

Meningioma mimicking vestibular schwannoma – a case report

Oponiak imitujący schwannoma nerwu przedsionkowo-ślimakowego – opis przypadku

Tomasz Wojciechowski^{1,2}, Adrian Drożdż^{2,3}, Kazimierz Niemczyk¹

¹Department of Otolaryngology, Medical University of Warsaw, Poland

²Department of Descriptive and Clinical Anatomy, Center for Biostructure Research, Warsaw, Poland

³Student Research Group at the Department of Otolaryngology, Medical University of Warsaw, Poland

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ABSTRACT: Meningiomas are one of the most common intracranial neoplasms, usually located in the supratentorial region. Their location within the posterior cranial fossa is rare, but even in such cases, the diagnosis is possible owing to the characteristic imaging features. In this article, we present a case report of a patient with a meningioma of an internal acoustic meatus resembling vestibulo-cochlear nerve schwannoma in its typical location, causing symptoms such as asymmetric hearing loss, tinnitus and dizziness.

KEYWORDS: meningioma, internal acoustic meatus, tinnitus, schwannoma

STRESZCZENIE: Oponiaki to jedne z najczęstszych nowotworów wewnątrzczaszkowych głównie lokalizujące się w przestrzeni nadnamiotowej. Ich lokalizacja w tylnym dole czaszki jest zjawiskiem niespotykanym, ale nawet wtedy poprawne postawienie diagnozy ułatwiają charakterystyczne cechy napotkane podczas analizy badań obrazowych. W niniejszej pracy autorzy prezentują przypadek chorego z oponiakami przewodu słuchowego wewnętrznego przypominającym schwannoma nerwu przedsionkowo-ślimakowego o typowej lokalizacji, a także wywołującym typowe objawy, takie jak asymetryczne pogorszenie słuchu, szumy uszne i zaburzenia równowagi. Ponadto w artykule przedyskutowany zostaje rozwój i diagnostyka oponiaka, a także możliwość jego leczenia w kontekście tak osobliwej lokalizacji.

SŁOWA KLUCZOWE: oponiak, przewód słuchowy wewnętrzny, szumy uszne, schwannoma

ABBREVIATIONS

MRI – Magnetic Resonance Imaging

CPA – Cerebello-Pontine Angle

IAM – Internal Acoustic Meatus

WHO – World Health Organization

PTA – pure-tone audiometry

SA – speech discrimination test

INTRODUCTION

Meningioma is one of the most commonly found intracranial, particularly supratentorial, tumor. In the vast majority, it is benign (WHO grade I), however, it also can be assigned grade II or III, corresponding to pathologic diagnosis of atypical or anaplastic meningioma [1]. They are usually spherical encapsulated tumors compressing but not infiltrating the surrounding brain tissue [2]. The natural history of this tumor can vary and, as Rengachary and

Suskind put it, 'some die of meningioma, some die with it' [3]. It is particularly challenging to make the right diagnosis when the mass is located in an atypical location, without any characteristic features on imaging [4].

CASE REPORT

The history of this 55-year-old patient started almost two years ago when he decided to visit his doctor due to worsening hearing loss in his right ear with recurrent low-pitched tinnitus and episodic dizziness. His diagnostic workup included an MRI scan, which revealed a mass filling the right internal acoustic meatus. Based on the radiological features, such as regular spherical shape of the mass, which also occupied the fundus of the internal auditory canal, as well as homogeneous contrast enhancement in T1-weighted images and clinical correlation with the ipsilateral hearing loss and tinnitus, stage T1 vestibular schwannoma was suspected (Fig. 1). The patient was presented with options for further ma-

