

Metastatic Melanoma to Thyroid: A Case Report and Institutional Review

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Abstract

Objective: To report a case of melanoma metastatic to the thyroid gland and to review our experience with secondary neoplasms of the thyroid.

Methods: We depict the presentation and treatment of the patient, illustrating pathologic and radiologic findings. All patients with pathologic confirmation of metastatic tumors of the thyroid undergoing thyroidectomy at the Massachusetts General Hospital were reviewed (1995-2008).

Results: A 59-year-old male presented with malignant melanoma of the scalp. Two months following his melanoma excision and lymphadenectomy, he underwent a hemi-thyroidectomy for fine-needle aspirate positive solitary metastasis. He initially did well, but on follow-up was noted to have diffuse metastases and expired from his disease eight months following initial diagnosis. Institutional review revealed 13 additional patients with pathologically confirmed secondary thyroid tumors.

Conclusions: FNA remains an indispensable diagnostic tool. Palliation from local compressive symptoms is an indication for surgery and long-term survival is seen in some patients undergoing resection of isolated metastases.

Keywords: Thyroid cancer, secondary tumors, metastatic melanoma, metastatic renal cell carcinoma, FNA.

INTRODUCTION

Secondary malignancies of the thyroid are rare. Autopsy series report an incidence of secondary thyroid malignancies in 0.5 to 1.8% of unselected autopsies and up to 2.8% of glands studied in cancer patients.¹⁻³ Screening ultrasound as well as surveillance CT and ¹⁸FDG-PET for established cancer patients has led to the increased detection of incidental secondary neoplasms of the thyroid.^{9,10} These lesions frequently harbor malignancy.⁴ Treatment of metastatic lesions to the thyroid is not well-established. In this paper, we describe a case report of a rare patient with melanoma metastatic to the thyroid and review our institution's experience with secondary lesions of the thyroid.

CASE REPORT

The patient is a 59-year-old male who in February 2005 was noted to have a suspicious mole on his left occiput. A shave biopsy was consistent with a superficial spreading melanoma, with a Breslow depth of 0.85 mm and Clark's level IV; no ulceration or lymphovascular invasion was

found. The patient was noted to have a palpable lymph node in the left occipital region; an FNA was consistent with metastatic melanoma.

Metastatic work-up with a brain MRI and an abdominopelvic CT scan were negative. A chest CT showed a 2.1 cm hypodense nodule consistent with a solitary ¹⁸FDG-PET avid region arising from the left lobe of the thyroid gland (Fig. 1). He underwent a wide excision of the scalp melanoma and a modified radical left neck dissection. Pathology revealed negative margins, with residual malignant melanoma and one of ten lymph nodes positive for metastatic melanoma. Systemic induction interferon therapy was initiated and he was referred to an endocrine surgeon for further evaluation of the thyroid nodule.

The patient denied local symptoms, history of thyroid disease or radiation exposure, and family history of thyroid cancer. On physical exam, he was noted to have a firm and mobile nodule at the lower pole of the left thyroid lobe. A thyroid ultrasound demonstrated a solitary 2.5 × 1.6 × 1.4 cm solid, hypoechoic nodule at the left lower pole of the thyroid (Fig. 2) and no cervical adenopathy was noted. A

