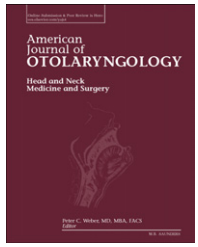
Available online at www.sciencedirect.com

ScienceDirect

www.elsevier.com/locate/amjoto



Bilateral hearing impairment as the initial symptom of sympathetic ophthalmia☆,☆☆

Yoshiyuki Kawashima, MD, PhD[a], *Yoshihiro Noguchi, MD, PhD*[a,*], *Hiroshi Takase, MD, PhD*[b], *Masatoki Takahashi, MD, PhD*[a], *Shintaro Horie, MD, PhD*[b]

[a] *Department of Otolaryngology, Tokyo Medical and Dental University, Tokyo, Japan*
[b] *Department of Ophthalmology, Tokyo Medical and Dental University, Tokyo, Japan*

ARTICLE INFO

Article history:
Received 2 February 2015

ABSTRACT

Importance: Sympathetic ophthalmia (SO), a rare bilateral panuveitis following penetrating ocular trauma or ocular surgery to one eye, shares a strikingly similar ocular pathology to that of Vogt–Koyanagi–Harada disease (VKH). Audiovestibular dysfunction is a major extraocular manifestation of VKH; however, to date, only a few cases of sympathetic ophthalmia associated with hearing loss have been reported from ophthalmologists, but not otolaryngologists. Accordingly, little is known about the audiovestibular findings in patients with SO. We herein present two cases of SO with preceding bilateral hearing loss.
Observations: The patient in Case 1, an 80-year-old female, experienced acute bilateral hearing loss. Five days after the onset of hearing loss, she presented with sudden bilateral blurred vision. In Case 2, a 32-year-old female noticed acute bilateral hearing loss and also experienced acute bilateral blurred vision the subsequent day. Patient 1 had a history of a penetrating injury to the right eye 25 days before the onset of hearing loss, while patient 2 had previously undergone right vitreous surgery twice for the treatment of a myopic macular hole and retinal detachment 36 and 43 days prior to the current symptom onset. Both cases were diagnosed as SO based on ocular findings of bilateral panuveitis and the history of ocular insult. Patient 1 carried HLA-DR4, HLA-DR15, HLA-A33, HLA-A24, HLA-B44 and HLA-B52, and patient 2 carried HLA-DR4. Audiograms showed bilateral mild to moderate sensorineural hearing loss in both cases, with normal auditory brainstem responses and deteriorated distortion product otoacoustic emission amplitudes. In addition, the significant recruitment phenomenon observed in case 1 suggested a

☆ Author contributions: All authors had full access to all of the data in the study and take responsibility for the integrity of the data collection and accuracy of the data analysis.
Study concept and design: Kawashima, Noguchi, Takase.
Acquisition, analysis and/or interpretation of the data: All authors.
Drafting of the manuscript: Kawashima.
Critical revision of the manuscript for important intellectual content: Noguchi, Takase.
Study supervision: Noguchi.

☆☆ Financial disclosure: This work was supported by JSPS KAKENHI Grant Numbers 26462551 (Y. K.) and 25462629 (Y.N.).

* *Corresponding author at:* Yushima 1-5-45, Bunkyo-ku, Tokyo, 113-8519, Japan. Tel.: +81 3 5803 5308; fax: +81 3 3813 2134.
E-mail addresses: kawashima.oto1@mac.com (Y. Kawashima), noguchi.oto@gmail.com (Y. Noguchi), h.takase.oph@tmd.ac.jp (H. Takase), masatoki1@icloud.com (M. Takahashi), shinoph@tmd.ac.jp (S. Horie).

http://dx.doi.org/10.1016/j.amjoto.2015.02.007

cochlear origin of the hearing loss. Both patients received corticosteroid therapy, and the cochlear signs and symptoms recovered within one month.

Conclusions and relevance: This is the first report to describe the comprehensive audiovestibular findings in patients with SO. In the present study, acute bilateral hearing loss developed a couple of days prior to the onset of bilateral visual loss and auditory examinations suggested a cochlear etiology in both cases.

Sympathetic ophthalmia (SO) is an extremely rare bilateral granulomatous panuveitis that occurs following penetrating ocular trauma or ocular surgery to one eye [1]. The primary symptoms of SO include acute fulminant bilateral blurred vision or blindness, developing within three months after the initial ocular trauma in approximately 80% of cases and within one year in 90% of cases [2–4]. The incidence of SO is calculated to be 0.3% among patients with ocular trauma [5] and at least 0.03/100,000 in the general population [6]. The true pathophysiology of this condition is poorly understood; however, it is thought to involve a T-cell-mediated autoimmune response directed against melanocyte-associated antigens in the eye [1]. Patients with SO are likely to express human leukocyte antigen DR4 (HLA-DR4) and HLA-Dw53, further suggesting the role of immune dysregulation in the underlying pathogenesis [7]. The primary treatment for SO consists of the administration of systemic anti-inflammatory agents, such as corticosteroids and/or other immunosuppressive drugs [1].

