SURGICAL TREATMENT OF CONGENITAL ANOMALIES OF THE CORONAL AND METOPIC SUTURES

TECHNICAL NOTE

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There is an unusual and interesting variety of craniosynostosis in which prenatal closure of the coronal suture is accompanied by persistent separation of the normally fused metopic suture (Fig. 1A). This is usually associated with premature fusion of the sphenoid and orbital bones. There results a characteristic deformity marked by: (1) widening of the biparietal diameter of the head, anteriorly, (2) soft-tissue prominence in the midline of the forehead from the region of the anterior fontanel to the depressed bridge of the nose, (3) concavity of the lateral, supra-orbital, and anterior temporal areas on both sides, (4) choanal atresia, and (5) protrusion of the eyes. This combination of cranial deformities may sometimes be accompanied by synaestylysm of the fingers and toes, or other congenital malformations. In spite of these various abnormalities, there may be no primary lesion of the central nervous system. The visible deformity is so striking and characteristic that these children should be recognized promptly at birth. Both cosmetic and functional results are best if operation is carried out during the first 2 or 3 months of life, preferably during the first month.1

A plan of surgical correction which has evolved in this clinic is described in this brief technical note. Repair is ordinarily performed in one stage. If there is exophthalmos of sufficient degree to endanger the eyes it is perhaps wise to do the operation in 2 stages so that orbital decompressions may be carried out as well.2 Among 325 patients with craniosynostosis operated upon in this clinic, this particular problem has arisen 4 times.

OPERATIVE PROCEDURE

The infant is placed on the operating table in the supine position under endotracheal, general anesthesia. Intubation should be performed with great care as there is usually narrowing of the nasopharyngeal airway. If, preoperatively, the baby is a mouth breather and it is impossible to pass a No. 8 French catheter through either nostril, indicating severe choanal atresia, it is wise previous to the cranial surgery to carry out elective tracheostomy and to give the anesthetic agent by this route.

A long coronal incision is made from zygoma to zygoma, well back of the hairline (Fig. 2A). The anterior scalp flap is elevated down to the orbital ridges, exposing the entire forehead. Periosteum is first widely removed from the frontal
bones and the area of the fused coronal suture (Fig. 2B). The temporal muscle is detached from its insertion and split in the axis of its fibers so that bone is exposed well below the squamosal suture. A strip of bone 6 to 8 mm. in width is now removed bilaterally, extending from the open fontanel to the wing of the sphenoid and across the squamosal suture to the floor of the middle fossa (Fig. 2D). This craniectomy should curve well forward laterally because of the shallow triangular shape of the frontal fossa. The craniectomy should be carried far enough forward and inferiorly to expose the orbital roof. The frontal bone is next cut across with a saw or stout scissors just above the orbital ridge so that each frontal bone is removed as a separate free bone flap (Fig. 3A). This allows the prominent midline metopic region of the intracranial contents to recede and the depressed anterior temporal areas to fill out bilaterally immediately. The fibrous-tissue layer continuous with periosteum which covers the anterior fontanel and separated metopic suture area is also removed (Fig. 3B). The frontal bones are brought together in the midline, reshaped as necessary, and held in close approximation by silk sutures through drill holes. The frontal bones are also secured to the orbital ridges medially in the same manner (Fig. 3C). This results in the lateral borders of the frontal bone flaps being rotated upward. These bone flaps may be bent or fractured laterally so that the scalp easily molds them to the new and normal contours of the underlying lobes of the brain. Polyethylene film is placed over the anterior margin of the

Fig. 1. (A) Anterior and lateral views of 4-month-old infant with coronal synostosis accompanied by widely patent metopic suture. (B) Postoperative appearance.