Brief Communication

Journal of Child Neurology
26(11) 1449-1451

DOI: 10.1177/0883073811410058
http://jcn.sagepub.com
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Spontaneous Resolution of Atraumatic Intrauterine Ping-Pong Fractures in Newborns Delivered by Cesarean Section

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Abstract

Two cases of spontaneous intrauterine ping-pong fractures are reported in newborns delivered by cesarean section. Skull fractures occurred with no evidence of extrinsic trauma or cephalopelvic disproportion. Subsequent clinical follow-up at 6 and 12 months revealed normal skull reshaping and growth, with no associated neurological deficits. Spontaneous intrauterine ping-pong fractures in newborns delivered by cesarean section is a distinctly rare condition. These 2 cases demonstrate that, even without complicated spontaneous vaginal delivery or history of external trauma, congenital ping-pong fracture of the skull can occur. The existence of this clinical condition and its spontaneous resolution is important knowledge that can assist in the prepartum and postpartum management of children with this pathology.

Keywords

ping-pong fracture, congenital skull fracture, intrauterine spontaneous skull fracture, fetal skull

Received March 28, 2011. Received revised April 18, 2011. Accepted for publication April 18, 2011.

Congenital depression of the fetal skull in newborns is uncommon, with a reported incidence ranging between 1 and 2.5 per 10 000 live births.[1,2] Two distinct types based on etiology have been identified: iatrogenic, due to forceps application or pressure from the obstetrician's hand, and spontaneous. The fetal skull is less mineralized and more pliable; prolonged focal pressure can produce circumscribed calvarial thinning and softening which can result in cranial bone collapse without true fracture. The process of delivery through the birth canal constitutes a form of trauma whereby the skull is moulded because of a shifting of the fetal cranial bones from the pressure exerted on the fetal head by the maternal soft tissues in the lower uterine segment. The shape of the head and the relation of the cranial bones normally return to normal in approximately 72 hours after delivery. However, skull depressions have been reported in uneventful vaginal deliveries without noticeable signs of trauma and in cesarean sections.[3–8] These observations have further complicated the etiology of congenital moulding depression of the skull, suggesting that intrauterine events before delivery can result in these deformities.[9,10] We report 2 cases of spontaneous intrauterine ping-pong fractures in newborns delivered by cesarean section in which immediately after the delivery the gynecologists and obstetricians were threatened with malpractice by the newborns' parents.

Case 1

A 2780-gram singleton baby girl was born at 38 weeks of gestation to a 40-year-old woman. Pregnancy was uncomplicated, with no history of maternal trauma prenatally reported. Fetal ultrasound was within normal limits, the last performed at 30 weeks of gestation. Urgent cesarean section was performed because of failure of the labor to progress. Apgar score was 9 and 10 at 1 and 5 minutes. Head circumference was 33 cm. A large left parietal skull depression was noted upon delivery (Figure 1A). The parents were informed that congenital moulding fractures are a rare and self-limiting occurrence, and the child was followed nonoperatively. A plaster cast measuring the skull depression was applied to the child's head every 2 months giving parents the opportunity to appreciate

