

## Special Issue Article "Brain Surgery"

## Case Report

## Post-Traumatic Leptomeningeal Cysts in a Pre-Teenager: A Rare Complication of Paediatric Head Injury

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### ABSTRACT

Post-traumatic leptomeningeal cyst is an uncommon neurosurgical condition that may complicate skull fracture. We managed a 10-year old boy who presented with a focal seizure involving left upper limb with secondary generalisation three months prior to presentation. He has associated gradually progressing right parietal scalp swelling. Physical examination revealed conscious child, oriented in time, place and person with Glasgow coma score of fifteen. Pupils were 3mm and reacted normally to light, no cranial palsy, motor and sensory functions were intact in all limbs. There was an oval shaped cystic, non-tender right parietal mass measuring about 5x6 cm, with an overlying scar and bony defects around the mass. A diagnosis of recurrent post-traumatic leptomeningeal cyst was entertained, he subsequently had craniectomy, duroplasty and cranioplasty with titanium mesh and had an excellent outcome.

### INTRODUCTION

Post-traumatic leptomeningeal cysts are rare but clinically important complication of head injury associated with growing skull fracture [1]. Majority of cases of post-traumatic leptomeningeal cysts present in paediatric age group, with 90% seen in children under the age of 3 years, but reported in literature to occur from perinatal period to elderly [2,3]. The estimated incidence of post-traumatic leptomeningeal is 0.005% to 1.6% of all skull fractures [2,4,5] and the time interval between occurrence of head injury and diagnosis of leptomeningeal cyst has been documented to varies from 1 day to 1 year [6].

The herniation of arachnoid and intracranial contents through the defects, in addition to continuous Cerebrospinal Fluid (CSF) pulsations causes erosion of the bone edges and prevent normal union of bone and healing [1,7]. Clinical presentations and neuroimaging findings give away the diagnosis and the most accepted treatment for posttraumatic leptomeningeal cysts is craniectomy, dural repair and cranioplasty using either auto or allograft [8,9].

There are few reports of post-traumatic leptomeningeal cysts occurring in children older 3 years in the literature. This report aimed to describe the clinical presentation, neuroimaging findings and management outcome of a case posttraumatic leptomeningeal seen in our centre.

### CASE PRESENTATION

A ten-year old boy presented with a focal seizure involving left upper limb with secondary generalization three months prior to presentation. There was associated gradually progressing right parietal scalp swelling and headache of two months

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duration. No associated alteration in conscious level, no motor or sensory deficit recorded. There was antecedent history of head injury from falls three months prior to the onset of symptoms, which he had laceration at the site of the swelling and treated at peripheral hospital with no neurosurgical care. Physical examination revealed conscious child oriented in time, place and person with Glasgow Coma Score (GCS) of fifteen. Pupils were 3mm and reacted normally to light, no cranial palsy, motor and sensory functions were intact in all limbs. There was an oval shaped cystic, non-tender right parietal mass measuring about 5x6 cm, with an overlying scar and bony defects around the mass. Cranial computerised tomographic scan showed a right parietal hypodense cystic lesion with overlying skull defect (Figure 1 and Figure 2).



Figure 1: CT scan showing right parietal hypodense lesion.



Figure 2: CT scan showing a right parietal skull defect.

Seizure was controlled with anticonvulsant and had craniectomy around the defects, drainage of clear CSF and cranioplasty using methyl-methacrylate. Three months after the surgery, the child represented with recurrence of the leptomeningeal cysts and displacement of the acrylics cranioplast, but seizure was controlled on anticonvulsant. He had re-do craniectomy around the cysts, duroplasty and cranioplasty using titanium mesh (Figure 3-5). He had good post-operative recovery and has remained stable with good cosmetic appearance as at last follow-up seven months after the last surgery.

