Spontaneous congenital intrauterine depressed skull fracture in Newborn

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ABSTRACT

Spontaneous congenital intrauterine depressions of skull in newborn has an incidence of 1/10,000 birth. These skull depression have two pathogenic types; deformed skull depression with and without fracture. The cause of skull depression being the pressure exerted by the fist of the fetus on the skull or skull being pressed against the sacral promontory. The treatment of choice for selected cases is surgical elevation.

Key words: neonatal, congenital, depressed fracture, spontaneous, sacral promontory.

الملخص

معدل حدوث انخفاض الجمجمة التلقائي الخلقي داخل الرحم يساوي 1 لكل 10,000 ولادة. هذا الانخفاض يتكون من نوعين , انخفاض مصحوب بكسر في الجمجمة والاخر بدون كسر , من اسباب هذا الانخفاض ضغط قبضة الجنين علي الجمجمة او الضغط علي الجمجمة من عظم عجز الام, يتم العلاج جراحيا في بعض الحالات المختارة

INTRODUCTION

A depressed skull fracture is an inward buckling of the calvarial bones and where no fracture line can be found, is referred to as Ping- Pong or Pond fracture or Greenstick fracture [1]. Sponteneous congenital depressions of skull have an incidence of 1/10000 birth in western countries [1,2]. Congenital depression of fetal skull not associated with trauma is a rare event. Infrequently noted that spontaneous intrauterine skull depressions are seen in neonates after easy and uneventful normal delivery or even after cesarean section. Etiology and pathogenesis of these congenital skull depressions are open to conjecture and the optimal method of management remains controversial. The actual cause is not known, but it is suggested that because of the cartilaginous nature of the fetal skull, compression by fetal limbs or pressure of the fetal head against the maternal bony structure, mainly the sacral promontory causes the most of the so-called "spontaneous" congenital depressed skull fractures. They are not true fractures, rather these are focal congenital molding depressions [2]. On the other hand, trauma to the mother's abdomen and traumatic delivery are accepted pathological mechanisms for such lesions [3].

One third of the depressed fractures are simple, one third are associated with dural laceration and one fourth have cortical laceration. Depressed skull fractures typically requires surgical elevation if the depth of the depression is thicker than the calvarium [4]. Associated intracranial injuries are rare. Theoretically a depression of more than 5 mm may impinge on the cerebral cortex, resulting in localized compression of the brain with resultant cerebral edema and decreased blood flow [5].

This condition can be diagnosed clinically. Plain x-ray of skull may show the degree of deformation. No fracture line is noted because of the resilient cartilaginous nature of the neonatal skull, and there are no secondary findings of an acute injury, such as soft tissue swelling, intracranial hemorrhage or adjacent brain edema seen on the CT scan [6].

The management of depressed skull fracture of neonates is discussed controversially. Small lessions are likely to resolve sponteneously without any surgical intervention [7]. Large lessions (>3cm) with a mass effect leading to midline shift, require corrective surgery. In addition, it is advisable to elevate severe depressions to prevent cortical injury from sustained pressure [8,9].

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Treatments advocated have included surgical elevation[10,11] usually by Burr-hole operation for large depression, elevation by digital pressure on the edges of the depression [12] by serial manipulation for several days for minor depression, elevation by vacuum extractor or a breast pump [13] for minimum to moderate size depression and watchful waiting [14] for minimal depression. In general larger and deeper depressions are treated more aggressively either by neurosurgical correction or suction elevation [10,11]. We report this case because of infrequent occurrence but with awareness of neurological consequence which may need good clinical assessment, evaluation and timely intervention.

Case Report

It was the fifth delivery of the mother. The actual delivery was at term, cephalic presentation and amniotic fluid was clear. Delivery was done by cesarean section. It was a female baby, body weight was 3100 gm, length was 54 cm. Apgar score 9 after 01 minute and 10 after 5 minute. During her stay in the hospital the child had normal neurological status. After delivery by cesarean section the left fronto- parietal bone depression was evident. The depression measured 2x3cm with a deapth of 1.5cm. The anterior frontonel measured 1x1cm and was normotensive. There was no maternal history of abdominal trauma during pregnancy and there was no complication or difficulty with cesarean section.

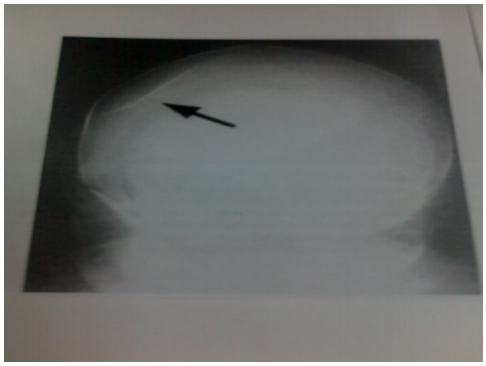


Figure 1: Frontal skull radiography showing "Ping-pong ball" fracture of the left parietal bone.

