**Name of Journal:** *World Journal of Clinical Cases*

**Manuscript NO:** 77076

**Manuscript Type:** CASE REPORT

**Varicella-zoster virus meningitis after spinal anesthesia: A case report**

Lee YW *et al.* Meningitis after spinal anesthesia

Ye-Won Lee, Byunghoon Yoo, Yun Hee Lim

**Ye-Won Lee, Byunghoon Yoo, Yun Hee Lim,** Department of Anesthesiology and Pain Medicine, College of Medicine, Inje University, Sanggye Paik Hospital, Seoul 01757, South Korea

**Author contributions:** Yoo B andLim YH designed the case report; Lee YW performed the anesthesia and wrote the original paper; Lee YW and Yoo B reviewed the literature; All authors revised the manuscript and approved the final version.

**Corresponding author: Byunghoon Yoo, MD, PhD, Associate Professor,** Department of Anesthesiology and Pain Medicine, College of Medicine, Inje University, Sanggye Paik Hospital, 1342, Dongil-ro, Nowon-gu, Seoul 01757, South Korea. twowind.yoo@gmail.com

**Received:** April 14, 2022

**Revised:** June 27, 2022

**Accepted:** July 22, 2022

**Published online:** September 6, 2022

**Abstract**

BACKGROUND

Headache is a common complication of regional anesthesia. The treatment of post spinal anesthesia headache varies depending on the cause. Although meningitis is rare, it can cause significant harm to the patient. Post dural puncture headache and septic meningitis are the most commonly suspected causes of post spinal anesthesia headache; however, other causes should also be considered.

CASE SUMMARY

A 69-year-old woman was scheduled for varicose vein stripping surgery under spinal anesthesia. The procedure was performed aseptically, and surgery was completed without any complications. After 4 d, the patient visited the emergency room with complaints of headache, nausea, and anorexia. Clinical examination revealed that the patient was afebrile. Considering the history of spinal anesthesia, post dural puncture headache and septic meningitis was initially suspected, and the patient was treated with empirical antibiotics. Subsequently, varicella-zoster virus PCR test result was positive, and all other test results were negative. The patient was diagnosed with meningitis caused by varicella-zoster virus and was treated with acyclovir for 5 d. The headache improved, and the patient was discharged without any problems.

CONCLUSION

Viral meningitis due to virus reactivation may cause headache after regional anesthesia. Therefore, clinicians should consider multiple etiologies of headache.

**Key Words:** Aseptic meningitis; Headache; Regional anesthesia; Spinal anesthesia; Varicella zoster virus infection; Case report

**©The** **Author(s) 2022.** Published by Baishideng Publishing Group Inc. All rights reserved.

**Citation:** Lee YW, Yoo B, Lim YH. Varicella-zoster virus meningitis after spinal anesthesia: A case report. *World J Clin Cases* 2022; 10(25): 9127-9131

**URL:** https://www.wjgnet.com/2307-8960/full/v10/i25/9127.htm

**DOI:** https://dx.doi.org/10.12998/wjcc.v10.i25.9127

**Core Tip:** Aseptic meningitis is a rare complication of spinal anesthesia. Herein, we present the case of a patient who developed aseptic meningitis due to reactivation of the varicella-zoster virus after spinal anesthesia for varicose vein stripping surgery. The patient was diagnosed with meningitis caused by varicella-zoster virus based on positive PCR test results and was treated with acyclovir for 5 d. The headache improved, and the patient was discharged without any sequelae. This case highlights the importance of differential diagnosis of post spinal anesthesia headache because viral meningitis due to virus reactivation may cause headache after regional anesthesia.

**INTRODUCTION**

Headache is a common complication of regional anesthesia. The treatment of post spinal anesthesia headache varies depending on the cause. Although meningitis is rare, it can cause significant harm to the patient. Post dural puncture headache (PDPH) and septic meningitis are the most commonly suspected causes of post spinal anesthesia headache; however, other causes should also be considered.

**CASE PRESENTATION**

***Chief complaints***

A 69-year-old Asian woman, who was a housewife, visited the emergency room with a complaint of headache in the right occipital region.

