Severe Headache After Lumbar Epidural Injection of Hyaluronic Acid

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Headache due to intracranial hypotension induced by CSF leakage is one of the usual complications after epidural injection. We present a case who has severe headache after lumbar epidural injection of hyaluronic acid and the brain computed tomography shows hypodensity lesions in the suprasellar cistern and cerebral tentorial surface.

Key words: headache, epidural injection, hyaluronic acid

Introduction

Headache due to intracranial hypotension induced by CSF leakage is one of the usual complications after epidural injection. Other unusual complications include subdural hemorrhage, pneumocephalus, cerebral venous sinus thrombosis, spinal meningocele, etc. The treatment of headache after epidural injection includes supportive care and epidural blood patch. We present a case that has suffered from severe headache after lumbar epidural injection of hyaluronic acid. The patient arrives the emergent department with remarkable neurological symptoms and signs and was advised to undergo brain computer tomography (CT). The brain CT shows hypodensity lesions in the suprasellar cistern and cerebral tentorial surface. The patient’s headache improves after supportive care and the hypodensity lesion absorption spontaneously in a few days later.

Case Report

A 57-years-old female visited our emergency department (ED) with severe headache after lumbar epidural injection of hyaluronic acid at orthopedic clinic on July 10, 2013 afternoon about 6pm. She has past history of: (1) displacement of lumbar intervertebral disc post operation several years ago; (2) cervical cancer post abdominal total hysterectomy several years ago. She comes to our ED and complains of sudden onset explosive headache with nausea and vomiting, and neck soreness this afternoon. She says she had received lumbar operation several years ago, but she still felt low back pain sometimes after operation. She went to orthopedic clinic and had received lumbar epidural injection of hyaluronic acid twice for decrease her low back pain at recent months. She did not have any uncomfortable after the lumbar epidural injection before. She goes to the orthopedic clinic again this afternoon and lumbar
epidural injection of hyaluronic acid has done again. Unfortunately, she feels explosive headache with nausea and vomiting, and neck soreness after lumbar injection about 1 hour later. The headache becomes more severe when she moves head and sits up and improves after she lies down. She denies have trauma, fever, upper respiratory infection symptoms at recent days. And she did not have the same headache before. When she arrives our ED, her vital signs are T/P/R: 36.8/81/18, blood pressure: 134/78 mmHg. She looks ill-looking and she still feels nausea. Her consciousness is clear, Glaucoma coma scale (GCS) is E4M6V5. Her neck is supple and muscle power is full. Her bilateral pupil size is 2.5 mm and light reflex is positive. Other physical examinations and neurological examinations are grossly normal. Her blood test showed: Hb 12.7 gm/dl; WBC 10000/ul, neutrophil 91%, monocyte 1%, lymphocyte 8%; BUN/Cr 19/0.5 mg/dl; GOT 19 U/L; Glucose 122 mg/dl; Na/K 137/3.8 mEq/L. Due to she has sudden onset explosive headache with persist nausea and vomiting, and neck soreness, subarachnoid hemorrhage is impressed initially and brain CT without enhancement has performed. The brain CT film (Fig. 1) shows hypodensity lesions over suprasellar cistern and cerebral tentorial surface. Our radiologist reported the lesions are suspected air or fat emboli. Due to the brain CT report, we consulted neurologist for evaluating the patient’s condition and arranged further treatment. After neurologist evaluated the patient’s condition, admission is suggested.

Fig. 1 The brain CT films show hypodensity lesions over suprasellar cistern and cerebral tentorial surface
After admission, supportive care including bed rest, fluid hydration, and pain control, was done. Echocardiogram has performed for evaluating the patient whether has heart thrombus, and only mild pulmonary artery regurgitation and tricuspid regurgitation are noted. Brain magnetic resonance imaging (MRI) without enhancement (Fig. 2) has performed for different diagnosis of the lesions, and radiologist reports that the lesions are pneumocephalus and are almost complete resolution. She is discharged 3 days later after headache improved, and she has no more vomiting. She comes back to neurologic outpatient department (OPD) follow up about 1 month later. And she complains she still has headache and nausea sometimes, especially when she stands up and symptoms improve after she lies down. Therefore, brain CT without enhancement has performed again. She has come back to OPD about 1.5 months after discharged again for reading brain CT report and the follow up brain CT report was normal (Fig. 3). But she still complains headache sometimes, so imipramine has given. Then she is loss follow up at our hospital after the second OPD returned.

**Discussion**

Conservative treatment of lumbar radiculopathy includes bed rest, oral medications, physical therapy,
spinal manipulation, mobilization, and epidural injection of steroid\textsuperscript{(1,2)}. Complications of epidural injection are including intracranial subdural air, spinal subdural hematoma, cauda equina syndrome and intracranial subdural hematoma\textsuperscript{(1,3-6)}. In our case, she received lumbar epidural injection of hyaluronic acid for decreased her low back pain. Unfortunately, she has post dural puncture headache (PDPH) after lumbar epidural injection of hyaluronic acid. Brain CT finds hypodensity lesions. The lesions are hypodensity, so hemorrhage is less likely. And because the lesions’ mean value is higher than air, so air embolism is less likely. Tracing her history, she just performs lumbar epidural injection of hyaluronic acid; we suspect the lesions are hyaluronic acid accumulation. We have the hypothesis that is unintentional punctured the dura when performed the procedure and injected the hyaluronic acid into the CSF system and the hyaluronic acid flows into the brain and accumulates at suprasellar cistern and cerebral tentorial surface, which induced the patient’s headache. We does not has evidence to improve the lesion is hyaluronic acid accumulation, because the lesion is absorbed spontaneously a few days later and we cannot get the sample by biopsy or other methods. Fortunately, the patient’s condition improves after bed rest, fluid hydration and analgesic a few days later.

