysis on the right side. Trismus was intense, and he was unable to speak or swallow. He had slight spasm of the facial muscles on the left side. The muscles of the neck were not appreciably affected. There was some hyper-tonus of the arms.

The wound was about half an inch long, and was situated at the junction of the nose and cheek. His temperature was 96.5° F. and the pulse 80. Subsequently the temperature ranged for the most part a degree or two above normal.

Treatment and Subsequent Course of the Disease.

His condition was improved with 10 per cent. glucose per rectum, and three hours after admission, under chloroform anaesthesia, suboccipital cisternal puncture was performed, and 15,000 units of antitetanus serum were injected after the removal of an equal volume of cerebro-spinal fluid. A further 15,000 units were injected into the facial nerve from its exit from the skull to its peripheral distribution near the wound; 20,000 units were given intravenously. The wound was then opened up and eusol dressings were applied. The jaws relaxed under deep anaesthesia, and opportunity was taken to tie corks between the teeth in order that subsequent feeding could be carried out.

During the next twelve hours his general condition improved slightly, and under anaesthesia 20,000 units were injected into the cisterna by suboccipital puncture, 20,000 intravenously, and 10,000 into the facial nerve distribution. He improved still further, though trismus and facial paralysis were unchanged. Swallowing was still difficult.

On December 18th 20,000 units were given intravenously. The next day, though the temperature and pulse were both still high, there was improvement in the general condition. Trismus was still severe, and any interference with the corks between the teeth increased the spasm; though urged to swallow sips of water and milk the patient was manifestly afraid to attempt this. There was no tendency to generalized spasm. Under chloroform anaesthesia 10,000 units of antitetanus serum were given into a vein.

The following day the slight improvement already evidenced was maintained, but fluid by the mouth was piteously refused, the patient being terrified of attempting to swallow. There was a noticeable smell of acetone in the breath, and this remained evident for nearly a week longer, in spite of the fact that copious enemata of glucose and water and of sodium bicarbonate solution were regularly given and satisfactorily retained. On this day, December 20th, chloroform was administered, and 10,000 units were given intravenously, and the opportunity was taken to remove the corks, which were almost bitten through. These were replaced by two round wooden blocks fashioned like little cotton-reels, adjusted between the bicuspid teeth on each side and fastened together by a string behind the head. Improvement was slow, but occurred day by day.

On December 22nd there was complaint of soreness in the shoulders and arms, but no spasm except in the masseter. Under chloroform 10,000 units were given intravenously and 10,000 into the spinal theca by a puncture in the upper lumbar region, after the withdrawal of a corresponding quantity of cerebro-spinal fluid.

On December 24th, 26th, and 28th intravenous and subcutaneous injections of 10,000 units each were given under anaesthesia. On December 29th trismus was noticeably less, and for the first time the patient allowed one to remove the wooden props, and was able voluntarily to separate his jaws

half an inch. He took sips of water, and sucked a small piece of orange. The props were replaced for the night.

The next day he was better still, and took a little drink of milk. Barley sugar was given him to suck, and from this time on the starvation acidosis seemed to disappear, and acetone was no longer present in the breath or the urine.

As his confidence in his swallowing powers returned his diet was steadily increased, the wooden props were dispensed with, and he began to speak intelligibly. On account of this rapid improvement it was thought that further administration of serum was not required, but in view of subsequent events this discontinuance, even in face of the steady abatement of symptoms, was probably unwise.

For the first week of January improvement was steady, and the boy began to eat with appetite, indeed almost ravenously, and to sleep soundly for ten or twelve hours at night. He was allowed to sit in the sun on a balcony for an increasing time each day, and then to walk from his bed to the balcony. All this time, though trismus had been abating steadily, the right-sided facial palsy was still complete. In addition, there was a frequent rise of temperature to 99° or 99.6° F., usually in the evening, but sometimes occurring at other times. Accordingly, on January 10th, after an experimental minute subcutaneous dose, 25,000 units of serum were given subcutaneously and intramuscularly with no ill effect, and with a subsequent lowering of the temperature on the next two days. On January 12th 10,000 units were given, also subcutaneously, and on January 16th 10,000 units were given intravenously; following this there were marked anaphylactic symptoms within a few minutes of injection. Abdominal discomfort, vomiting, diarrhoea, pallor, generalized urticaria, and a pulseless condition caused some alarm. Adrenaline, injected at once, was associated with rapid improvement.

The patient was discharged to his home on January 23rd. He could then open his mouth half an inch. The paralysis was not quite complete. He still looked very frail, and his evening temperature was 99° to 99.5° F. During the past two months the paralysis and trismus have completely cleared up. His general health is now good.