***History of present illness***

The patient was scheduled for varicose vein stripping surgery. Preoperative evaluation revealed degenerative spondylosis of the lumbar spine and scoliosis in the lumbosacral spine. However, there was no contraindication for regional anesthesia, and surgery under spinal anesthesia was planned.

The procedure was performed aseptically, and 10 mg of 0.5% bupivacaine was injected into the subarachnoid space using a 25 G spinal needle at the L4-5 level, which resulted in initial anesthesia at the L2 level. Therefore, for sufficient level of anesthesia, dexmedetomidine was injected as a 0.5 mcg/kg bolus over 10 min, followed by 0.3 mcg/kg/h infusion for 55 min. No additional drug was injected into the subarachnoid space. During surgery, the patient did not complain of symptoms such as headache and nausea. As the anesthesia level decreased to about T12 without any symptoms in the recovery room, the patient was shifted to a private room. The patient was discharged without specific symptoms on the following day. After 4 d, the patient visited the emergency room with complaints of headache, nausea, and anorexia.

***History of past illness***

The patient had a history of hypertension and dyslipidemia, which were treated with candesartan cilexetil 8 mg and rosuvastatin 5 mg, respectively, PO once a day.

***Personal and family history***

The patient’s personal and family histories were unremarkable.

***Physical examination***

The patient was 154 cm, 59 kg, alert, and afebrile. Neurologic examination revealed no specific findings. No remarkable skin lesions were noted.

***Laboratory examinations***

Spinal tapping was performed to evaluate complications, such as bacterial meningitis. The results showed lymphocyte-dominant white blood cell (WBC) count, normal glucose levels, and slightly elevated protein and adenosine deaminase levels in the cerebrospinal fluid (CSF) (Table 1).

***Imaging examinations***

Computed tomography showed no specific findings such as cerebral hemorrhage.

***Initial diagnosis***

Considering the history of spinal anesthesia, PDPH was initially suspected. However, the headache was limited to the right side, and there was no relief of symptoms with change of posture and motion, such as upright/seated/supine posture, and the likelihood of PDPH was low. Based on the lymphocyte-dominant WBC count and elevated adenosine deaminase level, tuberculous meningitis was suspected[1].

***Initial treatment***

Anti-tuberculous agents (isoniazid 75 mg, ethambutol hydrochloride 0.275 g, pyrazinamide 0.4 g, and rifampicin 0.15 g) were administered PO once a day prophylactically.

***Clinical course***

After 2 d, PCR test result for varicella-zoster virus (VZV) was positive. Results of PCR tests for *S. pneumonia, H. influenza, N. meningitidis*, Group B *streptococcus*, and *L. monocytogenes* were negative, and other tests, including Gram staining for Gram positive/negative bacilli and cocci, fungal culture, and acid-fast bacilli stain test, were negative.

**FINAL DIAGNOSIS**

The patient was diagnosed with meningitis caused by VZV.

**TREATMENT**

The patient was treated with acyclovir 300 mg IV every 8 h for 5 d.

**OUTCOME AND FOLLOW-UP**

After 5 d, the patient’s headache improved, and she was discharged without any sequelae. There was no remarkable symptom or sequelae for 9 mo after meningitis.

**DISCUSSION**

The differential diagnosis of post spinal anesthesia headache includes PDPH, septic meningitis, and aseptic meningitis. Septic meningitis is caused by bacteria, whereas aseptic meningitis is caused by viruses, spirochetes, fungi, medications, or malignancy, is difficult to diagnose, and can be considered when all other causes are excluded[2].

Our patient had a history of spinal anesthesia and presented with headache without fever; therefore, we first suspected PDPH. Patients with PDPH present with headache in the fronto-occipital area that is aggravated in the sitting position and is relieved in the supine position. Headache can be accompanied by nausea, vomiting, neck stiffness, tinnitus, hearing loss, diplopia, or photophobia[3]. Puncture of the dura mater and leakage of CSF lowers the CSF pressure and leads to lowering of intracranial pressure. Therefore, the main characteristic of PDPH is that pain is aggravated in the sitting position and is relieved in the supine position. However, in this case, no change in pain according to posture and movement was reported. Therefore, although PDPH was suspected, it was less likely, and tests were conducted to identify other causes.

