

Background

Metastases to the thyroid are rare despite being a highly vascularized organ. In the United States, metastatic tumors are present in 1% to 3% of all thyroid specimens removed for malignancy [1]. Intrathyroidal metastasis (ITM) are more common in women than men and in nodular thyroid glands [1]. Studies have shown the most common types of metastasis to be from renal cell carcinoma (RCC), lung cancer, gastrointestinal malignancies and breast [2-5]. Initially discovered on autopsy specimen, ITMs are increasingly being detected given the more accurate diagnostic tests and thus offer challenges to treatment protocols. In this case report, we discuss the presentation and disease progression of a patient diagnosed with metastatic breast cancer to the thyroid.

Case Description

A 67-year old female presented with three months of hoarseness and dysphagia following an upper respiratory infection. Her past medical history included breast cancer treated by mastectomy two years prior to presentation. On clinical examination, she was found to have paralysis of the right vocal cord, and a follow-up CT scan of the neck revealed an enlarged thyroid gland with multiple bilateral thyroid nodules. FNA of a right-sided 3.5 cm thyroid nodule was diagnosed as atypia of undetermined significance (Bethesda category III). A repeat FNA three months later yielded a diagnosis of benign follicular nodule (Bethesda category II). Persistent hoarseness and compressive symptoms, combined with atypical findings on the initial FNA, necessitated right thyroid lobectomy and right vocal cord injection. Intraoperatively, the right thyroid lobe was noted to be moderately enlarged with multiple nodules but no evidence of extrathyroidal extension.

At the one-week postoperative visit, the patient complained of right-sided hearing loss which had started the day of her surgery, as well as a two-day history of right-sided facial weakness. Audiologic testing showed a profound right-sided sensorineural hearing loss. Given these acute changes, she was directly admitted to the hospital for further workup where a brain MRI showed a right cerebellopontine angle mass concerning for further metastasis. A lumbar puncture was negative for malignancy; therefore, the patient underwent a retrosigmoid craniotomy for tissue diagnosis which confirmed metastatic breast cancer. Due to her extensive disease, no further surgical intervention was pursued.