We attribute his recovery mainly to the massive doses of serum administered, and more especially to the route used in this particular case. Both experimental and research investigation seem to point to the advisability of getting the serum to the area in which the toxin is concentrated, and in this case it was possible to carry this out very completely. The injections into the cisterna gave a high concentration in the region of the pons and medulla and intracranial course of the seventh nerve. The injection into the facial nerve distribution from the stylo-mastoid foramen to the region of the wound increased the concentration still further. Serum not utilized locally by these injections is absorbed and adds to the effect of the intravenous and subcutaneous doses.

Summary of Amounts of Serum given and Route Adopted.

Date.	Cisternal.	Spinal.	Intra-venous.	Subcut. or Intramusc.	Facial Nerve and Wound.	Total Units.
Dec. 15...	Units. 15,000	Units. —	Units. 20,000	Units. —	Units. 15,000	50,000
" 16...	20,000	—	20,000	—	10,000	50,000
" 18...	—	—	20,000	—	—	20,000
" 19...	—	—	10,000	—	—	10,000
" 20...	—	—	10,000	—	—	10,000
" 22...	—	10,000	10,000	—	—	20,000
" 24...	—	—	10,000	10,000 (I.M.)	—	20,000
" 26...	—	—	10,000	—	—	10,000
" 28...	—	—	10,000	10,000	—	20,000
Jan. 10...	—	—	—	25,000	—	25,000
" 12...	—	—	—	10,000	—	10,000
" 16...	—	—	10,000	—	—	10,000
						255,000

COMMENT.

Cephalic tetanus was first described by Rose in 1872. By 1911 some ninety-four cases had appeared in the literature, and Brown¹ gives an excellent summary of cases reported up to that time. In 84 per cent. of these cases

the first sign of the disease had been trismus, either alone or accompanied by paralysis of one or more cranial nerves. The mortality in which paralysis preceded trismus was 64.2 per cent., as compared with 53.2 per cent. for cephalic tetanus as a whole. Paralysis of the facial nerve was the commonest form of paralysis and appeared on the side of the lesion. Bilateral paralysis had occurred in seven cases, but in all but one the wound had been in the mid-line of the head.

Since this time relatively few cases have been reported. Most of these have been in Continental literature. The rarity of the condition is shown by the fact that the *Medical History of the War*² reports only two cases of head tetanus out of 2,529 cases of tetanus occurring on the Western front. A very complete description of head tetanus is given by Courtois-Suffit and Giron,³ and an admirable illustration by Quervain in *Clinical Surgical Diagnosis*.⁴

The prognosis in head tetanus is, judging from mortality statistics in the cases recorded; much that of the more common generalized form. The incubation period is less, apparently owing to the shorter distance the toxin has to travel, but even with a short incubation period—provided the spasm remains localized to the muscles of mastication—the prognosis is not affected. It would appear that the patient's attention is drawn to his condition earlier in head tetanus, and consequently treatment is more likely to be offered before the toxin has spread to other parts of the nervous system.

REFERENCES.

- ¹ Brown, A. J.: *Annals of Surgery*, April, 1912, vol. lv, No. 4.
- ² *Medical History of the War*, vol. i, p. 162.
- ³ Courtois-Suffit and Giron: *Abnormal Forms of Tetanus*, 1918.
- ⁴ Quervain: *Clinical Surgical Diagnosis*, third edition, p. 109.

ADENOMA OF THE LIVER WITH MALIGNANT CHANGES ASSOCIATED WITH INFANTILISM.

BY

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CASES of adenoma of the liver are uncommon, but the association with infantilism and the development later of malignancy in the tumour make this case of especial interest.

Clinical History.

A domestic servant, aged 19, was admitted to the Horton General Hospital, Banbury, on September 9th, 1927, complaining of vomiting and diarrhoea. Up to the age of 13 the patient had been healthy and of normal growth. Since that time she had ceased to grow, and there had never been any menstrual periods. Mentally she was bright, and up to the average standard at school. In every other way her health was excellent. Three weeks before admission she began to have attacks of vomiting two or three times daily soon after food; this was unassociated with nausea, and the appetite was good. There was no complaint of pain. At the same time diarrhoea came on. The only other symptom was an aching pain in the region of the right iliac fossa, which began the day before admission and aggravated the vomiting; the appetite, however, was still unaffected. There was nothing to note in the past history beyond the arrest of development at the age of 13. She had a mother and father and five brothers and sisters living and in good health.

