

## ARE ALL MALIGNANCIES OF THE THYROID GLAND PRIMARY?

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### QUESTIONS:

1. What is the most common malignancy that may metastasize to the thyroid gland?
2. Should any patient with proven metastatic disease to the thyroid gland undergo thyroidectomy?
3. Can a malignant thyroid mass be the initial presentation of an extra-thyroidal malignancy?

### CLINICAL ASPECTS:

A 57-year-old woman was seen in surgical consultation to evaluate a recent incidentally discovered right thyroid nodule. Past history was significant only for a nephrectomy performed for an encapsulated, low-grade renal-cell carcinoma (RCC) 12 years previously. Examination confirmed the presence of a 2.0 cm nodule in the right lobe of the thyroid gland with no palpable regional adenopathy. Fine-needle aspiration biopsy (FNA) of the nodule as well as a computerized tomographic examination (CT) of the neck, chest, and abdomen were advised.

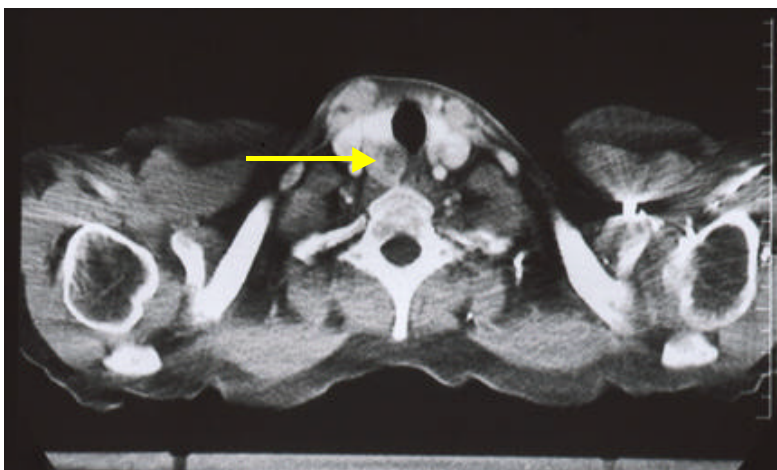


Figure 1: CT scan of the neck demonstrating a solitary nodule in the posterior aspect of the right lobe of the thyroid gland.

The FNA was positive for “malignant cells of indeterminate origin.” CT of the neck (Figure 1) demonstrated a solitary nodule in the posterior aspect of the right lobe of the thyroid gland.

A right thyroid lobectomy was performed (Figure 2).

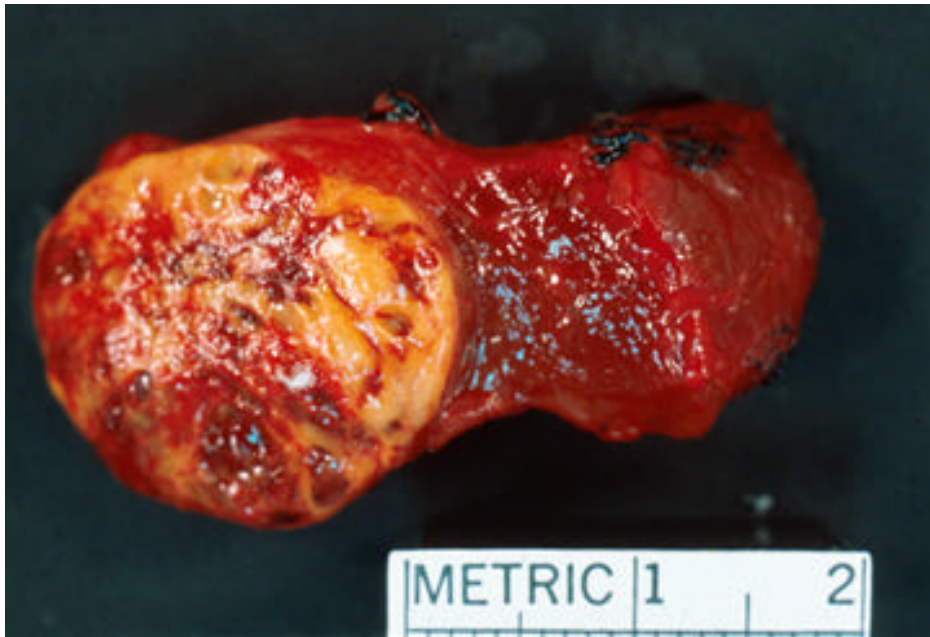


Figure 2: Gross specimen showing yellow, encapsulated mass.

Histology was that of a metastatic RCC which stained negatively for thyroglobulin (Figures 3A, B, and C).

