

## Malignant Giant Cell Tumor of the Soft Tissues of the Neck

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**M**alignant giant cell tumors of the neck occur very rarely. Although such tumors usually arise from cartilaginous neck structures, they sometimes originate in the soft tissues. Soft-tissue giant cell tumors of the neck are likely to be more aggressive and have a higher mortality rate than are tumors arising from the cartilaginous larynx. An aggressive use of available treatment modalities, including radiotherapy, is generally warranted. There has been only limited information published about giant cell tumors arising in the soft tissues of the neck.<sup>1,2</sup> This report details the case of a woman with such a tumor, which developed 2 months after she underwent total thyroidectomy. The pathology of the mass is described, the patient's treatment regimen is provided, and a brief review of the literature on giant cell tumors of the neck is presented.

### CASE PRESENTATION

#### Initial Presentation and Surgery

A 42-year-old woman was initially evaluated because of a 5-month history of a left anterior midline neck mass. Medical history was otherwise unremarkable. Physical examination showed a mass that was 2 cm in diameter, mobile, and slightly painful. Subsequent ultrasound examination revealed a solid mass. Results of fine-needle aspiration were nondiagnostic. Suppressive therapy with levothyroxine was initiated but was unsuccessful. After an intraoperative examination of the thyroid gland revealed many suspicious nodules on both sides of the gland, a total thyroidectomy was performed. Pathologic examination of the thyroid gland showed nodular hyperplasia with microscopic follicular adenoma. No vascular invasion was noted. The postoperative course was at first unremarkable.

#### Subsequent Presentation and Surgery

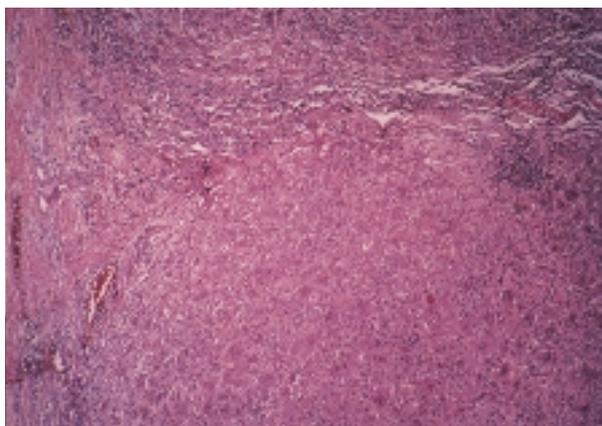
The patient returned 2 months after the thyroidectomy because of a new anterior midline neck mass. She reported no symptoms of pain, tenderness, dysphagia, or shortness of breath. Examination of the mass showed it to be 2 cm in diameter, firm, and mobile; the mass did not move with deglutition. The differential diagnosis included a stitch granuloma or a new thyroid mass in retained tissue. Intraoperatively, the mass was found located in the soft tissues of the neck, anterior to the platysma muscle. The mass did not involve any of the thyroid cartilages or muscles and did not appear to be associated with the surgical wound. The mass was widely excised.

#### Pathology

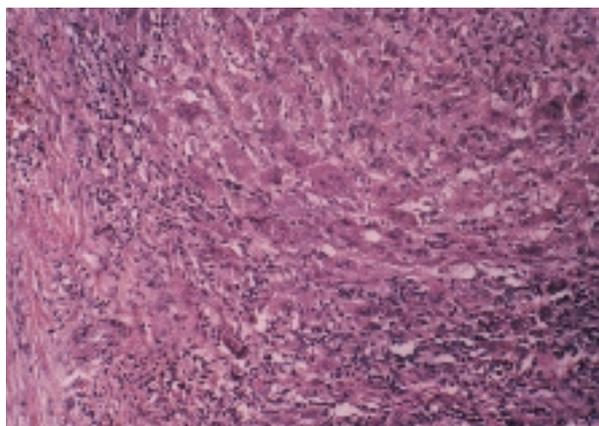
Pathologic examination of the second mass revealed a well-circumscribed tumor surrounded by fibrous tissue; no thyroid or lymphoid tissue was identified. The tumor was divided by fibrous bands into lobules and consisted of numerous osteoclast-type giant cells with abundant eosinophilic to amphophilic cytoplasm and multiple vesicular nuclei with chromatin clumping and parachromatin. The giant cells were surrounded by numerous mononucleated spindle cells with round to ovoid nuclei with vesicular chromatin

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**Figure 1.** Malignant giant cell tumor of case patient. Low magnification illustrates the border of the tumor. Numerous giant cells are visible in the tumor.



