Post-infectious Opsoclonus and Reversible Magnetic Resonance Imaging Changes: A Case Report and Review of the Literatures

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Abstract-

Purpose: Opsoclonus is a rare neurological disorder in adult. The etiology of opsoclonus includes parainfectious, paraneoplastic, toxic, and metabolic disorders. We reported an old female with post-infectious opsoclonus who had a benign clinical course and reversible brain MRI lesions, and its review of the literature.

Case Report: A 67-year-old woman presented with opsoclonus and truncal ataxia for two weeks. The magnetic resonance imaging (MRI) showed the hyperintensity lesions in bilateral medial thalamus, hypothalamus, and tegmentum of pons on Fluid-attenuated inversion recovery (FLAIR) imaging. Investigations of neoplasm and autoimmune disorders showed negative findings. Clinical symptoms subsided in two-week duration and MRI abnormalities also disappeared one month later.

Conclusion: A benign clinical course and reversible MRI lesions could be found in the patients with post-infectious opsoclonus such as our case. However, detailed investigations and long-term follow-up are needed to exclude paraneoplastic or other systemic and immunological disorders.

Key words: opsoclonus, postinfectious opsoclonus

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INTRODUCTION

Opsoclonus is a rare neurological manifestation in adult, which is characterized by spontaneous, arrhythmic, conjugate saccades occurring in all directions of gaze. Opsoclonus associated with post-infectious autoimmune process have been reported. To our knowledge, few authors reported abnormal brain image. We reported a 67-year-old female with suspicious post-infectious opsoclonus whose initial MRI showed lesions over bilateral thalamus, midbrain, and pons. Both opsoclonus and MRI abnormalities subsided within one month.

CASE REPORT

A 67-year-old woman complaining of dizziness, nausea, oscillation of her vision, and gait instability for two weeks was admitted to our hospital. Three weeks prior to admission, the patient had sore throat, nasal

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obstruction, and nonproductive cough. She thought the symptoms as “common cold”, therefore she did not seek medical attention. However, during the subsequent weeks her visual disturbance and unsteadiness gradually worsened. She was afraid of opening eyes because of jiggling image and it was impossible for her to walk unaided. On admission, the patient was alert, with normal body temperature and blood pressure. She had rapid irregular chaotic movement of the eyes in the horizontal, vertical, and rotatory planes interpreted as opsoclonus. She had wide-based, unsteady gait and there was swaying and staggering when seated unassisted because of truncal ataxia. No myoclonic jerk of the face, body or limbs was observed .The remainders of the physical and neurological examinations were normal.

The result of complete blood cell counts and serum chemistry were normal. Chest roentgenogram and chest computed tomography (CT) revealed neither parenchymal mass, consolidation, nor bilateral hilar lymphadenopathy. The brain MRI showed high-intensity lesions in bilateral medial thalamus and mesencephalon region on FLAIR imaging (Fig 1A-D). Post-contrast T1 weighted brain MRI revealed contrast enhancing of infundibulum, hypothalamus and pontine tegmentum (Fig 1E).

Cerebrospinal fluid (CSF) formula showed clear CSF and normal pressure. There was elevated protein of 144 mg/dL, glucose of 50 mg/dL, and 30 white cells/mm3, (lymphocytes 88%, monocytes 12%). Culture of the CSF was negative for microorganism. Virus culture and HSV IgG/IgM antibody in CSF were unrevealing. The cytology of CSF was unremarkable. Results of the serum tumor markers including AFP, CEA, Ca-125, CA-153, CA19-9, and SCC were negative. Serum angiotensin converting enzyme (ACE) was within normal limit.