Vogt–Koyanagi–Harada disease (VKH) is a relatively rare multisystem inflammatory disorder affecting pigmented tissues in the eyes, meninges, skin and inner ear [8–10]. In the inner ear, melanocytes are present in the intermediate cell layer of the stria vascularis, modiolus, endolymphatic sac, saccule and utricle [11,12]. This disease is characterized by the onset of bilateral uveitis associated with neurological, cutaneous and auditory manifestations [9,10], such as meningismus, poliosis, vitiligo, hearing loss and tinnitus [8,13–15]. The diagnostic criteria for VKH require the exclusion of a history of penetrating ocular trauma or ocular surgery that precedes the onset of uveitis [8], as VKH shares a strikingly similar ocular pathology with SO. VKH has also been linked to HLA-DR4 and HLA-Dw53, in common with SO [16]. Although the pathophysiology of VKH is unclear, it is believed to involve a T-cell-mediated autoimmune response to melanocytes, analogous to that observed with SO, and may be triggered by infectious agents in genetically susceptible individuals [17,18].

Patients with VKH commonly present with the aforementioned extraocular findings, whereas it is believed that patients with SO typically lack such extraocular symptoms [6]. In fact, in contrast to the high prevalence of audiovestibular dysfunction noted in patients with VKH [14], only three cases of SO associated with hearing loss have been reported to date [19–21]. We herein present two cases of SO with preceding bilateral hearing loss.

1. Case reports

1.1. *Case 1*

An 80-year-old female with a history of penetrating injury to the right eye 25 days earlier noticed bilateral tinnitus and hearing loss. Her hearing deteriorated rapidly within a few days, resulting in difficulty communicating, even with family members. Neither vertigo nor dizziness was reported. Five days after the onset of hearing loss, the patient experienced sudden bilateral blurred vision and visited an ophthalmologist. She was subsequently referred to our university hospital and diagnosed with SO based on the clinical findings of bilateral panuveitis and a history of ocular trauma. A cerebrospinal fluid (CSF) examination showed pleocytosis (33/μl). The patient underwent HLA typing and was found to carry HLA-DR4, HLA-DR15, HLA-A33, HLA-A24, HLA-B44 and HLA-B52. Immediately after the diagnosis, steroid therapy was initiated with the intravenous administration of 1000 mg of methylprednisolone for three days followed by the oral administration of 1 mg/kg of prednisolone, the dose of which was then tapered and maintained at a low level for six months.

The patient was referred to the otolaryngology department three days after the initiation of therapy. An otoscopic examination revealed normal tympanic membranes, and no nystagmus was observed under a CCD camera with infrared illumination. She noticed a significant recovery in her hearing immediately after the start of the steroid therapy; however, a pure-tone audiogram showed bilateral moderate sensorineural hearing loss (Fig. 1A). Click-evoked auditory brainstem responses (ABRs) exhibited a normal inter-peak latency difference between waves I and V (IPL I–V) of 4.21 ms (normal range < 4.4 ms) in the right ear and 4.09 ms in the left ear at a stimulus intensity of a 90 dB normal hearing level (nHL, Fig. 1D). The distortion product otoacoustic emission (DPOAE) amplitudes were decreased to the noise levels bilaterally (Fig. 1E). A short increment sensitivity index (SISI) test with an increment of 1 dB revealed the following findings indicating the recruitment phenomenon: 45% at 1 kHz, 70% at 2 kHz, 85% at 3 kHz and 95% at 4 kHz in the right ear; and 35% at 1 kHz, 75% at 2 kHz, 80% at 3 kHz and 75% at 4 kHz in the left ear. Eighteen days after the initiation of therapy, the audiometric thresholds were decreased at all frequencies bilaterally (Fig. 1B). Her hearing and left vision subjectively recovered to the presymptomatic levels within one month after the initiation of therapy. There have been no signs of recurrence in either the visual or hearing loss for nine months since the time of onset. The last audiogram obtained nine months after the initiation of therapy is shown in Fig. 1C.

1.2. *Case 2*

A 32-year-old female noticed bilateral aural fullness and hearing loss. Neither vertigo nor dizziness was recognized. She had previously undergone right vitreous surgery for the treatment of a myopic macular hole and retinal detachment