SENSORINEURAL HEARING LOSS CONTRALATERAL TO CAROTID ARTERY ABNORMALITY: A CASE REPORT AND A POSSIBLE INTERPRETATION

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[Case report:ipoacusia improvvisa controlaterale ad un’anomalia carotide]

ABSTRACT

Objective: To discuss a possible etiopathogenic mechanism of contralateral inner ear damage in a patient with common carotid closure.

Clinical presentation and intervention: We report a clinical case concerning an episode of sudden sensorineural hearing loss affecting a patient with a common carotid closure on the contralateral side.

Conclusion: To the best of our Knowledge, this is the first case in literature concerning hearing loss affecting the opposite side. In our opinion, a precise explanation could be found on the basis of hemodynamic acute imbalance that could be performed by the particular anatomical condition.

Key words: Carotid artery abnormality, sudden hearing loss.

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Introduction

Internal carotid abnormalities are relatively infrequent findings, and include cases of congenital agenesis, aplasia or hypoplasia(1) that are important in cerebral hemodynamics(2). Symptoms can often be absent, due to communicating circles(3), but these anomalies can be associated with other central nervous system vascular or parenchymal anomalies(2). A major vascular damage can derive from intracranial vascular abnormalities such as a cerebral aneurysm(4).

Herein, a case sudden sensorineural hearing loss and tinnitus affecting a patient suffering from an internal carotid artery inveterate occlusion of the contralateral side, initially diagnosed as a congenital defect, is reported and a possible explanation for this unusual clinical picture is proposed.

Case report

A 65-year-old female patient presented complaining for an one-year lasting tinnitus on the left side in absence of vertigo, vascular risk factors and drug assumption.

Pure tone audiometry showed a mild sensorineural hearing loss for low and mid frequencies on the left side as the right side function was normal.

An angiographic exam dating back to 1986, that was executed in order to investigate on transient visus disturbances presenting since childhood, reported the congenital absence of the right common carotid artery and the hypoplasia of both subclavian arteries.

At present, pure tone audiometry showed a mild sensorineural hearing loss for low and mid frequencies on the left side as the right side function was normal.

A High Resolution Computed Tomography excluded any abnormalities of the middle and inner ear and showed a narrowed right carotid artery canal as compared to the contralateral one (fig. 1).

A Magnetic Resonance completed with MRAngiography evidenced a condition reliably derived from a non-congenital occlusion of the right common carotid artery and resulting in a
marked stenosis of the latter with a compensatory hypertrophy of the contralateral carotid artery (fig. 2); the subclavian arteries could not be precisely analyzed with the employed technique.

Fig 1: HRCT: narrowed right carotid artery as compared to the contralateral one.

Average 24-hour blood pressure values were only recordable at the inferior limbs, possibly due to the subclavian artery deficit; they proved lower than values referred both to the control group without hearing disturbances and to the study group with sudden sensorineural hearing loss (SSHL) examined in a previous study on (SSHL), that demonstrated a link between the latter and systemic hypotension[4].

Fig 2: angiography.

Discussion

To the best of our knowledge, this is the first report of a case of unilateral sensorineural hearing loss involving the side where a hypertrophic circle formed to compensate a contralateral carotid artery deficit. An exam of the literature shows that a hearing disorder is reported on the side of the arterial deficit[5], thus witnessing a fragility of the supplied area that should be more prone to a more or less transient lack of perfusion. In our opinion, although casual unknown causes as a viral infection cannot be ruled out, even in this case the phenomenon may be reliably interpreted in terms of hemodynamic changes. The terminal type of circulation that supplies the inner ear, despite a certain degree of autoregulatory capacities, renders this organ prone to hemodynamic imbalances that can be represented by a sharp reduction in blood pressure values followed by an exaggerated vasoconstriction[4,6,7,8]. In presence of habitually low blood pressure values, it can be argued that such a mechanism may be more easily elicited in a hypertrophic circle that must deal with an overload with respect to physiological conditions: it is conceivable that the hypertrophic circle in itself can cause an amplification of the oscillations of blood pressure values, due to the need of a higher volume of perfusion to the supplied area. The recorded low pressure values at 24-hour ambulatory measurement seems to confirm our interpretation, once more emphasizing the vulnerability of a highly energy requiring, peripheral organ as the inner ear to abrupt systemic circulatory changes. Under these conditions, the differential diagnosis between congenital or acquired deficit seems influential on the supposed pathogenesis of the hearing damage.

References