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Case Report

Needle in fetal brain and its role in modern obstetrics: a case report

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ABSTRACT

Fetal hydrocephalus at term can obstruct labour and increase maternal risk, and although rarely employed in modern practice, cephalocentesis may decompress the fetal head and facilitate vaginal delivery. We describe two intrapartum transvaginal cephalocentesis procedures and consider their obstetric and ethical implications. In case 1, a 30-year-old multigravida at 38 weeks with Dandy–Walker malformation and severe hydrocephalus underwent transvaginal cephalocentesis with drainage of approximately 400 ml of cerebrospinal fluid (CSF), resulting in reduced biparietal diameter and uncomplicated vaginal delivery of a live infant who later required shunt placement. In case 2, a 27-year-old gravida 2 in labour with cord prolapse declined caesarean delivery and underwent cephalocentesis with drainage of about 200 ml CSF, enabling vaginal delivery of a stillborn infant, with uneventful maternal recovery. Although cephalocentesis is considered a destructive and infrequently indicated procedure, these cases highlight its continuing relevance in selected situations where maternal morbidity from caesarean delivery can be avoided and fetal prognosis is already poor owing to severe hydrocephalus and associated anomalies.

Keywords: Cephalocentesis, Fetal hydrocephalus, Dandy–Walker malformation, Intrapartum management

INTRODUCTION

Fetal hydrocephalus remains a significant condition encountered in obstetric practice, with an incidence of approximately 0.2–1 per 1,000 live births.[1] Its origins may be congenital or acquired, with congenital cases frequently linked to developmental anomalies such as Arnold–Chiari malformation, Dandy–Walker malformation, megalencephaly syndromes, and associations within the VACTERL-H spectrum, while infections and intracranial hemorrhage account for many acquired causes.[2] The underlying mechanism often involves impaired cerebrospinal fluid circulation, most commonly due to obstruction at the aqueduct of Sylvius, and fetal outcomes depend heavily on the etiology and the degree of irreversible brain injury. In circumstances where the fetal prognosis is poor, decompression of the fetal head by aspirating cerebrospinal fluid may offer a practical alternative to prevent obstructed labour. Cephalocentesis—performed transvaginally or transabdominally under ultrasound guidance—enables reduction of the enlarged fetal skull, thereby minimizing maternal morbidity and potentially avoiding caesarean delivery, particularly in cases at risk of difficult labour. In this context, we present a case illustrating the role of ultrasound-guided cephalocentesis in facilitating safe vaginal delivery without adverse maternal outcomes.

CASE REPORTS

Case 1

A 30-year-old multigravida at 38 weeks of gestation was referred to our hospital for further management of a fetus diagnosed with Dandy–Walker malformation and hydrocephalus. Her most recent ultrasound showed a single live intrauterine pregnancy of approximately 37 weeks in longitudinal lie, with a biparietal diameter of

11.11 cm, gross hydrocephalus, and lobar holoprosencephaly. The antenatal period had been uneventful, with no associated maternal comorbidities, and she maintained regular follow-up at a government facility.

After detailed counselling regarding the poor perinatal prognosis and the potential role of cephalocentesis in facilitating vaginal delivery, the patient consented to the procedure despite its invasive nature. Labour induction was initiated with PGE_2 gel. When cervical dilatation reached 7–8 cm, progress arrested due to the markedly enlarged fetal head.

At this point, cephalocentesis was performed to decompress the fetal skull. A thorough pelvic examination confirmed fetal head position, suture lines, and anterior fontanelle. An 18-gauge needle was introduced through the anterior fontanelle into the cranial cavity, and approximately 400–500 ml of clear cerebrospinal fluid was drained. Following decompression, the biparietal diameter reduced sufficiently to allow unobstructed vaginal delivery of the head and body. A live male neonate was delivered with APGAR scores of 8, 9, and 10 at 1, 5, and 10 minutes respectively, weighing 2870 g. The baby was immediately handed over to the paediatric team for further evaluation.

Postnatal magnetic resonance imaging (MRI) confirmed Dandy–Walker malformation with obstructive hydrocephalus secondary to a Blake's pouch cyst (Figures 1a and b). The infant subsequently underwent ventriculoperitoneal shunt placement to relieve cerebrospinal fluid accumulation. After management of the associated conditions, the neonate was discharged with recommendations and counselling regarding long-term considerations in Dandy–Walker syndrome (Figures 2a and b).

