SPINAL TUMOURS IN CHILDHOOD

BY

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Spinal tumours are rare in childhood. Stursberg¹, in a collected series of 116 operated cases, found one in a child under ten, and six between ten and fifteen years of age. Schultze² in his series reported one case in a child, while none were noted in the series of Antoni³, of Flatau⁴ and of Nonne⁵. Elsberg⁶ had one patient under ten years in his own 100 cases. Byron Stookey⁷ found eight cases in children under twelve years out of 165 verified tumours of the spinal cord for which operation was performed at the Neurological Institute, New York, between 1910 and 1926 inclusive. Tuberculomata are probably not so common as was once supposed^{7, 11}.

The older statistics are from post-mortem records, and show a higher incidence in children. Thus, Horsley and Gowers⁸ in their compilation of 58 cases found 10 per cent. in children, and Lloyd and Mills⁹ found 12 per cent. Schlesinger¹⁰ in 251 collected cases found 13 per cent. occurring up to the age of nine years, and 11 per cent. between the ages of ten and fifteen.

The discrepancy between the post-mortem and operative groups of statistics suggested, naturally, that spinal tumours have not been recognized readily in children during life.

Case records.

In this paper we report two cases of spinal tumour, the first a cholesteatoma in a boy of eight years, and the second a tuberculoma in a girl of eight years. Both patients were operated upon successfully.

Case 1.—F.W., male, aged 8 years, was sent to the hospital (September 6th, 1930) as a probable case of Pott's disease of the spine. He was the youngest of a family of seven children. The parents were healthy, and there was nothing of note in the boy's past history.

For three years previous to admission he had complained of pain in his back. It was always worse on bending forwards and was first felt when he bent to put on his stockings or tie his bootlaces. It was not constant, but came and went. During the last few months the pain had been worse and more constant, and was often accompanied by a tired feeling in the legs, and a feeling of general weariness. For the last year of the illness, there had been nocturnal incontinence of urine, sometimes once, sometimes twice a week. For about three weeks before admission there had been incontinence almost every night.

He was a well-nourished boy weighing 51 pounds. There was lumbar lordosis, and bending the back backwards caused pain. Pain in the region of the lumbar spine was also caused by flexing

the head on the chest. There was tenderness on heavy percussion over the twelfth dorsal vertebra. Over the fourth lumbar vertebra there was a small dimple in the skin, which was surrounded by a port-wine stain about one inch in diameter. This in turn was surrounded by a brownish area of skin pigmentation. Heart and lungs were normal. There was some weakness of extension at the knee on both sides, and slight weakness of dorsi-flexion of the right foot. The gait was normal, except that the back was held rather stiffly. Apart from hyperæsthesia in both groins, there were no sensory disturbances as regards touch, heat and cold, and pain. No saddle anæsthesia was found. The senses of vibration and passive movement were not impaired. The plantar reflexes were flexor. The abdominal reflexes were elicited easily and the responses were equal on the two sides. The cremasteric reflexes were elicited. The knee jerks were not elicited. The ankle jerks were elicited, and equal on the two sides. There was no ankle clonus. There were no wasting of muscles, and no trophic changes in the skin. Nothing abnormal was noted in the cranial nerves. The fundi of the eyes were normal.

X-ray examination of the spine was negative, except that the shadow of the spine of the third lumbar vertebra in the antero-posterior picture was not so well marked as the spines of the other lumbar vertebræ. A lateral picture, however, showed the lumbar spines to be all about the same size. There was no spina bifida.

FIG. 1. Case 1. Spinal cholesteatoma.

Lumbar puncture gave a cerebro-spinal fluid which was clear and quite colourless, and contained three cells per cubic millimetre. Its globulin was greatly increased. The Wassermann reaction in the fluid, as in the blood, was negative. Quenckenstedt's test was positive.

