

Case Report

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Facial Paralysis Caused by Metastasis of Breast Carcinoma to the Temporal Bone

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Metastatic tumors to the temporal bone are very rare. The most common sites of origin of temporal bone metastases are breast, lung, kidney, gastrointestinal tract, larynx, prostate gland, and thyroid gland. The pathogenesis of spread to the temporal bone is most commonly by the hematogenous route. The common otologic symptoms that manifest with facial nerve paralysis are often thought to be due to a mastoid infection. Here is a report on a case of breast carcinoma presenting with otalgia, otorrhea, and facial paralysis for 2 months. The patient was initially diagnosed as mastoiditis, and later the clinical impression was revised to metastatic breast carcinoma to temporal bone, based on the pathologic findings. Metastatic disease should be considered as a possible etiology in patients with a clinical history of malignant neoplasms presenting with common otologic or vestibular symptoms, especially with facial nerve paralysis.

Key Words

facial nerve disorder;
neoplasm metastasis;
temporal bone

The temporal bone may be invaded by tumors originating from adjacent areas or as metastases from distant sites. Secondary malignant tumors are relatively uncommon and usually originate from the breast, lung, and kidney, sites with a tendency to metastasize to bone.¹ The actual incidence of metastatic temporal bone tumors is probably higher than that suggested in medical literature because histologic studies are rarely performed on temporal bones in routine postmortem examination of patients with possible metastatic diseases.² Here is an unusual case of metastatic breast carcinoma to the temporal bone with otorrhea and facial paralysis as presenting symptoms.

CASE REPORT

A 72-year-old woman presented to our institution with a 2-month history of right-sided otalgia, otorrhea, and facial weakness. Her past medical history included a right upper lobectomy for pulmonary tuberculosis 20 years before and diabetes mellitus currently controlled under medication. Three years earlier, she had been diag-

nosed as having an infiltrative ductal carcinoma in her left breast, with metastatic extension to the left axillary nodes. She had undergone a left modified radical mastectomy, with axillary lymph node dissection and adjuvant chemotherapy.

On examination, otoscopy revealed profuse purulent discharge and edema of the skin of the external ear canal, thereby obscuring the tympanic membrane. Physical examination was essentially unremarkable except for a right facial paralysis (grade IV based on the House-Brackmann scale). A pure-tone audiogram showed right-sided 51 dB mixed hearing loss with an air-bone gap of 27 dB and left-sided 30 dB sensorineural hearing loss.

Bacterial culture of the otorrhea disclosed *Klebsiella pneumoniae*. High-resolution computed tomography (CT) of the temporal bone revealed soft tissue density over the right middle ear cavity and mastoid cavity (Fig. 1). Right-sided chronic otitis media with mastoiditis, complicated with facial paralysis, was the initial impression.

After using intravenous cefazolin and amikacin for 1 week without any clinical improvement, a simple mastoidectomy was performed. A lot of granulation-like tissue with yellowish watery discharge over the mastoid

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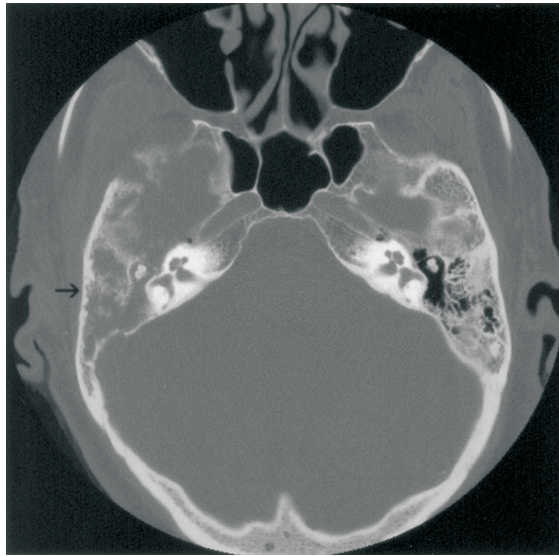


Fig. 1. Computed tomography showing soft tissue density over the right middle ear cavity and mastoid cavity with obscure bony trabecular structure (arrow).

cavity was noted during surgery. The ossicular chain, facial canal, and semicircular canal were intact. The pathology report showed metastatic infiltrative ductal carcinoma of the mastoid, the morphology of which was consistent with breast carcinoma (Fig. 2). The diagnosis was then revised to metastatic infiltrative ductal carcinoma of the temporal bone.

