Depressed skull fracture in the neonate

Report of three cases


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The authors describe three cases of neonatal depressed skull fracture that were elevated by means of an obstetrical vacuum extractor. In one case, a transparent breast pump shield replaced the metal vacuum extractor cup, permitting direct observation as the depression was elevated. Neonatal depressed skull fractures not associated with neurological signs may be safely elevated without surgery using the obstetrical vacuum extractor.

KEY WORDS • depressed skull fracture • skull fracture elevation • birth trauma • vacuum extractor • "ping-pong ball" fracture

In the neonate, pressure applied to the head in utero or during the birth process may result in a depression of a localized area of the parietal or frontal bone of the skull. Such a depression may be compared to the green-stick fracture of the long bones of a child, in that there is often no discontinuity of the bone. This characteristic has caused such depressions to be called "ping-pong ball" fractures.

The etiology of these depressions is not entirely clear. While most cases in western countries are thought to be caused by forceps application or as a result of pressure by the obstetrician's hand, Axton and Levy have reported 31 cases in an African population that were thought to result from extreme molding of the fetal skull in its passage through the birth canal. Tan, from Singapore, states that skull depressions occurred in deliveries that were "uneventful and easy," with no noticeable signs of trauma to the scalp. Pressure on the fetal skull by the L-5 vertebra, sacral promontory, symphysis pubis, ischial spines, or by an asymmetrical or contracted pelvis has been implicated in these depressions that occurred in the absence of forceps or traumatic delivery.

The incidence of depressed skull fracture of the neonate has not been ascertained. Natelson and Sayers have reported 15 cases, or 36%, of a series of 42 infants sustaining head trauma during the birth process. In an African population, Axton and Levy reported an incidence of one in 4000 births over a 3-year period, while reporting only one instrumentally produced depression in 6000 European women during the same period.

Although they are not usual, skull depressions may be associated with neurological symptoms resulting from associated subdural, epidural, or intracerebral hematomas. In addition, localized compression of the brain may cause cerebral edema and decreased blood flow which could cause impairment of function or the development of epileptogenic foci.

The management of skull depressions is controversial. Matson stated that "treatment consists of surgical elevation of the depressed bone;" other authors have proposed alternative approaches. Loeser, et al., reported three cases of neonatal skull depressions, which were observed and found to elevate spontaneously. Raynor and Parsa elevated such depressions using digital pressure at the margins of the depression.

Negative pressure has been used by several authors to elevate these depressions. Schrager reported a case in which the depression was elevated by means of a hand breast pump; other authors have found the obstetrical vacuum extractor to be an effective instrument for the elevation of depressed skull fractures in the neonate. With the vacuum extractor, the amount...
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Case Reports

Case 1

This 980-gm male infant was delivered vaginally by breech extraction at 28 weeks of gestation. Delivery of the aftercoming head was difficult, and the child suffered a 2 × 2-cm depressed skull fracture of the right frontal region (Fig. 1 left). Apgar scores were 2 at 1 minute and 6 at 5 minutes, and resuscitation was required. Neurological examination revealed a floppy, depressed infant with no localizing signs. Assisted ventilation was required for 24 hours because of apnea.

On the first day of life, after the infant’s general condition had stabilized, the depressed skull fracture was elevated by means of an obstetrical vacuum extractor (Fig. 2) at 0.2 kg/sq cm negative pressure for 20 seconds (Fig. 1 right). No complications from the procedure were observed.

Case 2

This 3200-gm male infant was born at term to a 21-year-old woman whose first pregnancy was abortive. This pregnancy was complicated by pre-eclampsia and premature rupture of membranes 25½ hours before delivery. After a pitocin induction of 12 hours, a caesarean section was performed because of cephalopelvic disproportion. The Apgar scores were 6 at 1 minute and 8 at 5 minutes. Physical examination of the infant was unremarkable except for a large left parietal depressed skull fracture. An obstetrical vacuum extractor was used to apply a negative pressure of 0.5 kg/sq cm to the depression for 6 minutes, which resulted in elevation of the previously described defect. Repeat skull films showed no defect. The infant was entirely well at discharge on the fifth day of life, and at follow-up review at 1 year of age.

Case 3

This 3430-gm male infant was delivered of a 21-year-old primigravida mother whose pregnancy was complicated by Class D diabetes mellitus. At 38 weeks gestation, amniocentesis was performed and a fetal lung maturity profile indicated fetal pulmonary...
FIG. 3. Transparent plastic breast pump shield applied over left frontal depression in Case 3.

Discussion

While no figures are available comparing the morbidity and mortality from surgical elevation with nonsurgical techniques, it is clear that the nonsurgical approach is technically easier and less traumatic to the infant. No complications are known to have been reported from the use of the vacuum extractor to elevate neonatal skull depressions.


The modification reported in Case 3 in which a transparent plastic breast pump shield is attached to the vacuum extractor pump allows the surgeon to observe the depression elevate. This permits visual determination of when adequate pressure has been delivered.

Despite the usefulness of the nonsurgical approach to elevation of skull depressions, there are cases which should be treated surgically. Loeser, et al., propose indications for the surgical treatment, which include: 1) bone fragments in the cerebral tissue; 2) associated neurological deficits that could indicate epidural or subdural hematoma; 3) signs of increased intracranial pressure; 4) evidence of cerebrospinal fluid beneath the galea; and 5) failure to elevate by nonsurgical means.

Summary

Elevation of depressed skull fracture is effectively produced by means of negative pressure applied with an obstetrical vacuum extractor. When modified with a transparent plastic breast pump shield instead of an opaque extractor cup, the elevation may be directly observed. Surgical intervention is necessary in those cases where complications of the depressed fracture are observed.

References


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