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Case Report

Mucosal Melanoma of Eustachian Tube: A Case Report

Yung Jee Kang[1], Min Bum Kim[2], Sang Duk Hong[1], Yang-Sun Cho[1]

[1]Department of Otolaryngology–Head and Neck Surgery, Samsung Medical Center, Sungkyunkwan University Faculty of Medicine, Seoul, Korea
[2]Department of Otolaryngology-Head and Neck Surgery, Jeju Medical Center, Jeju University Faculty of Medicine, Jeju, Korea

ORCID IDs of the authors: Y.J.K. 0000-0003-4062-0717, M.B.K. 0000-0001-5418-5176, S.D.H. 0000-0003-3075-1035, Y.-S.C. 0000-0001-9180-2903.

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Mucosal melanoma originating from the eustachian tube is very rare, and only 15 cases were reported so far. In this study, we report a case of mucosal melanoma from the eustachian tube which was surgically managed, followed by chemoradiotherapy. A 53-year-old man presented with a history of recurrent idiopathic hemotympanum and a dark red mass in the nasopharynx protruding from the eustachian tube orifice. Under an impression of mucosal melanoma from the eustachian tube, *en-bloc* surgical removal was performed using the infratemporal fossa approach type C combined with a transnasal endoscopic approach followed by postoperative chemoradiotherapy. However, the disease progressed to lung metastasis, and the patient died of the disease at 13 months postoperatively. The presenting case showed a poor progression despite a margin-free surgical resection followed by chemoradiotherapy. Additional trial of new treatment options is necessary to improve the poor prognosis.

KEYWORDS: Mucosal melanoma, eustachian tube, middle ear

INTRODUCTION

Primary malignant mucosal melanoma (MM) is a rare disease, and only 15 cases of melanoma originating from the eustachian tube (ET) have been reported.[1] Mucosal melanoma accounts for 0.8%-3.7% of all melanomas[2] and most commonly occurs in the paranasal sinus and oral cavity.[2,3] Mucosal melanoma originates from ectopic migration of melanocytes to the mucosa, presenting as black pigmentation.[3] Common symptoms of nasal MM are nasal symptoms such as nasal obstruction or epistaxis.[2,3] Otorrhea, ear fullness, and hearing loss can occur as symptoms in MM from the middle ear or ET.[4,5] Radiologic workup including computed tomography (CT), magnetic resonance imaging (MRI), and fluorodeoxyglucose positron-emission tomography (FDG-PET) is necessary, and histologic confirmation is required for diagnosis.[4,6] Histopathologic findings include positivity for S-100 protein and positivity for Melan A and HMB 45, which are anti-melanoma antibodies.[4] A study found that primary MM from ET is associated with upregulation of CTLA-4 and IL-17.[7]

Primary management of MM is surgical excision combined with chemoradiotherapy.[5,8] Immunotherapy may be helpful, but few reports have evidenced its efficacy.[3] The prognosis of MM is very poor and 5-year survival rate is reported to be 17%-31.7%.[2,3]

In this case report, we present a case of MM originating from the ET, which was surgically managed using a combined approach to the nasopharynx and middle ear, followed by chemoradiotherapy.

CASE PRESENTATION

A 53-year-old male presented with a nasopharyngeal mass. He had a history of recurrent idiopathic hemotympanum and ventilation tube insertion on the left side.

Nasal endoscopy revealed a dark-red mass in the left nasopharynx protruding from the ET orifice (Figure 1A). On MRI, the mass in the ET showed mild high signal intensity on T1-weighted imaging with moderate homogeneous contrast enhancement and isosignal intensity on T2-weighted imaging. The mass extended into the ipsilateral middle ear along with the ET (Figure 1B-D). No other FDG uptake was found in other parts of the body including the neck.