CSF examination findings can be used to differentiate between bacterial meningitis and aseptic meningitis (mainly viral). In viral meningitis, the CSF is clear in appearance and shows a lymphocyte-dominant WBC count, normal glucose level, and normal or elevated protein levels. Conversely, in bacterial meningitis, the CSF is turbid in appearance, shows a neutrophil-dominant WBC count, low glucose level, and significantly increased protein levels, and Gram staining is positive in ≥ 60% of cases[4].

In our patient, the CSF was clear in appearance, showed lymphocyte-dominance with 100 lymphocytes per 120 WBCs, the glucose level was normal, and the protein level was elevated. Therefore, we suspected aseptic meningitis more than bacterial meningitis even before the results of various culture and PCR tests for bacteria, viruses, and fungi were revealed. Varicella-zoster meningitis is caused by VZV, which is a human herpes virus, and it usually occurs in immunocompromised patients. The virus remains latent in the cranial nerves and dorsal root ganglia and can occasionally reactivate and lead to meningitis, neuralgia, or myelitis[5].

In patients with active herpes infection, meningitis can occur due to the introduction of the virus into the central nervous system during spinal/epidural anesthesia[6]. However, our patient had no skin lesions or neurologic symptoms and was not immunocompromised. Although aseptic meningitis is a rare cause of headache after regional anesthesia, viral meningitis due to virus reactivation may occur.

In this case, a decrease in immunity related to surgery or direct stimulation during spinal anesthesia may have caused reactivation of VZV that was latent in the dorsal root ganglion. However, the exact mechanism could not be identified. In a previously reported case of *Herpes simplex* meningitis after dural puncture, the mechanism of meningitis was unclear[7].

According to a previous report comparing groups with VZV meningitis, central nervous system involvement, and peripheral nervous involvement, the meningitis group had a better prognosis than the other two groups in terms of mortality, incomplete recovery, and shorter treatment period[8]. In our patient, symptoms were relieved after 5 d of acyclovir treatment, and the patient was discharged without sequelae. Although the prognosis of VZV meningitis is good, the duration of acyclovir administration and recovery period would have been shortened if the patient had been diagnosed earlier. Treatment for tuberculous meningitis was administered based on the results of CSF examination, and acyclovir treatment was started after the results of PCR were obtained. The usefulness of CSF lactate level and serum procalcitonin as a method for differentiating aseptic meningitis and septic meningitis has been consistently suggested, but we did not evaluate the CSF lactate level and serum procalcitonin[9,10].

For early diagnosis, CSF examination with PCR and culture should be performed if the pattern of headache after spinal anesthesia does not match the characteristics of PDPH and if no evidence of increased intracranial pressure or cerebral hemorrhage is revealed on brain computed tomography.

**CONCLUSION**

In conclusion, in patients with post spinal anesthesia headache, clinicians should consider multiple etiologies and perform PCR and culture test on CSF to diagnose or rule out meningitis. This way, the patient’s symptoms can be resolved through rapid diagnosis and treatment.

**REFERENCES**

1 **Raviraj**, Henry RA, Rao GG. Determination and Validation of a Lower Cut Off Value of Cerebrospinal Fluid Adenosine Deaminase (CSF-ADA) Activity in Diagnosis of Tuberculous Meningitis. *J Clin Diagn Res* 2017; **11**: OC22-OC24 [PMID: 28571185 DOI: 10.7860/JCDR/2017/25823.9625]

2 **Doghmi N**, Meskine A, Benakroute A, Bensghir M, Baite A, Haimeur C. Aseptic meningitis following a bupivacaine spinal anesthesia. *Pan Afr Med J* 2017; **27**: 192 [PMID: 28904717 DOI: 10.11604/pamj.2017.27.192.9327]

3 **Sachs A**, Smiley R. Post-dural puncture headache: the worst common complication in obstetric anesthesia. *Semin Perinatol* 2014; **38**: 386-394 [PMID: 25146108 DOI: 10.1053/j.semperi.2014.07.007]

4 **Kohil A**, Jemmieh S, Smatti MK, Yassine HM. Viral meningitis: an overview. *Arch Virol* 2021; **166**: 335-345 [PMID: 33392820 DOI: 10.1007/s00705-020-04891-1]