On examination the patient appeared undersized for her age, her height being 4 ft. 8 in. and the weight 4 st. 10½ lb., but she was otherwise healthy. The eyes were normal. There were a few slightly enlarged cervical glands on both sides, but the thyroid appeared normal. The skin of the whole trunk showed a faint brownish pigmentation. There was no abnormality in the chest. The abdomen moved well on respiration, but was uniformly distended. Pubic hair was present. There was no tenderness. The liver edge was palpable 2½ in. below the right costal margin. The spleen and left kidney could not be felt. In the right flank was a mass of dense consistency, deep to the parietes and having an irregular craggy surface. Above, it was continuous with liver dullness; below, it extended to within 2 in. of the anterior superior iliac spine. It was fairly mobile antero-posteriorly and laterally. Above Poupart's ligament on each side irregular craggy masses could be palpated. No free

fluid could be detected. Knee-jerks were present and equal. There was no oedema of the ankles. The urine was acid, specific gravity 1020, no albumin or sugar.

The diarrhoea and sickness improved during the first three weeks in hospital, but the abdomen slowly increased in size, the tumours showing no appreciable change. Four weeks after admission free fluid was definitely detected, and after this the girth of the abdomen increased more rapidly. Two weeks later oedema of both ankles developed, and the superficial abdominal veins became very dilated.

On October 31st (about seven weeks after admission) the abdomen was tapped to relieve dyspnoea and general discomfort, and 8½ pints of clear sticky light yellow fluid were drawn off. This contained 2.3 per cent. of albumin, and in the centrifugized deposit were little masses of tissue cells such as might be shed from some growing epitheliomatous structure. On November 11th a further 3½ pints were drawn off. From this time the patient went rapidly downhill, and died, after being comatose for twenty-four hours, on November 17th—ten weeks after admission. Throughout the patient was apyrexial, and the pulse rate averaged 80 to within the last fourteen days, when it ranged between 100 and 130.

Pathological Findings.

Post-mortem examination revealed some clear blood-stained fluid free in the peritoneal cavity. The great omentum was much thickened and enlarged by numerous knob-like deposits of growth, which completely covered its surface. All other peritoneal folds, and the abdominal surface of the diaphragm, were studded with these knob-like masses of growth closely set together. On the right side of the abdominal cavity, extending down from the liver, was an elongated mass about 5 in. long by 2½ in. by 3 in. Its upper pole was embedded in the right lobe of the liver, but marked off from the liver substance by a definite capsule. It was separate from the right kidney and suprarenal. On section it was firm, and had a hard core of fibrous tissue with a small calcified patch in the centre. The liver itself was somewhat enlarged, and showed congestion on section; there were one or two knobs of growth on its surface. The gall-bladder was normal. The kidneys and suprarenals were a little congested, but otherwise normal. The pancreas was normal, and the spleen was not enlarged. The pelvic organs were set in a dense mass of knobby growth, which surrounded and pressed on all the vessels. The uterus and tubes, which were dissected out with difficulty, were infantile, and the ovaries could not be distinguished. There was no retroperitoneal growth. Examination of the brain, head and neck, and thoracic organs revealed nothing of note.

Dr. A. G. Gibson of the Radcliffe Infirmary, Oxford, very kindly made a histological examination of the growth. The elongated tumour embedded in the liver showed hypertrophied masses and strands of liver substance. At one spot in the capsule of this growth there was evidence of rapid metastasis into the peritoneal tissue. The secondary growth in the peritoneum showed evidence of much more recent and rapid cell formation, and consisted of strands of liver-like cells with a fibrous stroma. There was no resemblance either in the primary or the secondary growth to a suprarenal or a kidney growth.

Comment.

The tumour was presumably an adenoma of the liver with secondary malignant changes. These rare tumours are described as being often congenital, and the structure of this one, with its fibrous and calcareous centre, goes to show that it must have been of slow growth and present for some long time. When they occur, malignant change is not an uncommon sequel.

It was difficult to account for the lack of development, which did not appear to conform to any well-known type. Deficiency of anterior pituitary lobe secretion at first seemed a possibility, but x rays showed a normal skull, and post mortem there was no macroscopic abnormality of the gland. Moreover, the presence of pubic and axillary hair is an unusual feature of this condition. The thyroid gland was normal in appearance, and in other ways the patient did not conform to the type of under-development associated with hypothyroidism. Renal infantilism was a third possibility, but the urine was always normal, and the kidneys showed no marked change. Chronic diseases in childhood may delay development, and it would seem, therefore, that in this case the infantile condition of the patient is to be attributed to the state of cachexia produced by a long-standing liver tumour.

My thanks are due to Dr. Penrose of Banbury, under whose care the patient was admitted to hospital, for permission to publish this case, and for suggestions in putting together these notes.