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Case Report

A rare case of acute meningitis shortly after lumbar selective nerve root block: a case report

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Abstract: A 57-year-old man underwent lumbar selective nerve root block (SNRB) for low back pain and lower radiating pain caused by left-sided L4 disc herniation. He presented to the emergency department with fever, headache and aggravated low back pain approximately 3 hours after the procedure. Infection was suspected; hence, blood tests, cerebrospinal fluid (CSF) tests, lumbar magnetic resonance imaging, and brain computed tomography were performed. Imaging findings were not suggestive of infection. The CSF was turbid and yellowish with pleiocytosis; however, the CSF culture was negative. Based on these findings, the patient was diagnosed with acute meningitis. Broad-spectrum antibiotics and steroid therapy were initiated considering the patient's age and general condition. From hospital day (HD) 2, fever and headache were reduced and disappeared completely by HD 5. At the last follow-up, 1 month after discharge, the patient had no symptoms. Acute meningitis is associated with a high mortality and neurologic deficits. Hence, timely tests, diagnosis, and treatment are critical for positive outcomes. Symptoms of meningitis following a nerve block generally occur within 24-48 hours after the procedure. This case is notable, as it involved a quicker and more sudden onset of symptoms; meningitis occurred only a few hours after lumbar selective nerve root block.

Keywords: Low back pain, lower limb radiating pain, lumbar selective nerve root block, fever, turbid and yellowish CSF, quicker and sudden-onset, meningitis, antibiotics, steroid

Introduction

The number of patients with acute and chronic low back pain, such as pain due to disc disorder and spinal stenosis, is increasing.

Selective nerve root block (SNRB) was described by Macbab in 1971 as a diagnostic test [1]. SNRB has advantages: it targets the spinal nerve and dorsal root ganglion directly [2]. Therefore, lumbar SNRB is used for pain control in patients with nerve root irritation. Steroids and local anaesthetics are commonly used during the procedure as anti-inflammatory drugs and analgesics.

Side effects such as light headedness (2.8%), nausea (1.4%), increased radicular pain (0.9%), headache (0.5%), and vasovagal reaction (0.5%) have been reported in patients who undergo lumbar SNRB [2]. Infections, especially meningitis, after this procedure are rare [3, 4]. CSF infections usually occur 24-48 hours after the procedure [4].

Although not common, acute meningitis is a severe infectious disease with a high mortality and morbidity. Therefore, rapid diagnosis and examination are important. Meningitis can be diagnosed by the presence of pleiocytosis in the CSF, or bacteria in CSF culture and on Gram-stained slides. In addition, the leukocyte count, protein levels, and glucose levels in the CSF should also be analysed [5].

This patient presented with fever, headache, and aggravated low back pain, which developed 3 hours after lumbar SNRB in a private hospital. The patient was diagnosed and treated for meningitis.

Figure 1. Brain computed tomography scan of the patient after the procedure. It shows no evidence of infection, such as an abscess and pneumocephalus.

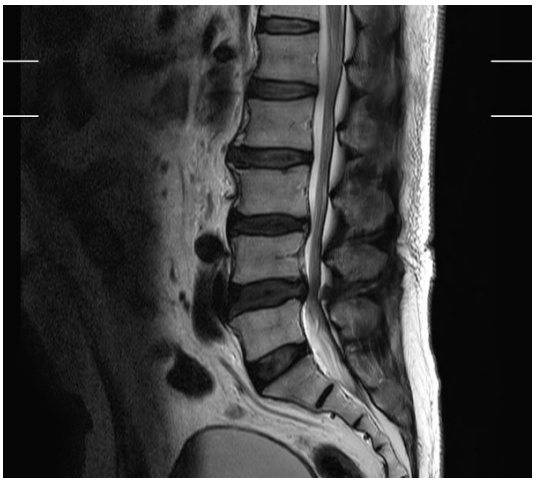

Figure 2. Magnetic resonance image of the patient's lumbar spine after the procedure. It shows no evidence of infection, such as an abscess.

