

ON A CASE OF TUMOUR OF THE CEREBELLUM WITH LEFT HEMIPLEGIA.

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THE following case was under the care of Dr. Ramskill, at the National Hospital for the Paralysed and Epileptic, Queen Square, and it is through his kindness that I am able to publish it.

F. D., a boy aged 11, was admitted into the hospital on June 22nd, 1880, and the following history was obtained from his mother.

There was no neurotic history, and he had had no previous illness of any importance.

Present illness came on five months ago rather suddenly, with pains in the head, and vomiting after everything he took. Four months ago he had a fit while in bed, and preceded by vomiting; he did not lose consciousness; the face was "drawn down on the right side," but the arms and legs were not convulsed; the face was not paralysed after the fit; he had another similar fit a week later.

About this time his sight began to be impaired, and in about another fortnight his mother noticed that his eyes were turned inwards, and they have remained so ever since. Two months ago he began to get giddy, and to reel about in his walking, and to fall forwards and to the left, and "one day he lost power" in the left arm and leg, but not completely, as he was able to walk with assistance till within a month of his admission; the left arm and leg have been getting gradually worse ever since.

His mother does not think that the face was affected the same time as the left arm and leg; but it probably was, as it was found to be affected on the left side on admission. His mother also states that he has not been able to lie on his left side for the last three months.

Present state.—Patient is a dull, heavy-looking boy, who does not take notice of anything, but answers questions slowly,

and takes a long time to do what he is told. He is very drowsy, and sleeps very much, and does not like to be disturbed.

He says he has not any pain at present, but frequently has severe pain in his forehead.

He has frequent vomiting, and the absence of food makes no difference, or very little.

Face.—On showing the upper teeth the right side of upper lip moves, and the left hardly at all; he can close both eyes equally well. Has no ptosis.

Ocular muscles.—There is internal strabismus of the right eye; he can direct either eye to the inner side, but cannot turn either eye outwards beyond the middle line; he cannot elevate or depress the eyes at all; he apparently cannot converge the eyes to a greater degree than they are already converged (?). Pupils equal, rather dilated, no reaction to light, contraction to accommodation doubtful.

Muscles of mastication not affected, and he protrudes the tongue a little to the left.

In phonation the soft palate seems to be drawn a little more to the right than left.

He swallows slowly and with difficulty.

Upper limbs.—Both wasted. Left measures about $\frac{1}{4}$ inch less than right.

Grasp of right hand = 2 kilogrammes by dynamometer.

“ left = 0 “ “

Has free movement of right arm.

With the left he cannot pick up a pin; he can just manage to raise the left hand to his head, but cannot hold it out straight in front of him; can just flex and extend the left fingers. He is unable to raise the left shoulder.

Lower limbs are much wasted, especially the left. He has free movement of the right leg, but he cannot move the left one at all, and it falls like a dead weight. No rigidity in either limb.

The power of right leg is much below normal, but this is probably due to his general weak condition.

Knee phenomenon obtained in either leg, but no excess can be made out.

Ankle clonus present in left leg, but not very well marked; absent in the right.

Plantar reflex present on both sides, but more marked on the right than the left.

Cremasteric reflex very well marked on the right side, not obtained on the left.

Abdominal and Epigastric reflexes very marked on the right, only just obtained on the left.

Sensibility does not seem to be affected, and he localises correctly where he is touched, on both sides all over the body.

Sight.—No diplopia; he can recognise objects—as a key—but cannot distinguish letters.

Ophthalmoscopic examination shows intense double optic neuritis, both discs very red and the margins obscured.

Hearing is much affected, a watch being heard about 12 inches away with the right ear, and only 2 inches off with the left ear.

Taste and *Smell* could not be properly ascertained, owing to the dense condition of his intellect.

Urine contains no albumen. He passes urine and fæces involuntarily into the bed.

He has almost constant priapism.

There is nothing abnormal in the heart, pulse 64.

The vomiting persisting three or four times a day, he was fed for a time on nutrient enemata only, but he still vomited every morning.

On July 15th he had a fit; he lost consciousness, and the head was drawn round to the left; there was marked arching of the back; the arms and legs were not convulsed, but became very stiff, especially the legs; the attack lasted about one minute, and in a few minutes he had another of a similar nature. He was very drowsy after them.

Patient gradually got worse and more dense and drowsy, and as far as could be ascertained he did not present any fresh symptoms; the vomiting persisted, and though he was fed with nutrient enemata he gradually sank, and died on August 4th.

