The Journal of Laryngology & Otology (2011), ***125***, *1173–1175*.

doi:10.1017/S0022215111001666

CLINICAL RECORD

Mastoiditis secondary to metastatic lung carcinoma: case report and literature review

P J CLAMP[1], A H JARDINE[2]

[1]*Department of Ear, Nose and Throat Surgery, Gloucestershire Hospitals NHS Foundation Trust, Gloucester, and*
[2]*Department of Ear, Nose and Throat Surgery, Royal United Hospital Bath NHS Trust, UK*

Abstract

Objective: We present a case report and systematic review of acute mastoiditis caused by metastatic lung cancer.

Case report: A 62-year-old woman developed acute mastoiditis as a complication of otitis media. Cortical mastoidectomy revealed deposits of metastatic non-small cell lung carcinoma around the sigmoid sinus. The patient had previously received treatment for lung cancer, but was thought to be in remission.

Discussion: A literature review confirmed that this is the first reported case of mastoiditis caused by metastatic lung cancer. Only four similar case reports were identified: two caused by breast carcinoma, one by renal cell carcinoma and one by cholangiocarcinoma. Post-mortem histopathological studies suggest that temporal bone metastasis occurs in 22 per cent of oncology cases.

Conclusion: This is the first reported case of mastoiditis caused by metastatic lung cancer. Metastasis to the temporal bone is not uncommon, but rarely causes mastoiditis.

Key words: Mastoiditis; Otitis Media; Lung Neoplasms; Neoplasm Metastasis; Otolaryngology

Introduction

Mastoiditis is a rare complication of otitis media which can lead to the formation of a sub-periosteal abscess, also known as acute coalescent mastoiditis. The clinical presentation is one of pain and swelling of the mastoid process, pushing the pinna anterolaterally. A fluctuant collection may be felt overlying the mastoid, and the patient displays signs and symptoms of systemic infection. Treatment consists of intravenous antibiotics and, often, surgical drainage of the abscess via cortical mastoidectomy. Acute mastoiditis may be complicated by spread of the infection to the skull base or cranial cavity, or lateral or sigmoid sinus thrombosis.

We report a case of acute mastoiditis caused by metastatic deposition of non-small cell lung cancer, and we review the literature regarding this presentation.

Case report

A 62-year-old woman was referred to the otolaryngology department with right-sided otalgia and decreased hearing. Her past medical history included a diagnosis of stage four, non-small cell lung cancer (see Figure 1). This had been treated with palliative chemo-radiotherapy, and was thought to be in remission.

A magnetic resonance imaging scan was performed by the patient's oncology team to exclude intracranial metastases. The scan confirmed the absence of signs of intracranial disease, and demonstrated fluid within the right mastoid air cells (Figure 2).

On otoscopy, the right tympanic membrane was noted to be erythematous, with a small degree of conductive hearing loss on free field and tuning fork testing. The rest of the ENT examination was normal.

A diagnosis of acute otitis media was made, and the patient was commenced on a course of oral clarithromycin (due to a penicillin allergy). Routine follow up was arranged for four weeks hence.

At review, the patient's pain had increased in severity and her tympanic membrane remained erythematous.

The next day, the patient underwent an examination of the ear under general anaesthesia. Myringotomy confirmed the presence of a purulent middle-ear effusion, and a ventilation tube was inserted. There was no evidence of post-auricular erythema or swelling at this time. Post-operatively, the patient's symptoms improved, and she was discharged on topical antibiotic and steroid drops.

Nine days after discharge, the patient was reviewed in clinic. Her symptoms had deteriorated once again, with increased otalgia. The patient felt systemically unwell, with pyrexia. Examination revealed mastoid tenderness and swelling, with pinna protrusion.

An urgent computed tomography scan (Figure 3) demonstrated opacification of the right mastoid air cells, with evidence of ill-defined bony destruction and loss of cortical definition.

The patient was admitted for intravenous antibiotics, and scheduled for an urgent right cortical mastoidectomy.