OPERATIONS.—On October 3rd, 1930, under intra-tracheal gas and oxygen and local novocaine anæsthesia, the spinal canal was opened by the removal of the laminae of the eleventh and twelfth dorsal vertebræ, and of the first to the fourth lumbar vertebræ. The removal of the third and fourth lumbar vertebræ was previously decided upon in case the spinal tumour had a relationship to the dimple in the skin over the fourth lumbar vertebra. The dura mater was joined to the laminae of the fourth lumbar vertebra by a fibrous band. There was no pulsation of the dura below the level of the eleventh dorsal vertebra. Otherwise the appearances were normal. The wound was closed up.

Five days later the second operation was carried out. The dura mater was incised, and at once a pearly white tumour was seen, which lay in its upper half on the cord, and in its lower half on the cauda equina. As the incision in the dura was extended, the tumour practically delivered itself from the canal, and was readily shelled out from above downwards. It was adherent to the pia-arachnoid by a pedicle at its lower pole. The pedicle was cut, and the tumour removed. The dura was stitched up, and the wound closed in layers.

REPORT ON TUMOUR.—The tumour was a typical cholesteatoma (see Fig. 1). It was spindle shaped, and was 3.6 cm. in length. The pedicle measured 0.7 cm. The maximum breadth was 1.6 cm. It was soft and crumbled readily on handling. It was white, and in places had a

pearly sheen. It gave the impression of a cocoon tending to unroll into thin sheets. Each tip was helical (see Fig. 2), and slightly yellow in colour. A transverse section showed the same structureless pearly white appearance, with occasional yellow patches. The greater part of the tumour dissolved away completely in the preparation of sections for microscopic observation, and the residual substance showed parallel but sometimes interlacing fibres of structureless basophilic material, showing no nuclei at all. The tumour contained 10 per cent. cholesterol.

PROGRESS.—Apart from a pyrexia lasting three days after each of the operations, the recovery was uneventful. The incontinence of urine ceased after the first operation, and did not return. Examination on November 5th, 1930, showed that the power in the legs was good, apart from very slight weakness of extension at the left knee. The knee jerks were still absent. The hyperæsthesia of the groins had disappeared, and the back and head could be bent forwards without pain.

Case 2.—(C.S., female, aged eight years and nine months, was admitted to hospital on November 5th, 1929. She was the elder of two children; the other, a boy of $5\frac{1}{2}$ years, was healthy. There was nothing of note in the past history, except an attack of uncomplicated diphtheria at the age of $3\frac{1}{2}$ years. There was no history of trauma.

FIG. 2. Case 1. Spinal cholesteatoma.

Eighteen months before admission she began to have attacks of abdominal pain. The pains, probably root pains, usually commenced in the back, and radiated down both sides of the abdomen just below the ribs, and settled usually about the umbilicus. The attacks lasted from a few minutes up to half an hour, and occurred at intervals over a period of six months. The pains then ceased, but the parents noted that the child walked with the right shoulder raised a little, and with the back held stiffly. The spine was X-rayed at this time at another institution, with a view to excluding Pott's disease. Six months before admission she began to complain of pins and needles in the feet, and about this time began to drag both feet a little when she walked. There was no incontinence or retention of urine, and no bowel disturbance. The power of walking steadily decreased, and for a month before admission she was confined to bed.

She was a fair, fine-skinned child, weighing 50 pounds. There was lumbar lordosis, and pain was felt in the back when she bent forwards. Pain in the lumbar region was complained of when the head was flexed on the chest. There was tenderness on heavy percussion over the three lowest dorsal vertebræ. She dragged both legs on walking, and there was a slight toe-drop. There was no wasting of any muscles. Flexion at the hips and at the knees and plantiflexion were good, but there was some weakness of extension at the knees and of dorsiflexion of the feet. The weakness was about equal on the two sides. The muscles of the abdomen, trunk and arms acted well. There was a band one inch wide of hyperæsthesia at the level of the umbilicus, and below this level there was some deficiency of sensation, as tested by cotton wool and the dragged pin. The child objected less to pin-prick over the same area. The temperature sense was

difficult to test, but the answers were certainly less accurate below the level of the umbilicus. The sense of vibration was absent below the twelfth dorsal vertebra. The sense of passive movement was defective in the right leg and foot, and the answers given on testing the passive movement of the left foot were not altogether satisfactory. The plantar reflexes were flexor. The lower abdominal reflexes were not elicited, but the upper abdominal ones were brisk. There was no disturbance of the sphincters of the bowel or bladder. The knee jerks were not elicited. The ankle jerks were elicited on the two sides and equal. The arm reflexes were equal on the two sides. There were no trophic changes of the skin or muscles. The cranial nerves were normal. The fundi of the eyes were normal. Examination of the heart, lungs and abdomen showed nothing abnormal. In particular, there were no evidences of tuberculosis. The cutaneous tuberculin test of von Pirquet was negative.

