

Intracranial hematoma as the cause of headache after subarachnoid anesthesia for cesarean section – a case report

Krwiak śródczaszkowy jako przyczyna bólu głowy po znieczuleniu podpajęczynówkowym do cięcia cesarskiego – opis przypadku

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Abstract

Background: Intracranial subdural hematoma is an exceptionally rare but life-threatening complication of epidural and spinal anesthesia. The diagnosis is rather difficult because the initial symptoms mimic post-dural puncture headache.

Case report: A 33-year-old primipara was admitted to the hospital at 38 weeks gestation for a cesarean section due to premature rupture of membranes and meconium stained amniotic fluid. During the procedure a single puncture between L2 and L3 vertebrae was made with the use of a 26-gauge, pencil-point needle. The amount of 2.8 ml of analgesic solution was administered in order to obtain subarachnoid analgesia at the level of Th4 and Th5 vertebrae. Postpartum recovery was uneventful for the first two days. On the third day the patient developed strong headache in the forehead area and tinnitus. An anesthesiologist diagnosed post-dural puncture headache (PDPH). The patient received 1g of Paracetamol every 6 hours intravenously, together with 3000 ml of crystalloid solution for 24 hours. As a result, the patient recovered and was discharged home with her infant. Five days later the patient presented at the neurology clinic because of strong and chronic temporal lobe headache. No other complaints were reported. Upon admission, the patient had a head CT, followed by an MRI examination, which revealed cranial hematomas localized bilaterally in the area of the frontal, temporal and parietal lobes, spreading from the cranial vault to the skull base. The width of the hematomas was: 3-4 mm on the left and 5-6 mm on the right side. Hematomas infiltrated the anterior part of the medial longitudinal fissure. Magnetic resonance angiography showed normal images of the arteries, veins, and the dural venous sinuses. No vascular malformations, which may be a source of intracranial hemorrhage, were found. Other tests showed normal results.

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Patient condition during hospitalization was stable. Conservative treatment was implemented, i.e. fluids administered intravenously, anti-edematous drugs, analgesic medications and bed rest. All pain complaints subsided and a control CT scan showed that hematomas evolved as expected i.e. their HU density decreased. About 6 weeks later the patient had a CT head scan, performed in outpatient settings, which showed complete absorption of extravasated blood.

Conclusion: *The presented case shows headaches in obstetric patients require thorough diagnostic examinations and appropriate management. In addition to the most typical PDPH, it may be the first sign of life-threatening intracranial pathology.*

Key words: **obstetric / anesthesia / complication / cranial subdural hematoma /**

Streszczenie

Ból głowy skojarzony z ciążą, naktuciem opony twardej i pajęczynówki wymaga szerokiej diagnostyki różnicowej. Poczynając od najczęściej spotykanych popunkcyjnych bólów głowy (PDPH), preeklampsji, migreny, bólów indukowanych lekami, do poważnych patologii wewnątrzczaszkowych.

W pracy przedstawiono przypadek 33 letniej ciężarnej (ciąża niepowikłana) w terminie porodu, która została przyjęta do szpitala z powodu odpłynięcia wód płodowych koloru zielonego. Ciążę ukończono cięciem cesarskim w znieczuleniu podpajęczynówkowym, przebieg zabiegu prawidłowy. Po trzech dniach od zabiegu u położnicy wystąpiły nasilające się bóle głowy okolicy czołowej oraz szumy w uszach. Po konsultacji anestezyjologicznej postawiono diagnozę zespołu popunkcyjnego, z zaleceniem podaży płynów i leków przeciw bólowych. Zastosowane leczenie wyeliminowało objawy i chora w dobrym stanie wraz z dzieckiem została wypisana do domu. Po upływie 5 dni chora zgłosiła się do oddziału neurologii z powodu silnych bólów głowy, obustronnie w okolicach skroniowych. Wykonana diagnostyka KT i MR głowy wykazały obecność krwiaków przymózgowych, obustronnie w okolicach czołowo-skroniowo-ciemiennych, ciągnących się od podstawy mózgu aż po sklepienie, o szerokości po lewej – 3-4 mm, po prawej 5-6mm z wnikaniem od przodu do szczeliny międzypłatowej.