This case is notable, as it involved a quicker and sudden onset of symptoms after SNRB (3 hours). In two prior reports, the onset of symptoms after SNRB was 1 and 10 day [3, 4].

To the best of our knowledge, we report the first case wherein meningitis developed shortly after a lumbar SNRB. This report will help create awareness of the short duration for the appearance of meningitis symptoms after SNRB.

Case

A 57-year-old male patient underwent left L4 lumbar SNRB at 3 PM in a private hospital for lower back pain (NRS 4) and left leg radiating pain (NRS 4) caused by left-sided L4 disc herniation.

SNRB was performed using 0.75% ropivacaine (1.5 mL), normal saline (1.5 mL), hyaluronic acid (1 mL), and dexamethasone (1 mL). The results of the preprocedural blood tests were normal. He had a normal body temperature (36.7°C), no symptoms of common cold, no other infections, and no underlying diseases preoperatively.

The patient was transferred to our emergency department (ED) at 6 PM, approximately 3 hours after the procedure, with severe headache, fever (38.9°C), and aggravated lower back pain than before the SNRB. Based on the numeric rating score (NRS) for pain, the lower back pain and headache was rated a score of 8.

At the time of presentation at the ED, the patient was conscious and had no redness or bleeding around the procedural site. The patient had no prognostic symptoms and neurologic deficits. The patient had a severe sudden-onset throbbing headache around both temporal regions with no relief and aggravating factors. The headache was accompanied by vomiting and nausea.

The patient was administered ketorolac (1 mL) injection, but the body temperature did not drop below 38.8°C, and the headache and low back pain aggravated with time.

Based on the patient's symptoms, infections such as meningitis or epidural abscess were suspected. Thus, blood and cerebrospinal fluid (CSF) tests, emergency brain computed tomography, and lumbar magnetic resonance imaging were performed. Imaging findings were not suggestive of an infection or abscess (**Figures 1**, **2**).

Results of the full blood count showed: a leukocyte count of 15.05×10^3/μL, absolute neutrophil count of 13.09×10^3/μL, C-reactive protein (CRP) level of 1.51 mg/dL, and erythrocyte sedimentation rate (ESR) of 27 mm/hr.

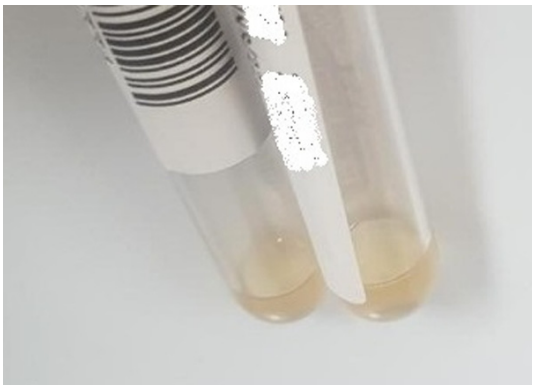

Figure 3. Results of cerebrospinal fluid (CSF) analysis. The CSF is yellowish and turbid.

The CSF was turbid and yellowish (**Figure 3**). The pressure of the CSF was 16 cm H_2O. The CSF had a leukocyte count of 13440/μL, erythrocyte count of 370/μL (polynuclear dominant), protein level of 259 mg/dL, and glucose level of 23 mg/dL. The CSF culture was negative. Based on the CSF findings and clinical symptoms, the patient was diagnosed with acute meningitis, and hence, antibiotics (ceftriaxone, ampicillin, and vancomycin) and steroids (dexamethasone) were initiated.

On hospital day (HD) 2, his body temperature dropped to 36.8°C, the lower back pain improved to NRS 6, and the headache improved to NRS 5. The nausea and vomiting disappeared.

On hospital day (HD) 3, his body temperature was 36.6°C. The lower back pain improved to NRS 5, and the headache improved to NRS 2-3. His blood leukocyte count was 13.05×10^3/μL, absolute neutrophil count was 11.50×10^3/μL, C-reactive protein level was 0.92 mg/dL, and the erythrocyte sedimentation rate was 19 mm/hr.

