

Chapter 2

Metastatic Cancers

Metastases to the pleura are much more common than primary cancers of the pleura. Pleural metastases produce pleural effusions and pleural-based nodules or masses or pleural thickening, features that are also produced by primary tumors of the pleura and by reactive processes. Whereas DMMs account for about 1,500 pleural effusions in the USA each year, metastatic cancers account for about 200,000 pleural effusions each year, a ratio of greater than 130 metastatic cancers to 1 DMM. The most frequent metastatic cancers causing pleural effusion are lung carcinoma (about 60,000), breast carcinoma (about 50,000), and lymphoma (about 40,000). The remaining metastatic tumors to the pleura include virtually every known malignancy, including carcinomas from various sites, sarcomas, and melanoma. Table 2.1 summarizes the incidence of primary sites for malignant pleural effusions.

Similar to DMM, diagnosis of metastatic cancer is often possible by transthoracic pleural biopsy or pleural effusion cytology, but may require more extensive tissue sampling by thoracotomy or thoracoscopy. In some cases, surgical biopsy may be performed to determine the primary site of a metastasis of unknown origin, and the pathologist must guide the surgeon in obtaining adequate amounts of tissue for a diagnosis on permanent sections. Even if the patient has a known primary cancer, pleural sampling may be necessary to confirm that the pleural thickening or mass does not represent a second primary cancer or a benign process mimicking metastatic malignancy. Frozen section is used to confirm adequate sampling of tissue for permanent sections (including for immunohistochemistry or other special studies if indicated) and to provide information for immediate treatment of metastatic cancer such as

TABLE 2.1 Approximate incidence of primary sites for malignant pleural effusions.

Lung carcinoma	36%
Breast carcinoma	25%
Lymphomas	10%
Ovarian carcinoma	5%
Gastric carcinoma	2%
Unknown	7%

TABLE 2.2 Differential diagnosis of distinctive histopathologic patterns of cancers metastatic to the pleura.

Clear cell cancers

Clear cell adenocarcinoma or clear cell squamous cell carcinoma
Renal cell carcinoma
Clear cell carcinoma of the ovary, endometrium, or cervix
Clear cell melanoma/clear cell sarcoma of soft parts
Adrenal cortical carcinoma
Alveolar soft part sarcoma
Rare clear cell variants of other cancer types (hepatocellular clear cell variant; clear cell adenocarcinoma of the urinary bladder, etc.)

Papillary cancers

Papillary adenocarcinoma of the lung (includes micropapillary subtype)
Papillary thyroid carcinoma
Papillary renal cell carcinoma
Papillary serous ovarian carcinoma
Papillary endometrial carcinoma and endocervical carcinoma
Papillary urothelial (transitional cell) carcinoma
Papillary pancreatic adenocarcinoma
Papillary breast carcinoma
Papillary cholangiocarcinoma
Serous papillary adenocarcinoma of the peritoneum

Small blue cell cancers

Lymphoma
Lobular breast carcinoma
Small cell carcinoma
Carcinoid tumor and atypical carcinoid tumor
Melanoma
Rhabdomyosarcoma

resection of solitary metastases or pleurodesis for symptomatic pleural effusions.

Although final diagnosis of the primary site of a metastasis may have to await permanent sections and possibly special studies such as immunohistochemistry, the pathologist can convey a differential diagnosis to the surgeon at the time of frozen section so that an informed clinical decision can be made. Adenocarcinomas are the most frequent cell type of cancer metastatic to the pleura, including adenocarcinomas of the lung, breast, ovary, stomach, and other sites. Even when a metastasis is of unknown origin, the differential diagnosis for probable primary sites can often be conveyed to the surgeon at the time of frozen section. The differential diagnosis of several distinctive histopathologic patterns of metastatic cancers is given in Table 2.2 (Figs. 2.1–2.16).



FIGURE 2.1 Gross of wedge biopsy of lung and pleura shows multiple white nodules of metastatic carcinoma involving the pleura. There is adipose tissue attached to the top of the specimen.