Opisany przypadek przedstawia konieczność stosowania szczegółowej i wnikliwej diagnostyki objawu jakim jest ból głowy pacjentki położniczej. Oprócz najbardziej typowego PDPH, może być on pierwszym objawem zagrażającej życiu patologii wewnątrzczaszkowej.

Słowa kluczowe: **położnictwo / anestezjologia / komplikacje / krwiak śródczaszkowy /**

Introduction

Subdural hematoma is an extremely rare yet life-threatening complication of epidural and spinal anesthesia. Headache and vomiting are usually the first symptoms [1]. This case report describes an intracranial subdural hematoma as the cause of a headache after subarachnoid anesthesia for section cesarean.

Case report

A 33-year-old primipara was admitted to the hospital at 38 weeks of gestation after premature rupture of membranes and meconium stained amniotic fluid. The course of gestation was normal. Upon admission the general condition of the patient and the fetus was good: arterial blood pressure – 110/70 mmHg, heart rate – 80 bpm, fetal heart rate – 130 bpm. During the cesarean section 0.5% Bupivacaine solution (Marcaine Spinal 0,5% Heavy, AstraZeneca AB, Sweden) was used. A single puncture between L2 and L3 vertebrae was made using a 26-gauge pencil-point needle (Balton, Poland) and 2.8 ml of analgesic solution was administered in order to obtain analgesia at the level of Th4 and Th5 vertebrae. The general condition of the patient was continuously monitored. During the 35-minute surgical procedure, patient heart rate ranged between 70 and 85 bpm,

systolic pressure ranged from 105 to 130 mmHg, and saturation was 99% as the oxygen was delivered through a face mask with the flow rate of 6 l/min. Transfusion of crystalloid solution (1000ml) was performed. After the infant was delivered, the surgeon decided to administer oxytocin (Oxytocin Richter 5u/ml, Geodon Richter, Hungary). During the surgical intervention the patient did not require any antidepressant medication. The patient was moved to the postoperative care room after the procedure. Her respiratory and circulatory performance was good and the patient was conscious. The anesthesiologist prescribed the following drugs for the postoperative period: 1 g of Paracetamol every 6 hours intravenously, 0.3 mg of Buprenorphine every 8 hours, 2000ml of crystalloid solution for 24 hours. Basic life functions were monitored. The condition of the patient was normal during the first 24 hours after the surgery. Afterwards, she was mobilized and did not report any complaints. In the course of the first and second post-operative day, 2500 ml of crystalloid solution for 24 hours was administered, as well as 1g of Paracetamol every 6 hours intravenously and 0.4 ml of Clefan for 24 hours. Obstetric and general condition of the patient was good.

On the third post-operative day the patient developed strong headache in the forehead area and tinnitus. The anesthesiologist

diagnosed post-dural puncture headache (PDPH). The patient received 1g of Paracetamol every 6 hours intravenously, together with 3000 ml of crystalloid solution for 24 hours. As a result, the patient recovered and was discharged home with her infant.

Five days later the patient presented at the neurology clinic because of strong and chronic temporal lobe headache. No other complaints were reported. Cardiopulmonary functions were normal. The speech and logical coherence of the patient were unaffected. Meningeal symptoms were absent, cranial nerves deficits were not identified, muscular strength and tension in the extremities was normal, symmetrical, deep tendon reflexes were present, superficial and deep sensibility were unchanged, and pathological symptoms were absent. The patient was mobile.

Upon admission, the patient had a head CT, followed by an MRI examination, which revealed cranial hematomas localized bilaterally in the area of the frontal, temporal and parietal lobes, spreading from the cranial vault to the skull base. The width of the hematomas was: 3-4 mm on the left and 5-6 mm on the right side. Hematomas infiltrated the anterior part of the medial longitudinal fissure (Figures 1, 2, 3). The usefulness of the MRI test was confirmed also in other vessel pathologies during pregnancy [2].

Magnetic resonance angiography showed normal images of the arteries, veins, and the dural venous sinuses. No vascular malformations, which may be a source of intracranial hemorrhage, were found. Basic coagulation tests (including kaolin cephalin clotting time, prothrombin time, INR, fibrinogen level, and platelet count) were normal.