His temperature on the evening before he died was 104, and just before death was 107·4.

On post-mortem examination a tumour was found shaped like a cottage loaf, measuring 3 inches long, and $2\frac{1}{2}$ broad at its larger end, by which it grew from the upper surface of the cerebellum, extending on each side of its middle line. The smaller end of the tumour was free, and extended forwards between the optic thalami, and flattening the corpora quadrigemina, so that there was hardly any trace of them visible; the right optic thalamus for about the inner $\frac{1}{4}$ of an inch, the right crus cerebri, and the right superior cerebellar peduncle, were also compressed; there was some thickening of the meninges about the tumour, but there was no sign of pressure on the pons, medulla, or any of the cranial nerves.

In this case there were the following symptoms met with in intra-cranial tumours: pain in the head, daily purposeless vomiting, and double optic neuritis.

The localisation of the tumour to the cerebellum was not warranted by the symptoms as they first presented themselves,

as during the first month he only had pain in the head and constant vomiting. The description of the fits as given by his mother was very imperfect, and she did not know very much about them, but those he had in the hospital were cerebellar in character, arching of the back with tonic rigidity of the legs, and absence of clonic convulsions. The first fit occurred about a month after onset, and about this time his sight began to fail; but whether this was due to the optic neuritis is doubtful, as Dr. Hughlings-Jackson has shown that double optic neuritis may exist and yet with no impairment of vision.

In one and a half to two months after onset of illness he was one day noticed to have internal strabismus, and he gradually became giddy and staggering in his walking, falling forwards and to the left, and he suddenly one day lost some power in the left arm and leg.

It seems probable that the tumour, which had hitherto kept to the middle line of the cerebellum and had produced no symptoms pointing to its position, now began to grow forwards and to the right, and press on the right crus cerebri; for it has been found that lesions of the cerebellum *per se* do not cause hemiplegia. The loss of power in the limbs was not complete, but gradually increased as the pressure of the growth on the crus became more and more; the leg being affected, on admission, more than the arm, and so differing from ordinary cases of hemiplegia, and thus bearing out Dr. Bastian's opinion (Paralysis from Brain Disease) that these cases are due often to pressure on the pons Varolii from lesions of the cerebellum.

With regard to the strabismus and paralysis of the movements of the eyeballs, they were probably due to the compression of the corpora quadrigemina, which are now considered to be the centres for the co-ordination of the movements of the eyeballs; for in this case there was no paralysis due to lesion of any one nerve, for the portions of the third nerves supplying the internal recti were not affected, while the parts of the nerves supplying the superior and inferior recti were paralysed, clearly showing that it was not the nuclei or the nerve trunks themselves that were affected, but a centre higher up, which co-ordinates the movements of the eyes in different directions; and this case would seem to bear out the theory that the centres for converging the eyes, and for elevating and depressing them were paralysed, while the centre for causing lateral movement was very much impaired.

The corpora quadrigemina are not now considered the seat of vision, and in this case, though they were so much com-

pressed, the patient was able to see well enough to distinguish objects.

The pupils were immovable, and this has been found in other cases to be associated with bilateral lesion of the corpora quadrigemina.

With regard to the situation of the tumour in the median lobe of the cerebellum, there was one symptom which Dr. Bastian (Paralysis from Brain Disease) has stated to be met with most commonly in lesion of this part, viz., persistent priapism, which occurred the whole time he was in the hospital.

The superficial reflexes in this case were altered as they frequently are in hemiplegia, viz., diminished on the paralysed side; the plantar, abdominal and epigastric reflexes being less marked on the left than on the right, while the left cremasteric was absent, the right being very active; on the other hand, ankle clonus was obtained on the left side, but absent on the right—no difference could be made out between the knee phenomena of the two sides.

This diminution of the superficial reflexes on the paralysed side has been explained by a theory based on Setschenow's experiment, who stimulated the optic lobes in a frog and thereby found that reflex action was not so active, the optic lobes exercising an inhibitory action over the reflexes. In man it has been supposed that the optic thalami exercise this inhibitory power over the superficial reflexes; but normally the thalami are themselves inhibited by the cerebral hemispheres, so that when hemiplegia occurs from a lesion cutting the connection between the hemisphere and the optic thalamus, the latter has full play and inhibits the superficial reflexes of the paralysed side.