F-fluorodeoxy glucose Positron emission tomography (FDG- PET) showed asymmetrical mild abnormal

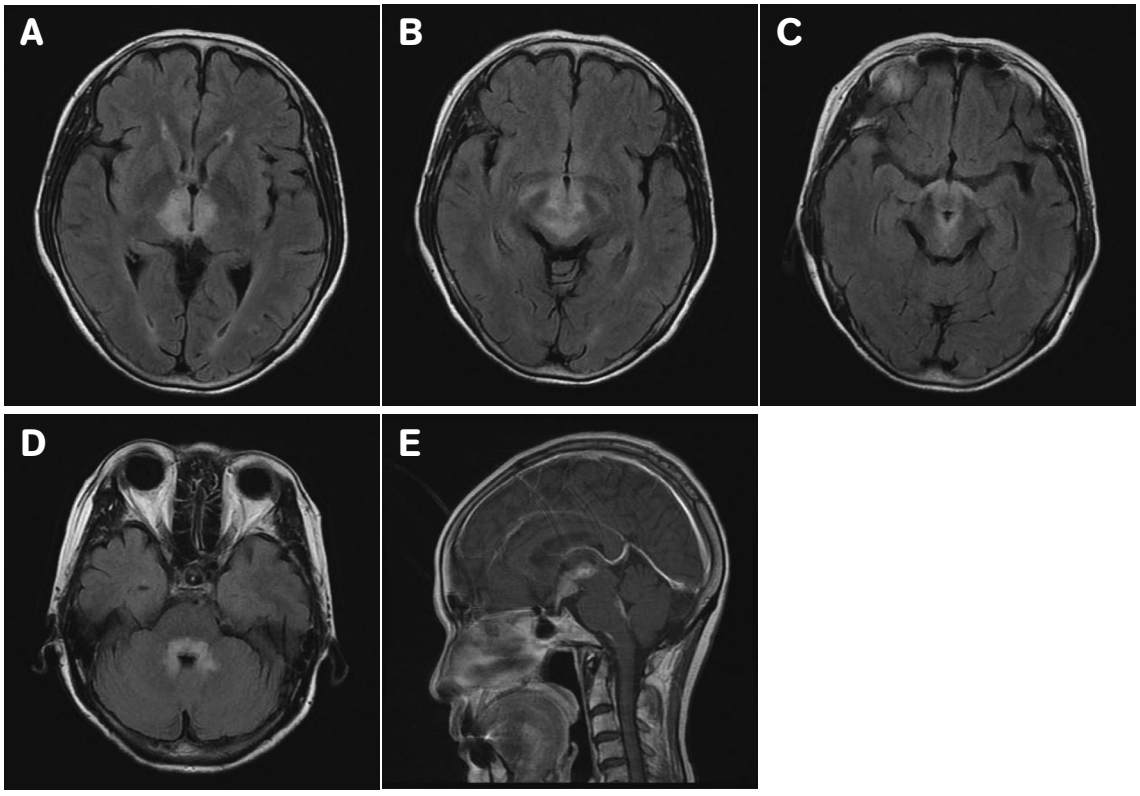

Figure 1. Brain MRI on admission. Axial FLAIR imaging revealed high-intensity lesions over (A) bilateral medial thalamus (B) bilateral midbrain (C) medial cerebral peduncle (D) Pontine tegmentum, (E) Saggital post-contrast T1 weighted imaging showed contrast enhancing of infundibulum, hypothalamus and pontine tegmentum

hypermetabolic uptake in infundibular and thalamus region. Brainstem auditory evoked potential (BAEP), visual evoked potential (VEP) and somatosensory evoked potential (SEP) yield no abnormal results.

Because that viral menigoencephalitis could not be excluded at that time, the infectious disease specialist suggested a treatment with Acyclovir 500mg every 8 hours for 10 days. One week after treatment with Acyclovir, she had fully recovered. Follow-up MRI performed one month after onset showed resolution of previous signal abnormalites (Fig. 2A-E). The patient has been doing well on one-year follow-up and no relapses or new symptoms have appeared.

DISCUSSION

Opsoclonus, a rare visual disorder in adult, has been associated with various medical conditions, including structural brain lesion (such as metastasis, vascular events, demyelinating disease, sarcoidosis), post-infectious encephalitis, paraneoplastic syndromes, toxin, and systemic infection[1].

Concerning the investigation of opsoclonus in adult , brain MRI with contrast enhancement was recommended to exclude structural lesion, although in most idiopathic cases, brain MRI is normal[2]. CSF analysis should be considered if there is concern for central nervous system infection or post infectious encephalitis.