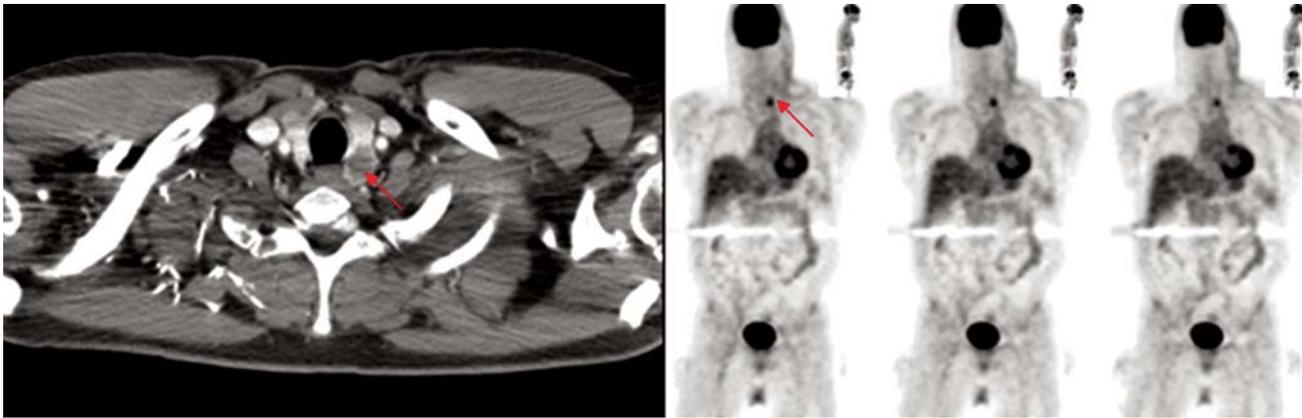


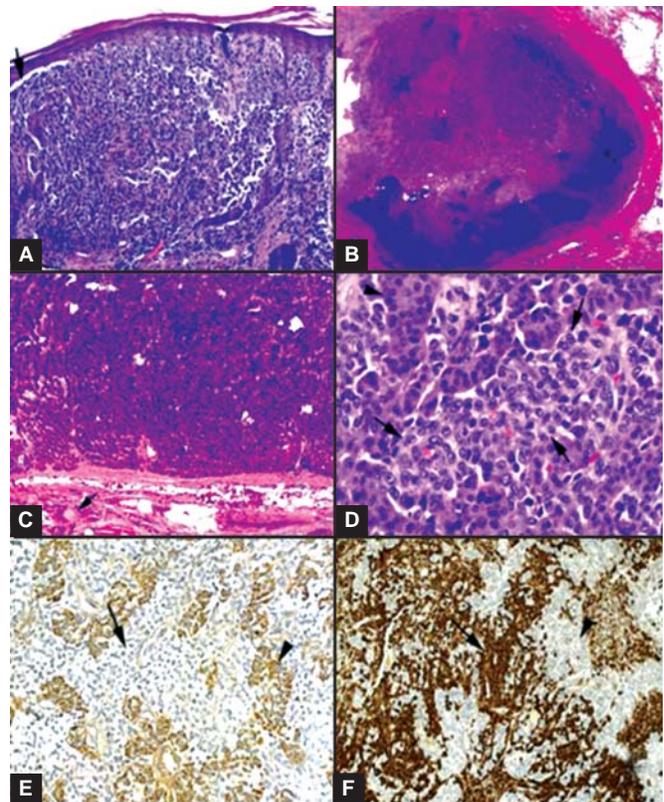
Fig. 1: CT-chest showing left lower pole 2.1 cm hypodense thyroid mass (left); PET-FDG scan illustrating avidity in the left lower pole of the thyroid (right)



Fig. 2: Neck ultrasound demonstrating a 2.5 × 1.6 × 1.4 cm solid, heterogeneous, hypochoic nodule in the left lower pole of the thyroid

fine needle aspiration (FNA) was performed confirming metastatic melanoma consistent with the known scalp primary. He underwent a left hemi-thyroidectomy and left central lymph node dissection. At exploration, there was a focal 2.5 cm nodule at the left lower pole that was readily mobilized from the surrounding tissues. The final pathology revealed metastatic melanoma within a follicular adenoma with Hürthle cell features and two negative perithyroidal lymph nodes (Figs 3A to F).

He initially did well following his thyroidectomy, but on routine follow-up was noted to have diffuse metastases including liver metastases on CT and numerous osteolytic bone lesions on bone scan. Maintenance interferon therapy was not tolerated and the disease progressed. Palliative



