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Congenital depressed fracture of the skull in a neonate

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Abstract. *Objective:* Congenital depression of the skull is a rare event and the cause is not always clear. It may be complicated by brain injury, hematoma and epilepsy. This case is presented to draw attention to this rare congenital disorder which may raise suspicions in the family and discuss treatment options.

Description: This baby boy was born at term by cesarean section and the depressed fracture of the right parietal bone, 5 cm × 4 cm, with a depth of 7.7 mm was noted at the first examination. Conventional and 3-dimensional computed tomography of the skull confirmed the diagnosis. The neurological examination was unremarkable. The depressed portion was elevated by surgery; the baby was growing well in the first month.

Comments: Skull fracture is frequently assumed to have resulted from trauma, but it may occur prenatally.

Keywords: Skull fracture, depressed fracture, newborn

1. Introduction

Congenital depressed fracture of the skull is a rare event with a reported incidence between 1 to 2.5 per 10 000 live births [1, 2]. The cause is frequently unclear but various maternal, fetal and instrumental factors may be responsible. The main importance of a depressed skull is the potential to induce brain injury, including hematomas and epileptogenic foci. The number of cases reported in the literature is quite few and

the approaches are heterogenous. The anxiety of the parents is another confounding factor. We describe a new case of depressed skull fracture managed by early surgical correction.

2. Case report

This baby boy was born after 39 weeks of gestation by cesarean section. The pregnancy was complicated by gestational diabetes and cephalopelvic disproportion. His weight was 3360 grams. At the first examination of the baby at the delivery room, right parietal skull depression with diameters of 5 cm × 4 cm

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was noted. The rest of the examination, including neurological examination was unremarkable. Conventional and 3-dimensional computerized tomography (3D-CT) was obtained and right parietal depressed fracture was observed (Figs. 1 and 2). The depth of the depression was 7.7 mm. Surgical and non-surgical treatment options and benefits and risks of each option were discussed with the family and operation was

decided. Treatment: the neurosurgeon decided to operate the patient. During the operation, coronary suture was decided as the elevation introduction point. However, since it was impossible to elevate the cranium from this incision, an additional incision of 1 cm from the coronary suture, towards the parietal region was made and by the help of a dissector, the center

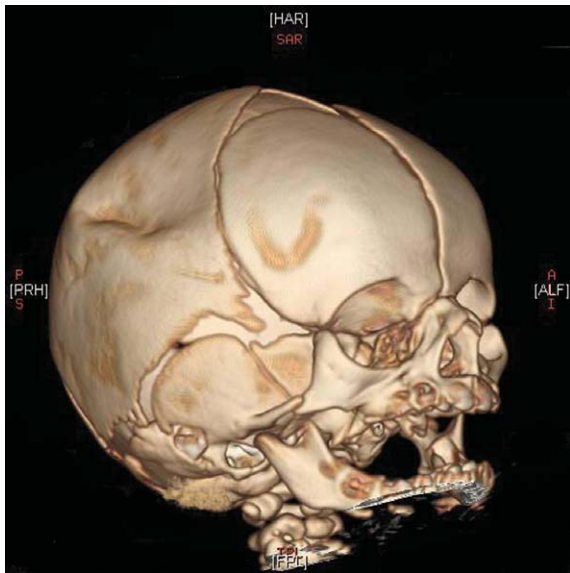


Fig. 1. Depression of the right parietal bone.

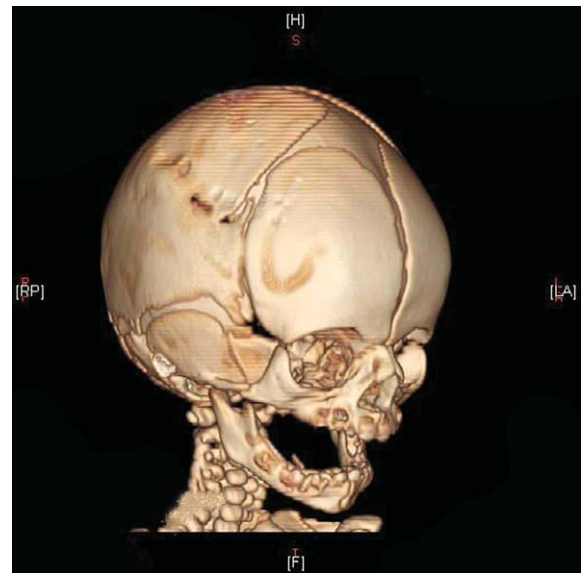


Fig. 3. Restoration of the parietal bone after surgery.

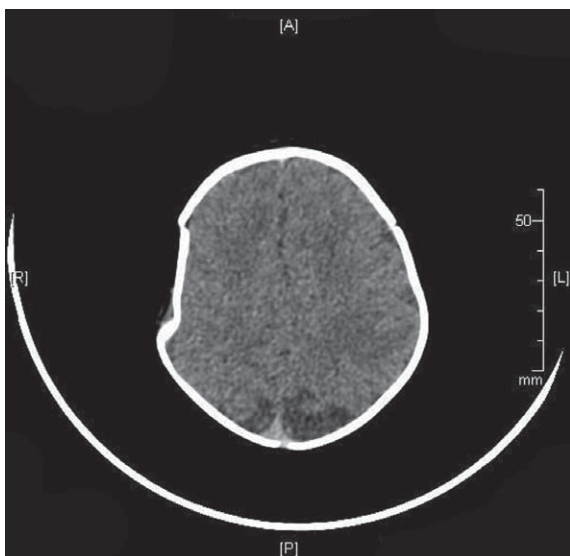


Fig. 2. Conventional CT before the operation.

