

Solitary Lung Metastasis of the Internal Auditory Canal: A Case Report

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ABSTRACT

Background: Metastases of the internal auditory canal (IAC) are rare, but their occurrence dramatically affects the patient's prognosis. We report a case of an isolated non-small cell lung carcinoma (NSCLC) metastasis to the internal auditory canal (IAC), aiming to improve diagnosis and management of these cases. **Case presentation:** A 58-year-old man who had received concomitant chemoradiotherapy and immunotherapy for NSCLC (T4N1M0) diagnosed in 2021, developed sudden left hypoacusis, left facial palsy, and loss of balance. Magnetic resonance imaging (MRI) showed contrast enhancement in the VII and VIII nerves extending from the cerebellopontine angle (CPA) to the left IAC. A provisional diagnosis of an isolated IAC metastasis was made. An endoscopic retro-sigmoidal biopsy of the lesion confirmed this diagnosis.

Conclusion: Metastasis to the IAC is rare, but its diagnosis should be evoked in patients with rapidly evolving acoustic- facial bundle symptoms and oncological history.

Keywords: Metastasis; Internal auditory canal; Lung cancer; Facial palsy; Sensorineural hearing loss

Abbreviations: CPA: Cerebellopontine angle IAC: Internal Auditory Canal; MRI: Magnetic Resonance Imaging NSCLC: Non-Small Cell Lung Carcinoma

INTRODUCTION

Non-small cell lung cancer (NSCLC) accounts for 85% of lung cancer cases, and approximately 30-40% of these cancers have distant metastases at diagnosis [1]. Although the most frequent metastatic sites are the bone, lung, and brain, the temporal bone is rarely the target [2]. Metastatic involvement of the internal auditory canal (IAC) is rare, and unilateral involvement is even less frequent [3]. We report a case of unilateral metastatic involvement of the IAC.

CASE REPORT

A 58-year-old man, diagnosed with NSCLC (T4N1M0) in 2021 and treated with concurrent chemoradiotherapy and maintenance immunotherapy for four months, with no sign of recurrence at the last follow-up imaging, presented himself at our outpatient clinic with rapidly progressing left-sided hypoacusis, grade 6 House-Brackmann left facial paralysis, tinnitus, unsteadiness and feeling of instability. Pure tone audiometry confirmed

the left-sided sensorineural hearing loss at 88 decibels and a 100% left vestibular deficit on caloric tests. Magnetic resonance imaging (MRI) showed fusiform contrast enhancement in the VII and VIII nerves, compatible with a local malignant process, extending from the cerebellopontine angle (CPA) to the bottom of the IAC (Figures 1 & 2). Three lumbar punctures showed no sign of malignant cells. Thus, an endoscopic minimally invasive retro-sigmoid biopsy was performed to obtain a definitive diagnosis (Figure 3). Extemporaneous examination confirmed the diagnosis of IAC metastasis of a poorly differentiated non-small cell carcinoma. Oncological collegial discussion decided on gamma knife therapy treatment.



Figure 1: T2-weighted MRI with a hypodense lesion in the IAC.

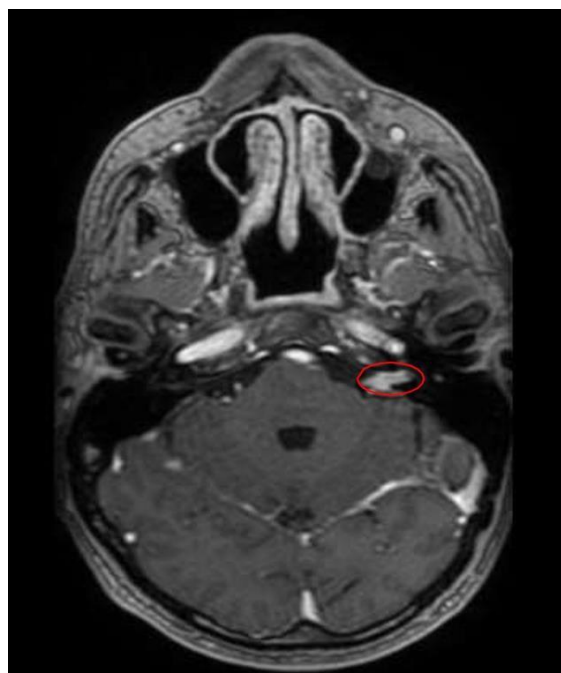


Figure 2: T1-weighted MRI with a fusiform contrast-enhancement of the seven and eight nerves extending from the CPA to the bottom of the IAC.

