CLINICAL REPORT

Post-Dural Puncture Headache Evolving to a Subdural Hematoma: A Case Report

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■ **Abstract**

Introduction: Cervical epidural corticosteroid injections are frequently used for the treatment of subacute cervicobrachial pain. This therapy is considered safe, with the vast majority of the complications being minor and transient.

Case Report: We present a case of a woman in her fifties who suffered from cervicobrachialgia and received 2 cervical epidural corticosteroid infiltrations. On day 3 after the second infiltration, a new headache appeared and on day 16 a bilateral subdural hematoma was visualized on CT scan. Complete resorption of the hematoma was seen on day 25 without surgical intervention.

Discussion: Up until now, only 1 case report of an intracranial subdural hematoma after a cervical epidural steroid injection has been published. But several cases of an intracranial subdural hematoma after spinal, epidural, or combined spinal and epidural anesthesia have been reported. Physicians should be aware of this potentially dramatic complication since post-dural puncture headache after any type of procedure can evolve into a subdural hematoma. Clinical differentiation between the two can be difficult; post-dural puncture headache is characterized by relief of symptoms in the supine position and photophobia/phonophobia. A subdural hematoma should be considered if the headache changes in character, does not respond to treatment, or there are neurological signs such as nausea/vomiting and blurred vision. Immediate medical imaging should then be performed. ■

Key Words: hematoma, subdural, injections, epidural, pain

INTRODUCTION

Cervical epidural corticosteroid injections are frequently used as the first-option interventional therapy for subacute cervicobrachial pain where conservative treatment has failed. Although there have been case reports of paraplegia[1] and death,[2] cervical epidural corticoid injections are considered safe, with the vast majority of complications being minor and transient.[3,4]

We present a case of a seemingly normal procedure that evolved into a major complication: a subdural hematoma. To our knowledge, there has been only 1 similar reported case.[5] Pain therapists should be aware of this possible complication, the difficult differential

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diagnosis with post-dural puncture headache (PDPH), and the possible evolution of PDPH into a subdural hematoma.

The patient provided written informed consent to publish the information.

CASE REPORT

A woman beginning 50 presented at our hospital with cervicobrachialgia, suggestive for C7-originated radicular pain. In her medical history, we only noted a mild hypertension, for which she had been treated with a combination of perindopril and indapamide. A CT scan showed important foraminal stenosis at C6 to C7. Standard coagulation test results were normal (thrombocytes: 209 $\times$ $10^3/\mu L$, international normalized ratio: 1.1, activated partial thromboplastin time: 29.3 seconds) and she was scheduled for cervical epidural corticosteroid injections at C6 to C7. The first injection was performed without any complications. The procedure was done under fluoroscopic guidance with the patient in the sitting position, whereafter the patient reported a 50% decrease in radicular pain. A second injection was performed 1 week later since the patient had a vacation planned. Both injections were performed by the same interventional pain specialist with over 10 years of experience. During and immediately after the second injection, no abnormalities were reported.

At follow-up consultation 10 days after the second injection, she reported complete recovery of the radicular pain, but a new headache had appeared on day 3. She described the pain as bilateral pulling and tearing from the neck to the frontal area. There was neither photophobia nor phonophobia. She was able to continue work and there was no impact on activities of daily living. The influence of the postural position on the pain was unclear. There was little to no pain at night, but she never laid down during the day. She rated the pain as 4 on the numeric rating scale. She planned to leave on vacation by car the next day.

It was explained to the patient that there were several arguments in favor of PDPH (ie, the timing, type of headache, and correlation of symptoms with the postural position). The absence of photophobia and phonophobia and the relatively low pain scores were arguments against PDPH. Since the pain was bearable and going on for a week without impeding going work, there was no immediate blood patch arranged and she was allowed to leave on vacation. A combination of paracetamol 500 mg and caffeine 50 mg was prescribed.