Patient condition during hospitalization was stable. Conservative treatment was implemented, i.e. fluids administered intravenously, anti-edematous drugs, analgesic medications and bed rest. All pain complaints subsided and a control CT scan showed that hematomas evolved as expected i.e. their HU density decreased. The patient was discharged with no neurological deficits and in good overall condition. About 6 weeks later the patient had a CT head scan performed in outpatient settings, which showed complete absorption of extravasated blood.

Discussion

Post-dural puncture headache (PDPH) is an increasingly rare complication after epidural and spinal anesthesia. In the majority of cases the symptoms subside within a few days when treated with analgesics and bed rest. Spinal headache typically presents 24-48h postpartum, with throbbing pain in the fronto-occipital area, which is relieved by flying down flat [3, 4]. Severe headache connected with pregnancy and dural/spinal puncture, has a broad differential diagnosis: PDPH, preeclampsia, migraine, drug-induced headache and intracranial pathologies. The latter include hemorrhages, venous sinus thrombosis and postpartum cerebral angiopathy [5].

The most common reason of PDPH is inadvertent dural puncture as a result of epidural anesthesia. The incidence of PDPH ranges from 0.4 to 6%. It may be accompanied by neck stiffness, nausea, vomiting, photophobia and occasional cochlear or ocular symptoms [6, 7, 8].

Intracranial subdural hematoma is a rare but a potentially life-threatening complication that can occur after epidural or spinal anesthesia. Most authors postulate the same mechanism for both PDPH and subdural hematoma. PDPH has been attributed to the loss of cerebrospinal fluid (CSF) through the dural puncture.

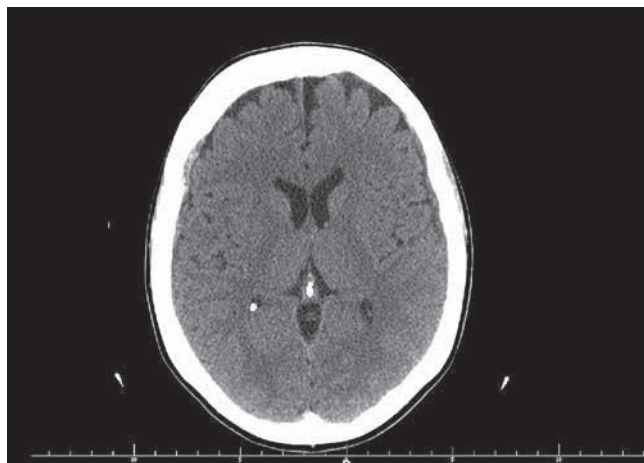


Figure 1. CT head examination: the images show narrow subdural hematoma with the maximum width of 5.5 mm at the frontal lobe and partial spread to the temporal lobe of the right brain.

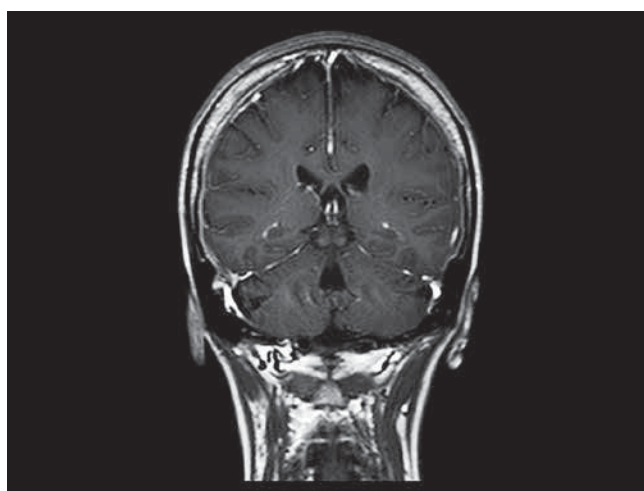


Figure 2. MRI examination: the images show bilateral epidural hematomas spreading from the bottom to the top of the brain with increased T1 relaxation time – methemoglobin phase – subacute hematoma. It is wider on the right (maximum width between 5 and 6 mm) whereas on the left the hemorrhaging area is smaller (from 3 to 4 mm). No mass effect is found.