Figs 3A to F: Left occiput skin biopsy: Nests of malignant melanoma cells at the dermal-epidermal junction (arrow) (A, 100X, H&E-stained); metastatic malignant melanoma replacing an occipital lymph node (B, 50X, H&E-stained); sharply circumscribed nodule of neoplastic cells with adjacent uninvolved thyroid tissue arrow (C, 100X, H&E-stained); two intermixed populations of neoplastic cells: follicular adenoma cells with round nuclei, prominent nucleoli, and brightly eosinophilic cytoplasm (arrowhead); and malignant melanoma cells with irregular nuclei, coarse chromatin, and pale cytoplasm (cells between arrows) (D, 400X, H&E-stained); follicular adenoma cells stain positive for thyroglobulin (arrowhead); the melanoma cells do not stain with this antibody (arrow) (E, 100X); metastatic melanoma cells stain positive for MART-1 (arrow); the follicular adenoma cells do not stain with this antibody (arrowhead) (F, 100X)

radiotherapy was started. The patient expired from his disease eight months following the initial diagnosis.

INSTITUTIONAL REVIEW

All patients with pathologic confirmation of metastatic tumors of the thyroid undergoing thyroidectomy at the Massachusetts General Hospital were studied with Institutional Review Board compliance (1995-2008). Patients with direct extension from local tumors were excluded. Patient age, gender, presentation, time from diagnosis of primary tumor, treatment, and outcome are retrospectively reviewed.

Fourteen patients had pathologically confirmed secondary tumors metastatic to the thyroid gland: five renal cell carcinomas (RCC), two melanomas, two colorectal adenocarcinomas, two nonsmall cell carcinomas of the lung, one breast adenocarcinoma, one fibrosarcoma, and one adenoid-cystic carcinoma. This cohort included six women and seven men with an average age of 64 (SD \pm 12) years. Ten out of the 14 patients presented with local symptoms including seven with compressive symptoms, one with dysphagia, one with hoarseness, and one with dyspnea.

Four incidental thyroid nodules were noted on surveillance imaging for the patient's primary malignancy, two on chest CT for two of the RCC patients, and 18FDG-PET for the others (Fig. 1). Twelve of the 14 patients

underwent FNA of the suspicious nodules. Seven of 12 were accurate in identifying the specific primary. Of the other five, one patient underwent three nondiagnostic FNAs prior to surgical confirmation of metastasis, two were false-negatives, and two were suspicious for malignancy. Seven patients had isolated metastases. Two of the four RCC patients with follow-up are alive with no evidence of disease, and the others lived greater than four years following the diagnosis of thyroid metastasis. Patient demographics, tumor type, presentation, and treatment are illustrated in Table 1.

DISCUSSION

Secondary malignancies account for 1.4 to 7.5% of all thyroid malignancies and up to 24% of autopsy specimens. RCC is the most common primary followed by lung, breast, and melanoma.⁵ Wychulis et al who reported 14 cases of biopsy proven secondary malignancy of the thyroid at the Mayo Clinic from 1907 to 1962.⁶ They found a similar distribution of primary tumors including eight RCC, four breast adenocarcinomas, one rectal adenocarcinoma, and one transitional cell carcinoma. A follow-up series reported 43 cases over a ten-year period. Consistent with other reports, the cancer with the highest frequency of thyroid metastases was RCC. In 6/43, the thyroid was the initial site of metastasis. In their series, the mean survival of patients who were treated with thyroidectomy (23/43) was

Table 1: Patient demographics, presentation of metastases, and outcomes: Tumor subtype, patient age and gender, extent of surgery, presence of symptoms and other metastases, time from diagnosis of primary tumor, and outcome at last known follow-up

