Rationale for Surgery in Growing Fractures of the Skull

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There have been a number of cases of growing fractures reported\(^1\)\(^-\)\(^4\) under various headings that include “leptomeningeal cyst” and “growing fractures.” Almost all the authors have advocated surgery. After discussing the clinical and radiological signs, the reports have proceeded to describe the pathogenesis of the condition and the operative findings in great detail. The need for surgery has not been questioned but has simply been assumed.

It is our purpose to present four cases which have not undergone surgery but which have done well, and to discuss the indications for surgical treatment in growing fractures of the skull. Our belief is that the usefulness of surgical therapy is limited to closure of skull and dural defects.

Case Reports

Case 1. A 3-year-old boy was admitted to our service a few hours after a fall from a height of 15 feet. He was reported to have been unconscious for 15 minutes, after which he regained consciousness, vomited, and was incontinent.

First examination. There was a small punctured scalp wound in the right frontoparietal region and a large right frontoparieto-occipital hematoma. He had a left hemiparesis involving the face, arm, and leg with an extensor plantar response. X-rays of the skull showed a right frontoparieto-occipital fracture with 4 mm maximum space between the fracture edges (Fig. 1 left). Altered blood was aspirated from the hematoma. At the time of discharge from the hospital 11 days after the injury his hemiparesis had partially disappeared.

Second examination. The patient was readmitted 2 months later for a palpable bony defect in the region of the fracture. He still had a left spastic hemiparesis, the arm being involved more than the face and the leg. Plantar responses were flexor. X-rays of the skull showed that the fracture had widened, the maximum space between the edges being now 10 mm (Fig. 1 right). The pneumoencephalogram showed the midline of the ventricular system shifted to the right. The

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Fig. 1. Case 1. Left: Skull x-ray film a few hours after injury showing right frontoparieto-occipital fracture. Right: Skull x-ray film 2 months later showing fracture line had widened.
right ventricle was larger than the left and was pulled toward the site of the fracture.

Third and fourth examinations. The patient was reexamined after a further period of 2 and 6 months. The fracture had not widened further. The hemiparesis had improved with physiotherapy. It was decided not to undertake surgery in view of the lessening neurological deficit, and the stationary nature of the cranial defect.

Case 2. This 20-year-old man was referred to us for a longstanding complaint of progressive hemiparesis. He had received a blow on the head from a falling coconut 15 years earlier which had rendered him semiconscious for a week following.

Examination. The patient had a spastic paraparesis with bilateral extensor plantar responses. There was a bony swelling in the left frontoparietal parasagittal region. X-rays of the skull showed a defect in the left frontoparietal parasagittal region with elevated edges (Fig. 2). The characteristic radiological appearance suggested a growing fracture with spontaneous arrest. The cerebrospinal fluid (CSF) protein content was 58 mg%. The electroencephalogram showed bilateral parasagittal slow waves. The left carotid angiogram was normal. The pneumoencephalogram showed the midline of the ventricular system to be shifted to the left. The left lateral ventricle was dilated and shifted upward.

Because 15 years had elapsed since the injury and the defect was closed by a thin bony shell, it was decided not to operate.

Case 3. This 2-month-old baby had received an injury to the head 3 weeks before admission to our service when an elder sibling had fallen on him. A swelling had developed in the occipital region and had gradually increased in size.

Examination. There was a parieto-occipital swelling with intact skin over it; it enlarged when the child cried. The fontanel was open and normal, and the head circumference was 15 inches. There was no neurological deficit. Skull x-rays showed a growing fracture of the left occipital region.

Surgery was advised but the child’s mother was not willing for surgical treatment. There has been no increase in the size of the fracture during the last 6 months.

Fig. 2. Case 2. Skull x-ray film 15 years after injury showing defect in the left frontoparietal parasagittal region with elevated edges.

Case 4. This 6-month-old baby girl was admitted to our hospital with a history of a fall of 4 feet. She had been unconscious for an hour after the fall, and then had developed right focal fits.

First examination. The patient had a left temporoparietal hematoma with a palpable linear depression underneath. There was weakness of the right arm but gross movements were possible; skilled movements with the hand were defective. An electroencephalogram done in our service a few weeks after the injury was normal, and the skull x-ray film showed a linear crack fracture.

Subsequent examinations. Five months after the injury, x-rays of the skull showed a growing fracture. A year after the injury the fracture had grown further and was now a palpable linear defect in the left parieto-temporal region. The weakness of the right arm was persistent and had extended to the leg also. A ventriculogram showed the frontal horn and body of the lateral ventricle to be