Headache is a common complaint in ED. The most common types of headache were tension and migraine headache\textsuperscript{(7)}. Other differential diagnosis are including cluster headache, hypertension crisis, vascular problem, intra-cranial space occupying lesion (such as brain tumor), intra-cranial infection (such as meningitis, encephalitis), intra-cranial

Fig. 3 The brain CT films show no hypodensity lesion compare with previous CT films
hemorrhage, etc. In our case, she did not have fever, hypertension, and the symptoms and signs are sudden onset, so infection and hypertension crisis are less likely. But intra-cranial lesion (such as hemorrhage, tumor, etc.) need further image study to rule out. One type of intra-cranial hemorrhage is spontaneous subarachnoid hemorrhage (SAH) which is caused by intra-cranial aneurysm rupture and induced sudden onset explosive headache, nausea and vomiting, neck stiffness. It may be life-threatening. For rule out intra-cranial lesions, brain CT is the useful tool in ED. We suggest if patient has the characteristics of headache (Table 1) should perform brain CT to exclude the dangerous conditions which need emergent surgery. In this case, she has below characteristics are: sudden onset explosive headache with nausea and vomiting, age over 50-years-old, headache with exertion. Therefore, we arrange the brain CT examination and have some unusual findings.

PDPH is a well known complication of epidural injection and lumbar puncture. Current evidence supports the hypothesis that PDPH results from a loss of CSF which lowering of CSF pressure and has contributions from sagging of the brain in the cranial vault, as well as cerebral arterial and venous dilatation to its cause. The overall incidence of PDPH varies from 0.1-36%. Most cases have the symptoms which happen 24-48 h after dura puncture and often interfere with the patient’s activities of daily living. Many factors reported to influence the incidence of PDPH were: age, sex, pregnancy, previous history of post spinal headache, needle size, needle tip shape, bevel orientation to the dural fibers, number of lumbar puncture attempts, midline versus lateral lumbar puncture approach, type of local anesthetic solution, and clinical experience of the operator. The typical feature of PDPH is the postural character of the dull pain in a frontal-occipital distribution, which is when the individual assumes an upright position. The differential diagnosis of PDPH like meningitis, encephalitis, migraine, tension headache, cluster headache, neuralgia, hypertension, cerebral vascular accident, postpartum cerebral angiopathy, subdural hematoma, subarachnoid hemorrhage, cortical vein thrombosis, space occupying lesion, benign intra-cranial hypertension, dehydration, lactation headache, preeclampsia, caffeine withdrawal and sinusitis. The diagnostic criteria for PDPH are as follows: headache:

1. worsens within 15 min of sitting or standing;
2. improves within 15 min after lying down;
3. must have one of the following:
   A. neck stiffness;
   B. tinnitus;
   C. hypacusia; and
   D. photophobia;
4. dural puncture has been performed;
5. headache develops within 5 days after dural puncture; and
6. headache resolves:
   (1) spontaneously within 1 week (95% of cases); and

| Table 1 Characteristics of headache with serious underlying pathology |
|--------------------------|------------------|
| **History**              |                  |
| Explosive onset and severe at onset |              |
| No similar headaches in the past |              |
| Concomitant infection   |                  |
| Altered mental status   |                  |
| Headache with exertion  |                  |
| Age over 50             |                  |
| Immunosuppression       |                  |
| Physical examination    |                  |
| Neurologic abnormalities|                  |
| Decreased level of consciousness |              |
| Meningismus             |                  |
| Toxic appearance        |                  |
| Papilledema             |                  |
Headache after lumbar epidural injection

(2) within 48 h after epidural blood patch (EBP)

In our case, she has headache with neck soreness, nausea and vomiting, worsen symptom when she sits up and symptoms improve after she lies down. And she has headache after epidural puncture 1 hour later. Her symptoms improve after supportive care 3 days later. Besides, she did not have fever, trauma, hypertension, pregnant, etc. Therefore, she can diagnose as PDPH as above criteria.

Treatment of PDPH typically includes bed rest, hydration, and analgesic, but epidural blood patch (EBP) may be used to prevent further cerebrospinal fluid leakage in patients with persistent headache beyond 24 hours. Fortunately, in our case, her headache improved after bed rest, hydration and analgesics 3 days later. Therefore, she did not need receiving EBP treatment.

**Conclusion**

Headaches following inadvertent dural puncture for epidural analgesia are very common. If patient has severe headache with persist nausea and vomiting after performing lumbar puncture, early use of diagnostic imaging is suggested. If patient does not have emergent surgery condition, supportive care that including bed rest, hydration and analgesic is suggested.

**References**

經腰椎硬腦膜上注射玻尿酸後引起之劇烈頭痛

陳德理 蔡維謀

頭痛在進行過硬腦膜上注射之病人是常見的併發症。最常見的原因是因腦脊髓液的滲漏導致顱內壓降低而引起。我們在此發表一個經腰椎硬腦膜上注射玻尿酸後引起劇烈頭痛的病例，而且她的腦部電腦斷層發現在蝶鞍上腦池及腦鐮處有不正常的低密度顯影。

關鍵詞：頭痛，硬腦膜上注射，玻尿酸