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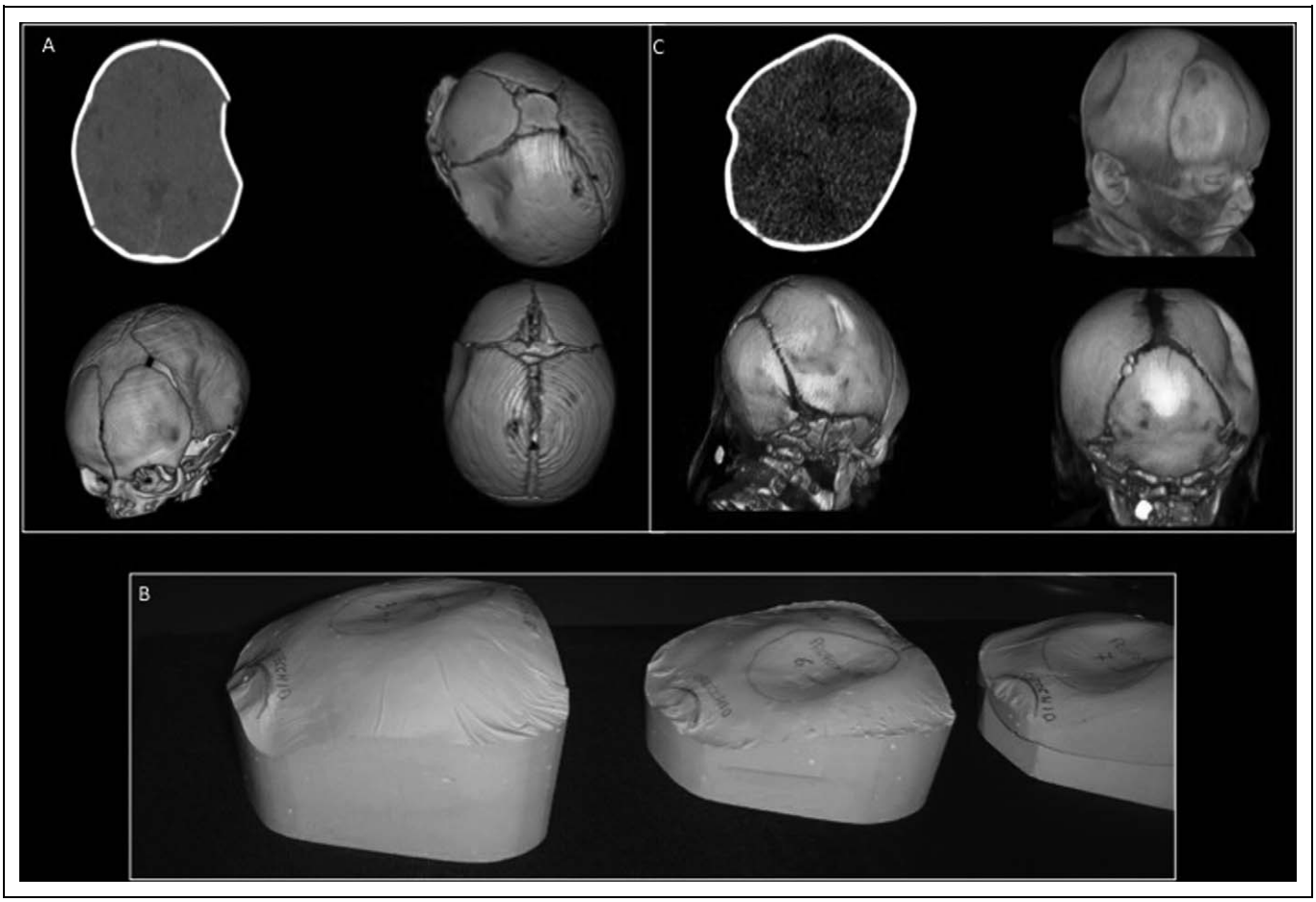

Figure 1. A, Computed tomography (CT) scan with three-dimensional (3D) reconstruction of a large left parietal skull depressed fracture. B, Plaster cast measuring the skull depression was applied to the child's head every 2 months giving parents the opportunity to appreciate the resolution (from right to left) of the deformity. C, CT scan with 3D reconstruction of a large right posterior parietal skull depressed fracture.

the resolution of the deformity (Figure 1B). By 8 months of age, the depression had completely resolved, with the child meeting all developmental milestones.

Case 2

A 3660-gram singleton baby girl was born at 36 weeks of gestation to a 41-year-old woman. Pregnancy was uncomplicated, with no history of maternal trauma prenatally. Maternal obstetrical history was remarkable for 1 previous normal spontaneous vaginal delivery and 1 previous spontaneous abortion at week 6. Fetal ultrasound had been within normal limits, the last performed at 34 weeks of gestation. Labor was induced by oxytocin and urgent cesarean section was performed because of failure to progress. Apgar score was 8 and 10 at 1 and 5 minutes. Head circumference was 36 cm. A large right parietal skull depression was noted upon delivery (Figure 1C). After neurosurgical evaluation, the child was followed expectantly. Follow-up evaluations were scheduled monthly to observe the reshaping of skull depression. By 8 months of age, the depression had completely resolved, and the child was meeting all appropriate developmental milestones.

