

Case Report

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A Rare Case of Traumatic Leptomeningeal Cyst in Adult: Case Report



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Abstract

Traumatic leptomeningeal cysts are a rare complication of a childhood skull fracture. Clinical manifestations of a childhood trauma are very rare in adults and usually presents as a nontender subcutaneous mass with progressive neurological deficit and seizures.

Keywords: Leptomeningeal cyst; Adult; Trauma; Seizures; Skull fracture

Abbreviations: CT: Computed Tomography; MRI: Magnetic Resonance Imaging; CSF: Cerebrospinal Fluid; T1WI: T1-Weighted Images; T2WI: T2-Weighted Images

Case Report

A 28-year-old male presenting with a gradually increasing scalp swelling in the left parietal region over a long period and seizures. The patient was conscious. On physical examination,

there was a cystic swelling over the left parietal prominence. The swelling was compressible but non-tender and non-pulsatile. There was a history of head injury during infancy (Figure 1-5).



Figure 1: 28-year-old male with leptomeningeal cyst. Lateral scannogram demonstrates a well-defined lytic area in the parietal bone with geographic margins.

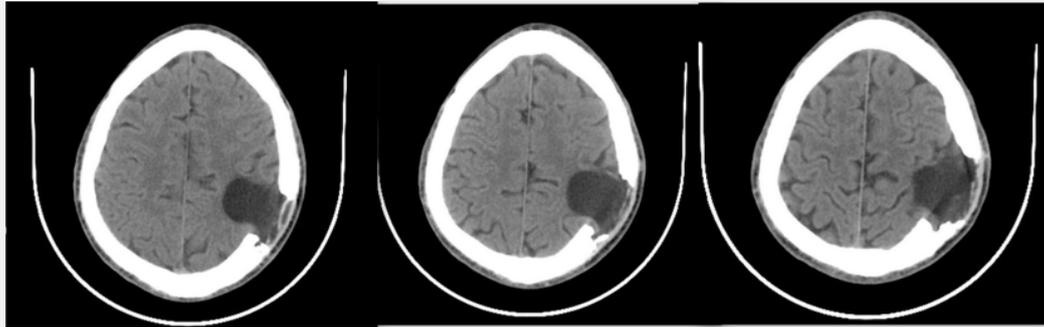


Figure 2: 28-year-old male with leptomenigeal cyst. Non-contrast contiguous axial CT sections of brain demonstrates CSF density cystic lesion in the left high parietal lobe with an adjacent large calvarial defect in the left parietal bone. The cyst is communicating with the subarachnoid space and is also seen extending through the calvarial defect.

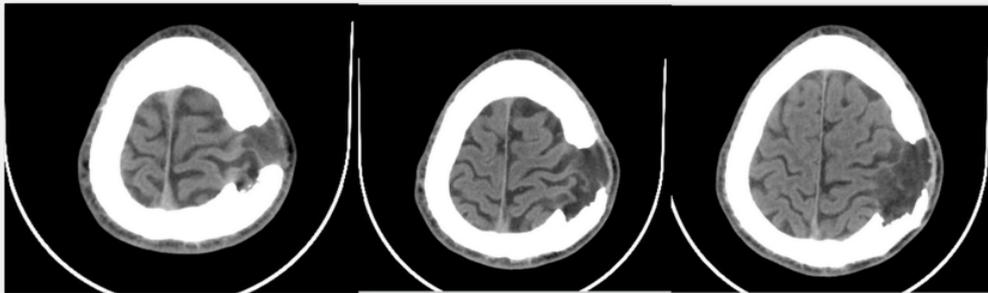


Figure 3: 28-year-old male with leptomenigeal cyst. Non-contrast contiguous axial CT sections of brain cephalad to fig 2 demonstrates mild widening of sulcal spaces and hypodense areas in the surrounding brain parenchyma adjacent to the lesion and calvarial defect due to encephalomalacia.

