

Non-surgical Approach and Rehabilitation in Bilateral Midbrain Infarction Nothnagel Syndrome: A Case Report

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Introduction

Brainstem stroke can present with various oculomotor dysfunction including ptosis and ptosis could significantly restrict activities of daily life and a participation in rehabilitation. Neurogenic ptosis, which resulted from complete or partial loss of the third cranial nerve and/or the muller's muscle. The use of surgery is a successful approach to treat ptosis, but patients with neurogenic ptosis should first be observed as they may experience natural recovery without surgical intervention. The purpose of this clinical case report is to provide insight into the benefits of early intensive rehabilitation, including a non-surgical approach, in patients with bilateral ptosis after acute stroke.

Case Presentation

A 66-year-old woman was admitted to the hospital via the emergency room with the complaint of altered consciousness. She had a medical history of diabetes mellitus, and she was able to gait without support and was capable of carrying out basic activities of daily living(ADLs) independently. On magnetic resonance imaging(MRI) of the brain, bilateral midbrain, thalamic and cerebellar infarction (Fig. 1A) was observed. In the neurology department, mechanical thrombectomy was performed. Mechanical thrombectomy was performed in the department of neurology, and MRI showed hemorrhagic transformation in bilateral midbrain (Fig. 1B). Six weeks after the onset of stroke, the patient was transferred to rehabilitation department.

Initial evaluation revealed marked bilateral ptosis and mydriasis with a left and right pupillary diameter of 6 mm (Fig. 2A). In addition, severe vertical paralysis and moderate adduction limitation were observed in both eyes. Visual field tests performed after an ophthalmological consultation revealed severe visual field defect (Fig. 3A). Due to visual field limitation, the patient's muscle strength was grade 3 on the Medical Research Council Scale, but independent ambulation was not possible and functional independence measure cognition (FIM) and MMSE scores were low.

As a non-surgical approach to compensate for the patient's visual field limitation, an early rehabilitation program was initiated after soft elastic eyelid bands were attached to both eyes (Fig. 2B). After 2 months of intensive rehabilitation, the patient's visual field limitations improved (Fig. 3B) and her functional level improved. She was finally able to walk independently without assistance and was discharged home. Three months after discharge, the patient's ptosis improvement was maintained without eyelid tape, with improved visual fields and continued functional improvement (Table 1).

Conclusion

Our case report demonstrates the effectiveness of early intensive rehabilitation treatment in a patient with bilateral midbrain infarction, Nothnagel syndrome, with bilateral ptosis and extraocular movement limitation. It also suggests that soft elastic eyelid bands can be an effective treatment option without complications associated with surgical correction.

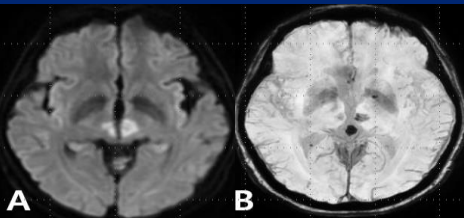


Figure 1.
A: Diffusion weighted imaging (DWI) demonstrating bilateral midbrain infarction,
B: Susceptibility weighted imaging(SWI) demonstrating hemorrhage after thrombectomy

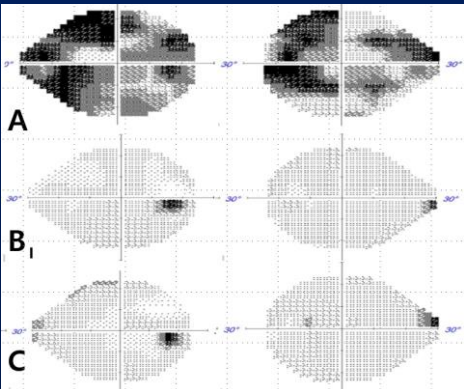


Figure 3.
A. Visual field evaluation findings before the application of the double eyelid tapes. B. Follow-up visual field evaluation obtained after the application of the double eyelid tapes. C. Visual field evaluation 3 months after discharge.



Figure 2.
A: photograph of the patient obtained before the application of the double eyelid tapes. Before application, the palpebral fissure height was uncheckable on the right, 1mm on the left.
B : Follow-up photograph obtained after the application of the double eyelid tapes. After application, the ptosis was improved by 2.5mm on the right and 4mm on the left side.
C : Follow-up photograph after 3 months. Without eyelid tapes, the ptosis was improved by 1.5mm on the right and 2.5mm on the left side

Table 1.
Rehabilitation outcomes

	Initial	Discharge	3 months After
K-MMSE	16	27	29
FSIQ	66 (1%ile)		102 (95%ile)
MBI	74	87	87
FIM Motor	63	75	75
FIM Cognition	23	31	33
BBS	20	39	51
6 minutes walking test	246.8m	321.6m	357m
10min walking test	12sec	11sec	9sec
TUG	15sec	13sec	12.45sec

K-MMSE, Korean Mini-Mental State Examination
MBI, Modified Barthel Index Score
FIM, functional independence measure
BBS, Berg balance Scale
TUG, Timed Up and Go Test