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Growing Skull Fractures

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Growing skull fractures or craniocerebral erosions are rare sequel to cranial fractures where progressively growing cranial defects follow lacerations involving the duramater. Their usual site is the parietal region. They present as a cystic, non-tender swelling with an underlying palpable bony defect. One such case is reported.

Keywords: *Craniocerebral erosions, Growing skull fractures, Leptomeningeal cysts.*

Growing skull fracture, recently termed as craniocerebral erosion, is a rare complication of skull fractures seen mainly in infancy and early childhood. It is characterized by progressive diastatic enlargement of the fracture line. This late complication is also known as leptomeningeal cyst because of its frequent association with a cystic mass filled with CSF.

Case Report

A 3-month male infant presented with a history of fall 15 days back. The infant had a gradually increasing swelling over the left parietal region. He was conscious and there was no history of seizures, vomiting or any discharge from the ears or nose. On physical

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Manuscript received: March 18, 2003;
Initial review completed: April 22, 2003;
Revision accepted: May 9, 2003.

examination, a cystic swelling approximately 8x6 cm in size was present over the left parietal prominence. The swelling was compressible but not tender. A bone gap was palpable. The anterior fontanalle was wide open. There were no focal neurological deficits.

A plain radiograph of the skull was obtained which confirmed fracture of the left parietal bone and also showed an oblong lucency with a soft tissue swelling over the fracture in the left parietal bone. The margins of the bone gap were everted. A low attenuation area of size 1.5 × l.2 cm of CSF density was seen protruding through the gap on C.T. examination (*Fig. 1*). Widening of the sulcal spaces in the left parietal region was also seen. A three dimensional reconstruction was done to demonstrate the defect for the operating surgeon (*Fig. 2*).

The patient was operated upon and corrective surgery was done. There were no intra-operative or post-operative complications and the patient was doing fine on the follow up visit a month after the operation.

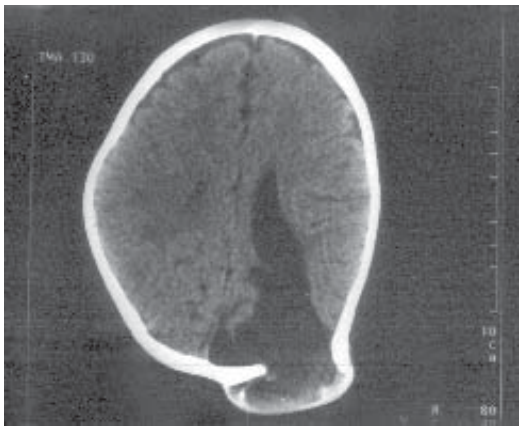

Fig. 1. Axial CT section showing defect in the skull with a cystic density lesion pushing through and communicating with the left lateral ventricle. Also noted is widening of the sulcal spaces.

Discussion

Growing skull fractures usually occur after severe head trauma during the first three years of the life (particularly infancy) and almost never after 8 yrs of life. The incidence reported is only 0.05 to 0.1% of skull fractures in childhood(1,2).

During this stage, the brain volume increases rapidly, which is in part responsible for its development. Though the development of growing skull fractures is multifactorial, the predominant factor in their causation is the presence of lacerated duramater. The pulsatile force, of the brain during its growth causes the fracture in the thin skull to enlarge. This interposition of tissue prevents osteoblasts from migrating to the fracture site, inhibiting healing. The resorption of the adjacent bone by the continuous pressure from tissue herniation through the bone gap adds to the progression of the fracture line.

The brain extrusion may be present shortly after diastatic linear fracture in neonates and young infants resulting in focal dilation of the lateral ventricle near the growing fracture(3). This dilatation is reversible and may normalize after surgical repair(4). Cranial defects have been found never to increase in

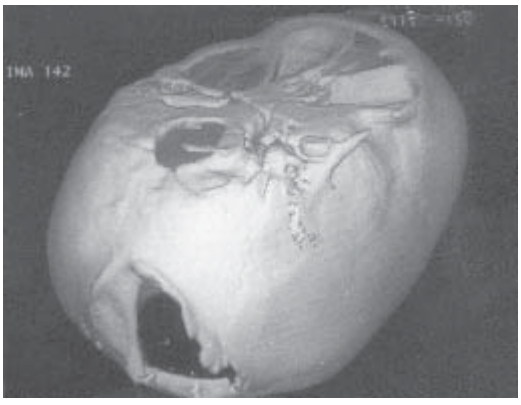

Fig. 2. Three dimensional reconstruction to demonstrate the calvarial defect.

size if the underlying dura is intact. Also, craniotomies performed without watertight closure of dural lacerations have been found to lead to growing skull fractures. These support dural tear as being the major risk factor in the development of a growing skull fracture.

Another risk factor is severity of the underlying trauma. A linear fracture associated with hemorrhagic contusion of subjacent brain suggests a trauma significant enough to cause dural laceration. The brain at the growing fracture site shows a cerebromeningeal cicatrix formation. Cystic changes at the growing fracture site may be because of cystic encephalomalacia. Post traumatic aneurysms and subdural hematomas have also been reported to accompany growing skull fractures(5,6). Though most patients show damage to underlying brain, this finding is not a prerequisite for the development of growing skull fractures(7).

These skull fractures, after reaching their maximum extent, cease to grow and remain stable throughout adulthood(2). A depressed fracture usually does not become a growing fracture(8) but a linear fracture extending from a depressed one can become one(9). A fracture with a diastasis of >4 mm may be considered at risk of developing a growing skull fracture(3,10). But a post traumatic diastasis of a cranial suture is an unusual site for a growing fracture. The usual site is the parietal region. A growing fracture at the skull base may present with ocular proptosis or CSF rhinorrhea or otorrhea.

Owing to the risk of neurological deterioration and development of seizure disorders, surgical correction of growing fractures is recommended.

Contributors: SGI was responsible for the image reconstruction, literature search and preparation of the manuscript. PS was responsible for the drafting of the manuscript. GDK critically evaluated the paper and gave the final approval of the version of the manuscript to be sent for publishing.

Funding: None.

Competing interests: None stated.

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