On day 14 after the second injection, the patient, still abroad, contacted our pain clinic with a worsening headache. The prescribed medication was changed to a combination of paracetamol and tramadol without caffeine. A medical letter in the language of the country she visited was provided, and she was advised to visit the emergency department if her complaints worsened.

On day 16 she had a near syncope, and she visited the local emergency department. Clinical neurologic examination was normal, but highly elevated blood pressure (180/80 mmHg) was noted. A CT scan showed a bilateral chronic subdural hematoma without a mass effect. She was admitted to the intensive care unit (ICU) for strict bed rest, hyperhydration, and tension control. Three days later she was transferred back to our hospital by medical transport in the supine position. At arrival in our ICU, the results of her neurological examination were normal, and a continuing need for antihypertensive therapy (nicardipine) was indicated.

A magnetic resonance imaging (MRI) scan on day 20 showed regression of the subdural hematoma with a maximal width of 5 mm on the left side and without midline shift. There were no arguments for residual cerebrospinal fluid (CSF) leakage on a cervical MRI scan. Neurosurgical intervention was not indicated. A screening test for coagulation deficits yielded negative results. A dose of amlodipine was added to the treatment to achieve normal arterial pressure. Mobilizing therapy was started to prevent deep venous thrombosis. Prophylactic low-molecular-weight heparin was started on day 24 and she was allowed to sit up. One day later she was able to stand up and was discharged from the ICU. At the time she still had tinnitus, positional vertigo, and subjective pressure and hearing loss on the right side. Audiometry showed bilateral normal hearing. Betahistine 16 mg twice a day was started for vertigo. On day 25, a CT scan showed complete resorption of the subdural hematoma and she was discharged from the hospital.

One week later the reported hearing loss was almost completely resolved.

At follow-up consultation on day 50, there was vertigo when sitting upright and turning to the right side in the supine position. A Hallpike maneuver was performed by the consulting neurologist with good clinical response.

DISCUSSION

Up until now, only 1 case report of an intracranial subdural hematoma after a cervical epidural steroid

injection has been published.[5] In that reported case, the patient revisited the clinic 5 days after the injection with a mild headache that worsened in the upright position. CT showed no remarkable findings. PDPH was suspected, and conservative treatment with bed rest and analgesic drugs was started. The headache disappeared and the patient was discharged. One month later, she presented with persistent headache. The pain did not resolve with analgesic drugs and the character had changed to a nonpositional headache. Results of a neurologic examination were normal, but an MRI revealed a massive chronic unilateral subdural hematoma. Emergency burr hole drainage was performed, and the pain disappeared immediately. She was discharged 5 days later.

Another case report after a therapeutic injection was published after a lumbar epidural corticosteroid injection.[6] On the first attempt at L4 to L5 a dural puncture was detected and the procedure was finalized at L3 to L4. Twenty-four hours later, the patient developed a headache and started vomiting in the upright position. An MRI scan showed a right frontal subdural hematoma. Treatment was conservative with bed rest and analgesic drugs. After 7 days, the patient fully recovered and was discharged.

Our case shows some major differences with the previously reported case after a cervical injection and more similarities with the case after the lumbar injection. In the previous cervical case, the patient suffered from a PDPH with a CT scan that was negative for a subdural hematoma. The pain resolved after conservative treatment and came back after a month with different characteristics. In our case, the pain never disappeared. It might even be that the PDPH evolved very quickly into a subdural hematoma. Similar to the case of the lumbar injection, the patient's symptoms were characteristic of a PDPH when a subdural hematoma was already present. Neurosurgical intervention was not necessary in our case, but burr hole drainage was performed after the previous cervical case.