Lumbar puncture gave a xanthochromic clear fluid which did not clot on standing. It contained four cells per cubic millimetre, and the globulin was much increased. The Wassermann reaction of the fluid, as of the blood, was negative. Quenckenstedt's test was positive. X-ray

FIG. 3. Case 2. Spinal tuberculoma, microscopic section ($\times 48$).

examination of the dorsal and lumbar regions of the spine was negative. The electrical reactions of the leg muscles were normal.

A diagnosis was made of spinal tumour extending from the tenth thoracic to the fourth lumbar segments of the cord.

OPERATIONS.—On November 15th, 1929, under intra-tracheal gas and oxygen, and local novocaine anæsthesia, the spinal canal was opened by the removal of the laminae of the seventh to the twelfth dorsal vertebrae, and of the first lumbar vertebra. At the level of the seventh vertebra there was definite pulsation of the dura mater noted, but below that level there was no pulsation and the dura was bulging and of a bluish red colour. The wound was then closed up.

Four days later a second operation was done. The wound was opened up, and the dura again exposed. The dura was incised along the whole length of the part exposed, and then it appeared that the cord itself was thickened, red in colour, and obviously very vascular. There was no appearance of a localized tumour. It was not considered that anything further could be done in the way of tumour removal. A small piece of the vascular tissue was removed for examination, the dura was stitched up, and the wound closed in layers.

REPORT ON TUMOUR TISSUE.—Tuberculous granulation tissue, composed mostly of endothelial cells and small round cells. Scanty giant cells also evident (see Fig. 3 and 4).

PROGRESS.—Apart from a pyrexia lasting two days after each operation recovery was good. Seven days after the second operation it was found that the knee jerks could be elicited on the two sides, but that the condition was otherwise as on admission. The sense of passive movement slowly returned, the weakness of the legs and feet slowly disappeared, and sensation below the umbilicus improved. When she was discharged on January 29th, 1930 she walked properly without support, and without dragging of the legs. In fact, the only abnormal sign was a slight deficiency of sensation up to the umbilicus. X-ray therapy was considered advisable, and four exposures at monthly intervals were given. On re-examination on November 3rd, 1930, the girl was found to be walking perfectly, and to be running with no apparent effort. The movements of the spine were normal. The area from which the laminae were removed felt quite firm. A skiagram taken on that date shows signs that are suggestive of the formation of new bone in the places where the laminae were removed. The general condition of the child is improved. She is attending school as a normal child.

FIG. 4. Case 2. Spinal tuberculoma, microscopic section ($\times 180$).

Note on operations.—A laminectomy followed by incision of the dura and handling of the cord is a proceeding that will tax the resistance of a young child to the fullest extent. We believe that a two-stage operation is the method of choice in such cases, and that the best anæsthetic is intra-tracheal gas and oxygen with as little ether as possible, and that infiltration of the operation area with a local anæsthetic combined with adrenalin should be practised.

Both the cases of spinal tumour showed signs of shock after the first operation, and both disturbances of temperature after each operation. It would appear that the removal of the laminae does not cause any apparent disability of the spine when the bodies of the vertebræ are healthy. In young patients one would expect a certain amount of bone regeneration from osteogenetic cells adherent to the under layer of the periosteum which is pushed off the laminae but remains adherent to the overlying muscles.

Summary.

1. A case of a spinal cholesteatoma in a boy of eight years is reported. Removal of the tumour was followed by recovery.

2. A case of a spinal tuberculoma in a girl of eight years is reported. Spinal decompression led to recovery.

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