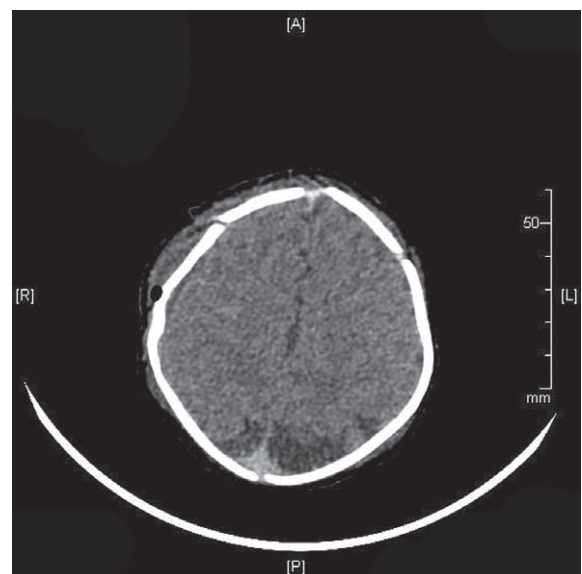


Fig. 4. Conventional CT after the operation.

region and the fracture line was elevated. There were not any complications of the operation. The patient was admitted to the neonatal intensive care unit after the operation and was observed for 5 more days. A repeat conventional and 3D-CT showed that the fracture was elevated completely and the natural anatomy was achieved. (Figs. 3 and 4). Minimal scalp edema and extradural air bubbles were observed, without any hemorrhage. He was discharged in good condition on the 7th day of life. A month after discharge, he was growing well, fed solely by breast milk, without any neurological signs or symptoms.

3. Discussion

Congenital depression of the neonatal skull is an extremely rare event and only 147 cases have been reported until now, most of them solitary and only 55 of them having a possible etiology [3]. In most of the cases, the etiology is unclear. Possible etiologic factors are as follows:

- 1) Maternal factors
 - a. Skeletal: Pressure against sacral promontory, symphysis pubis, ischial spine, asymmetrical or contracted pelvis, exostosis of lumbar vertebra, fracture of pelvis, L5 vertebra
 - b. Uterine: leiomyomas, fibromas, malformations
 - c. Placental: tumors
 - d. Membranes: amniorrhexis
- 2) Fetal factors: Pressure by: fetal arm, fetal wrist, fetal fingers, fetal fist, fetal foot, extreme moulding, twins
- 3) Instrumental factors: forceps, vacuum, obstetrician's hand
- 4) Idiopathic.

Some authors make a distinction between two types: 1) deformed skull depression (deformation without a fracture) and 2) fractured skull depression (depressed skull fracture) [2]. It is impossible to differentiate clinically between these entities. Although there was cephalopelvic disproportion in our case, the exact cause of depression could not be determined. However, the lesion was considered to be a depressed skull fracture, which may be compared to the green-stick fracture of long bones in children. In one study, the anatomic location of the

fractures were frontal (67%), parietal (28%) and others (5%) [3]. In our case, the lesion was in the right parietal region, quite far from the suture line, which made the surgical intervention more complex.

The treatment of congenital depressed fracture of the skull is controversial. Since localized pressure from the depressed region may cause cerebral disfunction, a decrease in cerebral blood flow and epileptogenic foci [4], most neurosurgeons prefer the surgical elevation of the depression, usually in an early elective fashion. The 3D-CT offers a better visualization of the depression and therefore a more precise decision. In case of bone fragments in the brain, neurological deficits, signs of elevated intracranial pressure and unsuccessful attempts of non-surgical elevation, an emergency surgical intervention should be contemplated [5]. Some authors suggest that the risk of cerebral compression and edema is increased if the depth of the bony depression is more than 5 mm [5]. However, others argue that this assumption is not evidence based and suggest 2 cm instead, again without any solid data [6]. Non-surgical methods of intervention include treatment by digital pressure on the edges of the depression or suction by means of a breast pump or vacuum extractor [7, 8]. Hanlon et al. have reported a depressed fracture with spontaneous resolution by 4 months of age [9]. Hung et al. have concluded that non-surgical management or vacuum extraction of depressed skull fractures are comparable [10]. Similarly Steinbok et al. have suggested that surgery may be indicated only in cases with dural laceration [11]. However, in experienced hands, the complications of surgery are minimal and in the developing brain such as in newborns and infants, conservative management is generally reserved for infants with minor depressions (<5 mm in depth). In infants with a depression >5 mm, surgical elevation may be preferred.

4. Conclusion

The etiology of depressed skull fracture in this newborn was unknown. He did not develop any neurological disfunction and since the depth of depression was >5 mm, he was treated surgically with a very good outcome. This entity is very rare and surgical prognosis is excellent. However, since most parents think that it may be related to birth trauma, detailed

explanation should be provided to them until they are satisfied.

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