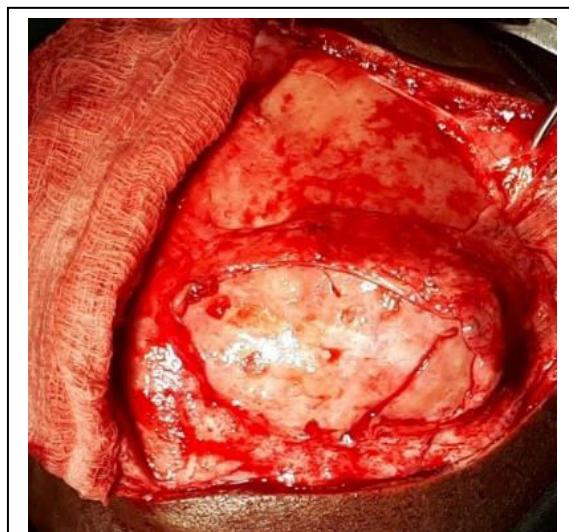


Figure 3: Intraoperative image showing leptomeningeal cyst.

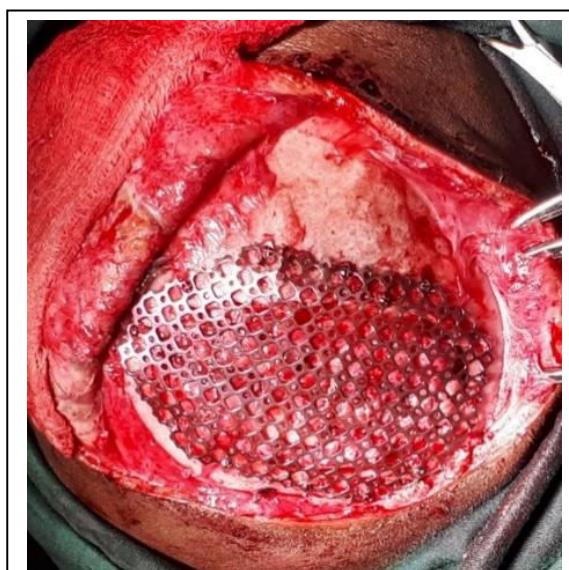


Figure 4: Intraoperative image showing titanium mesh placed.



Figure 5: Immediate postoperative image.

## DISCUSSION

Post-traumatic leptomeningeal cysts are unusual but clinically significant sequelae of traumatic skull fractures in paediatric age group. As in our index case, the commonest cause of post-traumatic leptomeningeal cysts is fall [5]. Variable clinical signs and symptoms have been described but the commonest presentation includes seizure, focal neurological deficits, loss of consciousness and scalp swelling. In comparison to the present case, the child presented with seizure, scalp swelling and headache.

Growing skull fracture has been classified by Ur-Rahman et al based on most dominant factor for growth, in order of severity into: type 1 (growing skull fracture with leptomeningeal cyst), type 2 (growing skull fracture with gliotic brain) and type 3 (growing skull fracture with porencephalic cyst [4,5]. By this classification, our patient has type 1 growing skull fracture.

The most accepted treatment of choice is surgical repair, which involves dural repair and cranioplasty [8]. Cranioplasty is usually recommended in defect greater than 3cm. In our patient, duroplasty was done using piece of pericranium and cranioplasty was achieved with titanium mesh after developing recurrence with polymethyl methacrylate. It's of note that patients with titanium skull prosthesis have increased risk of developing aneurysm of anterior cerebral artery when

exposed to cold temperature but not normal or hot weather [10].

The outcome of surgical repair of post-traumatic leptomeningeal cyst is generally good. However, complications reported in literature include recurrence, cerebrospinal fluid leak, bone flap infection and death. Mortality of 0 to 8% has been reported [8]. The bad prognostic factors documented include: age >8 years, defects greater than 7cm, delayed repair (>8 months), Glasgow coma score of 8 and below at initial trauma, defects crossing midline and female gender [5,8]. The index case had head trauma at the age of 10 years, diagnosis of leptomeningeal cyst was made after 3 months, GCS was 15 at initial trauma, defect did not cross the midline and it was less than 7cm. He had a very good outcomes, equivalent to other cases published in the literature.

## CONCLUSION

Post-traumatic leptomeningeal cyst is rare but clinically relevant sequelae of head injury. Recurrence can occur within short period of time (3 months), craniectomy around the defects, duroplasty and cranioplasty with titanium mesh may results in excellent outcomes.

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