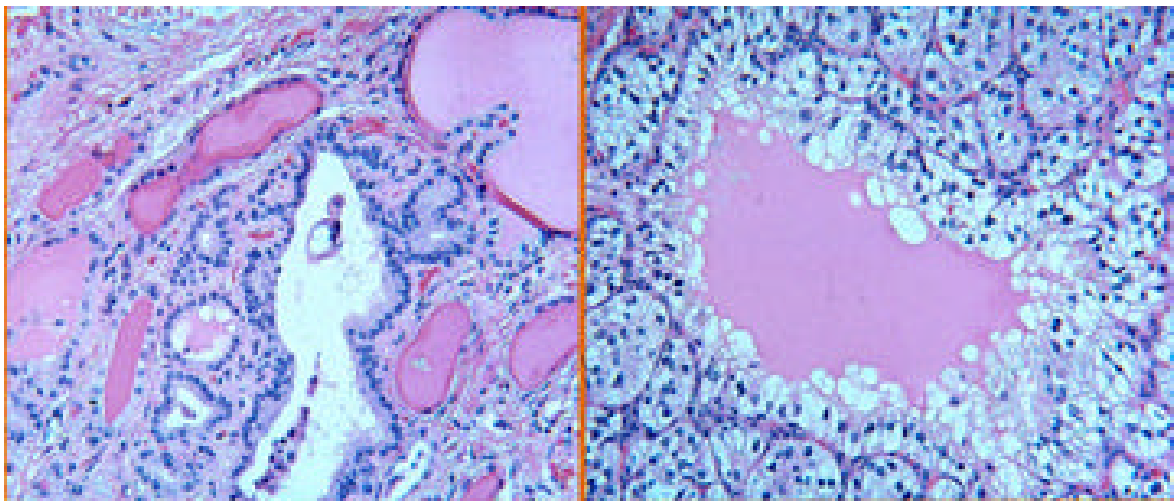


Figure 3A: Histology showing (left) benign thyroid tissue and (right) renal cell cancer, H&E 16x.

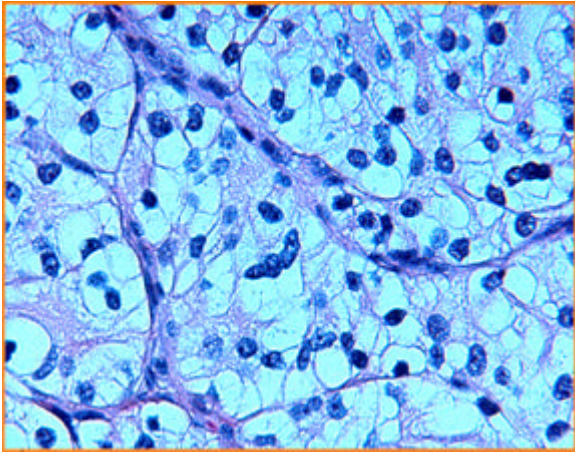


Figure 3B: Histology showing nuclear atypia, 40x.

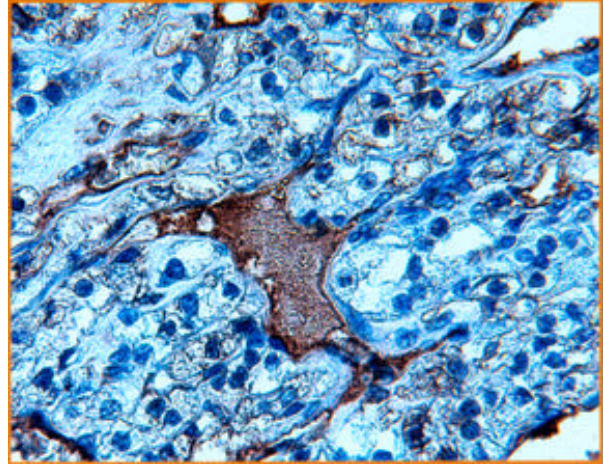


Figure 3C: Immunostain for thyroglobulin, 16x.

Occasionally, these metastases may be multiple (Figure 4)



Figure 4: Total thyroidectomy specimen demonstrating multiple RCC metastases.

The patient subsequently developed a recurrence of her RCC in the left infratemporal fossa, which was surgically removed. At most recent follow-up (nearly 15 years after nephrectomy and 28 months status post thyroidectomy), she is disease free.

**DATA SUMMARY:**

Metastatic disease to the thyroid gland from distant sites is a rare phenomenon. In a 20-year experience at the Mayo Clinic, only 12 patients were identified who came to surgical exploration for proven metastases from a non-thyroid site. This represents 0.2% of all thyroidectomies performed. The absolute rarity of metastases to the thyroid has been postulated to be due to the rapid blood flow *through* the gland, which is estimated to be  $\pm 560$  ml/100 grams of thyroid tissue per minute.

The most frequent primary site for metastases in this series of 12 patients was the kidney (RCC). Other primary sites (Figure 5) and corresponding mean survival times are varied (Figure 6).