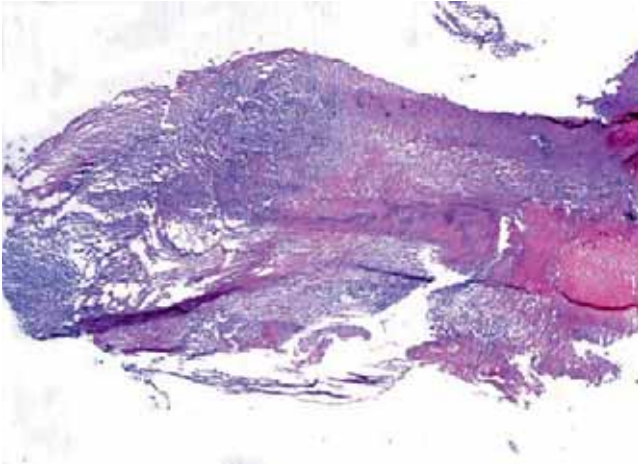


FIGURE 2.2 Low power of frozen section of pleura shows thickened fibrotic pleura containing a cellular nodule.

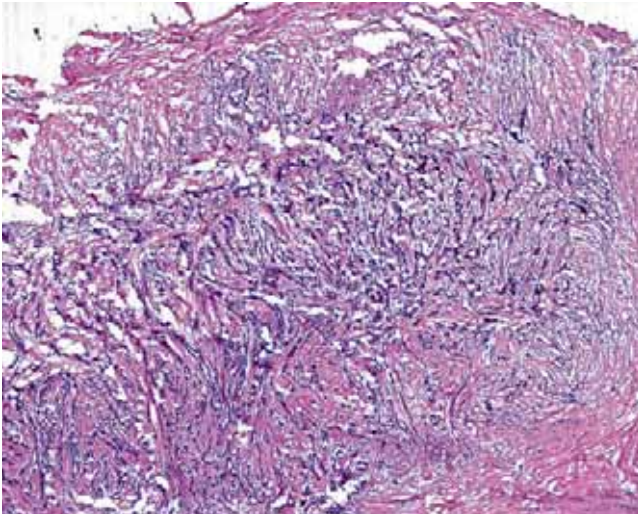


FIGURE 2.3 Medium power confirms that the cellular nodule consists of glands within a fibrous stroma.

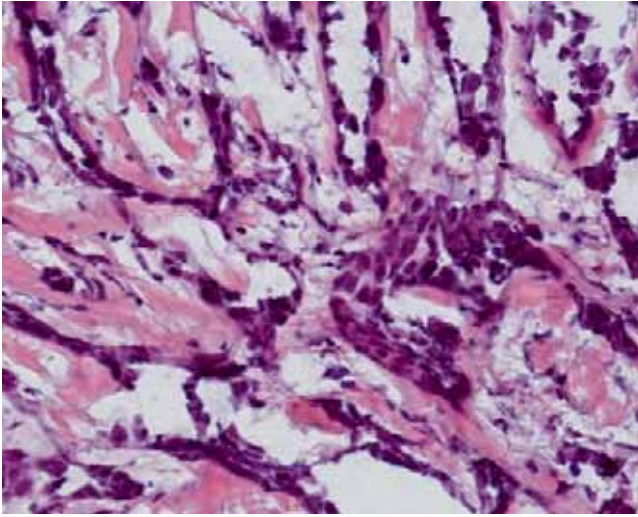


FIGURE 2.4 High power shows irregular glands lined by malignant cells consistent with adenocarcinoma metastatic to the pleura.