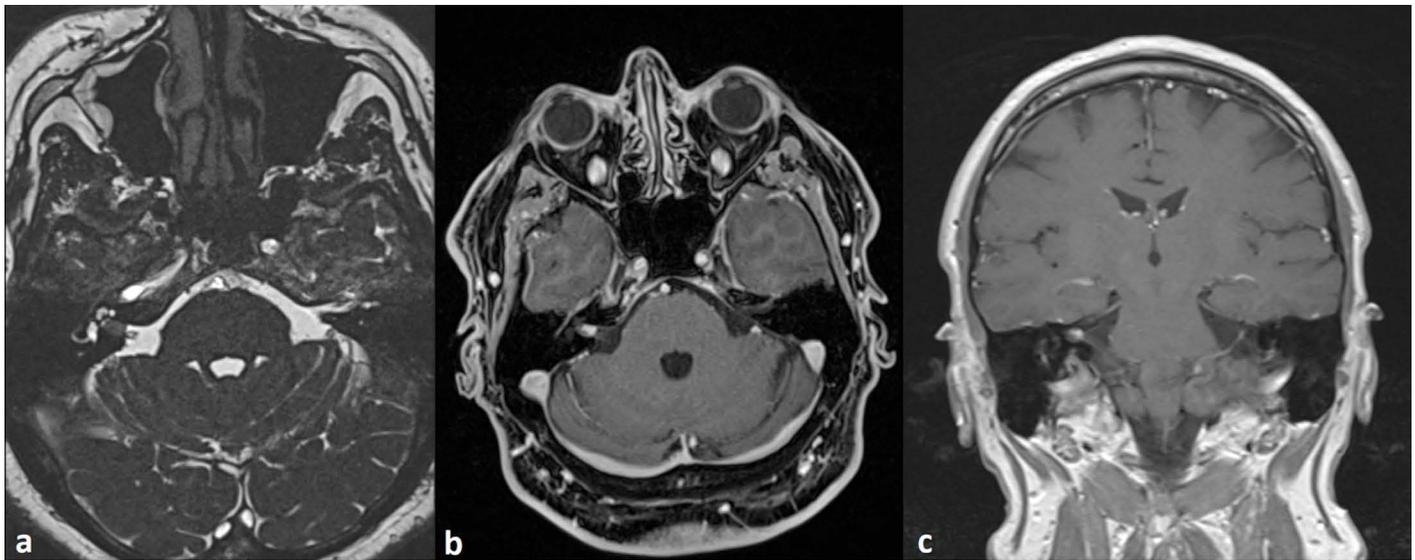


Fig. 1. MRI scan of the internal acoustic canal: a – FIESTA sequence, axial projection; b – T1-weighted image with contrast, axial projection; c – T1-weighted image, coronal projection.

nagement, including ‘wait and scan’ strategy, radiotherapy and surgical removal.

The patient presented at the Department of Otolaryngology, Medical University of Warsaw, in September 2018 for surgical resection of the mass through the middle fossa approach. Prior to surgery, pure-tone, impedance and speech discrimination test were performed, which confirmed severe sensorineural hearing loss at high frequencies in the right ear as well as mild sensorineural hearing loss in the left ear (Fig. 2). The impedance audiometry did not show any abnormalities, however, the speech discrimination test (Fig. 3) showed impaired speech recognition in the right ear. The patient was aware of possible complications and gave his informed consent. During the procedure, which was going in a routine manner, it was noted that the tumor was hard, difficult to dissect and its gross features did not resemble schwannoma but rather, in all likelihood, it was a meningioma strongly adhering to the dura inside IAM, especially within the fundus. In order to remove the mass completely and because of the intraoperative suspicion of meningioma, it was decided to transect the vestibular and cochlear nerves, open the ampulla of the anterior semicircular canal and to perform temporary re-routing of the facial nerve. The material was sent for histopathologic study, which confirmed the diagnosis of meningioma. Postoperatively, grade V facial nerve paralysis according to the House-Brackmann classification was observed, accompanied by total hearing loss in the right ear and vertigo. The patient was discharged home on postoperative day 7 in good general condition. After surgery, the rehabilitation of the facial muscles was started at hospital and is continued until now (last follow-up visit – 10.12.2018). Vertigo resolved completely after a month. The patient remains under the care of the otolaryngology outpatient clinic.

DISCUSSION

Meningiomas are tumors developing from the arachnoid epithelium [4]. In the vast majority, they are benign and assigned WHO

grade I [1]. They are one of the most common intracranial tumors, accounting for 12.5% of tumors of that location [2,5]. Within the cranial cavity, they are most commonly located near the dural venous sinuses and cranial nerve origins [6].

The cerebello-pontine angle (CPA) is the space, where meningioma is the second most common neoplasm following schwannoma [5,7]. In this location, meningiomas can be classified as being anterior or posterior to the internal acoustic opening, also referred to as premeatal and retromeatal location respectively [5]. Posterior fossa meningiomas are usually located on the posterior surface of the petrous part of the temporal bone, foramen magnum, clivus, tentorium and cerebellar convexity [2]. The typical sites of attachment on the posterior surface of the petrous temporal bone are the internal acoustic opening, jugular foramen, inferior and superior petrosal sulci [8]. Very rarely, meningiomas can develop within the internal auditory meatus (IAM) or expand with secondary IAM involvement [9]. Such a location is challenging both diagnostically and therapeutically, because of similarities in clinical and radiological presentation with vestibular schwannoma [2, 10, 11].

