Chronic Subdural Hematoma Following Spinal Anesthesia: case report

Hematoma Subdural Crônico Após Raquianestesia: relato de caso

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ABSTRACT

The authors report the case of a 34-year-old female patient who underwent spinal anesthesia for a cesarean delivery and developed CSF hypotension headache for 7 days, presenting, then, persisted continuous daily headache. Submitted to a Brain MRI, it showed subacute subdural hematoma in the right fronto-temporo-parietal area, and was, then, submitted to surgical drainage with total resolution of the hematoma. In this paper, the authors discuss the pathophysiology of the formation of this type of hematoma and emphasize the infrequency of this occurrence in the medical literature.

Keywords: Chronic subdural hematoma; Spinal anesthesia

RESUMO

Os autores relatam o caso de uma paciente de 34 anos submetida à raquianestesia para submeter-se a um parto do tipo cesariana e evoluiu com cefaleia do tipo hipotensão líquórica por sete dias e, em seguida, persistiu com cefaleia contínua e diária. Foi submetida à ressonância magnética do encéfalo que evidenciou hematoma subdural subagudo fronto-têmporo-parietal à direita sendo, então, submetida à drenagem cirúrgica com resolução do hematoma. Discute-se a fisiopatologia da formação deste tipo de hematoma e ressalta-se a infrequência desta ocorrência na literatura médica.

Palavras-chave: Hematoma subdural crônico; Anestesia espinal

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Case Report


INTRODUCTION

Chronic subdural hematomas (CSDH) represent one of the most frequent conditions in the daily practice of Neurosurgery. Its incidence increases proportionally with age, reaching up to 58 cases per 100,000 inhabitants in the elderly, 65 years old or over, and in Japan it is estimated that there are 20.6 cases per 100,000 inhabitants per year between 70-79 years and 127.1 cases for every 100,000 inhabitants per year over 80 years old.

Most cases can be related to a history of trauma, but as most traumas are minor or trivial, patients may not report that trauma has occurred. The thin wall of the bridging veins and the lack of support on these veins in the subarachnoid space may explain their fragility and their ruptures related to minor trauma to the skull.

Besides trauma, other etiologies may be associated with the occurrence of chronic subdural hematomas such as coagulopathies, use of anticoagulants, antiplatelet agents and, less frequently, associated with intracranial hypotension due to CSF loss after spinal surgery, spinal anesthesia or CSF fistula.

The authors, in this paper, report the case of a young patient who developed a chronic subdural hematoma, diagnosed 40 days after undergoing spinal anesthesia for a cesarean section, discussing the pathophysiology of chronic subdural hematomas and the infrequency of this occurrence after spinal anesthesia.

CASE PRESENTATION

A 34-year-old patient at 38 weeks gestation underwent a cesarean delivery because the fetus was in breech presentation. Spinal anesthetic block (spinal anesthesia) was performed for the surgery, with puncture at L3-L4 level, with the patient in a sitting position. The CSF obtained was clear and with normal pressure, and anesthetic block was obtained up to T6 level.

The delivery was uneventful and lasted about 60 minutes. The patient and the newborn were discharged 30 hours after delivery, with no symptoms.

On the second day after delivery, the patient started to have a low CSF pressure headache, which persisted for seven days and then, changed its characteristics, becoming daily, continuous and progressive, with short periods of improvement with common analgesics. On the thirty-first postoperative day, the patient noticed mild hypoesthesia in the left hemibody, but she only sought neurological care on the fortieth postoperative day, when it was requested a Brain MRI, which showed hyperintense extra-axial subdural collection at T1 and T2 weightings, with isointense areas in between, in the right fronto-temporo-parietal area, with mass effect, compressing the right lateral ventricle and shifting the midline to the left, compatible with chronic subdural hematoma (Figure 1).

After preoperative preparation, the patient had undergone neurological surgery to drain the hematoma, through two trepanations located one in the frontal and the other on the parietal areas, irrigation of the cavity with saline solution and subdural drainage with a closed system for 48 hours. She had complete resolution of the symptoms, and a Head CT scan performed on the 38th day after the hematoma drainage showed complete resolution of the hematoma (Figure 2).

DISCUSSION

Subdural hematomas can be classified according to the evolution time into: acute (occur within 3 days after trauma), subacute (4 to 20 days after trauma) and chronic (after 20 days). Chronic subdural hematomas consist of an encapsulated collection of fluid, blood, or blood breakdown products between the arachnoid and the dura mater.

One of the theories about the formation of CSDH would be the rupture of bridging veins that drain the cerebral cortex to the venous sinuses, leading to an accumulation of venous blood in the subdural space over the days following the trauma. But this theory has been challenged for years for several reasons. First, because we know that most CSDH become symptomatic on an average of four to seven weeks after trauma and a subdural hemorrhage of venous origin would lead the patient to have symptoms in just a few days. Second, in the current days with the increased access of patients to CT scans after a head injury, we often see cases where the initial CT scan is completely normal, with no signs of hemorrhage and...
yet the patient develops a CSDH weeks or months later. Therefore, more recently, several authors have discussed inflammation as a key process in the development of CSDH.