Corresponding author: Yang-Sun Cho, e-mail: yangsun.cho@gmail.com

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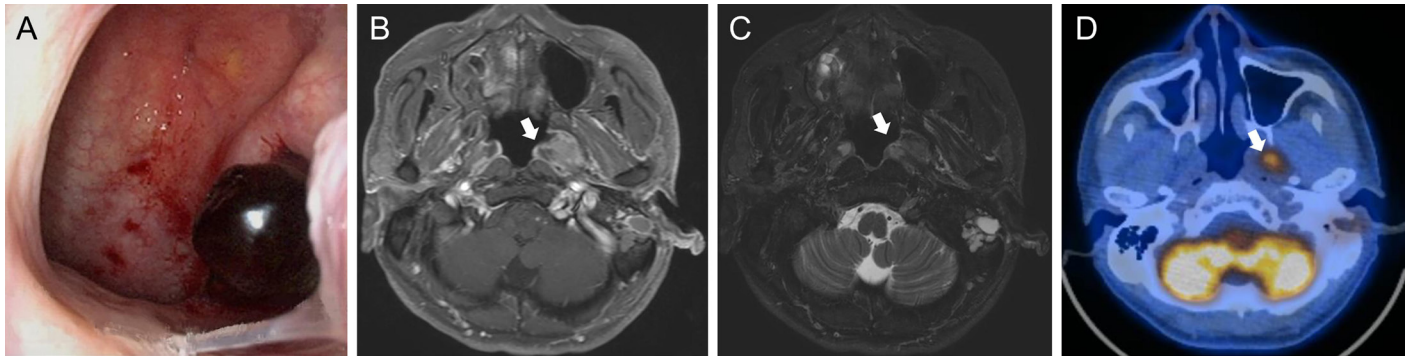

Figure 1. a-d. (A) Dark pigmented mass in the left nasopharynx protruding from the eustachian tube orifice. (B) T1-weighted image showing an enhanced mass (white arrows) in the eustachian tube. (C) On T2-weighted image, the mass showed an isodense signal. (D) On FDG-PET, high uptake of FDG was seen in the same location. FDG-PET, fluorodeoxyglucose positron-emission tomography.

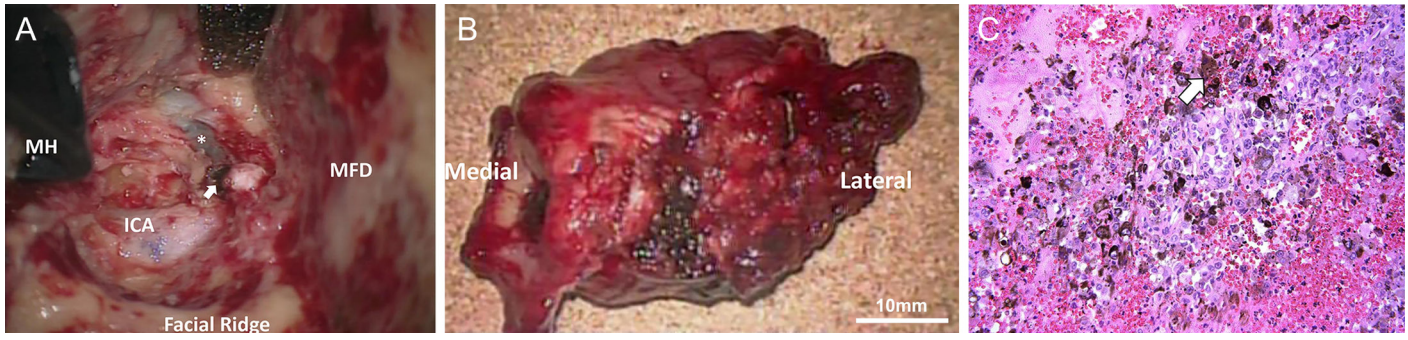

Figure 2. a-c. (A) Black pigmented mass in the eustachian tube (asterisk) identified during surgery. White arrow indicates the lumen of eustachian tube filled with black pigmented material (B) The surgical specimen. The lateral end of the specimen indicates the eustachian tube orifice in the middle ear, and the medial end indicates the nasopharyngeal orifice. (C) Microscopy (×200) shows prominent nucleoli, atypical melanocytes, and dysmorphism with significant pigmentation. White arrow indicates atypical melanocytes with significant pigmentation. ICA, petrous part of internal carotid artery; MFD, middle fossa dural plate; MH, inferiorly-retracted mandibular head.