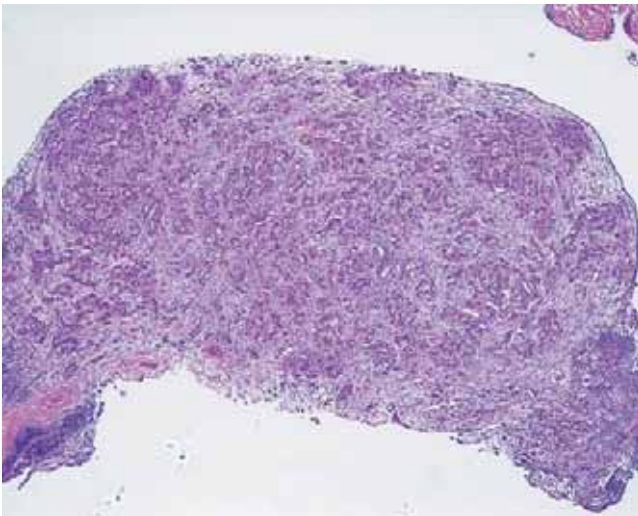


FIGURE 2.5 Frozen section of pleural biopsy displays cellular nests within desmoplastic connective tissue.

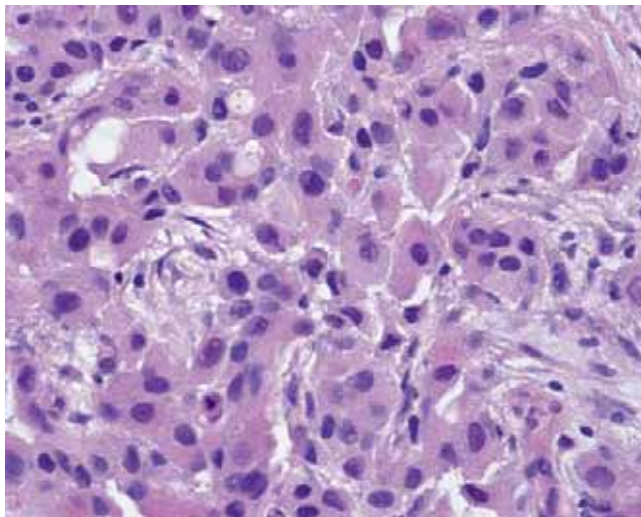


FIGURE 2.6 High power reveals that the nests are composed of epithelial cells with irregular nuclei, conspicuous nucleoli, and relatively abundant cytoplasm consistent with a metastatic carcinoma.

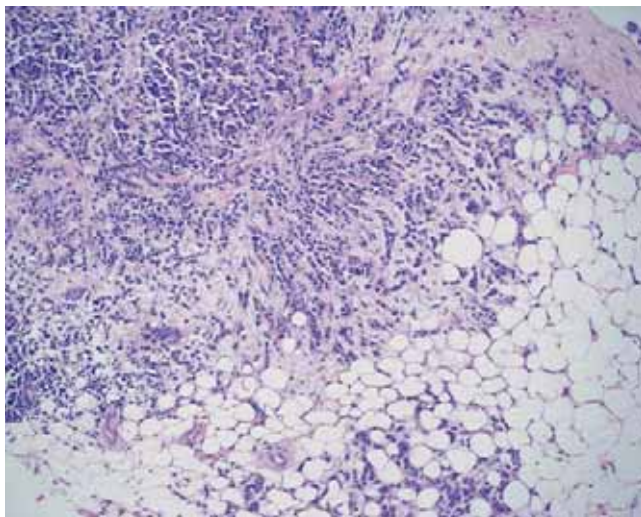


FIGURE 2.7 Low power of frozen section of relatively uniform, bland cells infiltrating in cords in a parietal pleura biopsy.

