CASE REPORT

Congenital depression of the skull in a neonate

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Accepted 25 August 2016

SUMMARY

Congenital depression of the fetal skull is a rare condition. We discuss the case of a 14-days-old male infant, born at term by elective non-complicated caesarean section presenting with a left temporoparietal skull depression. A CT scan was performed which showed no associated fracture. A conservative approach was followed since the infant showed no signs of neurological deficit. Similar cases have been managed successfully in other reports using a conservative approach, with the condition being often self-resolving over the course of a few months.

BACKGROUND

Congenital depression of the neonatal skull is a rare occurrence with an incidence of almost 1/10000. The majority of cases have been linked to obstetric trauma, where as a minority are believed to occur in utero.¹ Many methods of treatment have been reported, ranging from conservative management, non-surgical interventions and surgical correction. To date, there are still no specific recommendations in the literature for the management of this condition.

CASE PRESENTATION

This is the case of a 14-days-old male neonate born to a 27-year-old G3P3A0L2 mother. The pregnancy was otherwise uneventful.

The baby was born at term by elective caesarean section in another hospital. No forceps or other forms of instrumentation were used during delivery. There was also no history of obstetric trauma. He was vigorous and cried at birth and his Apgar scores was 9 and 10 at 1 and 5 min, respectively.

His birth weight was 2300 g, height 47 cm and head circumference 33 cm. Physical examination at

birth revealed a left parietal skull depression. The rest of the examination, including neurological status, was otherwise normal.

He presented to our outpatient clinic for the first time at 14 days of age for a second opinion. The mother reported that he was breast fed since birth, and had adequate weight gain and good activity at home. She reported normal developmental milestones.

Physical examination revealed a healthy appearing, active baby. He had a 3.5 cm×3 cm skull depression that felt like solid bone and was non-pulsatile and non-mobile (figure 1). Neurological examination showed no deficits. Patient had an open, soft anterior fontanelle and no coronal ridging.

INVESTIGATIONS

Skull radiograph showed a depression in the left temporoparietal region (figure 2). CT scan showed the same finding, with no associated displaced fracture or haematoma (figure 3). The brain parenchyma appeared normal with no signs of compression secondary to the skull depression.

DIFFERENTIAL DIAGNOSIS

The main differential diagnosis is an obstetric-related fracture or intrauterine moulding.¹ Owing to the lack of instrumentation usage at delivery and the mode of delivery via uncomplicated elective caesarean section, obstetric-related trauma is unlikely. The malformation seems to be secondary to intrauterine moulding, a rare, but previously reported occurrence in the literature.

TREATMENT

The neonate was managed conservatively with observation, and was advised to return to the outpatient clinic after 1-month to assess any change in the depression.

Figure 1 Photograph of the infant's head showing the left temporoparietal depressed skull.

Figure 2 Skull X-ray demonstrating a depressed area of the skull in the left temporoparietal region.

To cite: Tayeh C, Bali B, Milad N, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2016-215437

Figure 3 CT scan of the head showing the depressed skull bone with no associated fractures or intracranial haematoma.

OUTCOME AND FOLLOW-UP

At a 5 months follow-up visit, the skull depression was almost resolved ([figure 4](#)). He had normal developmental milestones. He was on the 70th centile for head circumference, the 45th centile for weight and the 50th centile for length. The remainder of his physical examination, including a complete neurological examination, was normal.

DISCUSSION

Congenital depressions of the neonatal skull are rare, with an incidence of $<1/10\,000$ in Western countries.² The majority of cases are attributed to obstetric trauma during delivery, such as pressure from forceps or obstetric manoeuvres during difficult labour. There are limited reports of depressed skull fractures in the absence of any known trauma or obvious risk factor.^{2–8} In a minority of cases, intrauterine events have been thought to contribute to this malformation. Axton and Levy⁹ suggest that the most frequent mechanism may be occult trauma from pressure of the fetal head on the sacral promontory, resulting in moulding. Other mechanisms include pressure on the soft fetal skull from the maternal fifth lumbar vertebrae, pubic symphysis, ischial spines, asymmetric or contracted pelvis, fetal limbs, and uterine myomas.^{10 11}

Another risk factor reported in the literature is multiparity. In such cases, skull depression is postulated to be secondary to increased fetal size of successive pregnancies and decreased calcium due to poor nutrition and subsequent depletion with multiple pregnancies.⁶

Neonatal skull depressions can occur with or without fractures. Skull fractures in newborns can be classified as linear, depressed or ‘ping-pong’ fractures and occipital osteodiasis.¹² The developing skull bone is unicortical and soft, thus depressed skull fractures are usually ping-pong fractures (not actual fractures into the cortex).⁵ These fractures usually occur in the parietal and temporal bones, less frequently in the frontal bones and, rarely, in the occipital region.¹³ Neurological deficits are a rare association, and are often secondary to subdural, epidural or intracerebral haematomas. Localised compression can also

Figure 4 Follow-up photograph of the infant after few months showing resolution of the depressed bone.

cause cerebral oedema, decreased blood flow, and the development of epileptogenic foci.¹⁰

CT scan of the head helps reveal fractures, underlying haematomas and cortical compression, all of which would entail more aggressive treatment.¹¹ Structural MRI is indicated if there is suspicion of structural brain anomalies.

The majority of skull depressions resolve spontaneously within 4 months. Therefore, in the absence of neurological symptoms, a conservative approach of a 6-month observation period is advised.¹ Non-surgical and surgical methods of reduction of the depression have also been cited in the literature.

Non-surgical interventions have been described, including elevation by digital pressure on the edges of the depression and elevation by vacuum extractor or a breast pump.^{3 14}

Surgical intervention was indicated only in certain cases: (1) bone fragments in the cerebrum, (2) neurological deficits with or without increased intracranial pressure, (3) associated dural tear with leakage of cerebrospinal fluid beneath the galea, (4) failure of spontaneous resolution after 6 months, (5) poor cosmetic results, (6) unreliable long-term follow-up, (7) failure to elevate using non-surgical techniques and (8) initial size of the depression (exceeding 2 cm).⁶

Surgical intervention may include a simple burr hole to elevate the depressed fracture, or a craniotomy to repair the fracture and/or possible dural tears. In view of absence of the mentioned indications for surgical intervention, where there was no obvious brain parenchymal injury or compression, dural tears, or bone fragments, our case was managed conservatively and followed with a good outcome. The outcome, thus, is favourable in the absence of underlying abnormalities.⁷ Developmental delay is rarely reported and is likely to be the result of insults to the brain resulting directly from the original trauma.

The decision on conservative observant management, non-surgical intervention or a minor surgical intervention is often difficult to make in simple non-complicated depressions,

especially when interventions have minimal risks and may have an immediate positive cosmetic result. The knowledge, however, that most of the simple depressions resolve spontaneously, helps reassure the physician and relieve stress of waiting that may be expressed by the family, especially that a procedure may always be done in few weeks time should observant treatment fails.

Learning points

- ▶ Neonatal skull depression is a rare occurrence, with a minority of cases believed to be secondary to intrauterine moulding.
- ▶ There are no specific guidelines for management of the condition. To date, conservative management is more commonly used, with non-surgical and surgical interventions being reserved to certain cases.
- ▶ The majority of cases will resolve spontaneously.
- ▶ We chose conservative management due to the lack of neurological deficit (size of depression), and its success in the previously reported literature.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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