Pathology	Age/ Gender	Treatment	Symptoms	Isolated thyroid metastasis	Time from primary diagnosis	Length of follow-up/outcome
Renal cell carcinoma	62M	Left hemi-thyroidectomy	No	No	5 years	5 years, alive with disease
Renal cell carcinoma	58M	Total thyroidectomy	Yes	No	6 years	6 years, alive with NED
Renal cell carcinoma	79M	Total thyroidectomy	Yes	Yes	14 years	5 years, alive with NED
Renal cell carcinoma	52F	Right hemi-thyroidectomy	No	No	7 years	4 years, expired
Renal cell carcinoma	72F	Total thyroidectomy	Yes	Yes	3 years	Unknown
Melanoma	70M	Total thyroidectomy	Yes	Yes	2 months	1 year, expired
Melanoma	60M	Left hemi-thyroidectomy, CLND	No	Yes	2 months	8 months, expired
Nonsmall cell	82M	Total thyroidectomy + tracheal resection	Yes	No	Simultaneous	Unknown
Nonsmall cell	62F	Total thyroidectomy + CLND	No	No (+LN)	2.5 years	1 year, alive with disease
Rectal adenocarcinoma	47M	Partial thyroidectomy	Yes	Yes	Simultaneous	3 years, expired
Colon adenocarcinoma	65F	Subtotal thyroidectomy	Yes	Yes	3 years	Unknown
Breast adenocarcinoma	82F	Total thyroidectomy + CLND	Yes	No	39 years	1 month, expired
Fibrosarcoma of esophagus	45F	Total thyroidectomy	Yes	No	2.5 years	Unknown
Adenoid cystic carcinoma	52F	Right hemi-thyroidectomy CLND	Yes	Yes	Simultaneous	1 year, alive

Abbreviations: CLND—central lymph node dissection of neck, Level VI. NED—no evidence of disease.

34 months compared with 25 months for those treated with chemotherapy or radiation alone (20/43). Ten patients who underwent thyroidectomy were identified in an eight-year review of clinically significant isolated metastatic disease to the thyroid gland at Johns Hopkins.⁸ Mean time from resection of primary to thyroid metastases was 3.5 years. At a median of five years, six patients were alive and two with no evidence of disease. Others have reported improved survival with resection of metastatic RCC.⁷

CONCLUSION

FNA remains a valuable tool for the diagnosis of secondary malignancies of the thyroid.⁵ RCC was the most common primary malignancy and these patients appear to portend the best prognosis. Palliation from locally compressive symptoms is a reasonable indication for surgery and can be performed with low morbidity. Our series and others have shown examples of long-term survival in patients undergoing resection of isolated metastases.^{5,7,8,11}

REFERENCES

1. Berge T, Lundberg S. Cancer in Malmo 1958-1969. An autopsy study. *Acta Pathol Microbiol Scand* 1977;(Suppl)1-235.
2. Lam KY, Lo CY. Metastatic tumors of the thyroid gland: A study of 79 cases in Chinese patients. *Arch Pathol Lab Med* 1998;122:37-41.
3. Silverberg SG, Vidone RA. Carcinoma of the thyroid in surgical and postmortem material. Analysis of 300 cases at autopsy and literature review. *Ann Surg* 1966;164:291-99.
4. Katz SC, Shaha A. PET-associated incidental neoplasms of the thyroid. *J Am Coll Surg* 2008;207:259-64.
5. Nakhjavani MK, Gharib H, Goellner JR, van Heerden JA. Metastasis to the thyroid gland. A report of 43 cases. *Cancer* 1997;79:574-78.
6. Wychulis AR, Beahrs OH, Woolner LB. Metastasis of Carcinoma to the Thyroid Gland. *Ann Surg* 1964;160:169-77.
7. Kierney PC, van Heerden JA, Segura JW, Weaver AL. Surgeon's role in the management of solitary renal cell carcinoma metastases occurring subsequent to initial curative nephrectomy: An institutional review. *Ann Surg Oncol* 1994;1:345-52.
8. Chen H, Nicol TL, Udelsman R. Clinically significant, isolated metastatic disease to the thyroid gland. *World J Surg* 1999;23:177-80; discussion 181.
9. Cohen MS, Arslan N, Dehdashti F, et al. Risk of malignancy in thyroid incidentalomas identified by fluorodeoxyglucose-positron emission tomography. *Surgery* 2001;130:941-46.
10. Kang KW, Kim SK, Kang HS, et al. Prevalence and risk of cancer of focal thyroid incidentaloma identified by 18F-fluorodeoxyglucose positron emission tomography for metastasis evaluation and cancer screening in healthy subjects. *J Clin Endocrinol Metab* 2003;88:4100-04.
11. Mirallie E, Rigaud J, Mathonnet M, et al. Management and prognosis of metastases to the thyroid gland. *J Am Coll Surg* 2005;200:203-07.