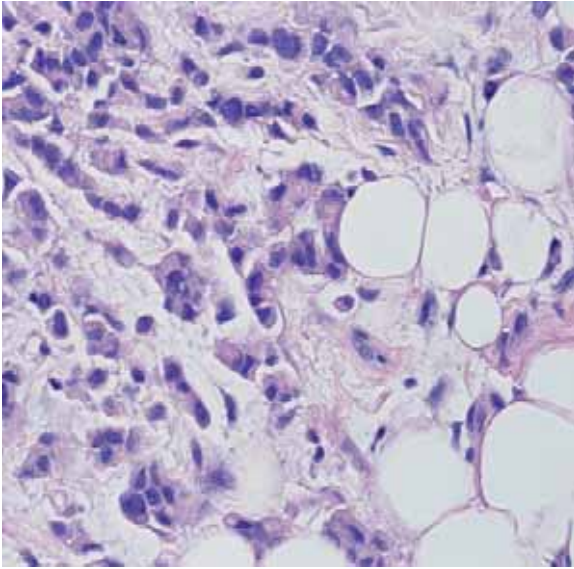


FIGURE 2.8 High power discloses cords or single files of relatively small, uniform cancer cells infiltrating into the fat consistent with metastatic breast carcinoma.

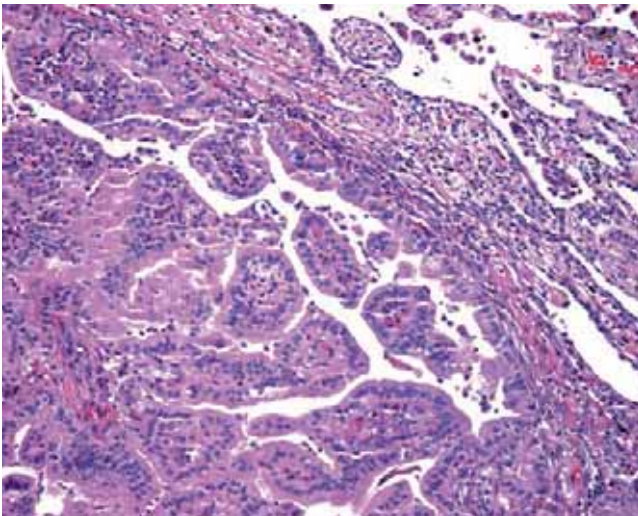


FIGURE 2.9 Medium power of frozen section of papillary carcinoma involving the pleura in patient with metastatic papillary thyroid carcinoma.

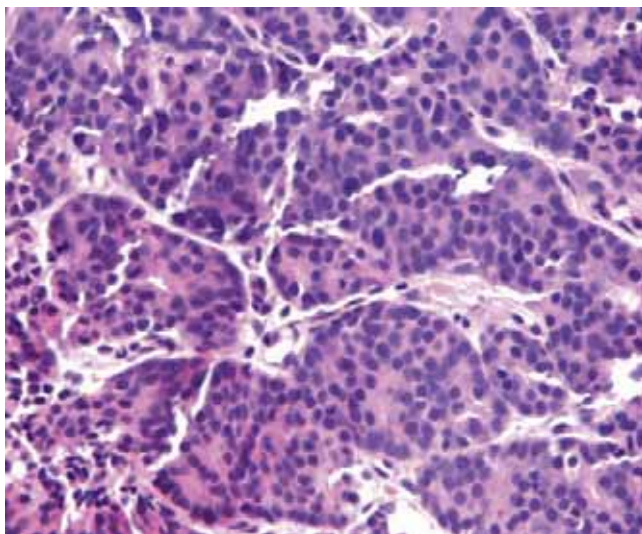


FIGURE 2.10 High power of metastatic prostate carcinoma to the pleura shows nests of cells with relatively uniform round nuclei.

