

Oculomotor palsy treated by microvascular decompression

Kensuke Suzuki, M.D., Ph.D.<sup>1</sup>, Ai Muroi, M.D.<sup>1</sup>, Yuji Kujiraoka, M.D.<sup>2</sup>,

Shingo Takano, M.D., Ph.D.<sup>1</sup>, and Akira Matsumura, M.D., Ph.D.<sup>1</sup>.

Department of Neurosurgery, University of Tsukuba<sup>1</sup>

Department of Neurosurgery, Ibaraki prefectural Chuo Hospital<sup>2</sup>, Ibaraki, Japan

Corresponding address: Kensuke Suzuki, M.D., Ph.D.

Department of Neurosurgery, University of Tsukuba, Ibaraki, Japan

Zip code: 305-8575

Tel: +81-29-853-3220

Fax: +81-29-853-3214

E-mail: [kensukes@md.tsukuba.ac.jp](mailto:kensukes@md.tsukuba.ac.jp)

**Abstract**

**Background:** Oculomotor palsy is well known due to diabetes mellitus or aneurysmal compression or cavernous sinus lesion. Only few reports presented that arterial compression was the reason for oculomotor palsy.

**Case Description:** We performed a surgical treatment for a 76-year-old man with left oculomotor palsy. In surgical clipping of left internal carotid artery-posterior communicating artery (IC-PC) aneurysm, it became clear that the left IC-PC aneurysm had not been compressing the third cranial nerve. The Left oculomotor nerve was being pinched between the arteriosclerotic posterior cerebral artery (PCA) and the superior cerebellar artery(SCA). Microvascular decompression was carried out and the oculomotor nerve palsy improved.

**Conclusion:** Arteriosclerotic PCA and SCA may compress oculomotor nerve. And microvascular decompression is effective in this type of oculomotor palsy.

**Key words:** oculomotor palsy, posterior cerebral artery, superior cerebellar artery, microvascular decompression

## **Introduction**

The causes of oculomotor nerve palsy are various. Especially, the compression of the third cranial nerve by cerebral aneurysm is well-known. It has recently become quite easy to diagnose cerebral aneurysms with the help of MRA. On the other hand, some oculomotor palsies brought on by the compression of blood vessels other than cerebral aneurysms have been reported (1,4,7). We experienced a case in which the oculomotor palsy was caused by pinching between the posterior cerebral artery(PCA) and the superior cerebellar artery(SCA). We hereby report this case.

## **Case report**

A 78-year-old man presented left ptosis, and disturbance of eye movement with papillary dilatation (Fig.1). His blood sugar was 126 mg/dl. An ophthalmologist suggested an intracranial lesion causing oculomotor palsy. MRI was performed, and revealed an aneurysm of the left internal carotid artery-posterior communicating artery(IC-PC). Cerebral angiography showed an aneurysm, 4mm in diameter. We diagnosed left oculomotor nerve palsy caused by an IC-PC aneurysm, although it was small in size. The patient wanted to be treated for the third cranial nerve palsy and we decided on a surgical clipping of the aneurysm.

Via a left pterional approach, clipping of the aneurysmal neck was performed. However, the left IC-PC aneurysm was found to be to the left of the third cranial nerve. After aneurysmal neck clipping, we explored along the oculomotor nerve in the subarachnoid space. Peeling the tough arachnoid membrane, arteriosclerotic PCA was exposed. After the arachnoid membrane around the third cranial nerve was cut, the patients oculomotor nerve, being compressed by PCA and SCA, was

visualized (Fig. 2). We mobilized the PCA and the SCA to decompress the third cranial nerve. One month after operation, the left oculomotor nerve palsy had improved (Fig. 3) and he was back playing golf again.

Pre-operative angiography showed that left PCA and SCA run very closely together in subarachnoidal space, retrospectively (Fig. 4).

## **Discussion**

Oculomotor palsy can be brought on by various diseases. Diabetes mellitus and cerebral aneurysms are major causes of it (3,6). Oculomotor palsy due to diabetes mellitus is characterized as pupil sparing. The present reported case was suggested to involve an intracranial organic lesion because it was non-pupil sparing. Brain tumors, brainstem infarction, trauma, and cavernous sinus lesions are known as organic diseases which cause third cranial palsy without pupil sparing (2). Some reports have shown oculomotor nerve dysfunction due to arterial compression without aneurysms (1,4,7). Hashimoto et.al. reported the case of a 74-year-old woman whose oculomotor nerve was compressed by a tortuous basilar artery detected with MRI (4). Albaham et.al. reported the case of a 24-year-old woman with mydria only, whose oculomotor nerve was found to be compressed by PCA and SCA with MRI (1).

In the present case, MRI could not detect the compression by PCA and SCA, but only an IC-PC aneurysm. However, PCA and SCA run closely together in subarachnoid space in cerebral angiography and we confirmed the compression to the oculomotor nerve during surgery. In addition, microvascular decompression for the third cranial nerve led to improvement of the patients symptoms. Nakagawa et.al. reported the case of a 59-year-old man, which was almost the

same as ours (7). In both cases, oculomotor palsy was found to have been caused by arterial compression based on the operative findings, and it had been difficult to make a preoperative diagnosis.

. Jacobson et.al. have reported that MRI could also confirm vascular compression to the optic nerve (5). High quality MRI can detect the microanatomical relationship between arteries and cranial nerves. They concluded that careful examination with MRI was especially needed in oculomotor palsy patients. If compression to the oculomotor nerve is revealed in MRI, microvascular decompression may be indicated.

## References

1. Albayram S, Ozer H, Sarici A, Murphy K, Miller N: Unilateral mydriasis without ophthalmoplegia--a sign of neurovascular compression? Case report. **Neurosurgery** 58:582-3, 2006
2. Blake PY, Mark AS, Kattah J, Kolsky M: MR of oculomotor nerve palsy. **AJNR Am J Neuroradiol** 16:1665-72, 1995
3. Good EF: Ptosis as the sole manifestation of compression of the oculomotor nerve by an aneurysm of the posterior communicating artery. **J Clin Neuroophthalmol** 10:59-61, 1990.
4. Hashimoto M, Ohtsuka K, Akiba H, Harada K: Vascular compression of the

- oculomotor nerve disclosed by thin-slice magnetic resonance imaging. **Am J Ophthalmol** 125:881–882, 1998.
5. Jacobson DM: Symptomatic compression of the optic nerve by the carotid artery: clinical profile of 18 patients with 24 affected eyes identified by magnetic resonance imaging. **Ophthalmology** 106:1994-2004, 1999
6. Kasner SE, Liu GT, Galetta SL: Neuro-ophthalmologic aspects of aneurysms. **Neuroimaging Clin N Am** 7:679–692, 1997.
7. Nakagawa H, Nakajima S, Nakajima Y, Furuta Y, Nishi O, Nishi K: Bilateral oculomotor nerve palsies due to posterior cerebral arterial compression relieved by microvascular decompression: Case report. **Neurol Med Chir (Tokyo)** 31:45–48, 1991.

## Figure legends

Fig 1:

A: Preoperative finding of left oculomotor palsy was complete with ptosis.

B: Oculomotor palsy was recovered incompletely after microvascular decompression.

Fig.2: Operative view after dissection of tight arachnoid adhesion: The third cranial nerve(※) was compressed between arteriosclerotic posterior cerebral artery (☆) and superior cerebellar artery (\*).

Fig. 3: Preoperative cerebral angiography demonstrated that left posterior cerebral artery run very closely with left superior cerebellar artery (allow).