



Bilateral Inferior Vestibular Nerve Lesion a Late Neurotoxic Effect of Liposoluble Myelographic Contrast Agent

Case Report with Imaging and Electrophysiological Confirmation

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An 83-year-old man presented with a history of progressive imbalance and positional paroxysmal vertigo over the past 3 months. He reported no cochlear symptoms, headache or history of trauma, and no prior complaints of visual or postural symptoms. The otoneurological examination revealed no spontaneous, gaze-evoked, or positional nystagmus. The clinical head-impulse test (HIT) was pathologic when testing the posterior canals. A 3D video HIT (Fig. 1) confirmed a low gain of the vestibulo-ocular reflex (VOR) in the posterior canals. The neurological examination was otherwise unremarkable.

A brain magnetic resonance imaging (MRI) disclosed moderate microvascular changes of cerebral white matter and mild cerebral atrophy. No lesions were seen in brainstem. The MRI examination of the inner ear showed large droplets in basal cerebrospinal fluid spaces (high signal on

non-fat-sat suppressed T1 images) and small dots in internal auditory canals (Fig. 2a, b). These were highly attenuated on computed tomography (CT; Fig. 2c) and are related to a previous myelography in which a liposoluble contrast agent (lipiodol) was used.

These small dots were located between the posterior wall of internal auditory canals and inferior vestibular nerves, causing anterior displacement of the inferior vestibular nerves (Fig. 2a, b). After gadolinium injection a linear enhancement of the inferior vestibular nerve on the left side (Fig. 2d), without increase in thickness. A punctate contrast enhancement is also noted on the right inferior vestibular nerve. No signs of posterior labyrinthitis were seen. Middle ear imaging was unremarkable.

The inferior vestibular nerve carries primary afferents from the posterior ampullae and the superior vestibular nerve from the anterior and lateral ampullae. End organ lesions, such as vestibular neuritis usually affect only part of the vestibular nerve, mostly the superior division, with the inferior division commonly being spared. This is an important concept to guide the topodiagnosis of vertigo [1, 2]. Other patterns of electrophysiological presentation can indicate a central etiology of vertigo [1–3].

This case is an unusual presentation of bilateral inferior vestibular nerve affection, sparing the superior vestibular division of the vestibular nerve, documented with imaging and physiological testing (deficient VOR in both posterior semicircular canal (SCC) directions and normal in both horizontal and anterior SCC directions).

The neurotoxicity of myelographic liposoluble contrasts have been widely described, mostly related to adhesive spinal arachnoiditis [4–9]. It is frequently underdiagnosed and represents a chronic and insidious condition, related to a chronic inflammatory reaction to a chemical insult. These oil-based myelogram dyes have nowadays been replaced by hydrosoluble less toxic contrast agents.

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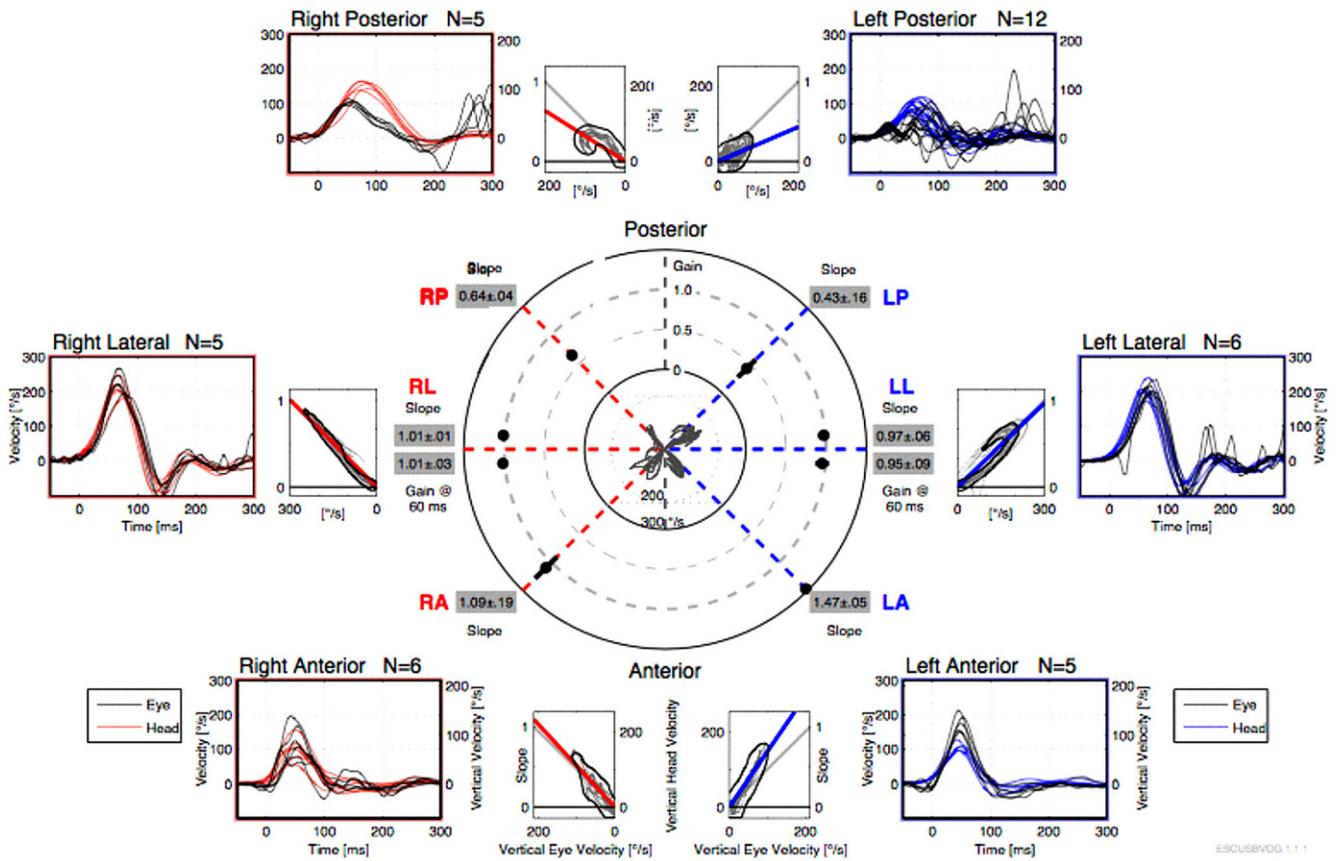