Surgical removal of the ET mass and postoperative chemoradiotherapy were planned. A balloon occlusion test revealed that the anterior and posterior communicating arteries were patent when the internal carotid artery (ICA) was occluded, accompanied by sufficient collateral vessels.

A Fisch-type C infratemporal fossa approach (ITFA) combined with a nasal endoscopic approach was employed to access the ET mass from both the nasopharynx and middle ear. The external auditory canal was blind-sac closed and subtotal petrosectomy was performed. The condylar fossa was further removed and the mandibular condyle was exposed and pulled down. The ET containing the tumor was exposed and separated from the ICA and skull base (Figure 2A). After isolation of the ET orifice from the nasopharynx, the tumor was removed *en-bloc* (Figure 2B). Selective ipsilateral neck dissection was also performed. The margins of excision were the paramedian line of the nasopharynx medially, the horizontal ICA superiorly, the upper margin of the soft palate inferiorly, and the tympanic bone laterally. The inner ear structures and facial nerve remained intact, but both the maxillary and mandibular nerves were sacrificed. The operative space was filled with a temporalis muscle rotation flap. Intraoperatively, several dark dots were found in the tympanic and mastoid mucosa. Frozen biopsy of those lesions was all negative for malignant cells and proven to be an accumulation of hemosiderin on histological examination.

The mass in the ET was histologically diagnosed as MM showing prominent nucleoli, atypical melanocytes, and dysmorphism with significant pigmentation (Figure 2C). All resection margins of the main mass were negative for malignancy. No perineural or endovascular invasion was noted and all cervical lymph nodes were proven negative. The patient underwent radiation therapy a month after surgery but refused subsequent interferon therapy due to severe oral pain and dryness. No local recurrence was observed on MRI after 3 months (Figure 3). However, at 6 months postoperative, lung metastasis was found on chest CT, and the patient started to undergo immunotherapy with pembrolizumab. Eight months after surgery, a small mass developed on the left temple area was revealed to be MM on fine-needle aspiration. The mass was removed, and the patient underwent palliative chemotherapy for several months until he died of disease progression 13 months after surgery. Institutional Review Board granted approval for this case report (IRB No# 2021-08-155).

MAIN POINTS

- Eustachian tube mucosal melanoma is a very rare disease, and only 15 cases have been reported so far.
- Margin-free surgical resection was performed using a combined approach of transnasal and type C infratemporal fossa approach, followed by chemoradiotherapy.
- Surgical resection followed by radiation therapy was the most common treatment option for mucosal melanoma from the eustachian tube, and new treatment options are necessary to improve the poor prognosis