At surgery, necrotic debris was found beneath the mastoid periosteum, and was sent for microbiological and histological analysis. A cortical mastoidectomy was carried out, which revealed pus extending into the mastoid antrum. An

Accepted for publication 23 January 2011 First published online 22 August 2011

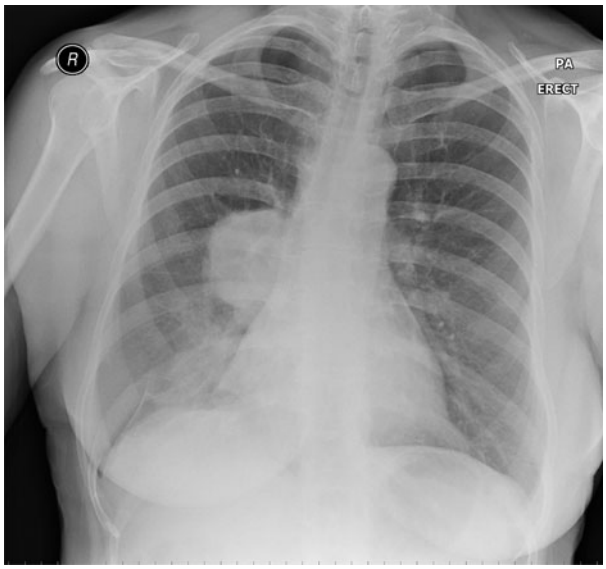

FIG. 1
Postero-anterior (PA) chest radiograph showing a 6 cm, right hilar carcinoma. R = right

abnormal area of necrotic tissue was noted within the posterior aspect of the mastoid cavity, arising around the sigmoid sinus. This was biopsied and sent for histological examination.

The patient's pain reduced post-operatively and the wound healed well. Four days after surgery, she developed a partial facial palsy which resolved following a course of oral steroids.

The biopsies taken from the posterior part of the mastoid showed malignant epithelial cells, with immunohistochemical staining consistent with metastatic non-small cell carcinoma. She was referred to the oncology department for consideration of further treatment.

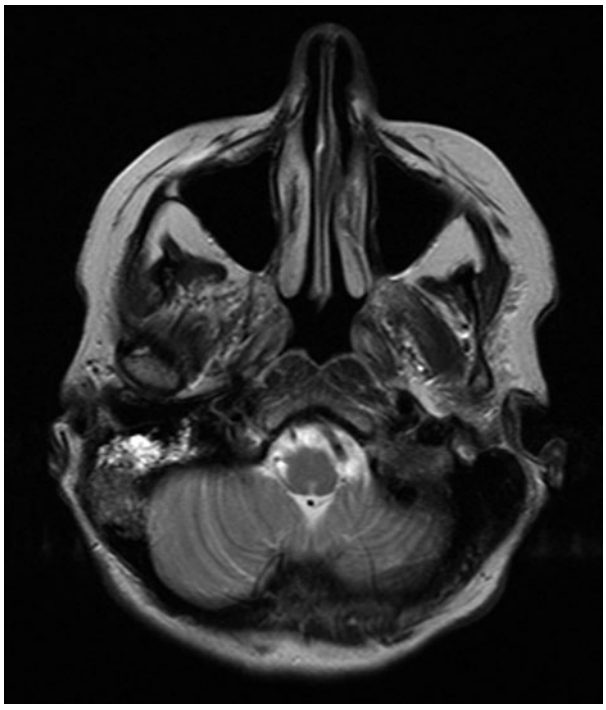

FIG. 2
Axial, T2-weighted magnetic resonance image showing abnormal soft tissue and fluid within the right mastoid air cells.

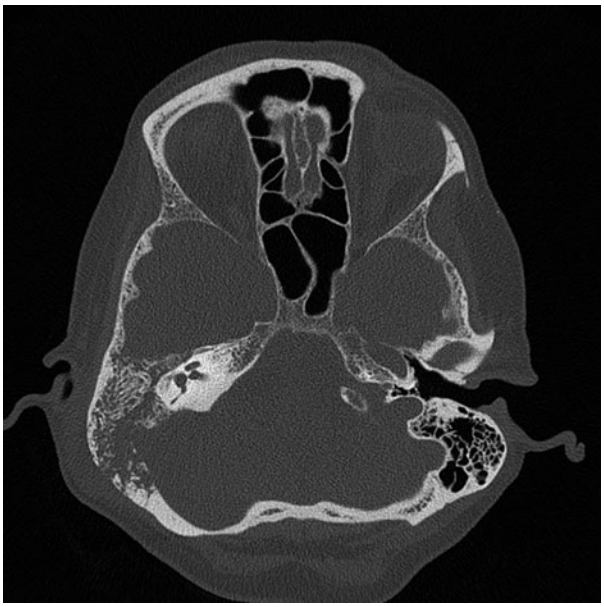

FIG. 3
Pre-operative computed tomography scan showing ill-defined bony destruction of the inner and outer cortices of the right mastoid.