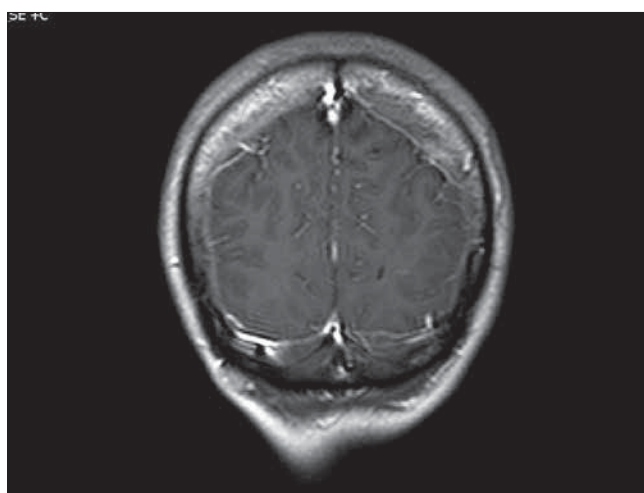


Figure 3. MRI examination.

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The sudden drop in CSF pressure allows for caudal movement of the brain and the attachments, including the bridging veins. This applies traction to the pain-sensitive dural sinuses, resulting in the characteristic postural headache. The loss of CSF may be accentuated by increased intracranial pressure, caused by bearing down during labor [9, 10, 11, 12].

Excessive leakage of CSF through the dural puncture (P 250 mL) may cause caudal displacement of the intracranial structures, what in turn may result in the formation of subdural hematoma [5].

Our patient complained of strong headache in the forehead area and tinnitus on the third postpartum day, what was interpreted by the anesthesiologist as post-dural headache. The condition is observed in up to 74% of obstetric patients after unintentional dural puncture [13]. The symptoms stopped when the patient received intravenous fluids and analgesic medication. The mother recovered and was discharged home with her infant. Five days later the patient presented at the neurology clinic because of strong and chronic temporal lobe headache. Upon admission, the CT head scan, followed by an MRI exam, revealed cranial hematomas localized bilaterally in the area of the frontal, temporal and parietal lobes, spreading from the cranial vault to the skull base. Laboratory tests did not reveal any coagulation disorders.

Most studies reported acute subdural intracranial hematoma in parturients who underwent craniotomy with evacuation of the hematoma and recovered well. These studies showed patients with deteriorating neurologic function who generally required urgent surgery [14, 15, 16, 17].

Some authors recommend epidural blood patch to prevent exacerbation of the CSF leakage for patients with persistent headaches beyond 24 h [11, 18]. However, the role of epidural blood patch in prophylactic or therapeutic treatment of PDPH, after the symptoms of PDPH have already developed, remains controversial [19, 20, 21].

Zeidan et al., reviewed the literature on 46 patients who developed a post-dural puncture headache complicated by subdural hematoma following spinal or epidural anesthesia. They concluded that post-dural puncture headache, if left untreated, may be complicated by the development of subdural hematoma. Patients developing a post-dural puncture headache unrelieved by conservative measures, as well as the change from postural to non-postural, require careful follow-up for early diagnosis and management of possible subdural hematoma [19].

Conclusion

The presented case shows that headaches in obstetric patients require thorough diagnostic examinations and appropriate management. In addition to the most typical PDPH, it may be the first sign of life-threatening intracranial pathology.

Oświadczenie autorów

1. Joanna Skręt-Magierło – autor koncepcji i założeń pracy, przygotowanie manuskryptu i piśmiennictwa – autor zgłaszający i odpowiedzialny za manuskrypt.
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3. Barbara Sęk-Kłębukowska – autor założeń pracy, analiza i interpretacja wyników, przygotowanie, korekta i akceptacja ostatecznego kształtu manuskryptu.
4. Jakub Nicpoń – zebranie materiału, analiza wyników, przygotowanie manuskryptu.
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References