On hospital day (HD) 4, his body temperature was 36.5°C, lower back pain improved to NRS 4, and the headache almost disappeared (NRS 0-1).

On hospital day (HD) 5, the body temperature was 36.6°C, lower back pain was NRS 4, and the headache had disappeared. His blood leukocyte count was 11.50×10^3/μL, absolute neutrophil count was 8.99×10^3/μL, C-reactive protein level was 0.39 mg/dL, and the erythrocyte sedimentation rate was 12 mm/h.

The patient was discharged without any symptoms and neurologic deficits, with near-normal CRP and ESR levels.

At the 1-month follow-up, the patient had no symptom or complication, and the results of his blood tests were normal. Based on these findings, the follow-ups were ended.

This case was approved by the Chungbuk National University Hospital Clinical Research Review Committee (approval number 2019-12-038). The patient provided informed consent for the publication of this case report.

Discussion

Infection is one of the complications of SNRB. Although not common, infections are particularly dangerous because they can cause pain, neurological deficits, and/or prolonged hospital stay.

Local anaesthetics used in nerve blocks, such as lidocaine and levobupivacaine, also have antimicrobial effects [6]. Infections are rare since it is an aseptic procedure. The rate of infection in the operating room ranges from 0.5%-11% [7, 8]. The most common causes of infection in the operating room are nerve blocks and catheterization using contaminated needles or inadequate skin disinfection [9]. The prevalence of meningitis following spinal or epidural anaesthesia varies with studies. One study reported an incidence of 1 case of meningitis per 53,000 cases of spinal blocks in the United States [10]. Another study reported an incidence of 1 case of meningitis per 35,439 cases of spinal block and 5,561 cases of epidural anaesthesia, excluding obstetrical anaesthesia, in France [11]. Further, cases of bacterial meningitis that occur after puncturing the dural space during administration of obstetrical anaesthesia are more common [12].

In meningitis, the leukocyte count in the CSF ranges from 250-100,000/mm^3 and sometimes 1000-100,000/mm^3. More than 90% of patients have protein levels >45 mg/dL, with most in the range of 100-500 mg/dL. Glucose in the CSF is generally <40 mg/dL or <40% of the glycaemia [5]. A positive Gram stain after CSF tests is an indication for selective antibiotherapy. A negative Gram stain is an indication for broad-spectrum antibiotics and ste-

roids according to the patient's age and condition [13].

Our patient was diagnosed with meningitis because his CSF leukocyte count and protein and glucose concentrations met the diagnostic criteria. The CSF culture was negative; hence, we prescribed broad-spectrum antibiotics and steroids considering the patient's age and symptoms.

Ahn et al. reported the case of a patient who developed meningitis and ventricular pneumocephalus after a lumbar SNRB; the patient presented with headache and signs of infection 24 hours after the nerve block [3]. Further, Kim et al. reported a case of CSF infection that occurred 72 hours after a nerve block [14]. CSF infection occurs most frequently 24-48 hours after the procedure [4].

Germs that can cause meningitis after a procedure vary widely, and most infections cannot be anticipated in most cases. Multiple causes can be involved: inadequate ventilation, contaminated air of the operating room, contamination during the preparation, and/or use of contaminated drugs. To reduce the risk of infection, these potential causes must be anticipated and addressed. Further, the patient's general condition and the presence of any underlying disease should also be assessed preoperatively using blood tests, measurement of body temperature, and an interview, before performing the procedure.

One notable aspect of this case is that the onset of symptoms occurred approximately 3 hours after the nerve block. This is significant, as the symptoms occurred within a time shorter than the generally known period for symptom onset in acute meningitis. Additionally, cases of acute meningitis following a nerve block are rare. If patients who have undergone a nerve block develop symptoms of acute infection, diagnosis and treatment should be prompt to lower the mortality rate. Furthermore, continued fever and low back pain are warning signs indicating the need for additional timely tests.

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Disclosure of conflict of interest

None.

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