Discussion

Skull deformities in neonates are generally discovered during the delivery process, although several cases have been discovered before delivery,[4–8] and in 1 occasion during vaginal examination.[11] A contracted pelvis is the most commonly reported etiology for congenital skull depressions (60%). In fact, Axton and Levy[1] have demonstrated, with the use of X-ray pelvimetry, evidence of pelvic abnormalities in all their patients. Other factors commonly encountered in neonates with congenital skull moulding include forceps delivery (13%), maternal trauma (9%), large uterine fibroids (7%), fetal malpresentation (5.5%), compression by fetal limbs (5.5%). The incidence of congenital skull depression by anatomic location is as follows: frontal (67%), parietal (28%), other (5%). Skull depressions associated with maternal trauma have more consistently been reported in the parietal area (80%).[4] Skull depressions rarely have been observed in atraumatic deliveries such as those performed by means of a cesarean section. Although the deformity provokes considerable distress to the family of the newborn, this disorder is usually benign and can be managed expectantly. Steinbok et al[12] recommend a nonsurgical approach in all

pediatric age groups, who have no evidence of dural penetration. Although untreated neonatal skull depression has been reported to occasionally persist into adult life, most untreated neonatal skull depressions seem to spontaneously resolve within 6 months.[5,13] Strong et al[14] propose a conservative therapeutic approach for the management of congenital skull depression. Adequate continuity of care and parental compliance is necessary. In the past, surgical intervention was favored because it allowed the physician to rule-out an underlying hematoma, which might otherwise have been missed. If there was evidence of a hematoma during surgery, that would be drained. Loeser et al[13] have proposed a surgical intervention when there are bone fragments in the brain, neurological deficits, signs of increased intracranial pressure, and unsuccessful attempts at nonsurgical elevation. Computed tomography (CT) to elucidate whether further treatment is needed can also be used. Pneumatic traction was suggested for the elevation of depressed skull fracture by Schranger.[15] Raynor and Parsa[16] report on a method for elevating pingpong ball depressions, which relies on gentle manipulation of the defect. The operator's digits are placed on 2 or 4 opposite margins of the depression, and gentle tangential pressure is applied toward the center of the depression. The main reason for intervention was to prevent cortical damage. It was believed in the past that patients with congenital moulding fractures had an increased risk of seizures. However, Jennet et al[17] noted no increase in the incidence of posttraumatic seizures in patients with congenital skull depressions that were not elevated surgically.

Despite the different preferences by various authors, no guidelines in the management of congenital skull depression, are available. However, there is consensus to treat these newborns without resorting to surgical procedures, because in most of these cases the bony contour invariably remodels to a normal shape. The role of parent's reassurance of spontaneous fracture remodeling is very important given the distress observed over those deformities, despite their benign nature. It is quite interesting that in a climate of trust between the parents and the physician, treatment modalities out of the ordinary can be suggested. Particularly as it is mentioned in our first case, the employment of a plaster cast technique to display the progressive skull reshaping was very helpful for the parents to understand the improvement of the deformity and improved their belief in a common therapeutic alliance. Congenital depressed fractures in newborns after cesarean delivery have been sparcely reported in the literature. It is pertinent that further studies in this area broaden our understanding of this pathology and determine its natural history. In any case, the self-limiting course of these deformities and their benign nature makes their early identification and appropriate parental counseling imperative for uneventful management.

Author Contributions

LB wrote the article and collected images from patients; PL conceived the article and saw the patients at consultation; EM revised the article and formatted it for submission; KB wrote part of the discussion and revised the literature.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Financial Disclosure/Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Ethical Approval

No ethical approval was required.

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