**Figure 2.** Intermediate magnification shows a mixture of giant cells, spindle cells, and inflammatory cells.

(**Figures 1 and 2**). The mitotic activity was brisk in areas [up to 8 per 10 high-power fields (hpf) and 4 per 1 hpf]. Occasional atypical mitoses were also present (**Figure 3**). No osteoid or cartilage was noted. Results of immunohistochemistry staining showed some spindle cells that were positive for  $\alpha_1$ -antitrypsin among giant cells that were negative for the enzyme. This finding indicated a histiocytic origin of the spindle cells (**Figure 4**). However, both giant cells and spindle cells were negative for S-100. Because of the active mitosis and the occasional atypical mitotic figures, her tumor was diagnosed as a malignant giant cell tumor, most likely of soft-tissue origin.

#### Further Testing and Treatment

A work-up for metastatic disease, including computed tomography scans of the neck, chest, and abdomen and a bone scan, showed no abnormalities. The patient was treated postoperatively with a total of 50 Gy of radiation over the course of 37 days. Three months postoperatively, the patient is doing well with no evidence of recurrent disease.

## DISCUSSION

### Giant Cell Tumors of Bone

Giant cell tumors of bone generally occur in women during the third decade of life. Although usually benign, these tumors may be locally aggressive and have a high recurrence rate. The most common areas of occurrence include the knee region (accounting for 70% of cases), the distal radius, and the distal femur/proximal tibia. About 2% to 8% of giant cell tumors of bone do metastasize, most often to the

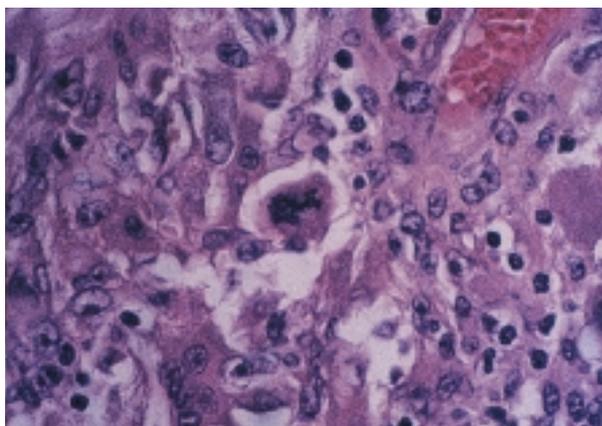
lungs. Such pulmonary metastases are successfully treated with surgical excision.<sup>3</sup>

Giant cell tumors of bony origin in the neck region are a much less common finding, with only 17 cases described in the literature.<sup>4-20</sup> The laryngeal giant cell tumors of bony origin described in these studies most often occurred in the thyroid cartilage, followed by the cricoid and the epiglottic cartilage. All of the published cases involved men whose average age was 40.7 years (SD, 10.5 years). One report concluded that cases of giant cell tumors of the larynx seldom require chemoradiation therapy because use of surgical excision alone results in a favorable prognosis in most cases.<sup>21</sup>

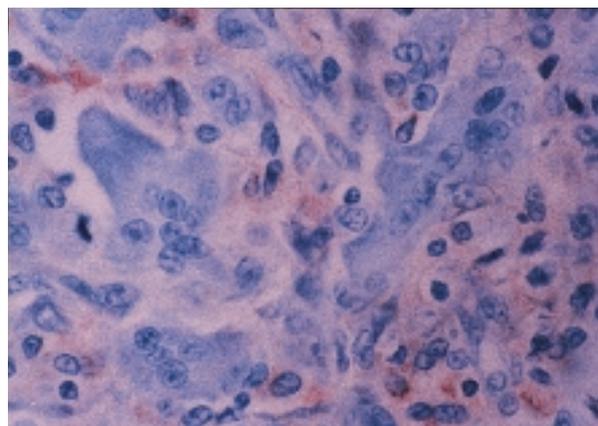
### Giant Cell Tumors of Soft Tissues

Malignant giant cell tumors of soft tissues are rare and have been described in the literature only relatively recently. In 1972, 2 articles presented the first reported cases.<sup>22,23</sup> One of these studies described the tumor as being multinodular and infiltrative and containing either osteoclast-like nucleated giant cells or a mixture of histiocyte-like and fibroblast-like pleomorphic and mononucleated/multinucleated spindle cells.<sup>22</sup> A comprehensive treatment of malignant giant cell tumors of soft tissue appeared in 1981.<sup>2</sup> According to this study, angiographic evidence indicated high vascularity and rapid circulation in such tumors. Histologic analysis of samples obtained from fine-needle aspiration revealed phagocytosing pleomorphic malignant cells and giant cells of osteoclast type.<sup>2</sup>

Giant cell tumors of soft tissues of the neck are rarer still, with only 2 such cases having been reported thus far: one involved a giant cell tumor arising from the right vocal cord (with no osteocartilaginous involvement) that



**Figure 3.** High power view of spindle and giant cells. An atypical mitosis is at the center of the field.



**Figure 4.** Immunohistochemistry stain for  $\alpha_1$ -antitrypsin shows scattered positive spindle cells among negative giant cells. (The immunohistochemistry stain for S-100 was negative in both types of tumor cells but is not illustrated here.)

had multiple recurrences and eventually involved the overlying skin<sup>1</sup>; the other involved a patient with a soft-tissue giant cell tumor of the neck who underwent local excision only and died of multiple subcutaneous and lung metastases after 1.5 years.<sup>2</sup>

Giant cell tumors of the soft tissues are more aggressive and less amenable to treatment than are their osteogenic counterparts. In the previously cited 1981 study, 11 cases of patients with giant cell tumor of soft tissue were reviewed and followed.<sup>2</sup> The tumors in these cases were divided into “deep seated” and “superficial” categories. There were 7 patients in the deep-seated group; 4 died within 15 months. Of the 4 patients in the superficial group, 2 died within 18 months. Six of the 11 patients developed metastases, and 3 developed local recurrences. Although this study showed a high incidence of metastasis and a high mortality in the 11 patients, the authors acknowledged that the series studied was too small to allow definite conclusions concerning treatment and prognosis.

#### Differential Diagnosis

The differential diagnosis of malignant giant cell tumor of soft tissues of the neck includes malignant fibrous histiocytoma. Although some authors consider malignant giant cell tumors of soft tissues to be a variant of malignant fibrous histiocytoma, the latter is a mesenchymal tumor and a distinct neoplasm from a malignant giant cell tumor.<sup>24</sup> In malignant fibrous histiocytomas, there is considerable cellular atypia of fibroblasts and histiocytes and many atypical mitoses. Moreover, malignant fibrous histiocytomas are considered high-grade sarcomas, whereas malignant giant cell tumors are thought to be low-grade tumors. The distinction between these 2 neoplasms is therefore nec-

essary as malignant fibrous histiocytomas may require radical surgical excision and additional chemo- or radiation therapy.

Another differential diagnosis is carcinosarcoma or sarcomatoid carcinoma. This diagnosis can be excluded by a negative results on cytokeratin staining.

#### Therapy

As with any exceedingly rare clinical entity, it is difficult to recommend a specific therapy for management of malignant giant cell tumor of the neck because of the scarcity of sufficient, solid evidence. Yet given the fact that this tumor can be both locally invasive and potentially metastatic, some general comments seem appropriate. Surgical excision should be the obvious first step in treatment. When the proximity of critical anatomic structures prevents clear surgical margins, radiation can be considered. The use of chemotherapy, however, is more problematic. A review of the literature shows a lack of consensus about an effective chemotherapeutic agent against these tumors, and further study is warranted.

#### SUMMARY

Soft-tissue giant cell tumor of the neck is a rare finding. The clinical behavior of the tumor depends on both its cell of origin and its pathologic appearance. It is critical to attempt to obtain adequate surgical margins when excising it and to consider multimodality therapy. **HP**

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