Metastasis of colonic adenocarcinoma to the external ear canal: An unusual case with a complex pattern of disease progression

Henry J. Carson, MD; Jeffrey S. Krivit, MD; Stanley G. Eilers, MD

Abstract
We report on a patient who developed far-ranging metastases of adenocarcinoma of the colon that followed a gradual cephalad progression, including the right external ear canal, and led to hearing loss. The patient was a 63-year-old white male with stage III adenocarcinoma of the colon. After 2 years with metastases elsewhere, he developed hearing loss on the right side. Physical examination of the head and neck showed a mass in the external ear canal, and biopsy confirmed adenocarcinoma. After removal, the patient’s hearing improved. This case is interesting not only because of the unusual metastasis to the external ear canal, but also because of the patient’s previous history of metastasis over the course of more than 2 years. The significance of such wide-ranging metastases is that metastasis of adenocarcinoma to the ear did not signal imminent death, and relief of the hearing loss it caused was possible.

Introduction
We observed a patient who had developed a series of unusual, far-ranging metastases of adenocarcinoma of the colon. The metastases had followed a gradual course of cephalad progression in the body over time and included a metastasis to the right external ear canal. Few cases of metastases of adenocarcinoma of the colon to the ear have been reported, and there is little information about how this malignancy might reach this site and what the implications of such spread are. Our case may offer insight into this pattern of disease progression by demonstrating a series of metastases spaced apart over a relatively long period. The significance of this type of metastatic disease is discussed.

Case report
The patient was a 63-year-old white man with an unremarkable medical history who presented to his local doctor with a chief complaint of passing 5 to 6 small stools per day. He denied the presence of blood in the stool, weight loss, or fatigue. Sigmoidoscopy revealed a bulky, friable tumor, 20 cm from the anal verge, located in the hollow of the sacrum. The patient underwent a sigmoid colon resection. Gross examination showed a friable, sessile circumferential mass. Histologic examination showed a poorly differentiated adenocarcinoma that infiltrated the muscularis propria. The margins were free of tumor, but 1 of 10 mesenteric lymph nodes was positive for metastatic adenocarcinoma. The carcinoma was staged T4 N1 Mx (stage III). Chemotherapy with 5-fluorouracil and leucovorin was initiated.

At the end of the year, the patient complained of right shoulder pain and new abdominal pain. Magnetic resonance imaging (MRI) of the brachial plexus and computed tomography (CT) of the abdomen confirmed new masses in the brachial plexus and liver consistent with metastases. He also complained of sudden-onset hearing loss on the right side. Audiometric examination confirmed hearing loss on...
the right side compared with the left. Physical examination of the head and neck showed the healed surgical site on the right submandibular area where the previous carcinoma had been excised. A new subcutaneous mass in the left anterior chin was observed with a concurrent left hypoglossal nerve palsy. Microscopic examination of the right ear showed an exophytic mass in the external auditory canal, which was believed to be an obstruction that caused the unilateral hearing loss. The left ear was unremarkable. Under local anesthesia, an excisional biopsy was performed.

Examination of the tissue taken at the biopsy showed an adenocarcinoma, characterized by irregular glands in an organoid pattern, high nuclear/cytoplasmic ratio, peripheral cytoplasm, and numerous mitoses (figure). Immunoperoxidase stains were negative for cytokeratin 7, and positive for cytokeratin, consistent with a colon primary. The neoplasm was assessed to be a metastasis from the adenocarcinoma of the colon, which began 27 months earlier. Excision of the mass of the external auditory canal led to improvement of the patient’s hearing on the right side and restoration of symmetric auditory functioning. He elected palliative therapy for the liver mass and brachial plexopathy.

Discussion
Reports of metastasis from distant primary malignancies to different sites in the ear are uncommon. Among the more common sites of the ear to receive metastases from distant malignancies are the temporal bones. The temporal bones typically receive metastases from primary malignancies that are prone to spread to bones in general, particularly primary carcinomas of the breast, kidney, and lung. The route of metastasis is believed to be hematogenous. The presenting features of temporal bone metastasis can include hearing loss, as this patient experienced. Cases with such hearing loss have originated from adenocarcinomas of the stomach, prostate, and pancreas. In our case, metastatic adenocarcinoma of the colon also presented with hearing loss, but the site of the implant in the external ear canal was unusual. Other tumors have spread to the external ear, but the only cases of colonic adenocarcinoma causing hearing loss resulted from metastasis to middle ear sites and a tumor of unknown primary that caused hearing loss by reaching the inner ear.

Neoplasms of the ear tend to be primary to those sites. Common primary neoplasms of the external auditory canal include ceruminous adenoma, adenoid cystic carcinoma, ceruminous adenocarcinoma, and pleomorphic adenoma. Carcinoids are another kind of rare primary tumor of the middle ear with low malignant potential.

Metastases from distant sites to the middle and inner ear have also been reported. Merrick describes a 62-year-old female patient with a history of Dukes B adenocarcinoma of the colon who presented with left otitis media. In the tenth postoperative month, a polypoid mass was found in
her left middle ear, and biopsy confirmed metastatic carcinoma. Chest x-ray showed a new lung mass at that time, and the patient died of disseminated carcinoma 9 months later. Moloy et al describe a 40-year-old man who, like our patient, developed unilateral hearing loss; his hearing loss was attributed to an adenocarcinoma of unknown primary. This man’s tumor spread to the internal auditory meatus, and he died 3 months later.

Our patient’s case is interesting not only because of the unusual metastasis to the external auditory canal, but also because of his previous history of metastasis over a fairly long period. The primary malignancy in the colon was detected and treated at stage III. Appropriate surgery and chemotherapy ensued. Over the course of more than 2 years, metastases were identified in the right submandibular gland, left buccal mucosa, abdomen, brachial plexus, and right external ear. The gradual cephalad progression of the adenocarcinoma in this patient, from left colon to right ear, is striking.

As noted, most malignancies metastatic to the ear appear to spread hematogenously via the temporal bones. Malignancies from the abdomen are also known to ascend to the head and neck via the thoracic duct, which drains at the junction of the left internal jugular and left subclavian veins. Malignancies from distant sites have been known to appear in the left supraclavicular nodes (the “sentinel” nodes), and backflow from this site can lead to other implants in the head and neck. This route through the mesenteric nodes and thoracic duct could explain the mesenteric and buccal implants. On the right side, the right lymphatic duct enters at the junction of the right internal jugular and right subclavian veins, but this duct only drains lymph from the right side of the head and neck, the right upper limb, and the right half of the thoracic cavity. This route could explain the right submandibular implant, right brachial plexopathy, and right ear metastasis. However, each route might require some retrograde flow of neoplastic cells or collateral circulation of these cells through common sites. Adenocarcinoma of the colon certainly can also enter the systemic circulation and spread to organs and bone, which would also explain the pattern of metastases in this patient.

Typically, the significance of such wide-ranging metastases in a patient with disseminated adenocarcinoma of the colon is the poor prognosis that it imparts. Interestingly, however, this malignancy’s metastasis to the ear did not signal imminent death for the patient; this outcome was also true of Merrick’s patient described above. Rather, our patient lived with disease long enough to develop unusual metastases, and management of the specific problems caused at each site of metastasis was fairly successful, as in restoration of hearing in the affected ear. Thus, suspicion and diagnosis of widely metastasized adenocarcinoma of the colon is a useful clinical activity because it can lead to relief of specific complications.

References