



**Figure 23-28** Phyllodes tumor. Compared to a fibroadenoma, there is increased stromal cellularity and overgrowth, giving rise to the typical leaflike architecture.

cellular and are mitotically active. High-grade lesions may be difficult to distinguish from malignant sarcomas and may have foci of mesenchymal differentiation (e.g., resembling rhabdomyosarcoma or liposarcoma).

Most phyllodes tumors are low-grade; these occasionally recur locally but do not metastasize. In contrast, intermediate and high-grade phyllodes tumors often recur locally unless they are treated with wide excision or mastectomy. Regardless of grade, lymphatic spread is rare and axillary lymph node dissection is contraindicated. The uncommon high-grade lesions give rise to distant hematogenous metastases in about one third of cases. Only the stromal component metastasizes.

### Lesions of Interlobular Stroma

Tumors of the interlobular stroma of the breast are composed of stromal cells without an accompanying epithelial component. These include benign tumors as well as malignant tumors, all uncommon and hence considered briefly. *Myofibroblastoma* consists of myofibroblasts and is unusual in that it is the only breast tumor that is equally common in males. *Lipomas* are often palpable but can also be detected mammographically as fat-containing lesions. The only importance of these lesions is to distinguish them from malignancies.

Fibromatosis is a clonal proliferation of fibroblasts and myofibroblasts. It presents as an irregular, infiltrating mass that can involve both skin and muscle. Though locally aggressive, this lesion does not metastasize. Some cases are associated with prior trauma or surgery. Other cases occur as part of familial adenomatous polyposis, hereditary desmoid syndrome, and Gardner syndrome.

### Malignant Tumors of Interlobular Stroma

Malignant stromal tumors include angiosarcoma, rhabdomyosarcoma, liposarcoma, leiomyosarcoma, chondrosarcoma, and osteosarcoma. The only sarcoma that occurs

with any frequency in the breast is angiosarcoma—however, it accounts for less than 0.05% of breast malignancies. *Angiosarcomas of the breast* can be sporadic or arise as a complication of therapy. Most sporadic angiosarcomas occur in the breast parenchyma of young women (mean age 35), are of high grade, and have a poor prognosis. Treatment related tumors arise secondary to radiation or edema. After radiation therapy, approximately 0.3% of women develop angiosarcomas in breast skin, with most cases being diagnosed 5 to 10 years after treatment.

## Other Malignant Tumors of the Breast

Malignancies of the breast arising from lymphocytes or skin, or metastatic from another site, comprise less than 5% of breast cancers. *Non-Hodgkin lymphoma* may arise primarily in the breast, or the breasts may be secondarily involved by systemic disease. Most primary breast lymphomas are of B-cell type, while rare T cell lymphomas may arise in the scar capsule that is associated with breast implants, possibly due to chronic inflammation, which is known to stimulate lymphoma development in other contexts. Young women with Burkitt lymphoma may present with massive bilateral breast involvement and are often pregnant or lactating. Malignant tumors may arise from the skin and dermis of the breast; these tumors are identical to their counterparts found in skin elsewhere (Chapter 25). Metastases to the breast are rare and most commonly arise from melanomas and ovarian cancers.

## KEY CONCEPTS

### Stromal Lesions and Other Malignant Tumors

- Intralobular stroma is the origin of the biphasic tumors, fibroadenoma and phyllodes tumor.
- Fibroadenomas are the most common benign tumor of the breast.
- Tumors of interlobular stroma consist only of stromal cells and include both benign and malignant lesions.
- Angiosarcoma is the most common stromal malignancy and can either be sporadic or associated with radiation exposure or lymphedema.

## SUGGESTED READINGS

### Benign Breast Disease

- Ellis IO: Intraductal proliferative lesions of the breast: morphology, associated risk and molecular biology. *Mod Pathol* 23(Suppl 2):S1-7, 2010. [Benign lesions of the breast have been classified according to the subsequent risk of cancer based on large epidemiologic studies. This is a comprehensive review on the diagnosis, clinical management, and underlying biology of these common findings in breast biopsies.]
- Howard BA: In the beginning: the establishment of the mammary lineage during embryogenesis. *Semin Cell Dev Biol* 23:574, 2012. [Early mammary mesenchyme and epithelium work together to form the mammary primordium – this fundamental interaction has a key role in the pathogenesis of stromal tumors and carcinomas.]
- Raouf A, Sun Y, Chatterjee S, et al: The biology of human breast epithelial progenitors. *Semin Cell Dev Biol* 23:606, 2012. [Stem or progenitor cells that give rise to mature breast cells persist into adulthood and are active during expansion of the epithelium during pregnancy. This review discusses the current state of knowledge about this difficult-to-study cell population.]