Primary tympanic membrane cancer is very rare; metastatic cancer to the tympanic membrane is extremely rare and presents diagnostic challenges. We report a case of metastatic hepatocellular carcinoma in the tympanic membrane. The presenting symptom was hearing loss. Physical examination revealed a friable granulomatous mass over the left anterior tympanic membrane extended from the external auditory canal. Computed tomography scan of the temporal bone revealed one soft tissue mass involving the left external auditory canal and tympanic membrane. A left middle ear mass biopsy was performed. The tumor cells were uniformly positive for cytokeratin and hepatocyte paraffin-1, confirming a diagnosis of metastatic tympanic membrane. A tympanic membrane mass might easily be misdiagnosed and improperly treated. This case serves as a reminder that the differential diagnosis of acute hearing loss in cancer patients should include the metastasis occurring in the auditory canal or tympanic membrane, and that tissue biopsies are necessary to establish the definitive diagnosis for such lesions.

**INTRODUCTION**

Carcinoma of the middle ear is rare. The majority of primary carcinomas of the middle ear are temporal bone carcinomas (1). Tympanic membrane (TM) tumors are even less common; only a few cases have been reported (2–8), and none of these have involved malignant metastases. TM tumors can cause symptoms such as hearing loss, otalgia and otorrhea. Here, we report a case of metastatic hepatocellular carcinoma (HCC) in the TM extended from the external auditory canal.

**CASE REPORT**

An 80-year-old male carrier of hepatitis B was diagnosed with HCC in 2005. He was not treated until February 2007, when he underwent transcatheter arterial chemoembolization (TACE) and then segmental hepatectomy. The pathological findings revealed HCC, moderately differentiated, with multiple vascular permeations and the tumor located very close to the resection margin of diaphragm and liver (<1 mm). He received regular follow-up and several times TACE was performed for recurrent liver tumors. In March 2009 radiographic detection of multiple nodules in the lung fields bilaterally led to a diagnosis of lung metastases. The first cycle of salvage chemotherapy (doxorubicin) was administered at that time. Before the second cycle of chemotherapy, the patient complained of left otorrhea and pruritus, followed by severe hearing loss. Physical examination revealed a friable granulomatous mass over the left anterior TM, and a computed tomography (CT) scan of the temporal bone demonstrated one soft tissue mass involving the left TM (Fig. 1A), extending from the left external ear canal and the infra-auricular region (Fig. 1B). CT contrast administration led to enhancement of the lesion. A left middle ear mass biopsy was performed in July 2009. Microscopically, the tympanic tissue consisted of stratified squamous epithelium with tumor cells and some exfoliate keratins. The tumor cells were poorly organized cells with abundant granular cytoplasm, occasional mitoses in small sheets and vaguely collapsed sinusoids (Fig. 2A and B), which is compatible with the histological and immunohistochemical findings of
the primary lesion (Fig. 2C). On immunohistochemistry (Bondmax, Leica, Australia), the tumor cells were uniformly positive for cytokeratin-PAN and hepatocyte paraffin-1 (Fig. 3A), and negative for anti-cytokeratin antibody (34βE12) and p63 protein (Fig. 3B and C). The overall features confirmed the diagnosis of HCC metastases in the external auditory canal. The general condition of the patient deteriorated rapidly so no additional salvage chemotherapy was possible. The patient died of tumor progression in September 2009.

DISCUSSION

TM tumors are very rare and their diagnosis is difficult because the lesions usually obscure direct visualization of the eardrum. The middle ear mass might easily be misdiagnosed as a cholesteatoma of the temporal bone and therefore be improperly treated. The majority of TM tumors are benign, such as fibromas, hemangiomas and schwannomas (3–6). Surgical treatment for tumors of the TM is usually indicated, since most of these cases are benign lesions Primary TM malignancies are extremely rare; only a few cases have been reported. The first was by Gisselsson in 1952, and was a case of squamous cell carcinoma (8). Goodarzi et al. reported a case of lymphoma of the TM in the setting of acquired immunodeficiency syndrome. The initial symptoms were 3 weeks of
worsening left ear pain, hearing loss and a 1 week history of left facial weakness (7). Somers et al. (6) reported another patient with isolated squamous cell carcinoma of the TM, presenting in a 65-year-old man with hearing loss, tinnitus and otorrhea secondary to a left-sided chronic otitis externa. All previously reported cases have been of primary TM tumors: ours may be the first report of a metastatic TM lesion. Our case is unique as this is probably the first case report about the metastasis of the external auditory canal cancer invading the TM.

HCC is a very highly invasive tumor that metastasizes through the vascular and lymphatic systems to distant sites. The most frequently affected sites are the lungs, regional lymph nodes, bones and adrenal glands. Extrahepatic metastasis of HCC is not uncommon in the late stages of the disease, and has been reported in 14–35% of patients (9). As the treatment of HCC has improved, patients survive longer, and so discovery of extrahepatic metastases has become more frequent. Extrahepatic metastasis, particularly to the head and neck, is a major independent predictor of poor outcome in patients with HCC. There have been several reports of HCC metastases to the head and neck, including to the mandible, orbital cavity and skull (10). In our patient, direct invasion to the TM from an external ear canal metastasis should be considered the tumor pathogenesis. There was no evidence of local bony metastasis or direct skin invasion from other head and neck areas. The pathogenesis probably is hematological extended spreading from the original site. In our case, curative surgical resection of the malignant metastatic lesion was not possible; radiation therapy and chemotherapy were considered as palliative therapies.

Metastasis cancer in the internal and external auditory canal is rare and difficult to diagnose. This case serves as a reminder that in a patient with known multiple metastases, acute hearing loss should be taken care of and an external auditory canal examination should be taken to rule out the possibility of metastasis. High resolution CT scan in this area would be helpful to make the diagnosis. Most importantly, tissue biopsies are necessary to establish the definitive diagnosis for such lesions. The patient with TM metastasis would have a very poor prognosis due to the very advanced stage of the disease.

Conflict of interest statement
None declared.

References