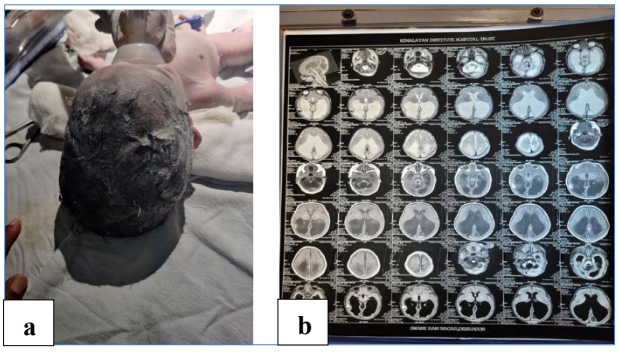

Figure 1: Intrapartum transvaginal cephalocentesis in case 1, (a) appearance of the fetal head immediately after decompression, showing marked reduction in size following drainage of approximately 400 ml of cerebrospinal fluid (CSF), and (b) postnatal neuroimaging (CT/MRI film images) demonstrating Dandy–Walker malformation with severe obstructive hydrocephalus.

The infant was followed up for two months, during which developmental milestones were found to be normal (Figure 3).

Figure 2: Postnatal progression of the neonate in case 1, (a) clinical photograph at birth showing macrocephaly with bulging cranial vault due to severe hydrocephalus, and (b) at 1 month of age, reduction in head size and improved contour following ventriculoperitoneal shunting.

Figure 3: Infant at 2 months of age (case 1). Photograph demonstrating further stabilization of head size and normal developmental milestones reported at follow-up.

Case 2

A 27-year-old unbooked gravida 2, para 1, with no living children, was admitted in the latent phase of labour following a history of premature rupture of membranes. On abdominal examination, a single live intrauterine fetus in cephalic presentation was noted. Per vaginal examination revealed an early-effaced cervix, admitting one finger, with the vertex positioned high at –4 station.

The patient had an Rh-negative pregnancy and was a known case of gestational diabetes mellitus and hypothyroidism. After appropriate counselling about the high-risk nature of the pregnancy, induction of labour was initiated using PGE_2 gel.

During the course of labour, the patient developed cord prolapse. The husband and accompanying attendants were

counselled regarding the urgent need for lower segment caesarean section (LSCS) for fetal salvage; however, they declined any surgical intervention for fetal indications and insisted on continuing with a trial for vaginal delivery.

When the cervix reached approximately 3 cm dilatation, the fetal head became visible. At this point, a spinal needle was inserted into the fetal ventricle, and approximately 200 ml of cerebrospinal fluid was drained to facilitate delivery.

Subsequently, an intrauterine demise (IUD) baby girl was delivered, weighing 3200 grams.

DISCUSSION

Fetal hydrocephalus is a significant cause of labour obstruction, with an incidence of 0.2–1 per 1,000 live births.[3] As described in previous studies, severe ventriculomegaly often defined as ventricular separation exceeding 33 mm results in rising intracranial pressure and thinning of cerebral tissue.[1] Management depends on fetal prognosis, associated anomalies, and maternal risk, with options ranging from caesarean delivery to decompressive procedures such as ventricular–amniotic shunting or cephalocentesis.[4]

Cephalocentesis, although rarely performed today, remains a valuable intervention when maternal safety is threatened and fetal prognosis is poor.[5] Similar to earlier reports, our cases demonstrate the technical feasibility of transvaginal cephalocentesis, especially when the fetal head is accessible. The volume of cerebrospinal fluid drained in our series (200–400 ml) is consistent with typical descriptions of 100–500 ml in the literature. Transvaginal access, preferred by several authors for its simplicity and reduced invasiveness, was also effective in our patients.[6]

Published outcomes indicate high fetal mortality following cephalocentesis: Chasen et al reported 10 of 11 perinatal deaths, while Garne et al found stillbirth or termination in over half of hydrocephalus cases.[5,7] Our findings are in agreement, with case 2 resulting in intrauterine demise. However, case 1 contrasts with these reports, as the infant survived following ventriculoperitoneal shunting—reflecting occasional favourable outcomes described in isolated series.[8] Nonetheless, long-term neurologic impairment remains common in survivors.[6]

Ethically, cephalocentesis is categorized as a destructive procedure and is generally reserved for non-viable fetuses or situations where caesarean section poses excessive maternal risk.[9,10] Both of our cases met these criteria: one involved obstructed labour and the other a refusal of surgical delivery. No major maternal complications occurred, supporting evidence that cephalocentesis can be safely performed by skilled clinicians. Counselling and multidisciplinary involvement remain essential due to the emotional and ethical implications.

Overall, comparison with existing studies highlights that while cephalocentesis has a limited role in modern obstetrics, it remains an important option for protecting maternal health when fetal prognosis is extremely poor and conventional delivery is not feasible.

CONCLUSION

Although rarely used in modern obstetrics, cephalocentesis remains a valuable option in carefully selected cases where severe fetal hydrocephalus obstructs labour and fetal prognosis is poor. Our two cases demonstrate that transvaginal cephalocentesis can successfully facilitate vaginal delivery and avoid caesarean section without increasing maternal morbidity. The procedure should be considered only when fetal survival is unlikely or caesarean delivery poses unacceptable risk, and must be accompanied by thorough counselling and ethical deliberation. Despite its limited indications today, cephalocentesis continues to serve an important maternal-saving role in specific obstetric emergencies.

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