5 **Gilden DH**, Kleinschmidt-DeMasters BK, LaGuardia JJ, Mahalingam R, Cohrs RJ. Neurologic complications of the reactivation of varicella-zoster virus. *N Engl J Med* 2000; **342**: 635-645 [PMID: 10699164 DOI: 10.1056/NEJM200003023420906]

6 **Brown NW**, Parsons AP, Kam PC. Anaesthetic considerations in a parturient with varicella presenting for Caesarean section. *Anaesthesia* 2003; **58**: 1092-1095 [PMID: 14616595 DOI: 10.1046/j.1365-2044.2003.03442.x]

7 **Hoesni S**, Bhinder R, Tan T, Hughes N, Carey M. Herpes simplex meningitis after accidental dural puncture during epidural analgesia for labour. *Int J Obstet Anesth* 2010; **19**: 466-467 [PMID: 20833529 DOI: 10.1016/j.ijoa.2010.07.022]

8 **Lenfant T**, L'Honneur AS, Ranque B, Pilmis B, Charlier C, Zuber M, Pouchot J, Rozenberg F, Michon A. Neurological complications of varicella zoster virus reactivation: Prognosis, diagnosis, and treatment of 72 patients with positive PCR in the cerebrospinal fluid. *Brain Behav* 2022; **12**: e2455 [PMID: 35040287 DOI: 10.1002/brb3.2455]

9 **Sakushima K**, Hayashino Y, Kawaguchi T, Jackson JL, Fukuhara S. Diagnostic accuracy of cerebrospinal fluid lactate for differentiating bacterial meningitis from aseptic meningitis: a meta-analysis. *J Infect* 2011; **62**: 255-262 [PMID: 21382412 DOI: 10.1016/j.jinf.2011.02.010]

10 **Dubos F**, Moulin F, Gajdos V, De Suremain N, Biscardi S, Lebon P, Raymond J, Breart G, Gendrel D, Chalumeau M. Serum procalcitonin and other biologic markers to distinguish between bacterial and aseptic meningitis. *J Pediatr* 2006; **149**: 72-76 [PMID: 16860131 DOI: 10.1016/j.jpeds.2006.02.034]

**Footnotes**

**Informed consent statement:** Informedwritten consent was obtained prior to treatment and for the publication of this report.

**Conflict-of-interest statement:** All authors report no relevant conflict of interest for this article.

**CARE Checklist (2016) statement:** The authors have read the CARE Checklist (2016), and the manuscript was prepared and revised according to the CARE Checklist (2016).

**Open-Access:** This article is an open-access article that was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution NonCommercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: https://creativecommons.org/Licenses/by-nc/4.0/

**Provenance and peer review:** Unsolicited article; Externally peer reviewed.

**Peer-review model:** Single blind

**Peer-review started:** April 14, 2022

**First decision:** June 16, 2022

**Article in press:** July 22, 2022

**Specialty type:** Anesthesiology

**Country/Territory of origin:** South Korea

**Peer-review report’s scientific quality classification**

Grade A (Excellent): 0

Grade B (Very good): B

Grade C (Good): C, C

Grade D (Fair): 0

Grade E (Poor): 0

**P-Reviewer:** Fazilat-Panah D, Iran; Son TQ, Vietnam; Yin F, United States **S-Editor:** Wu YXJ **L-Editor:** Filipodia **P-Editor:** Wu YXJ

**Figure Legends**

**Table 1 Results of spinal tapping**

|  |  |
| --- | --- |
| **Variable** | **Value** |
| Appearance | Clear |
| Cell count (cells/μL) |  |
| RBC | 5 |
| WBC | 120 |
| Polycyte | 0 |
| Lymphocyte | 100 |
| Glucose (mg/dL) | 46.2 |
| Protein (mg/dL) | 210.9 |
| ADA (IU/L) | 14.7 |

ADA: Adenosine deaminase; RBC: Red blood cell; WBC: White blood cell.



Published by **Baishideng Publishing Group Inc**

7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA

**Telephone:** +1-925-3991568

**E-mail:** bpgoffice@wjgnet.com

**Help Desk:** https://www.f6publishing.com/helpdesk

https://www.wjgnet.com



**© 2022 Baishideng Publishing Group Inc. All rights reserved.**