A series of studies were performed and revealed a suspected metastatic nodule over right lung and bony metastasis of the spine at L4 level. The patient was then arranged for palliative radiotherapy to the right temporal region and received chemotherapy with cyclophosphamide, fluorouracil-5 sodium, and epirubicin. The patient has been followed up for 15 months and is still alive.

DISCUSSION

Temporal bone metastases resulting from distant malignancies are uncommon, documented in medical literature mostly by single-case reports and several small-series studies. In 1996, Streitmann and Sismanis¹ reviewed 139 such patients reported in the world literature. Gloria-Cruz *et al.*³ reported 47 (22.2%) metastases to the temporal bone documented at autopsy in a population of 212 patients with primary, non-disseminated malignant neoplasms. The possible reason for the rela-

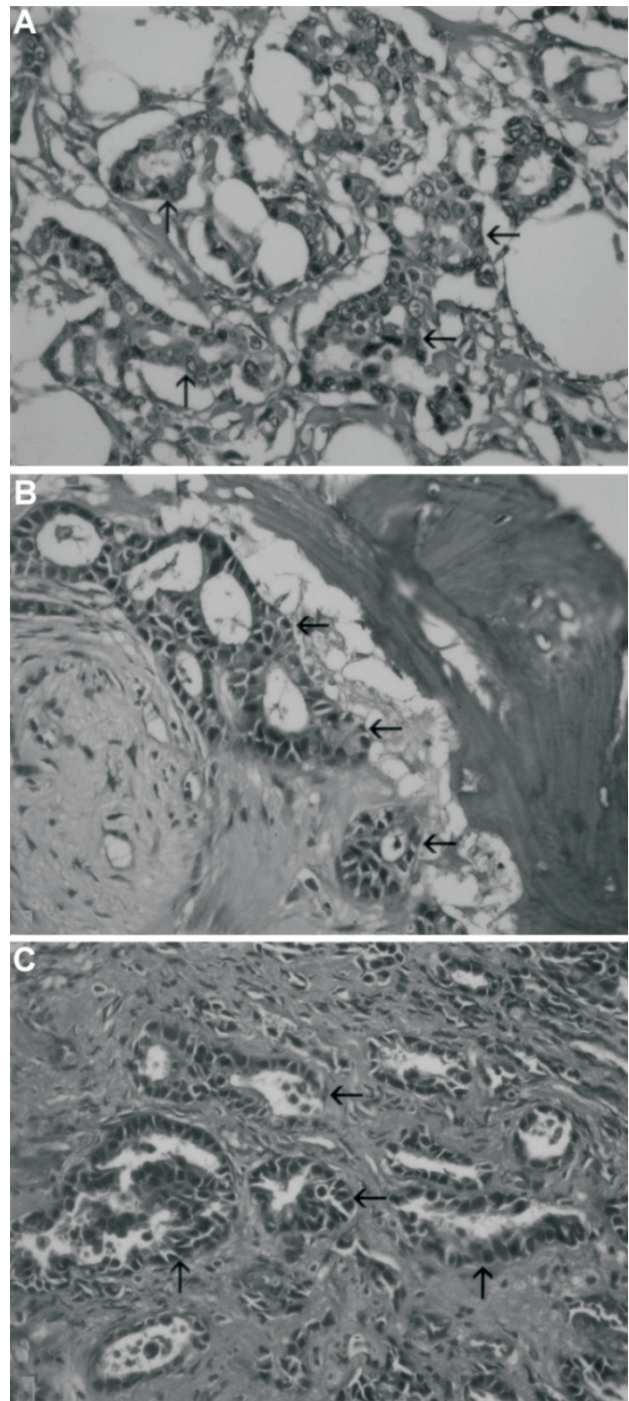


Fig. 2. (A) Pathologic examination of original mammary carcinoma shows infiltration of nests of malignant ductal epithelial cells in the fibro-adipose parenchyma of the breast. The tumor cells are arranged in solid, ductal, and cord-like patterns (arrow) (hematoxylin-eosin, original magnification X 20). (B) Pathologic examination of the mastoid shows infiltration of nests of tumor cells arranged in ductal pattern in the bone (arrow) (X 20). (C) Infiltration of nests of tumor arranged in ductal pattern in the fibrous connective tissue of the mastoid (arrow) (X 20).

tively few published cases is that otologic examination and radiologic studies are not performed routinely on patients with potentially metastatic diseases.