In this case, however, the superficial reflexes were diminished on the paralysed side, the connection between the optic thalamus and the hemisphere was intact, and the lesion was situated below the optic thalamus and between it and the spinal cord, so, in the first place, the optic thalamus was still inhibited by the hemisphere; and, secondly, the spinal centres were cut off from the influence of the thalamus.

Besides, if this theory were a correct explanation, the superficial reflexes ought to be diminished directly the inhibitory action of the hemisphere is removed—as by a sudden hemorrhage—and at the onset of the attack; but this is not found to be the case, the superficial reflexes not being absent or diminished on the paralysed side till some time after an apoplectic seizure.

The staggering in his walking and the falling forwards and towards the left side, which occurred about six weeks or two

months after the onset of his illness, were probably due to pressure of the tumour on the right half of the cerebellum, and on the right superior cerebellar peduncle.

The right half of the cerebellum works with the left half of the cerebral hemispheres, and they both govern the right half of the body, and when one half of the cerebellum is pressed upon by a tumour, the opposite half over compensates and carries the body over to the opposite side (Dr. Ferrier), and in this case, with a lesion of the right half of the cerebellum, the body was carried over to the left side. Falling forwards has also been considered as occurring in lesions of the anterior part of the median lobe of the cerebellum.

The power of hearing was very much affected, and on the left side more than on the right, which might have been caused by the pressure on the right crus cerebri involving the fibres passing up from the auditory nucleus to the higher centres for hearing in the cerebral convolutions. Hearing on the right side being affected would probably be due to the deficient condition of the patient's intellect; but, besides this, the theory has been advanced as to the possibility of the auditory nerves suffering from neuritis, from intracranial pressure, in a manner similar to the optic nerves, and thus their functions being impaired.

The involuntary evacuation of excreta—which is rare in young cases of hemiplegia—could be accounted for by the patient's mental condition, as he did not take notice of anything, and only spoke when asked a question.

For the appended account of the microscopical appearances of the tumour I am very much indebted to Mr. Victor Horsley, assistant pathologist at University College, who very kindly examined the growth for me.

Tumour of Cerebellum.

The growth in this case evidently sprang from the under surface of the dura mater, extending inwards towards the brain. Throughout it was soft and greyish in colour, obviously cystic in the older portions and more uniform in texture towards the growing edge. Microscopical examination showed it to consist of a fibrous stroma and two classes of corpuscular elements.

The stroma growing from the dura mater was composed of dense fibrous tissue at the periphery, but soon divided into more delicate trabeculae consisting of fibres and spindle-cells, while here and there patches of small round cells, forming a loose embryonic tissue, were found in the more actively growing portions. In several places the stroma was evidently

myxomatous, while everywhere the fibrous trabeculae formed alveoli containing the round cells described below, and sometimes presenting even the appearance of an alveolar sarcoma. Besides the connective tissue corpuscles of the stroma, there were two distinct classes of cells which formed the main mass of the tumour.

1. Round corpuscles. These were large round or oval cells with granular protoplasm, a large nucleus, and bright nucleolus, and measuring about $\frac{1}{1000}$ th inch in diameter. These occupied the alveolar spaces in the stroma sometimes in large masses, at others the cells would be enclosed in little single meshes.

2. The second class of corpuscles constituted an epithelial growth extending through the tumour in different directions. In its earliest stage it consisted of columns of cells which at the periphery were columnar in shape, but towards the centre of the column passed through the transitional stages until the central cells were large flat epithelial plates (figured by Cornil and Ranvier, part 1, p. 134). In other cases the cells in the centre of the column had undergone extensive colloidal change, and this had evidently led to the production of the cysts described below. The epithelial corpuscles were also scattered in groups through the tissue of the stroma without apparently any columnar arrangement, and were perfectly distinct from the large round cells occupying the alveoli of the stroma, since the latter spaces were bounded by well-marked trabeculae, while the epithelial columns were always found where the stroma was myxomatous.

An additional point of interest in the tumour was the formation of cysts. These cysts were of various sizes up to 2 mm. in diameter, and situated in the older portions of the growth, containing either simply granular debris, colloid material or cells which were not completely degenerated.

No relationship could be detected between the blood-vessels and epithelial columns, and the groups of epithelial cells had not become calcified.

The growth is obviously that described by Cornil and Ranvier under the name of "Angiolithic sarcoma," by Virchow as "psammoma," and Rindfleisch as "Epithelioma myxomatodes psammosum." Neither Cornil and Ranvier nor Rindfleisch mention a round-celled growth which was so striking a feature in this case.

The spinal cord on examination proved to be healthy throughout.