

# A Case of Aseptic Meningitis with an Isolated Positive Ocular Globe Compression Sign Diagnosed by Repeat Lumbar Puncture.

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## Abstract

This report describes a case of aseptic meningitis suspected of having positive ocular globe compression sign in a 33-year-old man who was diagnosed only after repeated lumbar puncture. We highlight the importance of repeat lumbar puncture and the clinical value of ocular globe compression sign in suspecting aseptic meningitis.

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None.

## CONFLICT OF INTEREST

The authors declare that there are no competing interests.

## DATA AVAILABILITY STATEMENT

All data related to this case report are available from the corresponding author upon request.

## CONSENT

Patient consent has been obtained for the publication of this report.

## ABSTRACT

This report describes a case of aseptic meningitis suspected of having positive ocular globe compression sign in a 33-year-old man who was diagnosed only after repeated lumbar puncture. We highlight the importance of repeat lumbar puncture and the clinical value of ocular globe compression sign in suspecting aseptic meningitis.

### Clinical key message

A normal first lumbar puncture result does not rule out a diagnosis of meningitis. Performing repeat lumbar punctures and meningeal sign tests, including the ocular globe compression sign test, aid in the diagnosis of aseptic meningitis.

## INTRODUCTION

Aseptic meningitis is diagnosed using clinical and laboratory findings of meningeal inflammation in the absence of bacteria on the cerebrospinal fluid (CSF) smear and culture. It is commonly caused by a viral infection, and in most cases improves without specific treatment. Diagnostic clues for aseptic meningitis include positive meningeal sign tests, such as nuchal rigidity, jolt accentuation test, Kernig and Brudzinski sign, and specific CSF findings (such as elevated cell count and protein level, mildly decreased glucose level). In this case report, we present a case of aseptic meningitis in a 33-year-old Japanese man suspected of having the positive sign of ocular globe compression that was diagnosed only after repeated lumbar puncture.

## CASE PRESENTATION

A previously healthy 33-year-old Japanese man presented to the emergency room with worsening headache, fever, and chills. CSF and blood samples were collected for culture due to suspected meningitis and bacteremia. The CSF was within normal limits, and the blood culture was negative. The patient's symptoms were treated with oral acetaminophen (3000 mg/day), and he was kept under observation in the outpatient clinic. He was hospitalized 3 days later for a worsening headache and fever. On admission, he had a Glasgow Coma Scale of E4V5M6. His vital signs included body temperature, 38.4°C; pulse rate, 99 beats/min; blood pressure, 122/72 mmHg; and respiratory rate, 20 breaths/min. Physical examination revealed patchy lymph follicles on the posterior pharyngeal wall and a positive ocular globe compression sign, which was absent at the initial visit. All other meningeal signs, such as nuchal rigidity, jolt accentuation, and Kernig and Brudzinski signs, were negative. Blood tests revealed mild leukocytosis (11,200 cells/ $\mu$ L, normal range: 3,900–9,700 cells/ $\mu$ L) with an elevated neutrophil count (79%) and C-reactive protein level (0.37 mg/dL; normal range [?]0.3 mg/dL). CSF, obtained by repeat lumbar puncture (LP), was clear, with an elevated initial pressure (300 mm H<sub>2</sub>O), cell count (22 cells/hpf, monocytes: 18/22, 82%), and protein level (50 mg/dL). The CSF smear, Indian ink test, antimicrobial culture, and polymerase chain reaction (PCR) tests for varicella-zoster virus and herpes simplex virus were negative. The patient's 4-year-old daughter was reported to have gastroenteritis. The patient was diagnosed with aseptic meningitis (probably caused by an enterovirus), based on family history and his physical and CSF findings. He was treated with intravenous acetaminophen. The intensity of the pain caused by the compression of the ocular globe decreased on day 10, his fever improved on day 15, and he was discharged on day 19. His symptoms did not recur after discharge.

## DISCUSSION

In this case, we suspected meningitis based on a positive ocular globe compression sign, and made a diagnosis of aseptic meningitis by repeat LP. A longer clinical course (7–18 days) characterizes enteroviral meningitis in comparison to other types of viral meningitis,<sup>1</sup> which was consistent with this case. A previous study

reported the sensitivity and specificity (respectively) of meningeal tests as follows: nuchal rigidity (46.1%, 71.3%), jolt accentuation test (52.4%, 71.1%), Kernig's sign (22.9%, 91.2%), and Brudzinski's sign (27.5%, 88.8%).<sup>2</sup> The ocular globe compression sign (applying digital pressure to both eyeballs and observing the presence and degree of pain reaction to the stimulus) was proposed in 2002,<sup>3</sup> and has a sensitivity and specificity of 34.5% and 78.6%, respectively.<sup>4</sup> In our patient, all the meningeal signs, except for the ocular globe compression sign, were negative. Moreover, the return to negativity of the ocular globe compression sign coincided with an improvement in his symptoms. Further studies are needed to clarify the clinical significance of the ocular globe compression sign in the diagnosis of aseptic meningitis and its relationship with the clinical course. In a previous study of patients with suspected meningitis and initial negative CSF findings, 88% had an elevated CSF cell count on repeat LP.<sup>5</sup> However, the sensitivity and specificity of repeat CSF tests in viral meningitis are unknown. PCR testing for viruses is not routinely available; therefore, clinical signs are useful in the diagnosis of aseptic meningitis. A diagnosis of meningitis should not be excluded if the first LP is normal. It is important to perform repeated CSF and meningeal sign tests to reduce the risk of missing the diagnosis.

## CONCLUSION

Aseptic meningitis is diagnosed using the clinical and cerebrospinal fluid findings of meningeal inflammation. Meningitis should not be excluded, even if the first lumbar puncture is normal.

To reduce the risk of misdiagnosis, repeated lumbar punctures and all meningeal signs, including the ocular globe compression sign, are useful.

## AUTHOR CONTRIBUTIONS

All authors participated in the diagnosis and treatment of the patient. YM wrote the initial draft of the manuscript. TM and TN were involved in the supervision and revision of the manuscript. All authors have read and approved the final manuscript before submission.

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