Combined Spinal-Epidural Analgesia for vaginal delivery in a parturient with Arnold-Chiari Type I Malformation

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Introduction:
Arnold-Chiari type I malformation is a congenital disorder in which the cerebellar tonsils are displaced through the foramen magnum. (1) In most cases, Arnold-Chiari type I malformations do not become symptomatic until adolescence or adulthood. The most commonly reported symptoms are suboccipital headache (81%), ocular manifestations (78%), otoneurologic disturbances (74%), pain in the extremities, cranial nerves disturbances (hoarseness, cough, dysphagia), weakness and muscle atrophy, and sensory disturbances (numbness, pain, and temperature deficits). (3) Arnold-Chiari type I malformation is mostly predisposed to women, with a female-to-male ratio of 3:1. There are no biomarkers in the blood, cerebrospinal fluid, or cultured tissue to confirm the diagnosis. Thus, MRI is the best imaging modality for evaluation. Increased frequency in MRI use has revealed a higher incidence of Arnold-Chiari type I malformations than initially thought, accounting for 0.6%–0.7% of the cases. (3)

Case Report:
A 22 year-old woman, G1P0 was diagnosed with Arnold Chiari type I malformation during her first trimester. Patient presented with complaint of intense occipital headaches 8/10 in severity without any visual disturbances or abnormal pain and temperature sensation in both upper extremities. Patient was worked up for the headache with MRI of the brain (MRIb) and MR venogram of the head without contrast (MRV). MRIb showed cerebellar tonsils extending 4mm below the foramen magnum and MRV was negative for sinus thrombosis. She was recommended to obtain a cervical-Spine MRI to assess for syrinx but patient was unable to do so. She was consulted by a multidisciplinary team, including the anesthesiologist and neurologist for a planned labor induction with vaginal delivery. With a single attempt, combined spinal epidural was achieved using a 18-gauge Tuohy needle and a 27-gauge Pencan spinal needle at the midline of the L2-L3 interspinous space while the patient was in a sitting position. Analgesia was obtained with fentanyl 7μg and ropivacaine 3.5μg intrathecally. A continuous epidural infusion of ropivacaine 0.1% and fentanyl 2μg/ml was initiated at the rate of 10mL/h. Fetal heart rate and uterine contractions were continuously monitored by an external cardiotocography. Maternal and fetal hemodynamics were stable during the entire labor and delivery process. Labor progressed smoothly and lasted for 10 hours and Apgar scores at 1 and 5 minutes were 9 and 9, respectively. The patient had an uneventful postpartum course without any neurological complications. She was discharged home two days later.

Conclusion:
Arnold-Chiari type I malformations are of particular concern because of the potential risk of increased intracranial pressure during pregnancy and delivery and present as potential dilemmas for the anesthesiologist at the time of delivery. Although there is theoretical risk of accidental dural puncture with subsequent decreased cerebral perfusion pressure, brain shifts and tentorial herniation, no cases like this have been reported in the literature. We have found only a few cases where neuraxial anesthesia was used for vaginal delivery and Cesarean Sect. Combined spinal epidural analgesia during labor for patients with Arnold-Chiari type I can be effectively implemented provided that there are no acute worsening of clinical signs and symptoms of intracranial pressure. In our case presentation, we selected the use of combined spinal epidural to provide immediate pain relief intrathecally for our patient and the epidural catheter to administer continuous epidural infusion for analgesia during the course of labor and delivery. It is important not to restrict the use of regional anesthesia due to theoretical concerns that have never been proved in a real life. The use of combined spinal epidural can be safe and effective in laboring parturients with Arnold-Chiari type I malformation when administered by a trained anesthesiologist.

References:


