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Rectal carcinoma metastatic to the thyroid gland

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Abstract
Clinically evident metastases to the thyroid gland are rarely found antemortem. A case of a 59-year-old woman with a history of rectal carcinoma, who presented with low back pain and a mass in the right lobe of her thyroid gland, is presented. The tumour of the thyroid was found to be metastatic adenocarcinoma from her previous rectal cancer. Other synchronous metastases were noted in her lumbar spine and kidneys.

The clinical finding of metastases to the thyroid gland is rare, particularly from a colorectal primary. One must consider, however, the possibility of a tumour of the thyroid gland representing a secondary malignancy in any patient with a prior history of cancer.

Key words: Rectal neoplasms; Adenocarcinoma; Thyroid neoplasms; Neoplasm metastasis

Introduction

Metastases to the thyroid gland are rare although autopsy data reflects a higher rate of subclinical involvement. A large autopsy series found that 9.5 per cent of patients dying with malignancy had thyroid metastases (Shimaoka *et al.*, 1962). The greatest incidence at post-mortem examinations was for malignant melanoma (39 per cent), followed by carcinoma of the breast (21 per cent), kidney (12 per cent) and lung (11 per cent). Gastrointestinal malignancies metastasize to the thyroid less frequently, with metastases from colorectal primaries noted in four per cent. Of all deaths from malignancy, only 0.5 per cent were noted to have clinically evident thyroid metastases prior to death (5.5 per cent of the total number of metastases). This appears to be related to the small size of the metastases. Only 31 of 188 metastases were grossly larger than 1 cm at autopsy.

In a surgical series of thyroidectomy, very few malignant tumours were found to be metastases. A Mayo Clinic series of 20 262 surgical patients found only 14 (0.07 per cent) to be secondary tumours (Wychulis *et al.*, 1964), although others have found higher incidences (Crile *et al.*, 1955).

We present an unusual case of rectal carcinoma metastatic to the thyroid gland.

Case report

The patient is a 59-year-old Russian woman, who underwent abdominal perineal resection of a Stage Duke's B-II (T_3, N_0, M_0) adenocarcinoma of the rectum in August of 1992. Following surgery, the patient received adjuvant 5-FU, leucovorin, levamisole and radiation therapy. The patient remained well until April of 1994 when she developed persistent low back pain. A carcinoembryonic antigen (CEA) estimation performed at that time was 132. Staging work-up revealed metastases to the thoracic and lumbar vertebrae, as well as bilateral renal metastases. In addition, a firm mass was found in the right lobe of the thyroid which produced moderate discomfort in the neck. An ultrasound of the thyroid revealed a solid, single, ill-defined nodule with no obviously enlarged perithyroidal lymph nodes. This solid mass could be seen in the lower right side of the neck on a CT scan performed of the chest (Figure 1). Since the pattern of metastases (spine, kidneys and thyroid) was somewhat unusual for a rectal cancer and in view of the primary tumour having been node-negative, the possibility of another primary site such as thyroid carcinoma was entertained. A fine needle aspiration biopsy of this thyroid mass revealed follicular cells and colloid suggestive of a colloid nodule. As the clinical appearance of this mass was suspicious, a repeat fine needle aspiration

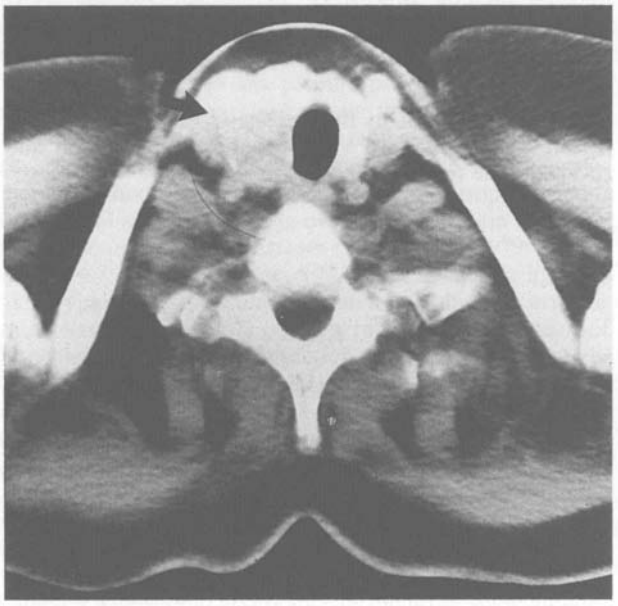

Fig. 1
CT scan of lower portion of neck demonstrating a mass of the right lobe of the thyroid.

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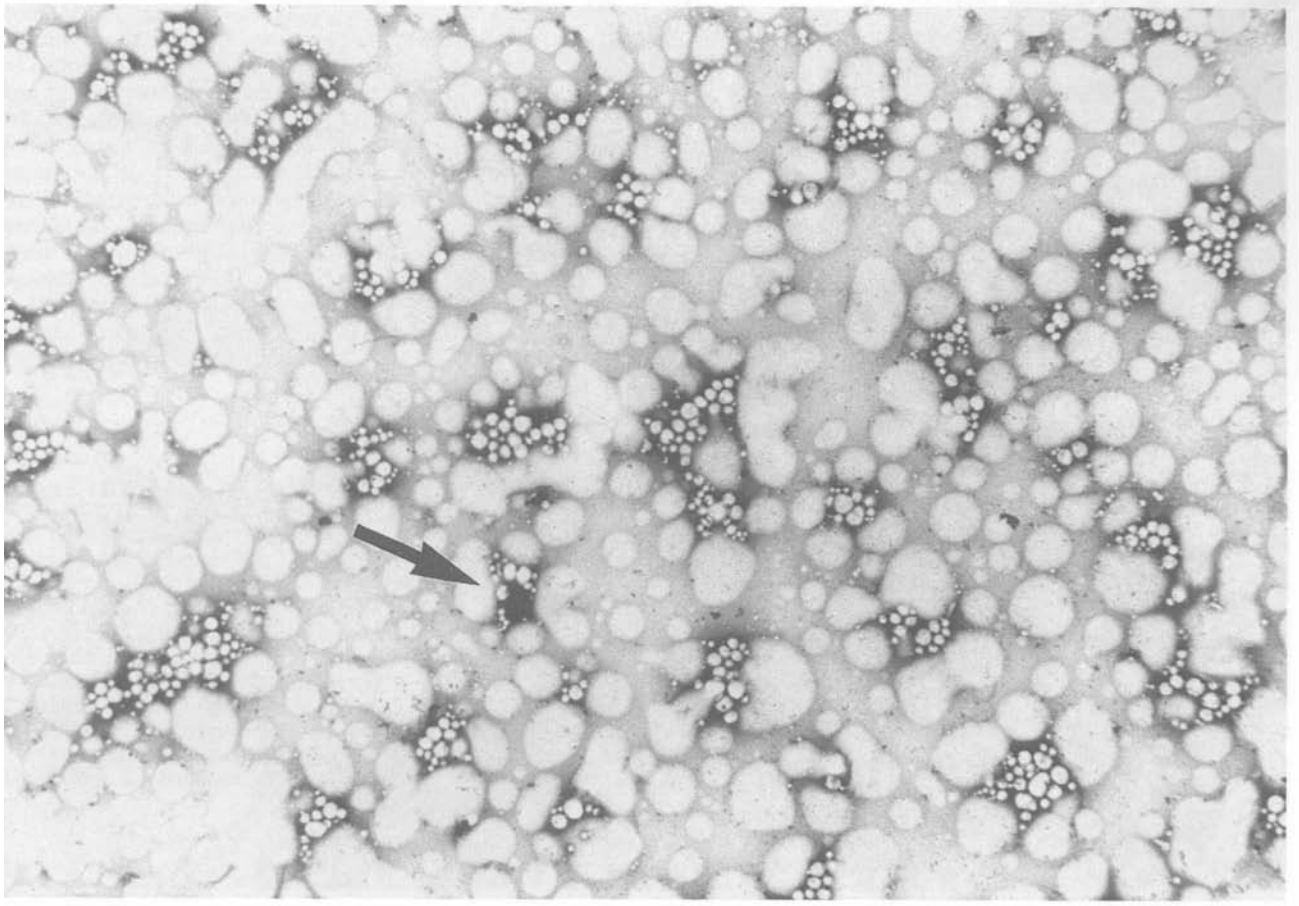

FIG. 2
Carcinoma cells with prominent vacuolation of the cytoplasm. (Dif-Quik, × 200)

was performed, which revealed carcinoma cells with vacuolated cytoplasm (Figure 2). Right thyroid lobectomy and isthmusectomy were then performed. Gross examination of the resected specimen revealed a 2.8 cm, irregular, tan, solid tumour mass surrounding a 1.9 cm brick-red colloid nodule with focal invasion of the tumour into the nodule (Figure 3). Histological examination revealed a moderately well-differentiated adenocarcinoma consistent with a rectal adenocarcinoma primary (Figure 4).

The patient recovered without incident from her surgery and subsequently received a course of radiation therapy for palliation of her vertebral metastases. The patient declined further systemic chemotherapy and is now receiving supportive care.

Discussion

This case of a clinically evident rectal metastasis to the thyroid gland is quite unusual. Reports of colorectal metastases that have been diagnosed antemortem are infrequent (Lester *et al.*, 1986; Cristallini *et al.*, 1990; Nachtigal *et al.*, 1992). An incidence of four per cent of those dying of colorectal cancer in a large autopsy series had thyroid metastases (Shimaoka *et al.*, 1962). Although clinically evident metastases to the thyroid are unusual, they occur more often than primary thyroid malignancy in those with a history of prior malignancy. Smith *et al.* (1987) found that the average time of appearance of metastases is two years from the primary tumour and almost all will have other sites of metastases when staging evaluation is performed, as was evident in this case. Occasionally, the diagnosis of a primary lesion is made only after the initial finding of a thyroid metastasis. Depending upon the histology of the primary, varying lengths of survival can be seen after the diagnosis of thyroid involvement. Occasionally, extended survival can be seen. This most

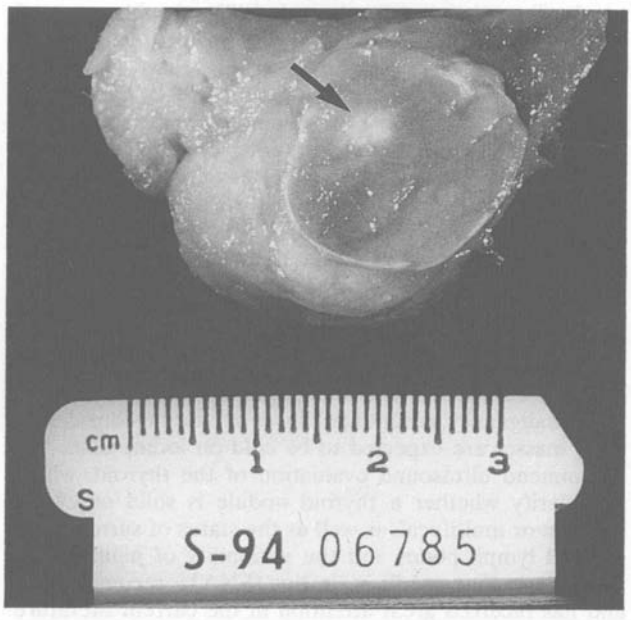

FIG. 3
Right thyroid lobe and isthmus demonstrating 2.8 cm tan tumour mass surrounding a colloid nodule with focal tumour invasion (arrow).

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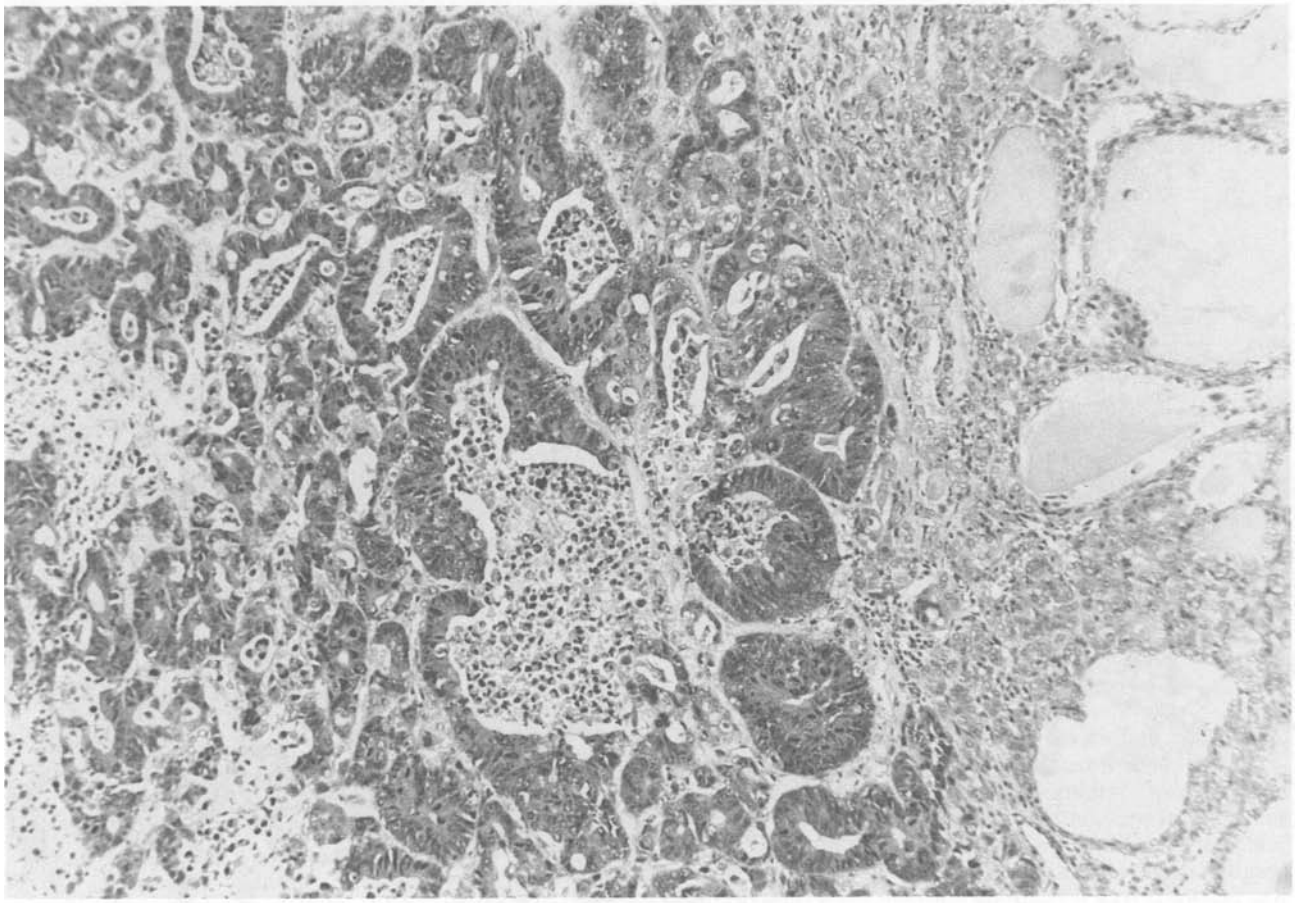

FIG. 4

Thyroid showing the interface between a colloid nodule (right) and the metastatic adenocarcinoma (left). Note a prominent intraluminal or 'dirty' necrosis typical of colonic adenocarcinoma. (H & E; × 200)

often occurs with metastatic renal cell carcinoma, with an approximate 26 month mean survival after the presentation of thyroid metastasis (Smith *et al.*, 1987). The most common clinically evident metastases appears to be from renal cell carcinoma (Czech *et al.*, 1982). A wide range of other primary sites may also metastasize to the thyroid. These include malignant melanoma, breast and lung, followed by head and neck tumour sites, lymphoma/leukaemia, gastrointestinal tumours, gynaecological tumours and sarcomas in decreasing order of frequency (Table I). The low rate of metastases to the thyroid is somewhat surprising in view of the significant blood flow (560 ml per 100 g of tissue per minute). The reason for this is unknown but may relate to the absence of a filtering function, such as is present in the liver, or a high level of local immunity. It does appear that previously diseased glands are more likely to develop secondary metastases (Ericsson *et al.*, 1981).

In patients with a thyroid mass and a known history of prior malignancy, secondary cancer should be considered. Such masses are expected to be cold on iodine scan. We recommend ultrasound evaluation of the thyroid, which will clarify whether a thyroid nodule is solid or cystic, unifocal or multifocal, as well as the status of surrounding cervical lymph nodes and the possibility of jugular vein thrombosis. Fine needle aspiration (FNA) is recommended and has received great attention in the current literature (Chacho *et al.*, 1987; Smith *et al.*, 1987; Cristallini *et al.*, 1990). The diagnosis of the primary tumour can often be made by this technique.

Clear cell carcinoma generally represents a renal cell carcinoma metastasis but should be differentiated from the rare clear cell thyroid primary malignancy, which is a variant of follicular carcinoma. Oil Red or Sudan Black, which stain for neutral fats, are usually positive in renal cell carcinoma and negative in clear cell thyroid carcinoma. Thyroglobulin stains are often positive for primary thyroid cancer but negative for secondary disease. Other clear cell carcinomas which can be found are from lung, acinic cell carcinoma of salivary gland origin and carcinoma of the parathyroid. The diagnosis of metastatic malignant melanoma can also be made by fine needle aspiration. Metastases from breast cancer can often be diagnosed by FNA as well but may be confused with primary papillary thyroid carcinoma.

Fine needle aspiration of metastases from colorectal adenocarcinoma may reveal vacuolated cells, as in this case, with hyperchromatic basally-oriented nuclei and stain positively for CEA and negatively for thyroglobulin. Primary mucin-producing carcinoma of the thyroid gland

TABLE I

PRIMARY SITES OF MALIGNANCY METASTASIZING TO THE THYROID

Kidney
Skin – malignant melanoma
Breast
Lung
Head and neck
Lymphoma/Leukaemia
Gastrointestinal tract
Genital tract
Sarcomas

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has been described (Deligdisch *et al.*, 1980) but can usually be differentiated from a metastasis by having the presence of colloid production in addition to mucin production. This can be detected either histochemically or ultrastructurally by electron microscopy.

Diagnosis of the primary histology by fine needle aspiration may obviate the need for surgery, particularly for patients who are not symptomatic from their thyroid metastasis. Symptomatic patients or selected cases with limited extra-thyroidal disease can be considered for surgical resection.

Despite the infrequency of metastases to the thyroid gland, secondary carcinoma should be considered in patients with a prior history of malignancy.

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