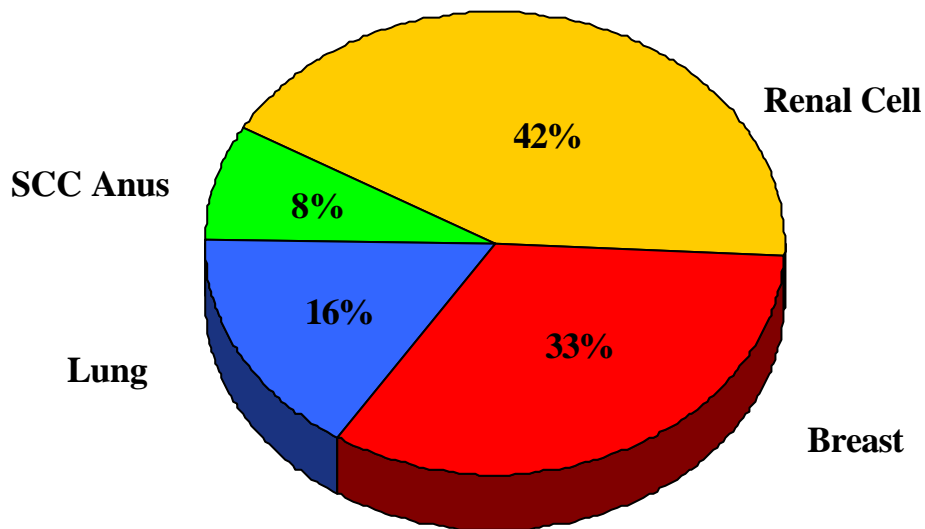


Figure 5: Primary site for metastases.

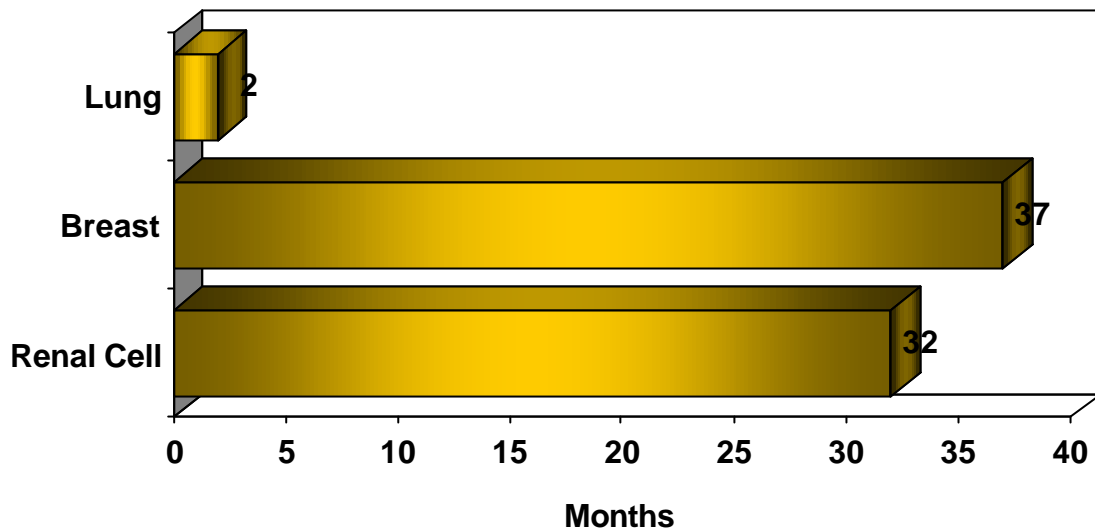


Figure 6: Mean survival after diagnosis.

Other studies have reported malignant melanoma, carcinoma of the breast or ovary to be the most common primary sites of origin.

The message in this rare endocrine phenomenon is that a history of a prior malignancy in a patient with a thyroid nodule needs to be taken seriously and that the thyroid lesion may occur either metachronously (most common) or synchronously with a distant malignancy and may, in fact, albeit rarely, be the sentinel event in a patient with a malignancy in a non-thyroid site. FNA is highly accurate in the diagnosis of most primary thyroid malignancies; thus the finding of “malignant cells of indeterminate etiology” should raise suspicion of metastatic disease to the thyroid gland with the ensuing appropriate diagnostic evaluation.

Pending the site of primary tumor, the extent of the metastatic disease and the general state of health of the patient, a judicious, aggressive surgical approach to the thyroid gland is warranted. In patients with RCC, in particular, a malignancy with a well-known propensity for prolonged survival and even rare spontaneous resolution, aggressive intervention is prudent.

## **ANSWERS:**

1. Renal cell carcinoma is the most common malignancy that may metastasize to the thyroid gland.
2. Yes, all patients with proven metastatic disease to the thyroid gland should be considered for thyroidectomy. This is particularly indicated in those patients who harbor metastases with a favorable/unpredictable prognosis such as RCC or malignant melanoma and who have localized disease with acceptable co-morbidities.
3. Yes, a malignant thyroid mass can occur as the initial presentation of an extra-thyroidal cancer. This can occur most often in patients with malignant melanoma or RCC.

## **REFERENCES**

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*“It is essential that we learn from our own mistakes,  
but it is better if we can learn from the mistakes of others.”*

*Kirk Stoddard*