MICROCEPHALUS SECONDARY TO BIRTH TRAUMA*

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There has been little or no surgical interest in microcephalus since the turn of the century. It seems a bit unusual with the progress and contributions in the field of neurologic surgery that no one has attempted a revival of or any improvements on the surgery of the 1890’s in behalf of this hopeless group of children. With the idea of possibly helping these babies by surgery, a review of the English literature was made by the author in 1935. This revealed a goodly number of articles dealing with the effects of irradiation upon the foetus, with resulting microcephalus. Many of these publications were controversial but the weight of evidence was that there were arrested developmental cerebral changes in these infants and as such the group did not invite any surgical interest.

Freeman 4 in 1917 reported in detail the histologic changes in four cases of microcephalus and these were discouraging for any optimum surgical possibilities. He found “a disordered fat metabolism as a distinctive feature” and “the absence of any inflammatory vascular and degenerative changes striking.” Eley 3 in 1933, in a review of neurologic conditions in children, was most discouraging in that “the treatment of this disorder (microcephalus) is ineffective.” He felt there could be little doubt “that trauma to the brain must be related to the production of microcephalus.” In support of this statement he cited the “frequency of a history of intracranial hemorrhage as a result of trauma or secondary to hemorrhagic disease of the new born” in these children. In 1926 Brushfield and Wyatt 1 supplied an excellent statistical study on six per cent of 1545 mentally defective children: twelve per cent of these defectives had cranial circumferences smaller than normal, but they felt that only six per cent were true microcephalics. The measurements as reported by these authors have been followed in diagnosing the microcephalics to be discussed in this communication, although a disproportion of more than 4 centimeters between the greatest circumference of the baby’s head and chest measurements at the nipple line has been a practical criterion for such a diagnosis. These same authors 2 in 1927 gave the autopsy findings in 10 cases, and in every instance “the meninges showed signs of chronic inflammatory changes . . . the dura was thickened and sometimes adherent to the pia arachnoid” microscopically . . . “the cerebral cortex showed a definite paucity of neurones; in the precentral gyrus for instance there were areas almost devoid of healthy pyramidal cells, etc. . . . Some brains under consideration showed definite evidence of a slight degree of atrophic sclerosis affecting both hemispheres.” Recalling the numerous in-

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stances in which dural-arachnoidal adherences in cases of tumor have been mistaken as the sole cause of the clinical symptoms of increased intracranial pressure, and the earlier explanations of pachymeningitis hemorrhagica on inflammatory bases, it occurred to mind that the chronic inflammatory changes described by Brushfield and Wyatt might well have been the result of subdural bleeding from birth trauma.

Lannelongue in 1891, before the 5th French Congress of Surgery, reported his results in 25 cases of craniectomies on microcephalics. He referred to them as obstetrical compressions due to forceps deliveries or difficult labor. He advocated linear or flap craniectomy and “detached the dura mater and allowed it to remain untouched.” In the 25 cases “the majority were improved both intellectually and in their ability to walk.” In this same year Keen reported 8 cases—3 of his own and 5 others whose records were furnished by his contemporaries. In none of these was the dura opened. One patient followed by Keen for a year “certainly improved steadily and considerably.” Wyeth (1891) noted that intelligence had greatly increased in a month following a bony incision. In 1900 Naylor sacrificed a large parietal flap without opening the dura and within a week noted improvement in the general spasms and that the spasm of the eyeball was less severe in extent and frequency. After 3 weeks his patient was moving the formerly spastic right arm and leg “quite freely.” The first report in which the dura was opened was by Stiles in 1901 (linear craniectomy). “The object of this was to prevent the subsequent obliteration of the artificial suture by the formation

Fig. 1 (left). Radiologic depictions of any changes other than premature bony closures excluded certain microcephalics for trephine exploration.

Fig. 2 (right). The rather consistent failure of air to enter the subarachnoid spaces in certain microcephalics might possibly be explained by the presence of the subdural membranes.