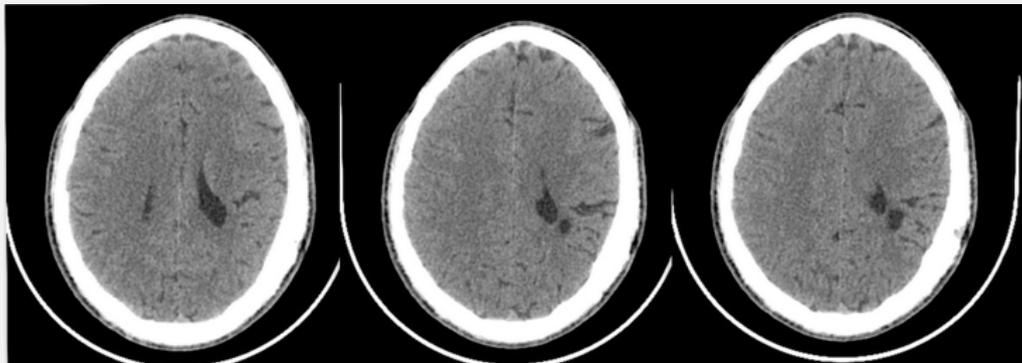


Figure 4: 28-year-old male with leptomenigeal cyst. Non contrast contiguous axial CT sections of brain caudad to figure 2 demonstrates the cystic lesion is closely abutting the left lateral ventricle, but not communicating with it.

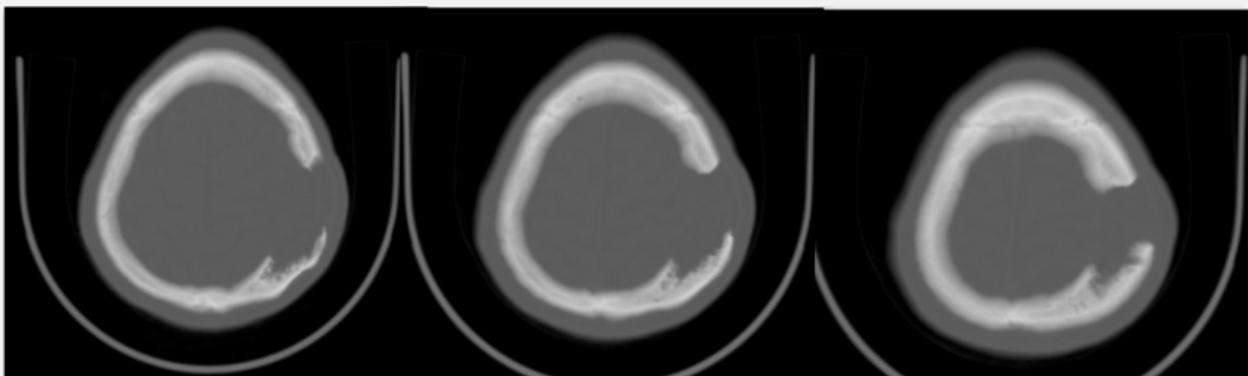


Figure 5: 28-year-old male with leptomenigeal cyst. Non-contrast contiguous axial CT sections of brain in bone window demonstrates a large defect in left high parietal bone with scalloped margins.

A non-contrast enhanced head computed tomography (CT) examination was performed on a multidetector CT (Lightspeed ultra, GE Medical Systems) and demonstrated a large calvarial defect in the left parietal region with irregular and beveled margins. An adjacent CSF density cystic lesion of size 42x41mm noted in the left high parietal lobe. The cyst was seen communicating with the subarachnoid space and also seen extending through the calvarial defect. Mild widening of sulcal spaces and hypodense areas also noted in the surrounding brain parenchyma due to encephalomalacia. The cystic lesion was seen closely abutting the left lateral ventricle with focal dilatation of the ventricle. But there was no communication of the cyst with the ventricle. Corrective surgery was done. The intraoperative and postoperative period was uneventful.

Discussion

Growing skull fractures usually occur due to severe head trauma during the first three years of life, particularly in infancy. Incidence reported is only 0.05 to 0.1% of skull fracture in childhood [1,2]. Cause for growing skull fractures is multifactorial but the main factor is tear in the dura mater. The pulsatile force of CSF and pressure of growing brain will cause cerebral or subarachnoid herniation through the dural tear which causes the fracture in the thin skull to enlarge. This interposition of tissue prevents osteoblasts from migrating, inhibiting fracture 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 (Tables 1-2).

Table 1: Differential diagnosis for leptomeningeal cyst.

Differential Diagnosis	CT Scan	MRI T1 W	MRI T2 W
Epidermoid cyst	Well defined defect with sclerotic margins in skull, CSF density cystic lesion in the brain.	Well defined hypointense signal lesion in skull. Well defined CSF isointense signal cystic lesion in brain	Well defined hyperintense signal lesion in skull. Well defined CSF isointense signal cystic lesion in brain.
Congenital calvarial defects	Look for bilateral symmetry, characteristic location to suggest the diagnosis.	Look for bilateral symmetry, characteristic location to suggest the diagnosis.	Look for bilateral symmetry, characteristic location to suggest the diagnosis.
Langerhans cell histiocytosis	Classic beveled appearance, unusual in infants prior to development of diploic layer. Soft tissue density lesion in the skull. Underlying brain usually normal.	Hypointense signal lesion in the diploic space.	Hyperintense signal lesion in the diploic space.
Calvarial metastasis: consider leukaemia, neuroblastoma	Lytic lesion in the skull with soft tissue mass. Underlying brain may or may not be involved.	Hypointense signal lesion in the skull. Underlying brain may or may not be involved.	Hyperintense signal lesion in the skull. Underlying brain may or may not be involved.
Osteomyelitis	Overlying soft tissue oedema, poorly defined infiltrating destructive margins of the skull.	Soft tissue oedema will be hypointense. Hypointense infiltrative destructive lesion of the skull.	Hyperintense infiltrative destructive lesion of the skull.

