CASE REPORT

Lung adenocarcinoma metastatic lesion in the internal auditory meatus

Eugene Hung Chih Wong, Daniel Bodmer, Nora Tetter, Yves Brand

Department of
Otorhinolaryngology, Head
and Neck Surgery, University
Hospital Basel, Basel,
Switzerland

Correspondence to
Dr Yves Brand,
yves.brand@unibas.ch

Accepted 7 October 2017

SUMMARY

Metastasis to the cerebellopontine angle (CPA) or internal auditory meatus (IAM) is rare. We report a rare case of a 69-year-old woman with metastatic lung adenocarcinoma, who presented with 2 weeks history of left-sided hearing loss and progressively worsening vertigo. Examination revealed a left-sided facial nerve palsy while pure tone audiometry (PTA) showed a new left-sided deafness. MRI showed a new enhancing soft tissue lesion in the left IAM, highly suspicious of new metastases from her progressive lung cancer, which contributed to her neuro-otological symptoms. Subsequent MRI scans 4 months later also showed new brain metastases. She continued to be managed with supportive palliative care in view of her extensive disease.

BACKGROUND

Metastatic lesions in the cerebellopontine angle (CPA) or internal auditory meatus (IAM) are rare, accounting for only 0.2% to 2% of all lesions.¹ We report a rare case of a female patient, with metastases of her progressive lung cancer to the internal auditory meatus, causing new onset of neuro-otological symptoms.

CASE PRESENTATION

A 69-year-old woman presented with 2 weeks history of left-sided hearing loss and progressively worsening vertigo. She was diagnosed with lung

adenocarcinoma, which metastasised to the bones, liver and brain 10 months prior to the onset of these symptoms and was managed with immunotherapy (Nivolumab), steroids and palliative radiotherapy.

Examination revealed a second-degree nystagmus to the right-sided and left-sided facial nerve palsy (House-Brackmann grade 2). Pure tone audiometry (PTA) (figure 1A) revealed a left-sided deafness, which was new compared with her old PTA (figure 1B) done 8 months before. There were no other ear, nose and throat or cranial nerves abnormalities.

INVESTIGATIONS

A 3 Tesla brain MRI was performed. The axial T1-weighted magnetisation-prepared rapid gradient-echo (MP-Rage) sequence images with contrast showed a new 15×9 mm enhancing soft tissue lesion in the left internal auditory meatus (IAM) (figure 2A), which was not present in the MRI scan taken 2 months before (figure 2B). Lumbar puncture and cerebrospinal fluid (CSF) analysis was not performed due to patient refusal. However, a follow-up MRI scan 4 months later showed multiple brain metastases at the left caudate nucleus (figure 2C), right frontal and right infra-tentorial region. The combination of these new neuro-otological symptoms and multiple brain metastases, in the context of progressive lung cancer make the diagnosis of new metastases to the IAM highly probable.

Figure 1 Pure tone audiogram (PTA) showing left-sided deafness (A). In contrast, PTA taken 8 months before showed symmetrical hearing thresholds (B).

CrossMark

To cite: Wong EHC,
Bodmer D, Tetter N, et al. *BMJ*
Case Rep Published Online
First: [please include Day
Month Year]. doi:10.1136/
bcr-2017-222014

Figure 2 Contrast-enhanced axial T1-weighted magnetization-prepared rapid gradient-echo MRI scan showing a new 15×9mm enhancing soft tissue lesion (arrow) in the left internal auditory meatus (IAM) (A), which was not present in the scans taken before the onset of patient's neuro-otological symptoms (B). New brain lesion (arrow) in the left caudate nucleus (C), together with other brain metastases were found 4 months later (there were no lesions found in the same imaging plane as the lesion in the left IAM).

OUTCOME AND FOLLOW-UP

She continued to be managed with supportive palliative care in view of her extensive disease.

DISCUSSION

The most common sites of origin for metastases to the temporal bone were found to be breast, lung, kidney, stomach and larynx.¹ This spread is thought to be haematogenous.² Histologically, adenocarcinoma from breast or lung cancers were found to be the most common type of tumour that metastasise to this region.³

However, more than 99% of CPA tumours are benign, with acoustic neuroma being the most common of such tumour.² Therefore, it is crucial to differentiate between benign and metastatic CPA tumours.¹ Benign CPA tumours are usually slow growing where patients can be asymptomatic although they may also present with vestibulocochlear nerve dysfunction (such as hearing loss, tinnitus and dizziness), but rarely with other cranial nerve dysfunctions.¹ On the other hand, acute onset, rapidly progressive dysfunction of the vestibulocochlear, facial and/or trigeminal nerves are characteristic features of metastatic CPA tumours,^{4 5} which should be considered as a differential diagnosis especially in cancer patients. However, 30% of patients with unilateral metastasis can be asymptomatic, accounting for the late diagnosis of the disease.⁵ It is also important to note that benign CPA tumours are still far more common than metastatic lesions even in cancer patients.⁶