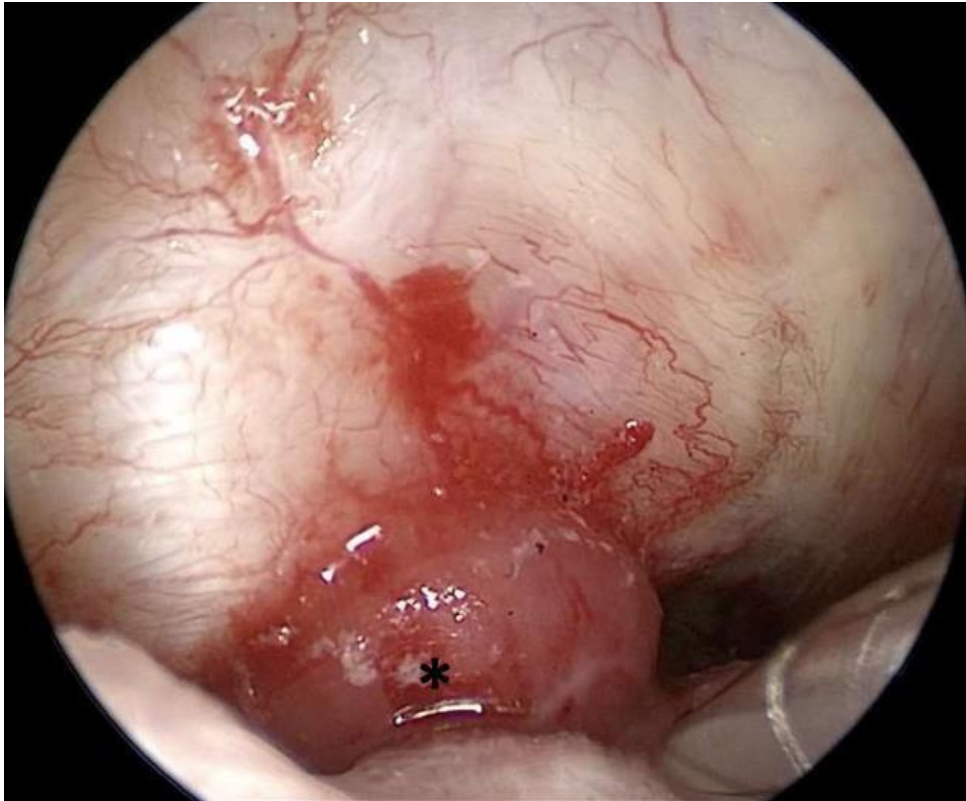


Figure 3: Minimally invasive endoscopic retro-sigmoidal approach of the IAC delimited inferiorly by the cerebellar surface and superiorly by the tentorium and petrous apex showing the hypervascularized lesion.

DISCUSSION

Metastases represent an infrequent diagnosis of internal auditory canal lesions. Indeed, if meningiomas and neurinomas are the most frequent IAC lesions, metastases constitute only 0.7% of cases [4]. In addition, the IAC accounts for only 25% of temporal bone metastases. The petrous apex and mastoid bone are more frequently affected [3].

A retrospective study by Chang et al. of 102 cases of IAC carcinoma metastases showed that the most common primary sites were lung, skin, breast, and gastrointestinal carcinomas [3].

In more than half of the cases, IAC metastases are bilateral [5], which may be explained by the dissemination of malignant cells in the cerebrospinal fluid. On lumbar punctures, the cerebrospinal fluid metastatic disease is found more often in bilateral than unilateral involvement [4]. Other possible mechanisms are hematogenous dissemination or direct extension from adjacent structures, such as the meninges or brain parenchyma [6].

Diagnosis of IAC metastasis is difficult due to its non-specific symptomatology, characterized mainly by hearing loss, facial paralysis, vertigo, tinnitus, and balance disorders. However, Brackmann et al. showed that symptom duration was relatively short and that sudden onset of facial paralysis or hearing loss should suggest an atypical pathology, wherein IAC metastases should be part of the differential diagnosis [7].

Regarding imaging, MRI with gadolinium injection remains the gold standard for detecting IAC lesions. Although MRI findings of an IAC metastasis appear similar to that of a vestibular schwannoma, the thick extra nodular

enhancement in the T1-weighted phase supports the diagnosis of an IAC metastasis [8]. However, biopsy alone allows for a definitive diagnosis.

Management of IAC metastases includes microsurgery, stereotactic radiosurgery, whole-brain radiotherapy, or chemotherapy. The choice of treatment is multifactorial, depending on the size and extent of the lesion, whether it is unilateral or bilateral, the type of cancer, the patient's co-morbidities, or the aims of the treatment [3].

Unfortunately, the mortality rate of IAC metastases is significant; at six months, unilateral and bilateral lesions are reported to have a 50% and 66.7% mortality rate, respectively [3].

Therefore, the final management decision must result from a multidisciplinary discussion among the various components of the patient's treatment plan.

CONCLUSION

Although rare, IAC metastasis diagnosis should be considered in patients with a history of neoplasia and IAC lesions. The appearance of sudden VII or VIII cranial nerves deficits (e.g., facial paralysis, hearing loss) associated with an enhancing lesion on MRI imaging strongly suggests a diagnosis of IAC metastasis. Biopsy alone offers a definitive diagnosis. A multidisciplinary meeting should be held to ensure the most appropriate treatment.

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