Histologic Examination of Lobectomy Specimen

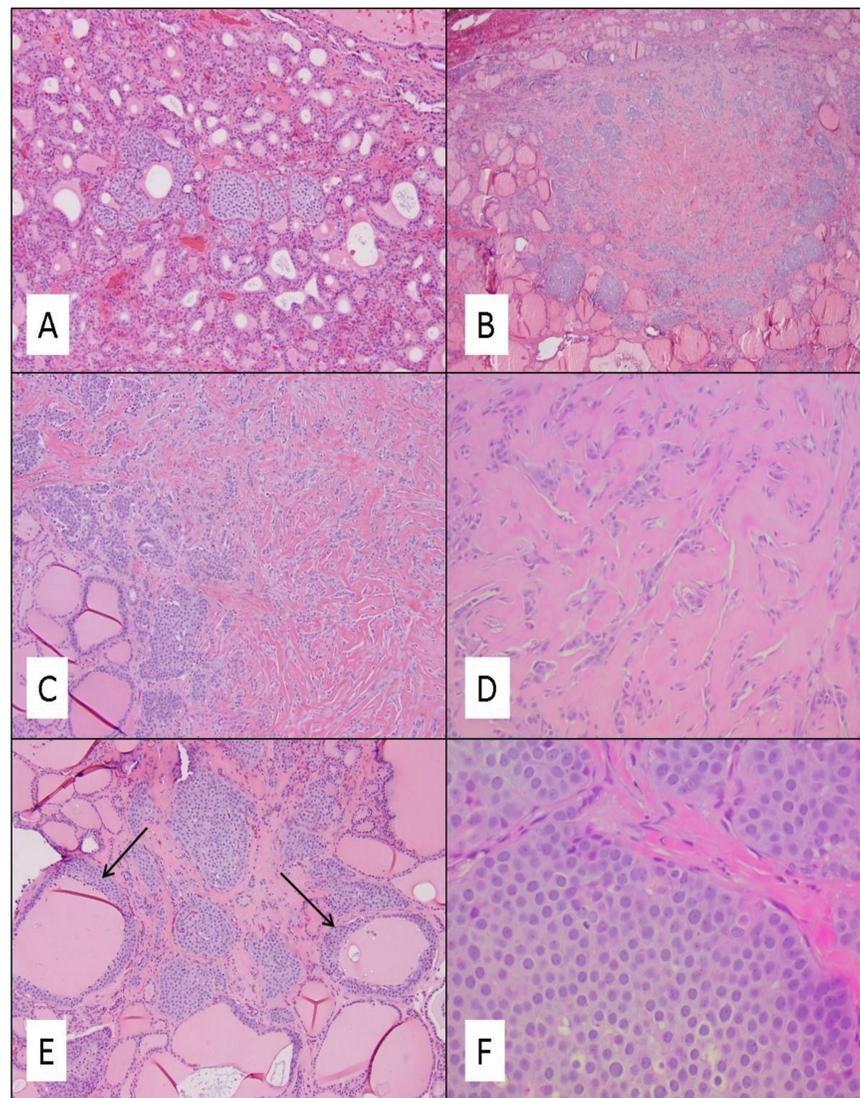


Fig 1. One of the smallest metastatic deposits consists of a few irregularly-shaped nests of tumor cells spanning only one millimeter (A, x100). One of the larger metastatic deposits consists of a fairly well-circumscribed proliferation of tumor cells, which are arranged peripherally in nests and centrally as cords within a sclerotic stroma (B, x40). The densely sclerotic stroma in this focus of metastatic breast carcinoma resembles the amyloid-type stroma seen in medullary thyroid carcinoma (C, x100), and the embedded cords and small nests of tumor cells display pronounced retraction artifact (D, x200). Some metastatic deposits show prominent peripheral rimming of the thyroid follicles by tumor cells, in a pattern reminiscent of C cell hyperplasia (E, x100). The tumor cells have round nuclei with fine chromatin and prominent nucleoli, ample eosinophilic cytoplasm, and distinct cell borders (F, x400).

Discussion

The thyroid gland has a rich arterial supply yet is a rare site of metastatic disease. This paradox is attributed to a combination of fast arterial flow hindering tumor cell adhesion, and high oxygen saturation and iodine content inhibiting tumor cell growth [1]. The clinical detection rate of thyroid metastases may be increasing with more accurate imaging and diagnostic techniques [6]. In a literature review of 374 of ITMs, Chung et al. [1] found that almost half of ITMs occurred in diseased thyroids affected by primary thyroid neoplasia, goiter, or thyroiditis. These abnormal thyroid glands may be more susceptible to metastatic disease, perhaps due to aberrant blood supply resulting in reduced oxygen and iodine levels; however, metastatic disease appears to affect otherwise normal thyroid glands at an equal predilection [1].

Although breast cancer ranks fourth among ITMs, autopsy studies suggest it may actually be more common [1, 7]. Detection of a ITMs can occur as late as 12 years post-treatment for the primary breast cancer, and is generally associated with poor prognosis [7, 8]. Most patients with clinically evident ITMs have widespread metastatic disease [6]. Surgical resection may not be indicated for intrathyroidal breast cancer metastases, so upfront detection is crucial if unnecessary surgery is to be avoided [8]. Unfortunately, sampling error or misinterpretation may hinder the FNA diagnosis of metastatic lesions in the thyroid, especially in the setting of a large goiter containing microscopic metastatic foci.

Conclusion

This case emphasizes the importance of a clinical history of cancer in the work up of a thyroid nodule and vocal cord paralysis. Despite being a rare entity, ITMs should be considered especially in those with a history of RCC and breast cancer. When possible, metastatic lesions should be identified early given the difference in treatment protocols and prognosis when compared to primary thyroid cancers.

Citations

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