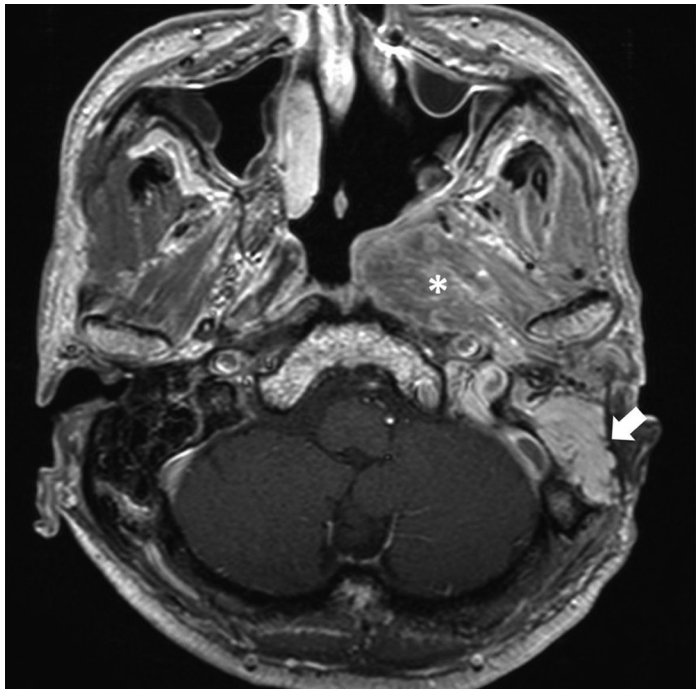

Figure 3. Postoperative T1-weighted MRI image 3 months after surgery. The surgical cavity was filled by the temporalis muscle rotation flap (asterisk), and there was no evidence of local recurrence. The mastoid cavity not covered by the muscle flap was filled with abdominal fat (white arrow). MRI, magnetic resonance imaging.

DISCUSSION

In the head and neck region, the nasal cavity, paranasal sinus, and oral cavity are the most common sites of MM, while MM of the ET is extremely rare.[4,9] To the best of our knowledge, only 15 cases of MM arising from the ET have been reported previously. Eustachian tube dysfunction induced by the mass usually presents as ear fullness or hearing loss.[10]

Imaging studies are essential to evaluate the mass. Although CT is helpful for assessing the bony changes, MRI has better soft tissue resolution and is more useful for evaluating MM from the ET.[11] Typical findings of MM on MRI depend on the concentration of melanin in the tumor.[4,11] Tumors with a high concentration of melanin show high signal intensity on T1-weighted imaging and low signal intensity on T2-weighted imaging. In addition, MM shows strong contrast enhancement on CT and MRI due to its rich vascularity.[4]

Histologically, with tumor cells rich in melanin, the patient can be diagnosed with melanoma. In the present case, dysmorphism and dense prominent nucleoli of melanocytes were observed with darker pigmentation than hemosiderin. Therefore, positive findings on immunohistochemical staining such as S-100, HMB-45, or Melan-A are necessary to diagnose MM.[10]

The recommended treatment of MM is surgical resection combined with postoperative radiotherapy. Complete tumor resection with a negative resection margin provides the best outcome.[8] However, nearby vital structures of the ET make margin-free resection challenging,[8] and a surgical approach including Fisch-type C ITFA, transnasal, or combined approach is needed.[7-9,12] In cases of disseminated MM, chemotherapy or interferon therapy can be considered, but the results are typically poor.[5,10]

Because MMs from the ET have the propensity to involve adjacent regions such as nasopharynx or middle ear,[1,5,7-13] and the potential to metastasize even after complete surgical removal, the prognosis is generally poor.

The differential diagnosis of pigmented mucosal lesions includes melanocytic lesions such as melanotic oncocytic metaplasia and nevus.[10] It is also necessary to distinguish melanin pigmentation from hemosiderin accumulation.[14] Interestingly, even in patients diagnosed with MM, dark spots around the lesion are not necessarily caused by melanoma. The surgical findings in this case demonstrated several dark spots in the middle ear and mastoid mucosa, but they were histologically free from malignant cells and proven to be hemosiderin accumulation.

Surgical treatment was the most common, and primary radiation therapy was performed in a few cases. Chemotherapy or concurrent chemoradiation therapy was performed for more advanced lesions. Recently, immunotherapy targeting CTLA-4 and IL-17 has been performed,[7] and a case report of primary MM from the middle ear treated with a PD-1 blockade reported a stable disease for more than 5 years.[15] However, most patients died of disease progression, with an average disease-free period of 1 year.

CONCLUSION

Mucosal melanoma from the ET is a very rare condition. In the presenting case, *en-bloc* surgical resection was performed with a negative resection margin using a combined approach of transnasal and type C ITFA, followed by chemoradiotherapy. However, the patient typically showed poor progression. To overcome the unfavorable prognosis of MM, the implementation of new treatment modalities in addition to existing treatment options should be actively considered.

Informed Consent: The informed consent could not be obtained from patient as the patient died of the disease.

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