Fig. 1 3D video HIT results showing low VOR (vestibulo-ocular reflex) gain in the right and left posterior canals

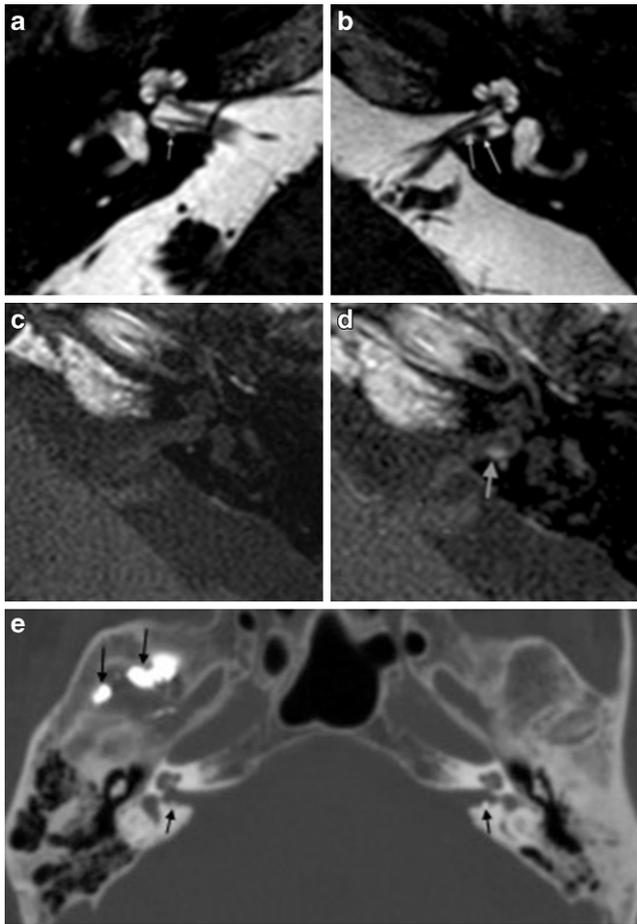


Fig. 2 **a** Right ear and **b** left ear. Magnetic resonance imaging (MRI), axial plane, high resolution T2 3D DRIVE, showing small dots in posteroinferior portion of both internal auditory canals, bigger in the left ear (**a**, gray arrow; **b**, white arrow), causing anterior displacement of left inferior vestibular nerve (**b**, gray arrow). **c** and **d** Magnetic resonance imaging left ear, axial plane, high resolution axial T1 before (**c**) and after (**d**) gadolinium injection, showing inferior vestibular nerve enhancement (gray arrow). **e** Computed tomography (CT) confirming high attenuated droplets in cerebrospinal fluid (CSF) spaces: right basal temporal sulci and internal auditory canals (black arrows)

To the best of our knowledge, this is the first report of peripheral vestibular neurotoxicity related to delayed effects of myelographic liposoluble contrast agent.

Compliance with ethical guidelines

Conflict of interest R.F. Sousa, J. Levy, J. Campos and L. Luis declare that they have no competing interests.

Ethical standards This article does not contain any studies with human participants or animals performed by any of the authors. Consent was obtained from all patients identifiable from images or other information within the manuscript. In the case of underage patients, consent was obtained from a parent or legal guardian.

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