At craniogram in antero-posterior projection, at the place of depression of the left fronto-parietal bone any fracture line was not visible. Cerebral ultra sonogram was normal without any sign of intracranial bleeding or contusion. CT scan of brain showed depression and angulations of bone on the left Fronto-parietal region. There was no intracranial hemorrhage or cerebral edema. Ventricular system was normal and there was no mid-line shift. The case was evaluated by Neurosurgeon and decided for surgical correction as the depressed segment was of large size.

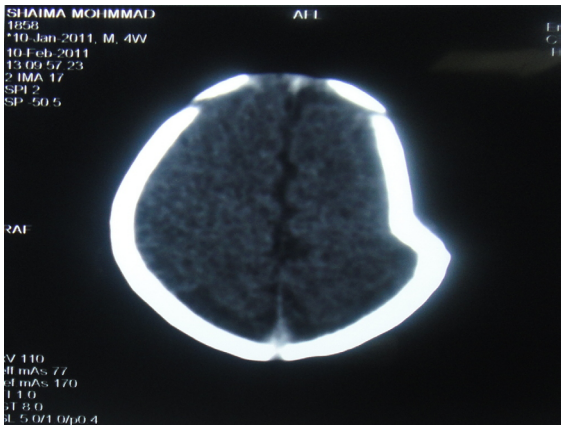


Figure 2: Axial computed tomography brain scan showing a depression in the left parietal region with no associated fracture.

The rationale for this policy is (a) to relieve local and general compression of the brain; (b)to prevent irritation of the brain and possibly the future development of seizures; and (c) cosmetic [15]. Accordingly on the 6th day of life, under General anesthesia the depression was elevated by Burr-hole operation. The dura matter was stripped and a periostial elevator was used to elevate the depressed fracture. Postoperative recovery was uneventful and was discharged from the hospital on 3rd post operative day at good shape and neurological status.



Figure 3: Axial computed tomography brain scan(Bony domain) showing a depression in the left parietal region with no associated fracture.

The patient was followed-up at 2 weeks, 2months, 6 months and ten months of age was found at normal neurological status. Milestones of development were normal.

Discussion

Congenital depression of the neonatal skull is a rare finding in our newborn population. We have encountered only one patient among 6528 births in the past 5 years in our hospital, from July 2006 to June 2011.

Regarding the pathogenesis we distinguished two types of congenital depressions of neonatal skull. (a) Deformed skull depression, which is deformation without fracture (b) Fractured skull deformation, which is depression with fracture [5]. It is impossible to differentiate between these two entities clinically. In our case the diagnosis was made by the use of X-ray and CT- scan of brain which ruled out the presence of any fracture, cerebral compression, hemorrhage or cerebral edema. Spontaneous intrauterine fracture of skull in neonates among African women may be more common and a large series by Axon and Levy [16] suggests that the most frequent mechanism may be occult trauma from pressure of the fetal head on the sacral promontory, resulting in molding.

In some reported cases, uncomplicated sponteneous vaginal or cesarean section delivaries, surprisingly yielded infants with depressed skull fractures [10]. The congenital depressed fracture, unlike the linear fracture, is caused by inward bending of the skull surface, leading to so called Pin-Pong ball or Pond fracture. In the neonate with a depressed fracture, usually there is no break in the surface continuity of the skull and on an X-ray the fracture appears as a line of increased density [17].

Normally the neonatal skull is very soft, and bones are separated by membraneous sutures, which makes the skull very pliable. There are some controversy as to whether depressed skull fracture in the newborn should be treated or not and if treatment is given whether it should be surgical or not. Some researcher states that in his experience all depressed skull fractures in neonates have corrected themselves sponteneously [18]. To our openion, this may be so, but there is no long term follow up studies to know the outcome in terms of neurological defeciency.

Sequelae due to acute head injury are well recognized in older children. These include, cranial nerve palsies, focal cerebral deficits, cerebral atrophy and post traumatic epilepsy [19].

A similar case report was published in Dove press journal: Research and Reports in Neonatology [20], which like our case was not a true fracture but rather a depression, which also was treated by surgical correction.

It is therefore, in conclusion more acceptable that congenital depressed skull fracture in newborn should be elevated as soon as possible after birth, although not necessararily as an emergency. Rational for this policy is (i) to relieve local and general compression of brain, (ii) to prevent irritation of brain and possibly the future development of seizures; and (iii) cosmetic [15].

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