Metastatic malignant tumors to the temporal bone are reported to take 1 of the following routes: the first is haematogenous dissemination of tumor cells to the bone marrow.¹⁻⁵ Schuknecht *et al.*⁴ mentioned mammary, renal cell, and bronchogenic carcinomas as the 3 most common tumors showing this embolic type of metastasis. The second route is direct extension from a regional primary tumor, such as those of the nasopharynx, hypopharynx, and parotid gland.^{5,6} The third route is direct meningeal carcinomatosis, or the so-called *titis interna carcinomatosa*.^{5,7} The fourth is leptomeningeal extension from an intracranial primary tumor, while the last route is leukemic or lymphomatous infiltration.³

As in all reported series, the petrous apex was found to be the site most commonly affected within the temporal bone.^{1,3} The second common site is the internal acoustic canal, followed by the mastoid.^{1,3} The bony labyrinth appears to resist neoplastic invasion because inner ear involvement is uncommon.³ The first 3 common sites of origin of temporal bone metastases in order of decreasing frequency are breast, lung and kidney.¹⁻³ The gastrointestinal tract, larynx, prostate gland, and thyroid gland are the less common sites.^{1-3,8}

Patients with temporal bone cancer can present with a variety of otologic symptoms. Hearing loss, facial paralysis, peri-auricular swelling, otorrhea, otalgia, vertigo, aural mass, and tinnitus were some of the more common symptoms reported.^{1-3,9} However, these conditions are not pathognomonic of metastatic temporal bone cancer but are most frequently symptoms of mastoid infection. In the study of Gloria-Cruz *et al.*,³ hearing loss was the most common otologic symptom (seen in 19 patients [40%]), while 17 (36%) had no otologic or vestibular symptoms. In Maddox's report,⁹ the incidence of facial paralysis has been reported to be 34%, compared to 50% and 14.9% in the studies of Schuknecht *et al.*⁴ and Gloria-Cruz *et al.*³ The combination of otalgia, facial palsy and the appearance of peri-auricular swelling has been mentioned as a triad highly suggestive of metastasis to the temporal bone.⁹

Temporal bone imaging is important in the diagno-

sis of secondary malignancy. The radiologic findings in CT may vary. They may be osteolytic and destructive to bone, or sclerosing and bone-forming; the osteolytic type appears to be the most common in metastases to the temporal bone.¹⁰ However, osteolytic lesions can also be found in cholesteatoma, glomus tumor and neoplasm. Aggressive, progressive bony erosion does seem to be more characteristic of malignant disease. The distinction is often difficult to make.^{11,12} Positron emission tomography should also be considered as another imaging modality for detection of metastatic temporal bone tumors.

The treatment of metastatic temporal bone lesions is systemic chemotherapy with local radiotherapy to the affected temporal region.^{1,10,13} Most series report dismal survival figures, with patients dying of their disease within a short period of time.^{9,10,13} Gloria-Cruz *et al.*³ found that temporal bone metastases were not observed in cases where the primary tumors had been adequately treated. All temporal bones with metastasis in their study had also been found at autopsy to have coexisting metastasis elsewhere. This stresses the need for early management of cancer.

In diabetics with common otologic symptoms as otorrhea, edematous external ear canal and facial palsy, the first impression often is malignant otitis externa or mastoiditis. Although CT in this case revealed soft tissue density over the middle ear cavity and mastoid cavity with obscure bony trabecular structure, it was not easy to differentiate between tumor and inflammatory process. The correct diagnosis was only made on histological examination of the operative specimen. This case emphasizes the importance of both a history of carcinoma and a thorough physical examination in all cases of suspected temporal bone lesions.

Temporal bone metastases may be occult and asymptomatic, or with mild symptoms mimicking those of middle ear or mastoid infections. Although metastatic tumors of the temporal bone are rare, otolaryngologists should consider them in the differential diagnosis for patients presenting with otologic symptoms or facial nerve disorder with a history of malignant neoplasm. Complete head and neck examination, including audiometry and radiographic imaging studies, are important for such patients.

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