Internal Carotid-Posterior Communicating Artery Aneurysm Manifesting as an Unusual Ocular Motor Paresis after Minor Head Trauma
—Case Report—

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Abstract

A 75-year-old female fell down in the road and hit her head. Two days later her right eye abduction was slightly limited on right lateral gaze. Cerebral angiography revealed an ipsilateral internal carotid-posterior communicating artery aneurysm. Craniotomy found the aneurysm had compressed the oculo-motor nerve and was successfully clipped. The ocular motor paresis completely resolved after the operation. Therefore, the ocular motor paresis was possibly due to the aneurysmal compression to the oculo-motor nerve. The oculomotor nerve stretched over the aneurysm was probably vulnerable to sudden mechanical stress, and aberrant innervation of the oculomotor nerve might be responsible for this unusual ocular motor paresis. Minor head trauma might precipitate ocular motor paresis in patients harboring an otherwise occult mass lesion at the skull base.

Key words: posterior communicating artery aneurysm, oculomotor nerve paralysis, abducens nerve paralysis, minor head trauma

Introduction

Ocular motor paresis or paralysis due to closed head trauma is usually associated with skull fracture or cerebral contusion. Ocular motor paresis or paralysis due to minor head trauma resulting in neither fracture nor loss of consciousness is very rare.3) Minor head trauma may uncover the presence of underlying mass lesions at the skull base.2,6,13)

We report a patient who developed ocular motor paresis simulating abducens nerve paresis after minor head trauma, which revealed internal carotid-posterior communicating artery (IC-PC) aneurysms.

Case Report

A 75-year-old female fell down in the road and hit her head. She did not lose consciousness. Two days later she noticed horizontal diplopia on right lateral gaze. The symptom persisted for 2 weeks. She was admitted to our hospital. She had a history of cerebral infarction, diabetes mellitus, hypertension, and cataracta.

Neurological examination showed left hemiparesis resulting from a previous stroke. Right eye abduction was slightly limited on right lateral gaze, and there was horizontal diplopia on right lateral gaze. Other neurological findings were normal. Brain magnetic resonance (MR) imaging showed cerebral infarction in the right pontine basis. MR angiography showed a right IC-PC aneurysm. Cerebral angiography revealed the right IC-PC aneurysm and a left true posterior communicating artery aneurysm (Fig. 1).

Craniotomy demonstrated no evidence of subarachnoid hemorrhage, and the right IC-PC aneurysm compressed against the right oculomotor nerve. The aneurysm was successfully clipped. Her diplopia completely resolved after the operation.

Discussion

The findings and outcome in our patient suggest that the ocular motor paresis was due to the compression of right oculomotor nerve caused by the right IC-PC aneurysm, which became manifest due to minor head trauma.
Minor head trauma precipitated oculomotor nerve paresis or paralysis due to brain tumors of skull base in two patients with clivus chordomas and one patient with a middle fossa meningioma.\textsuperscript{2) The oculomotor nerves were probably already stretched over the mass. Similar findings occurred in patients in whom the predisposing lesions were IC-PC aneurysms.\textsuperscript{1) The oculomotor nerves were likely to be already stretched or compressed by the adjacent aneurysm and therefore were vulnerable to mechanical stress. Our case is similar except that the presenting symptom was lateral gaze paresis of right eye. The ocular motor paresis in our case was considered to be incomplete right abducens nerve paresis. However, at surgery the abducens nerve was located far inferior to the right IC-PC aneurysm and was not likely to be affected. The oculomotor nerve was found to be compressed by the aneurysm at surgery, so the ocular motor paresis is considered to be due to the partial compression of oculomotor nerve.

Isolated abducens nerve paresis or paralysis due to intracranial aneurysms is very rare. Internal carotid artery aneurysms of the intracavernous portion, vertebrobasilar artery aneurysms, and persistent trigeminal artery aneurysms have caused isolated abducens nerve paresis or paralysis.\textsuperscript{11,12) IC-PC aneurysms usually cause oculomotor nerve paresis or paralysis. Giant aneurysms of this portion can cause both oculomotor nerve and abducens nerve pareses or paralyses. However, only one case of isolated abducens nerve paralysis has been caused by IC-PC aneurysm.\textsuperscript{9) In that case, the aneurysmal dome contacted directly with the abducens nerve. The ocular motor paresis may be due to pontine infarction or diabetic mononeuropathy, irrespectively of the head injury. We think these two explanations are less likely because the paresis developed after the injury and recovered after the oculomotor nerve became free of the compression. Therefore, the most probable explanation is that an extrabranch of the oculomotor nerve might innervate the lateral rectus muscle.\textsuperscript{9) Three anatomical studies have shown that an extrabranch of the oculomotor nerve innervated the lateral rectus muscle with absence of the unilateral abducens nerve.\textsuperscript{14,15,16) An extrabranch of the oculomotor nerve has also been found in the presence of a normal abducens nerve, thus providing the lateral rectus muscle with a dual nerve supply.\textsuperscript{3,15} This extrabranch may derive from the superior\textsuperscript{3) or inferior\textsuperscript{5) division of the oculomotor nerve. Such abnormal innervation occurs, but an accurate incidence is unknown. A great number of detailed dissection studies of the orbit would be required to clarify the frequency of this anomaly. We think that this aberrant innervation is the most likely mechanism in our case. Increased awareness and reporting of future similar cases will help clarify the issue.

The possibility of underlying mass lesions, especially intracranial aneurysms, should be considered in cases of isolated oculomotor nerve paresis or abducens nerve paresis after minor head trauma. Oculomotor nerve paresis may cause lateral rectus muscle weakness if abnormal innervation of the lateral rectus muscle by the oculomotor nerve is present.

\textbf{References}

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