In our case, brain metastasis or paraneoplastic syndrome was less likely because of negative findings of FDG-PET, serum tumor markers, and CSF cytology. Demyelinating disease such as multiple sclerosis can present spontaneous remission in nature. However, no relapsing and remitting history, negative findings of EP studies, and old age of onset made this diagnosis less likely. Neuromyelitis optica was another consideration because of the periventricular enhancing lesion on brain MRI. Nevertheless, absence of clinical evidence of optic

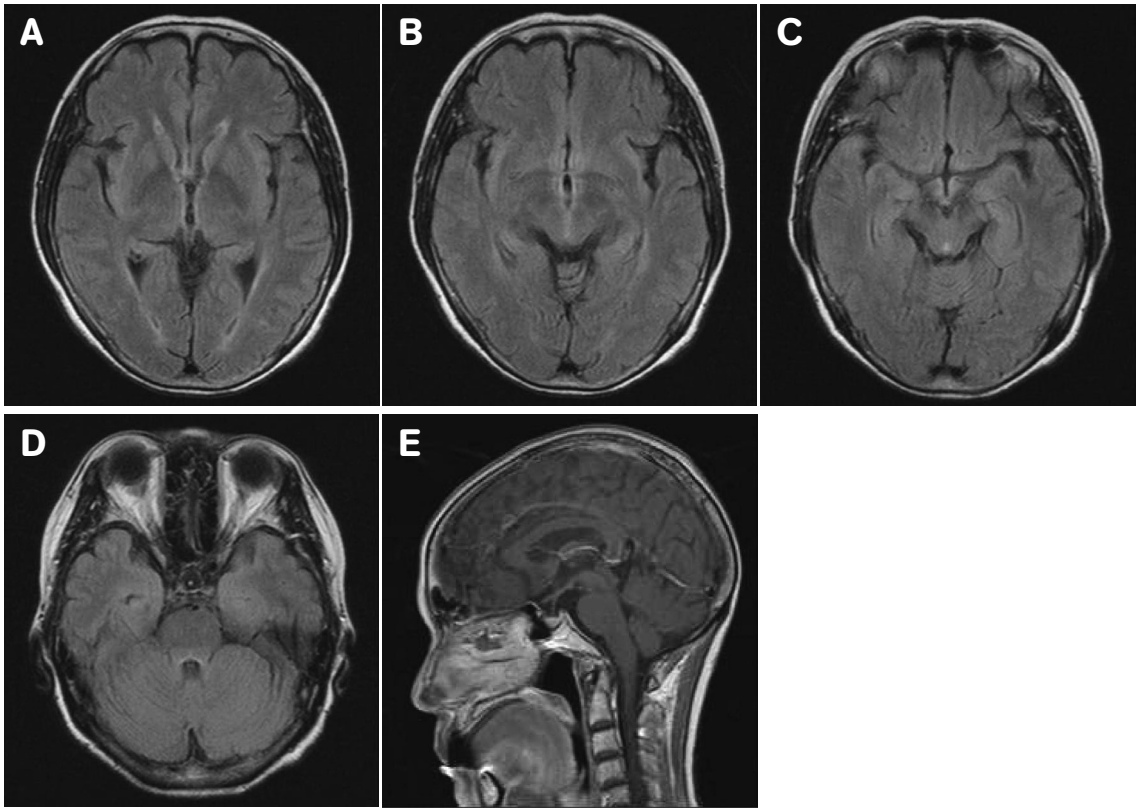

Figure 2. Brain MRI at one month after admission. (A)-(D) Axial FLAIR imaging and (E) Saggital post-contrast T1 weighted imaging showed that previous high-intensity and contrast enhancing lesions subsided.

neuritis and myelitis did not support this diagnosis. The possibility of neurosarcoidosis could not be completely ruled out. The natural course of neurosarcoidosis was variable[3]. However, in neurosarcoidosis, the spontaneous remission was rare and central nervous system involvement had worse prognosis[4]. Normal serum ACE level also against this diagnosis.

In adults, nearly 60% of opsoclonus patients may have a paraneoplastic etiology, especially the small cell carcinoma of the lung and breast carcinoma[5]. Beside the brain imaging, the contrast enhanced CT scan of the chest and abdomen, and breast examination with mammography for female are recommended[2]. Additionally, some characterized paraneoplastic antibodies such as anti-Hu, anti-Ri, anti-Yo, anti-Ma1, anti-Ta, anti-CRMP-5 and antineurolikin, are helpful to survey the occult neoplasm[6-10]. We did not perform above-mentioned autoantibodies since these tests were not commercially available in our hospital. However, long term follow-up for investigation of occult neoplasm in our patient is still needed.