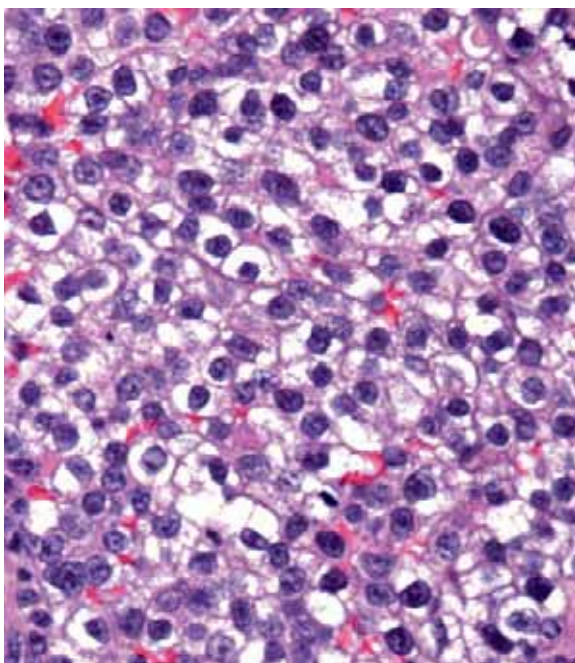


FIGURE 2.11 High power of clear cell renal cell carcinoma metastatic to the pleura. The cells have oval nuclei with conspicuous nucleoli, clear cytoplasm, and capillaries in the stroma.

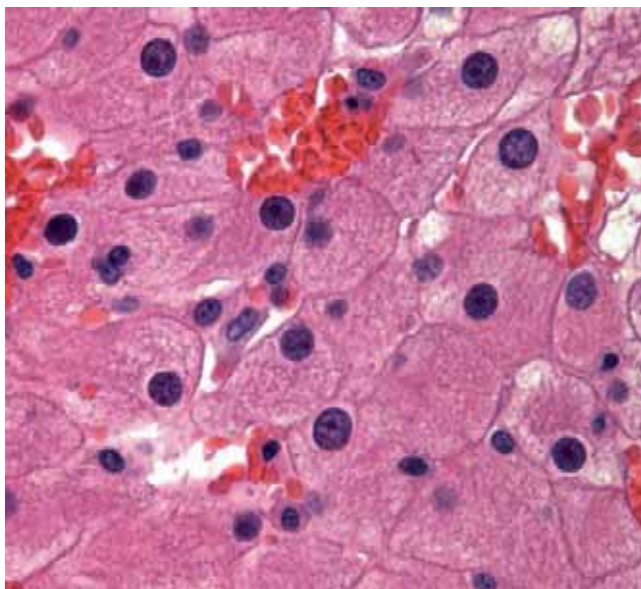


FIGURE 2.12 High power of another pattern of renal cell carcinoma metastatic to the pleura. In this tumor, the cells have granular cytoplasm.

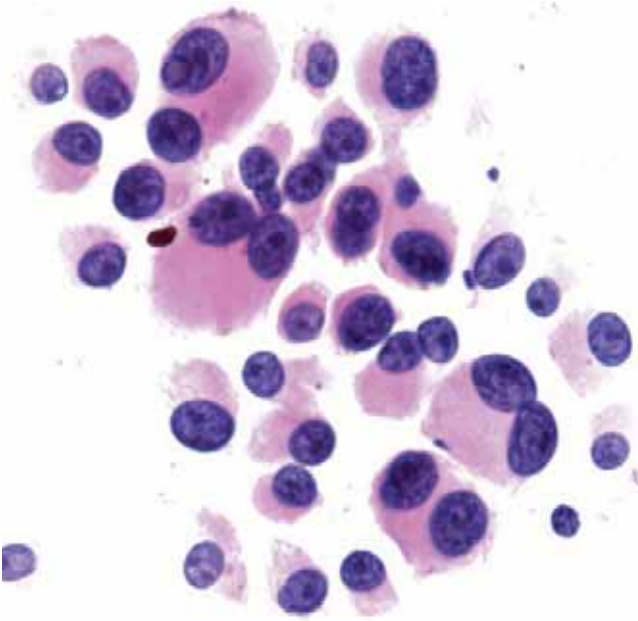


FIGURE 2.13 Touch preparation performed at the time of frozen section shows discohesive epithelioid-appearing cells with abundant cytoplasm, round to oval nuclei with conspicuous nucleoli, and binucleate cells. This is metastatic melanoma. There is one focus of brown material, representing melanin pigment, but most of the cells are amelanotic.

