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Letter to the Editor

Decompressive craniectomy in a three-month-old infant

Dear Sir,

Decompressive hemicraniectomy and duraplasty can relieve the pressure from swollen, infarcted brain tissue thus preventing brain herniation and death in patients with refractory intracranial hypertension due to various etiologies in adults[1–3] as well as in children.[4,5] A three-month-old male child presented to the emergency department about 10 h after with the fall from his mother's lap (about 4 feet height). Since then the child was in altered sensorium and had multiple episodes of vomiting. On examination the child was unconscious, had poor cry on painful stimulus, flexion response to pain and was opening eyes to painful stimuli. Pupils were 4 mm, bilateral equal and reactive to light. The anterior fontanel was open and soft and there was no focal weakness no systemic injuries. Initial computerized tomography (CT) brain scan showed thin left fronto-temporal hyperdense collection with mass effect (Fig. 1A). The child was started on conservative treatment (Nil orally, intravenous fluids and prophylactic injection phenytoin). However the child became progressively drowsy and non-responsive even to deep painful stimuli. A follow up CT scan showed increase in the size of hematoma and mass effect with evidence of left occipital infarct (Fig. 1B). Injection mannitol was added to control the cerebral edema. On further follow up clinical examination of the child deterioration in neurological status and increase in head size with tense fontanels and it was confirmed by cranial ultrasound. The patient underwent left temporo-parietal craniotomy. There was a large left temporo-parietal acute subdural hematoma which was evacuated. There was significant cerebral edema but the brain was pulsating well. Dura could not be closed primarily and a lax duraplasty was performed by using autologus pericardial graft harvested from the scalp flap. The bone flap could not be replaced. Following surgery the patient was kept on elective ventilation support. On day 1 patient improved neurologically. He was opening eyes to painful stimuli and moving all four limbs. The ventilator support was weaned off over a period of 5 days and the patient was discharged on tenth day. The parent had been asked to follow up with ophthalmologist for VEPs as the child had a PCA infarct CT scan (Fig. 2).

Infants have a greater capacity to tolerate raised intra-cranial pressure (ICP) than adults' as open fontanels and distensible sutures allow expansion of the cranial cavity to accommodate increase in intracranial volume,[6] reducing the risk of brain herniation and infarction in infants.[7,8] However, in rare situations, severe cerebral edema following severe head injuries can produce sustained rise of intracranial pressure leading to brain infarction infants.[7,8] As in present case, a similar situation making decompressive craniectomy a management option in infants.[5,7,8] According to the guidelines,

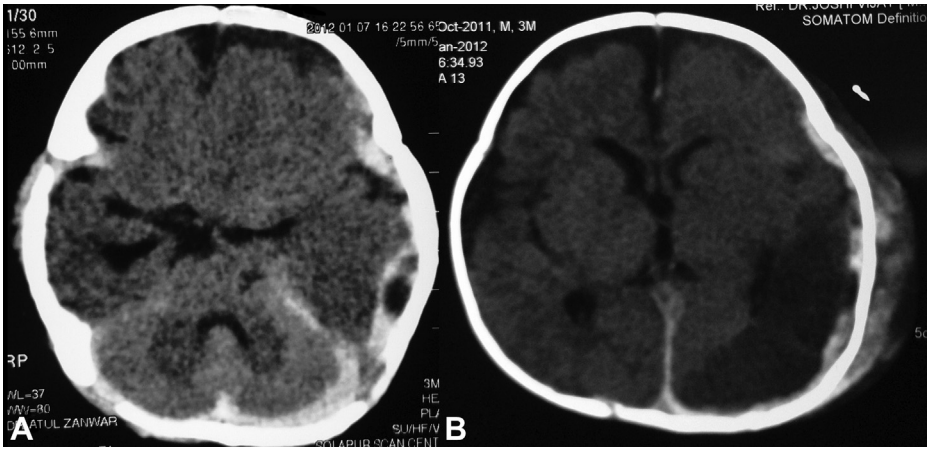

Fig. 1 – (A) Initial CT brain scan showing a thin left temporo-parietal acute subdural hematoma. (B) Follow up CT scan showing increase in the size of hematoma and associated left occipital lobe infarction.

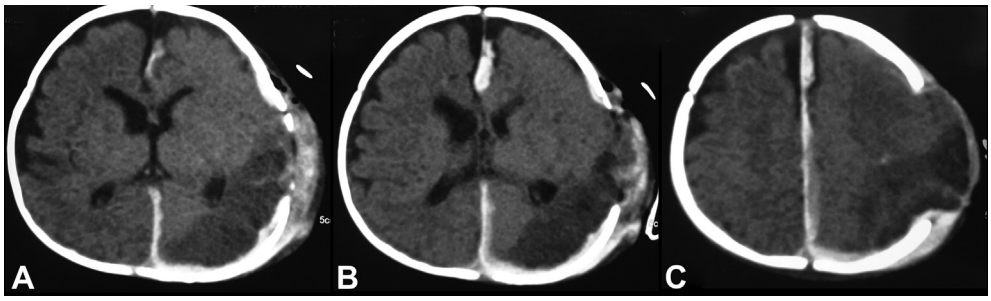

Fig. 2 – Postoperative CT scan brain plain showing increase in the size of infarction and external herniation of the brain through the craniectomy defect.

indications for decompressive craniotomy in children with traumatic brain injury include medically refractory intracranial hypertension, diffuse cerebral swelling on cranial CT imaging, admission to the hospital within 48 h of injury, no episodes of sustained ICP > 40 mm Hg before surgery, GCS > 3 at some point subsequent to injury, secondary clinical deterioration, and if there is evolving cerebral herniation syndrome.[5,9] The decision to perform surgical decompression is based primarily on clinical findings of bulging and tense fontanel, secondary clinical deterioration due to cerebral herniation (mydriasis and anisocoria) and the radiological findings of severe brain swelling causing obliteration of the basal cisterns however the procedure should ideally be carried out before the evolution of brain infarction and secondary brain damage.[5] There are many issues that need to be clarified including the size of craniotomy (particularly when the fontanels are not fused), also material and timing of craniolpasty in these patients. In summary, it has been shown that despite severe brain damage,[5] early removal of bone flap reduction in intracranial pressure and fewer episodes of intracranial hypertension occur resulting in good functional outcome and improved quality of life in children.[4] However there is a need for further controlled trials to evaluate the indication and standardization of early decompressive craniectomy in pediatric severe head injury.[9]

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