Table abbreviations: CT = Computed Tomography, MRI = Magnetic Resonance Imaging, CSF = Cerebrospinal fluid, T1WI= T1-weighted images, T2WI= T2-weighted images.

Table 2: Summary table for leptomeningeal cyst.

Terminology	Enlarging calvarial fracture adjacent to post traumatic encephalomalacia.
Age	90% occur in patients < three years, very rare in adults.
Epidemiology	Rare: 0.6% of paediatric skull fractures.
Clinical presentation	Infant or child: enlarging palpable soft scalp mass. Adults: usually discovered as noted in subcutaneous mass.
Natural history and prognosis	Increasing fracture diastasis over time. +/- progressive neurologic deficits (seizures, paresis) particularly in adult presentation.
Site	Parietal bone most common.
Imaging recommendations	Routine NECT viewed in brain and bone algorithm.
Imaging findings	<p><u>Plain radiograph:</u> well defined lytic area, usually in the parietal bone.</p> <p><u>NECT:</u> brain tissue, cerebrospinal (CSF) fluid extending between bone edges. Subjacent encephalomalacia under fracture.</p> <p><u>MRI findings:</u></p> <p>T1WI-cyst isointense with the CSF, communicate with the subarachnoid space. Subjacent encephalomalacia underlying fracture.</p> <p>T2 WI-same as T1 WI.</p>

Table abbreviations: CT = Computed Tomography, MRI = Magnetic Resonance Imaging, CSF = Cerebrospinal fluid, T1WI= T1-weighted images, T2WI= T2-weighted images.

The brain extrusion may be present shortly after diastatic linear fracture in neonates and young infants [3] resulting in focal dilatation of the lateral ventricle near the growing fracture. This focal dilatation may be seen in adults which is also seen in this case. This focal dilatation is reversible and may normalize after surgical repair [4]. Cranial defects never increase if the underlying dura is intact. Leptomeningeal cyst never occurs if the dura is intact.

Another risk factor is severity of underlying trauma. A linear fracture associated with hemorrhagic contusion of subjacent brain suggests a trauma significant enough to cause dural laceration. 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 [6,7]. Though most patients show damage to underlying brain, this finding is not a prerequisite for the development of growing skull fractures [8].

These skull fractures after reaching maximum extent will cease to grow and remain stable throughout adulthood [2,5].

A depressed fracture usually does not become a growing fracture [9] but a linear fracture extending from a depressed one can become one [10].

A fracture with a diastasis of >4mm may be considered at risk of developing a growing skull fracture [3,11,12]. But a post traumatic diastasis of a cranial suture is an unusual site for a growing fracture. Growing fractures can even be seen in usually in linear fractures in thin areas of skull base associated with dural laceration, for e.g.: Orbital roof, ethmoid plate, frontal sinus.

These fractures commonly present as a progressive, scalp mass that appears sometime after head trauma sustained during infancy. There may be seizures and hemiparesis, but an asymptomatic palpable mass may be the sole sign. The usual site is the parietal region. A growing fracture at the skull base may present with ocular proptosis or CSF rhinorrhea or otorrhea.

A plain radiograph may show a fracture line that crosses a coronal or lambdoid suture, but it is usually limited to a parietal bone [13]. CT or MRI demonstrates a cystic lesion near the fracture site communicating with the subarachnoid spaces and extending through the bony defect. Margins of bony defect may be beveled or irregular. Adjacent brain parenchyma usually shows mild

encephalomalacia changes and focal atrophy. Gliosis may also be seen in the adjacent brain parenchyma. On CT scan gliosis is seen as hypodense areas. On MRI gliosis is seen as hypointense T1 and hyperintense T2 signals.

Because of neurological deterioration and of seizure disorder surgical correction of growing fractures is recommended.

Even though traumatic leptomeningeal cyst is rare in adults, it should be considered in the differential diagnosis of intracranial cystic lesions with adjacent calvarial defects.

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