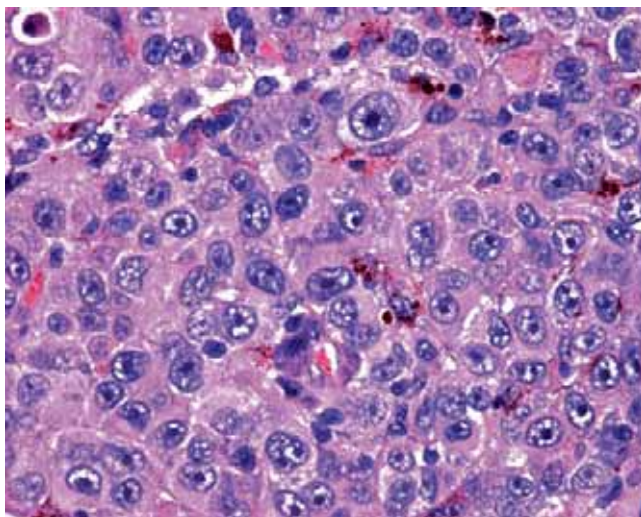


FIGURE 2.14 High power of melanoma metastatic to the pleura. The cells have large, vesicular nuclei with large purple nucleoli and only a modest amount of melanin pigment in the cytoplasm.

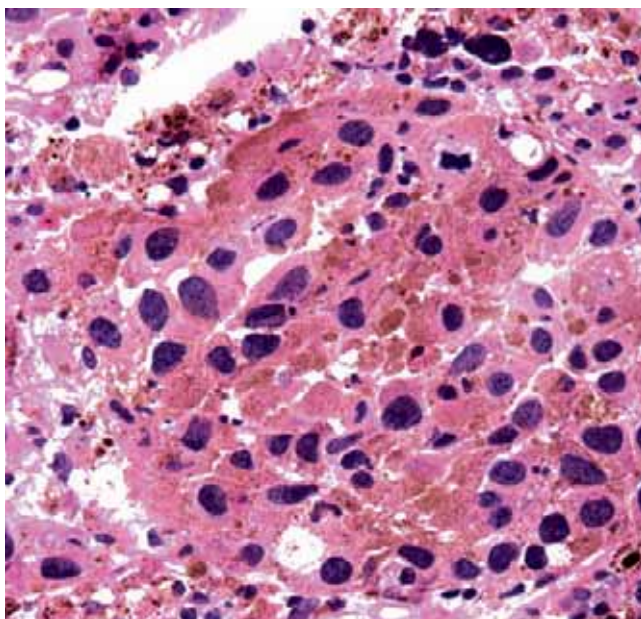


FIGURE 2.15 Melanoma metastatic to the pleura, which contains larger amounts of brown melanin pigment in the cytoplasm of the cancer cells than noted in the previous examples.

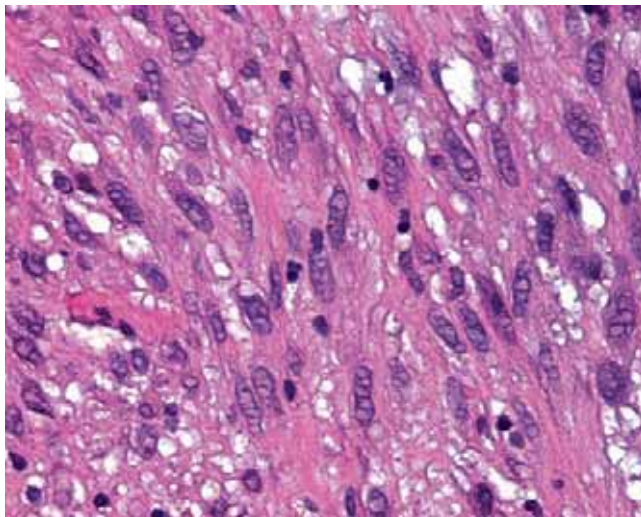


FIGURE 2.16 Malignant tumor composed of large, pleomorphic spindle cells involving the pleura. This tumor could represent metastatic sarcoma or metastatic sarcomatous carcinoma.

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