1. Harrington BE. Post-dural puncture headache and the development of the epidural blood patch. *Reg Anesth Pain Med.* 2004, 29 (2), 136-163.
2. Jankowski R, Nowak S, Kasprzyk M, [et al.]. Symptomatic vertebral hemangioma related to pregnancy. A case report. *Ginekol Pol.* 2012, 83 (01), 62-66.
3. Vaughan DJ, Stirrup CA, Robinson PN. Cranial subdural haematoma associated with dural puncture in labour. *Br J Anaesth.* 2000, 84 (4), 518-520.
4. Kayacan N, Arici G, Karsli B, Erman M. Acute subdural haematoma after accidental dural puncture during epidural anaesthesia. *Int J Obstet Anesth.* 2004, 13 (1), 47-49.
5. Yildirim GB, Colakoglu S, Atakan TY, Büyükkirli H. Intracranial subdural hematoma after spinal anesthesia. *Int J Obstet Anesth.* 2005, 14 (2), 159-162.
6. Acharya R, Chhabia SS, Ratra MI, Sehoal AD. Cranial subdural haematoma after spinal anaesthesia. *Br J Anaesth.* 2001, 86 (6), 893-895.
7. Nepomuceno R, Herd A. Bilateral subdural hematoma after inadvertent dural puncture during epidural analgesia. *J Emerg Med.* 2013, 44 (2), 227-230.
8. Kuczkowski KM, Drobnik L. Anestezjologia w położnictwie i medycynie perinatalnej. Wydanie I, Warszawa: Med-Media, 2009.
9. Turnbull DK, Shepherd DB. Post-dural puncture headache: pathogenesis, prevention and treatment. *Br J Anaesth.* 2003, 91 (5), 718-729.
10. Loo C, Dahlgren G, Irestedt L. Neurological complications in obstetric regional anesthesia. *Int J Obstet Anesth.* 2000, 9 (2), 99-124.
11. Vaughan DJ, Stirrup CA, Robinson PN. Cranial subdural haematoma associated with dural puncture in labour. *Br J Anaesth.* 2000, 84 (4), 518-520.
12. Lin W, Geiderman J. Myth: Fluids, bed rest, and caffeine are effective in preventing and treating patients with post-lumbar puncture headache. *West J Med.* 2002, 176 (1), 69-70.
13. Nolte CH, Lehmann TN. Postpartum headache resulting from bilateral chronic subdural hematoma after dural puncture. *Am J Emerg Med.* 2004, 22 (3), 241-242.
14. Abbinante C, Lauta E, Di Venosa N, [et al.]. Acute subdural intracranial hematoma after combined spinal-epidural analgesia in labor. *Minerva Anestesiol.* 2010, 76 (12), 1091-1094.
15. Dawley B, Hendrix A. Intracranial subdural hematoma after spinal anesthesia in a parturient. *Obstet Gynecol.* 2009, 113 (2 Pt 2), 570-573.
16. Ramos-Aparici R, Segura-Pastor D, Edo-Cebollada L, Vila-Sanchez M. Acute subdural hematoma after spinal anesthesia in an obstetric patient. *J Clin Anesth.* 2008, 20 (5), 376-378.
17. Ulivieri S, Oliveri G, Dell'Acqua S. Intracerebral haematoma following spinal anaesthesia for caesarean section: case report. *G Chir.* 2009, 30 (3), 109-111.
18. Verdusco LA, Atlas SW, Riley ET. Subdural hematoma after an epidural blood patch. *Int J Obstet Anesth.* 2012, 21 (2), 189-192.
19. Zeidan A, Farhat O, Maaliki H, Baraka A. Does postdural puncture headache headacheleft untreated lead to subdural hematoma? Case report and review of the literature. *Int J Obstet Anesth.* 2006, 15 (1), 50-58.
20. Davies JM, Murphy A, Smith M, O'Sullivan G. Subdural haematoma after dural puncture treated by epidural blood patch. *Br J Anaesth.* 2001, 86 (5), 720-723.
21. Boonmak P, Boonmak S. Epidural blood patching for preventing and treating post-dural puncture headache (Review). *Cochrane Database Syst Rev.* 2010, (1), CD0017, doi: 10.1002/14651858.CD001791.pub2