Discussion

Metastatic malignancy is a rare differential diagnosis of acute mastoiditis. In order to identify reported cases, a systematic literature review was undertaken (on 8 June 2010), searching the Medline (1950 to present), Embase (1974 to present) and CINAHL databases. The search terms 'mastoiditis', 'carcinoma', 'cancer' and 'metasta*' were combined with Boolean operators. Duplicate results were removed and reference lists were cross-referenced for additional relevant studies. Results were limited to English-language publications.

Four case reports of mastoiditis secondary to metastatic carcinoma were identified. Two cases were caused by metastatic breast carcinoma, one by renal cell carcinoma and one by cholangiocarcinoma.[1–4] We found no reported cases of mastoiditis caused by metastatic lung cancer.

Metastatic temporal bone tumours were initially thought to be rare, but this belief has been refuted by a number of post-mortem studies.

- **Temporal bone metastasis is a rare cause of mastoiditis**
- **This case report highlights the potential for lung cancer metastasis to cause mastoiditis**
- **Post-mortem studies of cancer patients have demonstrated temporal bone metastases in 22 per cent, although significant symptoms seemed rare**

The largest autopsy series was published in 2000 by Gloria-Cruz *et al.*[5] This study reviewed the temporal bone collection at the University of Minnesota. Autopsy reports from 864 patients were reviewed, and 212 patients were identified

https://doi.org/10.1017/S0022215111001666 Published online by Cambridge University Press

with non-systemic malignancies (excluding diseases such as lymphoma, leukaemia or multiple myeloma). Histological examination of these temporal bones demonstrated metastatic deposits in 47 patients (22.2 per cent).

The commonest primary source for metastatic spread to the temporal bone appears to be the breast, accounting for 18–29 per cent of cases.[6–8] Other possible sources include lung, renal, stomach, prostate and laryngeal cancers.

In Gloria-Cruz and colleagues' series, the commonest otological feature of temporal bone metastasis was hearing loss (occurring in 40.4 per cent of cases), although this could not necessarily be attributed to the metastatic disease. In this series, 36.2 per cent of patients were asymptomatic. Otalgia was only present in four cases (8.5 per cent), suggesting that acute otitis media and mastoiditis are rare presentations of metastatic disease.

Conclusion

The presented case represents the first report of mastoiditis caused by metastatic lung cancer. Post-mortem histopathological studies suggest that metastasis to the temporal bone is not uncommon. However, it would appear to be a rare cause of mastoiditis.

References

1 Johnson FE, Brown WH 3rd. Cholangiocarcinoma masquerading as mastoiditis. *Surgical Research Communications* 1987;**2**:131–4
2 Kedjanyi WK, Bath AP, Ball RY, Hosni AA, Wickstead M. Metastatic adenocarcinoma of the temporal bone. *J Laryngol Otol* 1994;**108**:710–12
3 Lan MY, Shiao AS, Li WY. Facial paralysis caused by metastasis of breast carcinoma to the temporal bone. *J Chin Med Assoc* 2004;**67**:587–90
4 Mansell NJ. Renal carcinoma with acute mastoiditis. *J R Soc Med* 1998;**91**:644–5
5 Gloria-Cruz TI, Schachern PA, Paparella MM, Adams GL, Fulton SE. Metastases to temporal bones from primary nonsystemic malignant neoplasms. *Arch Otolaryngol Head Neck Surg* 2000; **126**:209–14
6 Belal A Jr. Metastatic tumours of the temporal bone. A histopathological report. *J Laryngol Otol* 1985;**99**:839–46
7 Cumberworth VL, Friedmann I, Glover GW. Late metastasis of breast carcinoma to the external auditory canal. *J Laryngol Otol* 1994;**108**:808–10
8 Streitmann MJ, Sismanis A. Metastatic carcinoma of the temporal bone. *Am J Otol* 1996;**17**:780–3

Address for correspondence:
Mr P J Clamp,
Department of ENT Surgery,
Gloucester Royal Hospital,
Great Western Way,
Gloucester GL1 3NN, UK

E-mail: philip.clamp@nhs.net

Mr P J Clamp takes responsibility for the integrity of the content of the paper
Competing interests: None declared

https://doi.org/10.1017/S0022215111001666 Published online by Cambridge University Press