Although Acyclovir was prescribed to our case, negative finding of virus culture and negative HSV IgG/IgM antibody in CSF did not support the diagnosis of herpes meningoencephalitis. According to the prodromal symptoms of upper respiratory tract infection, subsequent clinical course and exclusion of neoplastic and autoimmune disorders, post-infectious opsoclonus was favored. Although the elicited infectious organism was unable to identify in our case, several viruses including enterovirus [11], West Nile virus [12], Epstein Barr virus[13], Human immunodeficiency virus [14], cytomegalovirus [15], and hepatitis virus C [16] had been reported to be associated with post-infectious opsoclonus.

Up to the present, a few articles reported abnormal brain MRI finding associated with post-infectious opsoclonus. Araki K, et al and Hattori T, et al reported four patients with opsoclonus followed by flu-like illness [17,18]. The brain MRI of their patients demonstrated focal lesion in tegmentum at the level of pons, which was similar to our cases. However, there was no follow-up brain MRI in their reports. Tsutada T, et al also described a patient with post-infectious opsoclonus whose brain MRI revealed pontine tegmentum lesion[19]. Follow-up brain MRI disclosed shrinkage of the lesions which was correlated with the patient's clinical state. To our knowledge, our case is the first report concerning post-infectious opsoclonus with complete resolution of focal lesion on brain MRI.

The exact anatomical localization and pathogenesis for opsoclonus are uncertain. Two hypotheses had been proposed [1,2]. One hypothesis suggests that opsoclonus is due to damage of the omnipause cells in the nucleus raphe of the pons[20]. David GC had reported autopsy findings in a patient with opsoclonus which showed lymphocytic infiltration in the hypothalamus, midbrain and pons [21]. MRI findings of our case and previous reports which revealed lesion at the pontine tegmentum may support this hypothesis. Another hypothesis is that opsoclonus is caused by disinhibition of the fastigial nucleus in the cerebellum[22]. This hypothesis was supported by histopathological examination and a functional MRI study[23]. In addition, bilateral medial temporal lobe lesion was speculated in one case report[24].

Treatment of underlying cause such as tumor or encephalitis is the choice of management for opsoclonus. In some cases of adult-onset idiopathic opsoclonus, corticosteroids or intravenous immunoglobulin (IVIG) had been reported to speed up improvement[5]. Plasma exchange (PE) and plasma filtration also have been tried in adult onset immune-mediated or idiopathic opsoclonus [25]. Nevertheless, our case showed a relatively "benign" course without the necessity of those intensive managements. The clinical course of idiopathic opsoclonus in adult is monophasic with good prognosis in most of patients[1]. However, reviewing the literature, there was no report concerning the incidence and predictors for the clinically "benign" opsoclonus. Further large-scale studies are required to identify the "benign" patient for conservative treatment.

In conclusion, a benign clinical course and reversible MRI lesions could be found in the patients with post-infectious opsoclonus such as our case. However, detailed investigations for structural brain lesion or underlying neoplasm are necessary in old patients with presumed post-infectious opsoclonus. Despite many

patients with post-infectious opsoclonus had good prognosis, further studies for identifying the indicators of "benign" clinical course is needed.

REFERENCES

1. Wong A. An update on opsoclonus. Curr Opin Neurol 2007;20:25-31.
2. Sahu1 JK, Prasad K. The opsoclonus-myoclonus syndrome. Pract Neurol 2011;11:160-166.
3. Marangoni S, Argentiero V, Tavolato B. Neurosarcoidosis Clinical description of 7 cases with a proposal for a new diagnostic strategy. J Neurol 2006;253:488-495.
4. Gascón-Bayarri J, Mañá J, Martínez-Yélamos S, Murillo O, Reñé R, Rubio F. Neurosarcoidosis Report of 30 cases and a literature survey. Eur J Intern Med 2011;22:e125-e132.
5. Bataller L, Graus F, Saiz A, Vilchez JJ. Clinical outcome in adult onset idiopathic or paraneoplastic opsoclonus-myoclonus. Brain 2001;124: 437-443.
6. Fisher PG, Wechsler DS, Singer HS. Anti-Hu antibody in neuroblastoma-associated paraneoplastic syndrome. Pediatr Neurol 1994;10:309-312.
7. Peterson K, Rosenblum MK, Kotanides H, Posner JB. Paraneoplastic cerebellar degeneration. A clinical analysis of 55 anti-Yo antibody-positive patients. Neurology 1992; 42:1931-1937.
8. Rosenfeld MR, Eichen JG, Wade DF, Posner JB, Dalmau J. Molecular and clinical diversity in paraneoplastic immunity to Ma proteins. Ann Neurol 2001;50:339-348.
9. Yu Z, Kryzer TJ, Griesmann GE, Kim K, Benarroch EE, Lennon VA. CRMP-5 neuronal autoantibody: marker of lung cancer and thymoma-related autoimmunity. Ann Neurol 2001;49:146-154.
10. Candler PM, Dale RC, Griffin S, Church AJ, Wait R, Chapman MD, Keir G, Giovannoni G, Rees JH. Post-streptococcal opsoclonus-myoclonus syndrome associated with anti-neuroleukin antibodies. J Neurol Neurosurg Psychiatry 2006;77:507-512.
11. Wiest G, Safoschnik G, Schnaberth G, Mueller C. Ocular flutter and truncal ataxia may be associated with enterovirus infection. J Neurol 1997;244:288-292.
12. Alshekhlee A, Sultan B, Chandar K. Opsoclonus persisting during sleep in West Nile encephalitis. Arch Neurol 2006;63:1324-1326.
13. Verma A, Brozman B. Opsoclonus-myoclonus syndrome following Epstein-Barr virus infection. Neurology 2002;58: 1131-1132.
14. Kanjanasut N, Phanthumchinda K, Bhidayasiri R. HIV-related opsoclonus-myoclonus-ataxia syndrome: report on two cases. Clin Neurol Neurosurg 2010;112:572-574.
15. Zaganas I, Prinianakis G, Xirouchaki N, Mavridis M. Opsoclonus-myoclonus syndrome associated with cytomegalovirus encephalitis. Neurology 2007;68:1636.
16. Ertekin V, Tan H. Opsoclonus-myoclonus syndrome attributable to hepatitis C Infection. Pediatr Neurol 2010;42:441-442.
17. Araki K, Ueda Y, Hayafuji M, Takino T. Opsoclonus-myoclonus syndrome with abnormal magnetic resonance imaging and brainstem auditory evoked potentials. Jpn J Med 1989;28:753-756.
18. Hattori T, Hirayama K, Imai T, Yamada T, Kojima S. Pontine lesion in opsoclonus-myoclonus syndrome shown by MRI. J Neurol Neurosurg Psychiatry 1988;51:1572-1575.
19. Tsutada T, Izumi T, Murakami T.Correlation of clinical improvement with pontine lesions in opsoclonus-myoclonus syndrome. Osaka City Med J 1996;42:53-60.
20. Zee DS, Robinson DA. A hypothetical explanation of saccadic oscillations. Ann Neurol 1979;5:405-414.
21. COGAN DG. Ocular dysmetria; flutterlike oscillation of the eyes, and opsoclonus. AMA Arch Ophthalmol. 1954; 51:318-335.
22. Wong AM, Musallam S, Tomlinson RD, Shannon P, Sharpe JA.Opsoclonus in three dimensions: oculographic, neuropathologic and modelling correlates. J Neurol Sci 2001; 189:71-81.
23. Helmchen C, Rambold H, Sprenger A, Erdmann C, Binkofski.Cerebellar activation in opsoclonus: An fMRI study. Neurology 2003;61:412-415.
24. Nunes JC, Bruscato AM, Walz R, Lin K. Opsoclonus-myoclonus syndrome associated with Mycoplasma pneumoniae infection in an elderly patient. J Neurol Sci 2011; 305:147-148.
25. Nitschke M, Hochberg F, Dropcho E. Improvement of paraneoplastic opsoclonus-myoclonus after protein A column therapy. N Engl J Med 1995; 332:192.