

CASE OF ATROPHY OF THE FRONTAL AND PARIETAL LOBES OF THE BRAIN, CONSE- QUENT ON LONG-CONTINUED PARALYSIS OF THE LIMBS FROM SPINAL DISEASE.

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S. P., æt. 37, was admitted into St. Thomas's Hospital under the care of Dr. Harley on the 2nd of August, 1884, and died there on the 3rd of February, 1887. She dated her illness from the preceding April, when she was confined of a still-born child, since which time she had suffered from a pain in the back, and had wasted and lost power in her arms and legs, to such a degree that she could neither stand, nor carry anything in her hands. On admission, her legs and right hand were quite powerless, and she had retention of urine. On the 27th of March, 1886, a year before her death, pain and loss of power were noticed in her left arm, which gradually increased. She continued absolutely confined to bed during the time which she remained alive in St. Thomas's Hospital—a period of two years and seven months. During the whole of this time her legs were completely paralysed, and they became rigid and flexed, while her right hand was affected in the same way. Her left hand and arm were partially paralysed for the last year only. Sensation was retained throughout, except that on rare occasions some dulness was said to be noticed; but this was a transitory phenomenon. She had at first retention, and then incontinence of urine, with cystitis and attacks of high fever.

During the latter part of her life she put on flesh, and her general condition improved very much. Throughout, her mind was free from disturbance, and not in any way deficient. She died on the 3rd of February, 1887.

Post-mortem examination showed that the body was very well nourished.

The legs were rigidly flexed on the abdomen and at the knees: the fingers of the right hand were also flexed.

The lungs, heart, and liver were very atrophied, but otherwise presented no signs of disease.

The spleen was the seat of amyloid changes.

In the pelvis of the left kidney were several irregularly shaped calculi with centres of uric acid, and a deposit of phosphates externally. The pelvis of the kidney was inflamed, the ureter not. Amyloid changes were found in the straight vessels and Malpighian tufts. The right kidney and its pelvis were in a similar condition.

The bladder was inflamed, and its walls thickened.

Uterus and ovaries atrophied.

The brain¹ was healthy, so far as its structure, vascular supply, &c., were concerned; but there was very marked atrophy of the frontal and parietal lobes on both sides. The convolutions were thin, and separated from their neighbours by broad sulci, full of clear fluid. The atrophy was very striking, and was most marked in the upper extremities of the two ascending parietal convolutions of the right hemisphere, and in the superior parietal lobule. The same convolutions were most affected in the left hemisphere, but, in addition, the middle third of the parietal convolutions looked strikingly reduced in size. Microscopic examination showed that there was no disease in these convolutions, but that they were simply atrophied. The frontal convolutions on both sides were in a condition of atrophy similar to that seen in the parietal, but less in degree. In both hemispheres the occipital and temporo-sphenoidal lobes stood out in marked contrast, being well developed, and presenting an almost smooth expanse of broad convolutions, with very ill-marked sulci between them. The central ganglia appeared to be healthy, and those in the right hemisphere were examined in sections and found to be normal.

The bodies of five vertebræ—the sixth and seventh cervical, and the first three dorsal—were carious, and had partially disappeared. There were no collections of pus, but as the disease was most advanced on the right side, a marked curvature, with its concavity towards the right, had been produced. This had caused a displacement of the spinal cord to the left. The dura mater in this region was thickened, but it was not adherent to the spinal cord. The latter was softened for an area of about two inches, and below that level there was well-defined lateral sclerosis in the usual position. The nerves issuing from this part of the cord did not appear to be diseased, nor were the nerve trunks or large muscles of the limbs structurally altered, so far as one could judge from naked-eye examination; but the small muscles of the hand and some of the deep muscles on the flexor surface of the forearm were atrophied and pale.

¹ See Plate, Fig. 1.

The point of special interest in this case, for the sake of which I record it, is that it illustrates the separation in the cerebral cortex of the sensory from the psycho-motor centres. We have frequent opportunities of seeing this proved, either by the results of disease or of experiments on the cortex, lesions of which, in certain regions only, produce paralysis.

But it is a very rare event to get a good specimen illustrating this connection between certain parts of the brain and voluntary muscular action by the secondary effects on the cortex cerebri of experimental or pathological lesions of the cord, nerves, or muscles. The patient, whose brain I now show, may be said to have had voluntary muscular action reduced to a minimum for two and a half years. Her legs were quite paralysed, and incapable of being affected by voluntary stimuli during all that period; so was her right hand, and the inability to use the hand made it practically useless to move such muscles of the arm as were not paralysed. The left arm and hand were only affected for one year before death, and that partially. Being kept absolutely at rest in bed for two and a half years precluded the opportunity of bringing the muscles of the trunk into play, and even the head must have been subjected to but little movement.

The special senses, on the other hand, were all good and in use, and common sensation was little if at all affected. Hence if atrophy follows disuse, we should have expected those parts of the cortex which subserve voluntary muscular action to have wasted, while those which preside over sensation ought to have remained well preserved. Now without going into detail, the striking feature of this brain is the atrophy of the frontal and parietal, and the plump condition of the temporo-sphenoidal and occipital lobes. This, I think, is in accordance with our present views as regards the localisation of the sensory and motor centres.

We know too little of the physiology of the intellectual operations to say whether one part of the brain is more concerned in them than another. But even if it be held that the frontal lobes preside more especially over the processes referred to, one would not, on that account, have necessarily looked for mental deterioration in this case. For the absence of determinations to, and execution of, voluntary motor actions, might give rise to some atrophy of the parts concerned in them, without producing serious diminution of intellectual power.