THE NERVOUS SYSTEM IN CLEIDOCRANIAL DYSOSTOSIS: REPORT OF A CASE.

BY R. M. STEWART, LEAVESDEN.

IN the thirty years which have elapsed since Marie and Sainton first described the congenital abnormality of the osseous system named by them cleidocranial dysostosis about one hundred cases have been recorded. The number of pathological reports is, however, very small, and for this reason it may be of some interest to describe the post-mortem findings in a typical example of this disease.

REPORT OF CASE.

Full clinical notes of the case were published in the Annual Report of the Metropolitan Asylums Board for 1924-25¹, and it will be sufficient to state here that the patient was a partially demented female who presented all the characteristics of cleidocranial dysostosis in a typical form (Fig. 1). In

Fig. 1. The patient, showing the characteristic facies and thoracic deformity.

addition she showed a slight degree of spastic paralysis of the lower limbs and physical signs of mitral and tricuspid stenosis; the latter condition was directly responsible for her death, which occurred in her forty-seventh year.

POST MORTEM EXAMINATION. *Nervous System.* *Brain.*—The dura mater was thickened and firmly adherent to the skull cap. The soft membranes were opaque and markedly thickened in the neighbourhood of the anterior extremity of the great longitudinal fissure.

The brain, which weighed $29\frac{1}{2}$ oz., was small, rounded rather than oval, and its configuration altered in an unusual manner: the frontal poles were small and so extremely narrow from side to side that, viewed from the vertex, the appearance was totally unlike that seen in any other condition (Fig. 2).

Fig. 2. Cerebral hemispheres, showing the narrow frontal poles and large central gyri.

The prefrontal gyri were small and of a complex pattern which differed slightly on the two sides. The superior frontal convolutions were narrow, shrunken and firm to the touch; the middle and inferior frontal gyri were also poorly developed, but showed no evidence of sclerosis. In contrast with these, the precentral, postcentral, and to a lesser extent, the superior parietal convolutions were huge—larger, indeed, than those of a brain of normal size and weight.

Owing to the smallness of the frontal poles, the temporal gyri were visible to a considerable extent when the brain was viewed from above.

The cerebellum, pons and medulla oblongata showed no abnormality. A vertical coronal section in a plane through the rostral end of the corpus callosum revealed marked atrophy or agenesis of the gyrus cinguli on both sides. Equally striking was the poor development of the anterior end of the

corpus callosum, which was seen as a thin band uniting the centrum ovale of the two hemispheres (Fig. 3). When traced in a caudal direction the body of the corpus callosum rapidly increased in thickness, becoming normal at the splenic end.

Fig. 3. Coronal section, showing atrophy of the rostral end of the corpus callosum and of the cingular gyri.

A further point of interest was the asymmetry of the caudate and lenticular nuclei, those of the left hemisphere being unduly small.

Other sections made in a caudal direction showed that the optic thalami were of equal size, and the internal capsules free from gross pathological change.

Sections through the brain stem and spinal cord showed no naked-eye abnormality.

Microscopic Examination.—Sections through the sclerosed cingular gyrus showed a complete absence of mature nerve-cells, the neuron development being represented by a few neuroblasts, globular in shape, and almost devoid of processes. Blood vessels were scanty and the grey matter was almost entirely composed of enormous numbers of fibroblastic astrocytes (Fig. 4).

The motor cortex showed Betz-cells in various stages of chronic degeneration.

Spinal Cord.—The direct and crossed pyramidal tracts furnished no evidence of degeneration, and it is to be particularly noted that there was no dilatation of the central canal in the grey matter.

DISCUSSION.

In a recent publication, Léri and Trétiakoff report the presence of gross inflammatory and hæmorrhagic lesions in the brain of a dysostotic woman who died in her thirty-first year. The dura mater was firmly adherent to the calvaria, and the pia-arachnoid much thickened, especially in the occipital region. When the brain was sectioned a large cyst was found in the right occipital pole, closely related to the posterior horn of the lateral ventricle, but

not actually communicating with it. The wall of the cavity had a neuroglial lining, and its vascular origin was indicated by the presence in it of hæmatoidin crystals and a number of obliterated vessels.

In the opinion of these writers a cavity of this nature cannot be regarded as purely fortuitous, since analogous lesions have been noted before in this disease. In Marie and Sainton's first case a large syringomyelia was present, and in another specimen described by Schaulthauer cavities the size of pigeon's eggs were found in each frontal lobe. The similarity of these morbid processes and their probable origin at about the end of the second month of development, when the clavicles are commencing to ossify, suggests the possibility of an inflammatory process which determines both the cerebral lesions and the malformations of cleidocranial dysostosis.

Fig. 4. Low-power microphotograph of gyrus cinguli, showing neuroglial sclerosis and absence of nerve cells.

In the case reported above, although the brain contained no cavities, there was evidence of an old standing inflammatory process; the sclerosis of portions of the superior frontal and cingular gyri, giving rise to the appearance known as pseudo-microgyria, and the presence in these affected areas of a few incompletely differentiated nerve cells, indicated clearly a morbid process sustained during intrauterine life. At what stage it occurred can only be conjectured, but the firm adhesion of the dura mater, the open fontanelle, and the incomplete closure of the sagittal, frontal and lambdoidal sutures which were present point to an interference with development at the end of the second month of foetal life.

If this be so it is obvious that Jansen's attempt to explain all the signs of dysostosis on the purely mechanical basis of increased amniotic pressure is hardly adequate.

REFERENCES.

- ¹ *Metropolitan Asylums Board : Annual Report*, 1924, p. 261.
- ² LÉRI and TRÉTIKOFF, *Bull. et Mém. Soc. méd. des Hôp.*, 1923, xlvii, 1091.
- ³ JANSEN, *Feebleness of Growth and Congenital Dwarfism*, London, 1921.