Severe brain injury with rupture of the superior sagittal sinus after vacuum extraction birth

Case report

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✓ Vacuum extraction in nonprogressive labor is a relatively safe procedure. Only a few major complications have been reported in the literature. The authors present a case of severe brain damage with rupture of the sinus after vacuum extraction delivery for which surgical repair of the dural tear and brain prolapse was required.

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KEY WORDS • brain injury • intracerebral hemorrhage • vacuum extraction

TRAUMATIC brain lesions after vacuum extraction delivery are rare and seldom cause permanent neurological deficits. In the present report we illustrate the clinical course after major traumatic brain injury with rupture of the superior sagittal sinus in a newborn after vacuum extraction.

Case Report

History and Examination. The patient was a full-term baby girl delivered via vacuum extraction after an uncomplicated pregnancy. The child was in an occipitoposterior position when an arrest of labor occurred and cardiotocography indicated fetal distress. A vacuum extraction was performed. The Apgar scores were 10 each. A large frontal cephalic hematoma was visible immediately after delivery. She developed an expanding fluid collection of the scalp. Her head circumference expanded from 31 cm at birth to 36.5 cm within hours. On the second day after birth, she suffered generalized epileptic seizures, which were successfully treated with a phenobarbiturate.

The child was referred to our hospital 13 days later. At admission, a large bifrontal CSF collection, mimicking scaphocephaly, was visible (Fig. 1). The child suffered paresis of the right leg. Her general condition was stable (no hypovolemia, no tachycardia, and no hepatosplenomegaly).

Imaging Examination. Sonography revealed large cephalic hematomas with intracerebral hemorrhage and small arterial vessels in the midline. On magnetic resonance imaging (Fig. 2) a bifrontal, intraparenchymal hemorrhage was revealed predominantly on her left side with upward dislocation of the pericallosal arterial vessels, discontinuation of the superior sagittal sinus, brain prolapse, and a large bifrontal subgaleal hematoma.

Operation and Postoperative Course. To reduce the risk of hypovolemic shock, we postponed surgery and performed repeated punctures of the bloody CSF collection. We aspirated 50 ml of CSF 3 times, and 80 ml once. The first puncture showed bloody CSF and the last was xanthochromic.

Surgery was performed on Day 21 after birth via a bicoronal approach. The CSF collection was surrounded by neo-membranes that were dissected to the plane of the defect. A craniotomy via 4 bur holes was performed. The anterior fontanelle and the sagittal suture were ruptured. The defect with the brain prolapse was 5 cm, and the sinus was completely ruptured and caudally occluded. The exophytic brain tissue was excised, leaving behind the small, diffuse intracerebral hemorrhage. The periosteal flap was used for duraplasty. The 2 bone pieces were reinserted and fixed in place with sutures. Histological testing of the extracted tissue revealed brain tissue and dura mater with evidence of old hemorrhages and reactive astrogliosis. At follow-up when the child was 3 months of age, leg paresis was absent. Despite her serious injury, the child was noted to have recovered completely without long-term consequences at the last follow-up 11 months later.

Abbreviations used in this paper: CSF = cerebrospinal fluid; ICH = intracranial hemorrhage.
Discussion

In a 1979 review of 15 studies involving 7124 infants who were delivered by vacuum extraction with the metal Malmstrom cup, the incidence of ICH was 1 in 286 infants. This rate decreased after the introduction of plastic cups, to an incidence of < 1% reported in 1999. Compared with those born by spontaneous vaginal delivery, infants delivered by vacuum extraction have significantly higher rates of subdural or cerebral hemorrhage, brachial plexus injury, and seizures. Towner et al. reported ICH in 1 of every 860 infants delivered by vacuum extraction, compared with 1 of 1900 delivered spontaneously. There was an incremental increase in the rate of ICH if multiple methods of delivery were used.

A confounding factor may be the position of the fetal head in the maternal pelvis. Operative delivery is often required when the head of the fetus does not descend through the pelvis correctly, either because of an oblique position or poor flexion. Thus, an intracranial injury associated with any type of operative delivery may be due to dysfunctional labor rather than to complications of the operative intervention. Nevertheless, fetal weight and head position should be evaluated carefully before operative vaginal delivery is undertaken.

The spectrum of possible sequelae after vacuum extraction is broad, and includes circular fracture; elevation of the outer table of skull bones; subperiosteal, intraosseous, subdural, or tentorial hematomas; and intracerebral and intraventricular hemorrhaging. The vertical stress may lead to laceration of bridging veins and venous sinuses, and venous hemorrhagic infarctions. The most common complication is subgaleal hematomas, which resolve on their own in the majority of cases. However, Amar et al. reported on 2 cases of subgaleal hematoma causing brain compression, which required surgical intervention to control elevated intracranial pressure.

Conclusions

Long-term follow-up of babies born via vacuum extraction who experienced ICH usually shows complete resolution of hemorrhage. Surgery is only required in rare cases. Management consists of measures to correct hypovolemia and secondary surgical intervention to repair the dural tear and prevent a growing skull fracture. Evacuation of the ICH is not recommended.

References

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