Meningiomas are, in the vast majority, benign lesions without tendency to metastasize. The symptoms are caused by local growth of the tumor resulting in compression of surrounding nervous and vascular structures [11, 12]. In the case of cerebello-pontine angle meningiomas, the most common symptoms are tinnitus, hearing loss, facial nerve palsy, dizziness, vertigo and trigeminal neuralgia [11-13]. Diagnostic imaging focuses around magnetic resonance imaging (MRI) [14, 15]. The characteristic MRI features of CPA meningiomas include tumor’s wide base, spherical shape, ‘dural tail’ sign, isointense signal relative to the cerebral cortex in T1WI and T2WI as well as strong contrast enhancement.

Meningiomas developing inside the internal acoustic canal are very rare, and therefore there are only single scientific reports on this issue [2, 4, 7]. When diagnosing such tumors, the clinical and radiological resemblance to the most common IAM neoplasm, i.e. schwannoma, should be kept in mind. The characteristic MRI fea-

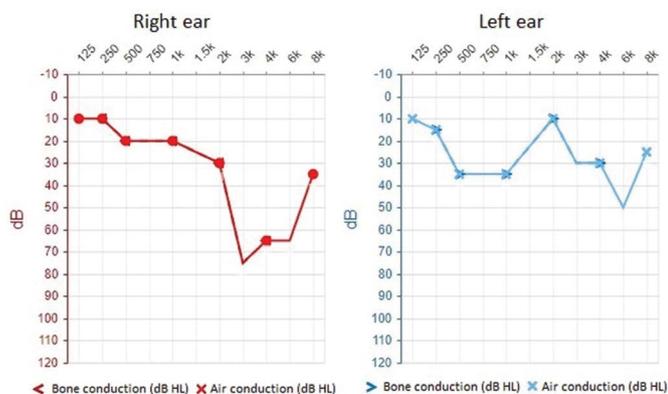


Fig. 2. Pure-tone audiometry result.

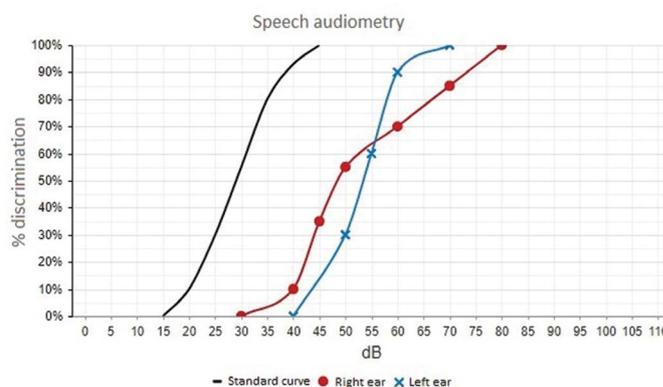


Fig. 3. Speech discrimination test.

res of meningiomas are usually hard or even impossible to identify for IAM location [2]. Differentiation between IAM schwannoma and meningioma is one of the elements that help surgeons decide on the proper surgical management [13]. Surgical resection is the treatment of choice. The major goal is to remove the mass without function loss of the facial nerve or hearing [2]. Two factors are crucial when deciding on the surgical approach: radiological image and the level of remaining hearing function. Three major approaches can be adopted for internal acoustic canal and cerebello-pontine angle tumors, including the middle fossa approach, translabyrinthine approach and retrosigmoid approach [2, 12, 13]. Normal or slightly abnormal audiometry results should prompt the surgeon to choose the approach that enables hearing preservation. However, when significant or complete hearing loss is present, the translabyrinthine approach is the best option; for normal audiometry results, the middle fossa approach is the method of choice [12]. Incomplete removal of the meningioma is usually associated with a recurrence. It makes the surgery even more difficult, because it requires great precision

and meticulousness during tumor resection, especially considering the surrounding structures such as the facial or vestibulo-cochlear nerve [2]. Complete tumor resection in our case required an extended approach through the middle cranial fossa, which made hearing preservation impossible. Facial nerve derouting enabled us to resect the tumor from the fundus of the internal acoustic meatus and to preserve its integrity.

SUMMARY

1. Meningioma appearing as a mass within the internal acoustic canal has been reported only in single cases and can mimic schwannoma of that location.
2. Features of meningioma at that location can only be confirmed intraoperatively. Expanding the approach makes it possible to remove the mass entirely.

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Corresponding author: Tomasz Wojciechowski, Katedra i Klinika Otolaryngologii WUM, 02-097 Warszawa, ul Banacha 1a,
e-mail: tomasz.wojciechowski@wum.edu.pl

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