Abducens Nerve Palsy Complicated by Inferior Petrosal Sinus Septic Thrombosis Due to Mastoiditis

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We present a very rare case of a 29-month-old boy with acute onset right abducens nerve palsy complicated by inferior petrosal sinus septic thrombosis due to mastoiditis without petrous apicitis. Four months after mastoidectomy, the patient fully recovered from an esotropia of 30 prism diopters and an abduction limitation (-4) in his right eye.

Key Words: Abducens nerve diseases, Inferior petrosal sinus thrombosis, Mastoiditis, Otitis media

In many reports, abducens nerve palsy complicated by otitis media is accompanied by involvement of the abducens nerve pathway due to petrous apicitis [1]. In contrast, abducens nerve palsy complicated by septic thrombosis of the inferior petrosal sinus due to mastoiditis and otitis media without petrous apicitis is very rare. Here we report our findings in such a patient.

Case Report

A 29-month-old boy presented with acute onset esodeviation and limitation of ocular movement in his right eye. Six weeks earlier, he had right otitis media, but no improvement was achieved. Five days before onset of esodeviation, he had a high fever (over 39°C), otorrhea, and cough. Otolaryngeal examination showed that the right eardrum and tonsils were congestive. Laboratory evaluation revealed a white blood cell (WBC) of 30,127/uL and C-reactive protein (CRP) of 51.60 mg/L. A blood culture was positive for *Streptococcus pneumoniae*, suggesting a septic condition. On his second day in the hospital, the patient had a recurrent high fever due to mastoiditis complicated by otitis media. On his fourth day in the hospital, his fever was controlled but he complained of mastoid tenderness, otalgia, rhinorrhea, nasal stuffness, and postnasal drip, and his right eardrum was yellowish brown. Laboratory evaluation revealed a WBC of 15,000/uL, CRP of 19.68 mg/L, erythrocyte sedimentation rate of 115 mm/hr, and D-dimer of 739 ng/mL, suggesting a septic condition. On his fifth day in the hospital, he underwent myringotomy and insertion of a ventilation tube into the right ear. A serous discharge was drained from the myringotomy site. On the first day after surgery, an esotropia of 30 prism diopters (PD) and an abduction limitation (-4) occurred in his right eye, and facial turn to the right appeared (Fig. 1). Six days after surgery, he underwent magnetic resonance imaging (MRI) to assess other defects in intracranial or optic nerve pathways. The MRI showed right mastoiditis, and stasis of the transverse sinus and internal jugular vein. The thrombus, however, was not significant (Fig. 2). Temporal bone computed tomography showed erosive changes in the right mastoid adjacent to the sigmoid sinus, but petrous apicitis was not observed (Fig. 3). Seven days after surgery, the patient underwent a mastoidectomy. One week after mastoidectomy, he had mostly recovered from the septic condition caused by the mastoiditis, but the esotropia of 30 PD, the abduction limitation (-4) in the right eye, and the facial turn to the right were sustained. Three weeks after mastoidectomy, we observed improvements in the esotropia (25 PD), abduction limitation (-2) and alternate fixation. Four months after surgery, he had fully recovered from the esotropia, limitation of
ocular movement, and anomalous head posture (Fig. 4).

Discussion

Acute mastoiditis and intracranial complications resulting from otitis media were very common prior to the introduction of antibiotics [1,2]. Although the incidence of these complications dropped dramatically after antibiotics were developed, intracranial complications caused by mastoiditis remain serious complications, especially in infants, with an incidence of about 10% to 15% [3]. Abducens nerve palsy is a rare complication resulting from direct damage to abducens nerve pathways caused by Gradenigo’s

Fig. 1. Photographs show an anomalous head posture of right-turning facial position, an abduction defect (-4), and an esodeviation of 30 prism diopters in his right eye. Informed consent was received from parents of the patient.

Fig. 2. (A) Preoperative axial enhanced T2-weighted magnetic resonance (MR) image shows right otomastoiditis. (B) Preoperative coronal enhanced T2-weighted MR image shows right otomastoiditis. (C) Axial enhanced T1-weighted MR image shows slow flow velocity of the right transverse sinus (white arrow). (D) Coronal enhanced T1-weighted MR image shows slow-flow velocity of the right internal jugular vein (black arrow).