Obstetrical and Pediatric Anesthesia

Postdural puncture headache in a parturient with sickle cell disease: use of an epidural colloid patch

[Céphalées post ponction durale chez une parturiente drépanocytaire : injection péri-durale de colloïde]

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Purpose: To report the injection of a colloid in the epidural space as an alternative to an epidural blood patch in a woman with sickle cell disease.

Clinical features: A Cesarean delivery was performed under spinal anesthesia in a 32-yr-old woman with severe sickle cell disease and a past medical history of vaso-occlusive crisis. In the post-operative period, the patient complained of postdural puncture headache resistant to symptomatic treatment. Because there were no data concerning the safety of a blood patch in this condition, a colloid (a modified fluid gelatin heated to 37°C) was injected in the epidural space instead of blood. Headaches decreased immediately after the epidural injection of the colloid and disappeared totally within 12 hr.

Conclusion: Data concerning the safety of epidural blood patches in patients with sickle cell disease are lacking. Injection of colloids in the epidural space could be an alternative.

Objectif : Rapporter l'injection de colloïde dans l'espace péri-dural comme alternative au "blood patch" chez une femme drépanocytaire.

Éléments cliniques : Réalisation d'une Césarienne sous rachianesthésie chez une femme de 32 ans, avec une drépanocytose homozygote et des antécédents de crises vaso-occlusives. En postopératoire on note la survenue de céphalées post ponction durale résistant à un traitement symptomatique. Il est alors réalisé, devant l'absence de données concernant l'innocuité d'un "colmatage sanguin" dans cette pathologie, une injection dans l'espace péri-dural de colloïde à 37 °C à la place de sang. Les céphalées ont diminué immédiatement

après l'injection, pour disparaître en 12 h.

Conclusion : Devant l'absence de données concernant le "colmatage sanguin" chez le drépanocytaire, l'injection de colloïde dans l'espace péri-dural pourrait être une solution de remplacement.

THE medical and surgical care of patients with severe sickle cell disease has improved and anesthesiologists have to perform anesthesia more often on those patients. In this population, the incidence of Cesarean delivery is higher than in the normal population (36% *vs* 14%).^{1,2} For Cesarean section, spinal anesthesia is usually performed. Even though 25-G needles are used, spinal anesthesia can induce postdural puncture headache (PDPH).³ An epidural blood patch (EBP) is the most appropriate treatment of persistent PDPH. However, in these patients, there are no data on the safety of EBP. Instead of autologous blood injection in the epidural space a colloid or saline solution could be an alternative. We report the injection of a colloid solution in the epidural space for PDPH after Cesarean section in a patient with sickle cell disease.

Case report

A 32-yr-old Creole, primiparous woman was admitted at 35 weeks of gestation for vaso-occlusive crisis, severe anemia [hemoglobin (Hb: 72 g·L⁻¹)] and fetal distress. Her past medical history was notable for severe sickle cell disease (Hb SS, Hb S: 87.7%, Hb F: 11.4%) with

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several previous hospitalizations for cholecystectomy, vaso-occlusive crisis and blood transfusions. The last hospitalization, 20 days earlier, was to manage a vaso-occlusive crisis that required the transfusion of two red cell units. An urgent Cesarean delivery was planned. Following oral ranitidine, the Cesarean section was performed under spinal anesthesia with a 25-G Whitacre needle in the L3–L4 interspace inserted on the first attempt, using 10 mg of hyperbaric bupivacaine, 0.5% with 5 µg sufentanil. Spinal anesthesia was performed with the standard monitoring attached (automated blood pressure cuff, pulse oximeter, electrocardiogram), in the sitting position, after an *iv* fluid bolus of 30 mL·kg⁻¹ Ringer's lactate had been administered. The patient was then placed supine with a left lateral tilt, and 4 L·min⁻¹ oxygen were administered via a face mask. The delivery of a 2530 g girl with an Apgar score of 10/10 proceeded uneventfully five minutes later without hypotension. In the postoperative period, resolution of the spinal block was normal. On day two the patient complained of unspecific headache. Additional analgesics (nalbuphine, paracetamol, ketoprofen) were administered with a slight decrease of the headache. Caffeine was contraindicated in this case. On the third day, the patient complained of severe postural headache. Physical examination was normal except for the postural component and neck stiffness. The diagnosis of PDPH was made and the indication of an EBP was discussed. Because the safety of EBP in patients with sickle cell disease is unknown, it was decided that if PDPH persisted, a colloid solution would be injected into the epidural space instead of autologous blood. On the fifth day, despite appropriate medical treatment (hydration, bed rest, oral analgesics), the patient still presented severe headache. After consent was obtained from the patient, a colloid (Plasmion®, a modified fluid gelatin, Fresenius France Pharma) previously warmed at 37.5°C, was injected in the epidural space. Administration of colloid was stopped at 30 mL when lumbar pain occurred. The epidural puncture was performed in the sitting position, in the L3–L4 space with an 18-G Tuohy needle. The patient was supine during six hours after the injection of colloid. The PDPH decreased immediately after epidural injection of gelatin and disappeared totally within 12 hr. The patient was discharged on day eight without any cephalalgia and with the recommendation to call if the headache recurred.

Discussion

EBP in patients with sickle cell disease has not been reported. EBP may be associated with potential problems. Epidural injection of autologous blood can induce a local inflammatory reaction because of the

injection of clot formed in the syringe. In the vascular space, clot formation induces activation of the coagulation cascade (decrease of antithrombin and protein C, increase of thromboxane B2) or pro-inflammatory cytokines (tumour necrosis factor, interleukin (IL)1, IL6) and nitric oxide release by HbS polymerization which induce cell modifications.⁴ Moreover, the temperature of the blood probably does not decrease much between sampling and injection, and the risk of a medullar vaso-occlusive crisis following autologous blood epidural injection may not exist, but there are no data to confirm this hypothesis. Consequently, a colloid (Dextran 40, gelatin, hydroxyethylstarch), or saline epidural injection instead of blood might be more appropriate. Moreover, these solutions can be heated to 37.5°C to minimize the risk of medullar vaso-occlusive crisis. Their effect on PDPH could be related to a secondary increase of intracranial pressure. Because the viscosity is greater and the epidural reabsorption of the colloid solution takes longer compared to saline, we chose a colloid to obtain a prolonged increase in epidural and intracranial pressures. This theory, unproven in humans, has been discussed in rats where the magnitude and duration in cerebrospinal fluid pressure increases were similar after the epidural injection of saline, dextran 40 and hydroxyethylstarch solutions.⁵ However, the injection of dextran 40 in the epidural space has successfully treated PDPH without any serious complication, except for an incidence of dysesthesia of 10% at the site of injection.^{6–8} There are no data regarding the use of gelatin solution in patients with sickle cell disease. A survey conducted in France on the management of dural taps noted that 11.6% of the centres routinely used epidural colloid injection instead of blood. A modified fluid gelatin was used in most instances (30/31 centres) and hydroxyethylstarch in 1/31 centres.^{9,10} This practice has not been reported in United Kingdom and North American surveys which noted a larger use of therapeutic and prophylactic epidural saline infusion.^{11,12} The choice between fluid gelatin, dextran 40 and hydroxyethylstarch solutions must take into account the allergic risk which is higher with the gelatins than with hydroxyethylstarch. However the long-term neurotoxic effects of epidural colloids are unknown and warrant further investigations.

In the absence of any safety data on the injection of autologous blood in the epidural space in patients with sickle cell disease, we chose to avoid an EBP. PDPH was managed successfully by the injection of an isothermic fluid gelatin in the epidural space. Further studies on the management of PDPH in this population are warranted.

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