Several case reports of an intracranial subdural hematoma after spinal, epidural, or combined spinal and epidural anesthesia have already been published.[7–11] The symptoms ranged from diplopia,[7] severe (nonpostural) headache,[9] or headache and vomiting,[11] to hemiparesis[10] or loss of consciousness.[8] Several patients presented with subdural hematoma within 48 hours.[8,10,11] In other cases, the first symptoms matched PDPH and were treated accordingly. The headache disappeared but returned in 3 days to several weeks after the puncture,[9,11] just like in the earlier reported cervical case.[5] In one case, the only symptom was diplopia, which started 10 days after the spinal anesthesia. In all the cited cases, invasive therapy was performed, ranging from a blood patch[9] to burr holes[11] and even craniectomy.[7,8,10] In one case the use of aspirin might have been an aggravating factor.[9]

In 2016, Lim et al.[12] published a case series of 11 post-dural puncture subdural hematomas in obstetric patients at a tertiary center. Ten of 11 patients had signs of PDPH before the diagnosis of subdural hematoma: pain was exacerbated by being in an upright position and was accompanied by nausea, vomiting, photophobia, or neck stiffness. The diagnosis was made on average on day 4, with 1 late diagnosis on day 25. One patient needed an emergency craniectomy. Nine patients received an epidural blood patch. In the majority of the cases no contributing factors (coagulopathy, hypertension, etc.) were found. In almost half of the patients, no unintended dural puncture was noted, similar to our case. Also, in an obstetric population, Cuypers et al.[13] performed a literature review and analysis of 56 cases, of which 34 were after epidural anesthesia. Confirmed dural tap occurred in 71% of the cases. PDPH was the first symptom in 91% of cases, with evolution to persistent nonpostural headache in 84%. In 26% of the cases, the diagnosis was made in the first week. In 50% of the cases, burr holes were performed. Three patients died and 1 patient suffered from permanent visual impairment.

Post-dural puncture subdural hematoma has also been described after diagnostic punctures such as lumbar puncture[14,15] and myelography.[16] Leakage of CSF may cause intracranial hypotension and PDPH. It has been suggested that the intracranial hypotension leads to displacement of the brain and traction and even rupture on the bridging veins.[6] In the subdural space, the wall of veins is the smallest and therefore this may be the predisposed place for rupture.[17]

As already mentioned, several different treatment options have been described: observation, blood patch, burr hole drainage, craniectomy, or a combination.[5–16] The choice should be based on the patients' neurological status and the size of the hematoma. Any patient with neurological signs, a subdural hematoma greater than 10 mm, or midline shift greater than 5 mm should undergo surgical evacuation.[1,6,13] Surgical drainage without an epidural blood patch might lead to a return of the hematoma since the provoking factor remains.[9,18] On the other hand, epidural injection of a large volume

of blood might lead to a further increase in cerebral pressure.[13,19,20] Rebound intracranial hypertension was described in a case series of 9 patients who received an epidural blood patch for intracranial hypotension (8 spontaneous, 1 post-lumbar puncture) and subsequently developed a new headache. To meet the criteria of rebound intracranial hypertension, patients had to develop symptoms of intracranial hypertension (headache, nausea, blurred vision) and opening pressure during lumbar puncture of >20 cm H_2O. The main clinical differences with intracranial hypotension were the location of the headache (frontal vs. occipital), the worst position (recumbent vs. upright), and the degree of nausea and blurred vision (severe vs. mild or absent).[21] Epidural blood patches have been used safely in spontaneous intracranial hypotension with subdural hematoma.[22]

In our case report, the subdural hematoma was smaller than 10 mm and there was no midline shift. The patient did not suffer from neurological symptoms, so observation with serial CT scans was the initial treatment. Since the headache improved in the supine position, no epidural blood patch was performed.

CONCLUSION

We present a case of a subdural hematoma after a cervical epidural steroid injection. This seems to be a rare but serious complication that requires special attention from physicians. When patients present with a new type of headache, the first possibility to consider is PDPH. The latter is, however, characterized by photophobia and phonophobia. A subdural hematoma should be considered if the headache changes in character, does not respond to treatment, or there are neurological signs, such as nausea/vomiting and blurred vision. Immediate medical imaging should then be performed.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

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