In 1857, Virchow referred to this condition as “pachymeningitis haemorrhagica interna”, because he believed that the hematoma would be originated from a chronic inflammatory response of the

Figure 1. MRI in T1 and T2 showing an extensive fronto-temporo-parietal subdural collection on the right.

Figure 2. Head CT Scan, without contrast, performed on the 38th post-operative day showing total resolution of the subdural hematoma.
dura mater, resulting in fibrin exudation and the development of new capillaries.

In 1946, Inglis, after histological analysis of several cases of CSDH, identified that the dura mater is lined with a layer of specialized, modified connective tissue cells, which more recently has been called “dural border cells”. These cells have two essential functions, which are: phagocytize; and also become fibro-cellular connective tissue, allowing the formation of new membranes as seen in CSDH. Damage to the “dural border cells” besides an acute hemorrhage, could also initiate inflammation, recruiting inflammatory cells into the subdural space in order to repair this layer of cells. However, what actually happens is a differentiation and proliferation of these cells resulting in the formation of new membranes. Thus, with the delamination of the dural border cells, two new membranes are formed, one internal, in contact with the arachnoid, and the other external, in contact with the dura mater, thereby creating a new subdural cavity which will be filled with fluids and blood, once, mainly the outer layer contains fibroblasts and collagen fibers, in addition to cells such as neutrophils, lymphocytes, macrophages and eosinophils, capillaries with very thin walls and extremely thin or absent basement membrane, highly permeable, which allow the migration of erythrocytes, leukocytes and plasma from these vessels to the subdural cavity, favoring the increase of the subdural collection. In addition, there are several studies that analyzed the membranes of CSDH as well as the fluid from these hematomas, and have showed that in the process of formation and progression of these hematomas there are fibrinolysis, angiogenesis and inflammation.

Subarachnoid anesthesia is a type of anesthetic block, safe and widely used in daily practice, and the incidence of serious complications is approximately 0.05%. Intentional or inadvertent puncture of the dura mater, even if done with fine needles and adequate bevels, can leave the puncture orifice open from 14 days to a few weeks and could lead to the drainage of up to 240 mL of CSF per day, through an orifice of 0.6 mm. The loss of CSF leads to a reduction in its volume, which initially decreases spinal pressure and, more dangerously, intracranial pressure. These changes result in a movement of the spinal cord and brain in a caudal direction, which, thus, pulls pain-sensitive structures such as the dura mater, cranial nerves, and blood vessels. In the literature, we can find several factors that enhance this mechanism and contribute to the genesis of subdural hematoma after puncture of the subarachnoid space. Among these factors, we have the excessive loss of CSF due to the use of thick needles, a sharp bevel, as well as multiple attempts to puncture the subarachnoid space. However, the use of fine gauge needles and/or with a non-cutting bevel, reduces the chance, but does not totally prevent the appearance of this complication.

The venous drainage of the brain is done through short, almost perpendicular venous branches, called bridge veins, which pass directly from the brain to the dural sinuses, which adhere to the internal bone plate of the skull. Between these two points, the bridging veins have a straight course, without tortuosity, therefore favoring their rupture when they are pulled or there are movements of anteroposterior acceleration and deceleration of the brain, culminating in the formation of subdural hematomas.

Headache is the most frequent complication after intentional puncture of the dura mater for diagnostic purposes or for spinal anesthesia. It is a headache that starts 15 minutes after the individual sits or stands and improves in a similar time after lying down, starting up to 5 days after lumbar dural puncture, usually associated with sensation of noises in the ears and cervical pain. It disappears spontaneously after one week or, 48h after epidural blood patching. When headache persists beyond one week or changes its characteristics, some complication associated with CSF hypotension resulting from spinal anesthesia should be considered. The average time elapsed between the loss of CSF leading to headache and the development of hematoma varies from two hours to 44 days. According to literature review, the earliest diagnosis occurred after two days of anesthesia and the latest after 20 weeks. In the case reported, the change in the characteristics of the patient’s headache after the 8th day became clear, becoming a continuous headache that was no longer influenced by her posture. Attention is also drawn to the symptomatology presented by the patient on the thirtieth day postpartum of altered sensation over the left hemibody, which could suggest some cortical dysfunction in primary sensory areas, but she only sought neurological care four weeks after delivery and spinal anesthesia.

CONCLUSION

We recommend that all patients who underwent any kind of procedure related to puncture of the subarachnoid space and who present headache for more than one week, with different characteristics to headache due to low CSF pressure, should be evaluated by specialists and submitted to imaging exams to rule out bleeding complications resulting from CSF hypotension.
REFERENCES


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