De mones del Pujos *et al*³ described six cases of meningeal carcinomatosis (MC) of IAM, presenting with facial paralysis and cochleovestibular symptoms, two of which had their primary cancer originating from the lung. In one of the patients, the primary lung cancer was only discovered after further investigation of the metastatic symptoms.³ This was also described in other literatures, where primary tumours from lung, oesophagus, colon and breast were only discovered at further clinical workup of patients.³ Therefore, clinicians should also have higher index of suspicion to search for a primary tumour in such patients.³

However, very often, the primary cancer is already known, and therefore facilitates the diagnosis of the metastases.⁷ Gadolinium-enhanced MRI is accepted as the 'gold standard' in

investigation of CPA tumours.⁸ Many authors also performed cytology analysis of the cerebrospinal fluid (CSF) to confirm the diagnosis, looking for the presence of malignant cells.^{3 9} However, MRI has been found to detect IAM invasion before CSF analysis shows any abnormalities.¹⁰

There is little consensus on the best treatment for this tumour as it depends on the general condition of the patient as well as the status of the primary cancer, whether localised or diffuse.³ Some authors have described whole-brain and spine radiation, while others have used chemotherapy as their treatment.³

In conclusion, metastasis of lung adenocarcinoma to the IAM is rare but should be considered as a differential diagnosis in patients presenting with new-onset retrocochlear hearing loss, facial nerve palsy and vertigo.

Learning points

- ▶ Lung adenocarcinoma metastasis to the internal auditory meatus (IAM) is possible especially in patients with progressive disease.
- ▶ Clinicians should have high index of suspicion for IAM metastasis as a differential diagnosis in patients with history of lung cancer and presenting with acute onset, rapidly progressive neuro-otological symptoms.
- ▶ MRI scans can help with the diagnosis of metastasis to this region.

Contributors EW, NT: Data acquisition and analysis, drafting and design of article and final approval of article. DB: Critical revision of article and final approval of article. YB: Data interpretation, critical revision of article and final approval of article.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

© BMJ Publishing Group Ltd (unless otherwise stated in the text of the article) 2017. All rights reserved. No commercial use is permitted unless otherwise expressly granted.

REFERENCES

- 1 Minami M, Hanakita J, Suwa H, *et al*. Solitary metastasis of lung cancer to the cerebellopontine angle--case report. *Neurol Med Chir* 1996;36:172-4.
- 2 Jain A, Ablett M, Wardrop P. Vanishing tumour of the internal auditory meatus. *J Laryngol Otol* 2009;123:563-5.
- 3 de Mones del Pujol E, Kouassi J, Maire JP, *et al*. Meningeal carcinomatosis of the internal auditory meatus: clinical and imaging-aided differentiation. *Otol Neurotol* 2014;35:911-7.
- 4 Yuh WT, Mayr-Yuh NA, Koci TM, *et al*. Metastatic lesions involving the cerebellopontine angle. *AJNR Am J Neuroradiol* 1993;14:99-106.
- 5 Schrock A, Laffers W, Bootz F. Solitary metastasis of lung carcinoma to the internal auditory canal. *Am J Otolaryngol* 2006;27:214-6.
- 6 Martuza RL, Parker SW, Nadol JB, *et al*. Diagnosis of cerebellopontine angle tumors. *Clin Neurosurg* 1985;32:177-213.
- 7 Ohno T, Yokoyama Y, Aihara R, *et al*. Sudden bilateral sensorineural hearing loss as the presenting symptom of meningeal carcinomatosis of gastric cancer: report of a case. *Surg Today* 2010;40:561-5.
- 8 Sidman JD, Carrasco VN, Whaley RA, *et al*. Gadolinium. The new gold standard for diagnosing cerebellopontine angle tumors. *Arch Otolaryngol Head Neck Surg* 1989;115:1244-7.
- 9 Uppal HS, Ayshford CA, Wilson F. Sudden onset bilateral sensorineural hearing loss: a manifestation of occult breast carcinoma. *J Laryngol Otol* 2001;115:907-10.
- 10 Morgan MK, Zammit-Maempel I, Hill J. Meningeal carcinomatosis: an unusual cause of deafness. *J R Coll Surg Edinb* 1998;43:119-21.

Copyright 2017 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow