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# Sensorineural hearing loss caused by metastatic prostatic carcinoma: a case report

M. B. PRINGLE, F.R.C.S., A. F. JEFFERIS, M. CHIR., F.R.C.S., G. S. BARRETT, F.R.C.S. (Slough)

**Abstract**
Metastases to the temporal bone are a recognized, if rare, cause of otological symptoms including sudden sensorineural hearing loss. Carcinoma of the prostate is a common cancer which frequently metastasizes to bone but is only rarely reported in the temporal bone. We report a case of sudden sensorineural hearing loss due to metastatic prostatic carcinoma in the temporal bone.

**Key words: Hearing loss, sensorineural; Prostatic neoplasms; Metastasis**

## Introduction

The vast majority of cases of sudden sensorineural hearing loss are of unknown cause. However one of the recognized, though rare, causes is metastatic disease of the temporal bone. Despite the fact that carcinoma of the prostate is a very common neoplasm and is well known for metastasizing to bone we present what we believe is the first case history, in English literature, of a prostatic metastasis to the temporal bone causing sudden sensorineural hearing loss. The patient was otherwise well and the primary tumour had apparently been cured.

## Case report

A 50-year-old male patient had a transurethral resection for carcinoma of the prostate in February 1988. A bone scan and CT scan of the abdomen failed to show any distal spread and the patient was treated with a course of local radiotherapy.

He was well until July 1991 when he developed sudden onset left-sided deafness and tinnitus associated with pain in his left ear, around his left eye and radiating into the back of the head. On examination he was generally well. Locally there was injection of the handle of malleus on the left side: he was Rinne positive on both sides and Weber conducted to the right.

A pure tone audiogram was performed (Figure 1), together with speech audiometry (Figure 2) and evoked response audiometry. The responses on Brainstem evoked response audiometry (BSER) were consistent with the audiogram and suggested a cochlear loss on the left side. A MRI scan (Figure 3) was performed. It revealed a large enhancing lesion on the right side adjacent to the internal auditory meatus.

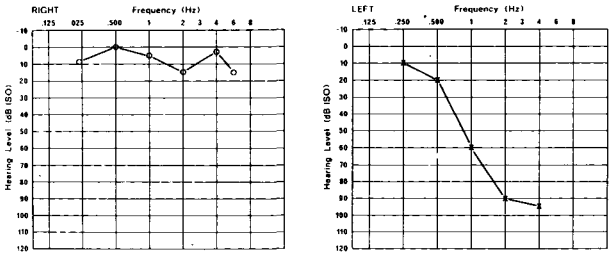


FIG. 1
Pure tone audiogram.

The left temporal bone was biopsied and found to contain metastatic prostatic carcinoma. The patient was treated with local radiotherapy and goserilin (Zoladex). It was decided that intervention was not appropriate for the asymptomatic right-sided swelling. Eighteen months later he remained well but without any improvement in his left-sided hearing.

## Discussion

We believe that this is the first case report in the English literature of a patient with sudden sensorineural hearing loss due to metastatic tumour in the temporal bone from a prostatic primary.

Metastases to the temporal bone are a rare but well recognized cause of otological symptoms. Friedman and Osborn (1965) reviewed their Hospitals' cases of metastases to the ear, nose and throat region in the preceding 15 years and did a literature search of the preceding 65 years. They found 71 cases of metastatic tumour seven of which were in the temporal bone. The kidney (42 cases) was the commonest site for the primary tumour and the commonest site for metastatic deposits was the nasal and paranasal sinuses (24 cases). They found no prostatic primaries. Scott (1939) found 70 reports of malignant growths of the ear of which only two were secondaries. Reviewing the ear tumours of the Massachusetts Eye and Ear Hospital from 1960–1970 Goodman (1971) found 84 neoplastic tumours 11 of which were meta-

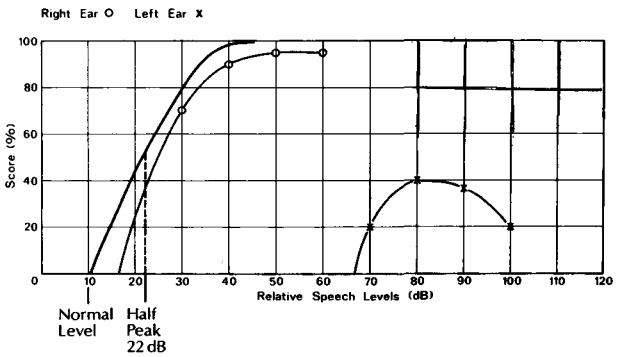


FIG. 2
Speech audiogram.

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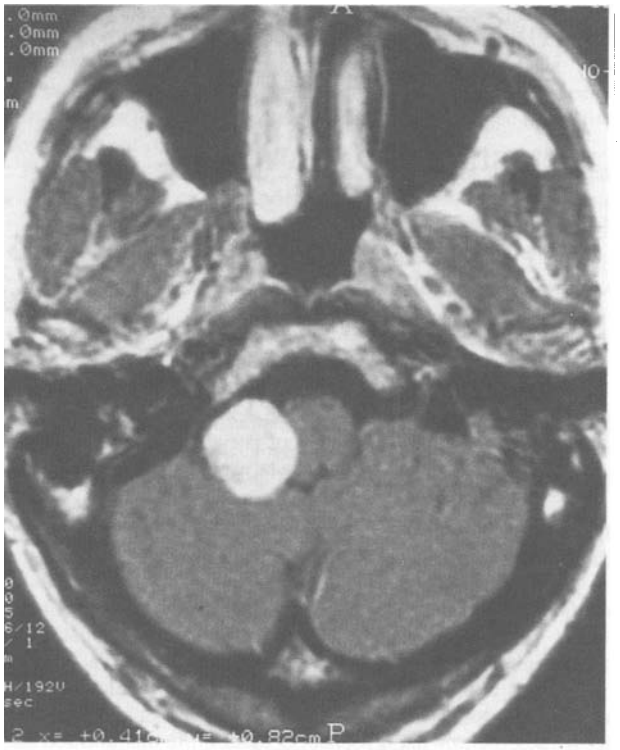

FIG. 3

MRI scan revealing a large enhancing lesion on the right side adjacent to the internal auditory meatus.

static – four from direct extension, the remainder from distal primaries (four breast, two lung and one renal). A review of the Mayo Clinic patients (Greer *et al.*, 1976) from 1952–1971 resulted in 110 patients with malignancies of the ear out of 1 154 674 new patients – an incidence of about nine per 100 000 new patients. Only nine of these 110 patients had metastatic disease (five breast, two upper respiratory tract and two genito-urinary). Figi and Hempstead (1943) suggested an incidence of malignant ear disease of three per 100 000 and Lodge *et al.* (1955) of 0.6 per 100 000.

A review of the signs and symptoms of temporal bone neoplasms in 110 patients showed the following: pain (70 per cent), otorrhoea (49 per cent), deafness (41 per cent), facial nerve palsy (23 per cent), tinnitus (21 per cent), bleeding (18 per cent), vertigo (8 per cent). Our patient presented with three of these symptoms *i.e.* pain, deafness and tinnitus.

Metastases to the temporal bone are generally thought to be less common than primary tumours of the temporal bone. This is unusual in that many of the commonest primary tumours *e.g.* lung, breast, prostate, kidney and thyroid are all well known for metastasizing to bone.

Schuknecht *et al.* (1968) studied 10 cases of temporal bones with secondary malignant disease. Four were from direct adjacent spread, this event occurring most frequently in pharyngeal carcinoma, lymphoepithelioma, parotid tumours, diffuse invasion of the meninges and metastatic disease of the cervical nodes. He found that the commonest tumours to metastasize to the temporal bone are the breast, kidney and lung. In their review of the literature Schuknecht *et al.* (1968) refer to two cases of prostatic carcinoma as the primary – both in the German literature and both secondhand references.

Metastases invade the temporal bone mainly by haematogenous spread. Procter and Lindsay (1947) stated that the marrow of the petrosa is capable of filtering out tumour cells circulating in the blood stream. Tumours to the temporal bone as with tumours elsewhere in the skeleton may be osteolytic or osteoblastic and though prostatic tumours are usually osteoblastic Schuknecht *et al.* (1968) state that they can initially be destructive.

Schuknecht *et al* (1968) also comment that tumour cells deposited in the temporal bone may proliferate rapidly or die out, or may lie dormant for months or years only to grow later, which may be long after the primary tumour has been cured.

Deafness is a common early symptom of secondary malignant tumours to the temporal bone. It can be conductive due to eustachian tube obstruction with secondary secretory otitis media or from direct infiltration of the middle ear and ossicles. Involvement of the inner ear by metastatic growth is uncommon because the bony otic capsule has a high resistance to invasion by neoplasm. Sensorineural loss is usually due to destruction of cochlear nerve fibres or compression in the internal auditory meatus (IAM) and rarely due to invasion of the inner ear.

In these patients the otological symptoms are often not severely disabling and may be overshadowed by other metastatic lesions. The bilateral nature of symptoms should also not rule out the possibility of metastatic disease (Katsarkas *et al.*, 1976; Bergstrom *et al.*, 1977; Igarashi *et al.*, 1979). Even though metastases to the temporal bone are surprisingly rare this should be considered in the differential diagnosis of any patient with otological symptoms and a past history of cancer, and serves to remind us to think beyond the bounds of the presenting lesion and always remember the importance of a full clinical history.

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Address for correspondence:
Mr M. B. Pringle, F.R.C.S.,
ENT Registrar,
Royal National Throat, Nose, and Ear Hospital,
Gray's Inn Road,
London WC1.


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