



Cytology of Thymic Lesions

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Thymic neoplasms are rare and range from benign hyperplasia to neoplastic, with thymomas being the most common [1]. Thymic hyperplasia, which is characterized by a dual population of epithelial cells and lymphocytes, is indistinguishable from thymomas by cytomorphology alone. Thymomas are neoplasms of the thymic epithelial cells and account for the most common anterior mediastinal tumors. The fine needle aspiration (FNA) of thymomas is characterized by a biphasic cellular pattern with two populations of cells: epithelial cells and admixed lymphocytes. The proportion of epithelial cells and lymphocytes varies and the various thymoma subtypes are based on the cytomorphology and the proportion of different cell types present. The cytomorphology of the World Health Organization (WHO) subtypes is described below. However, thymomas frequently have varying morphologies depending on the area sampled and subtyping based on cytomorphology alone may be difficult [2–7].

Type A thymoma (spindle cell or medullary thymoma) is highly cellular, predominantly composed of bland spindle or round epithelial cells and relative lack of lymphocytes. The epithelial cells are relatively small sized and uniform with small-sized oval or round bland nuclei, fine chromatin, and inconspicuous nucleoli. The cells are dispersed in single cells, arranged in loosely aggregated groups, or even arranged in whorled or fascicular patterns (Fig. 8.1).

Type B1 thymoma (lymphocyte rich) is characterized by relatively rare groups of neoplastic epithelial cells with a predominance of nonneoplastic lymphocytes. The lymphocytes that predominate are mostly mature T cells. The epithelial cells are usually in small clusters and scattered singly

with modest amounts of delicate cytoplasm and rounded to slightly oval nuclei, smooth or minimally irregular nuclear contours, fine evenly dispersed nuclear chromatin, and small nucleoli with no morphological malignant features (Fig. 8.2).

Type B2 thymoma is characterized by a mixed population of epithelial cells in loose clusters admixed with a heterogeneous population of lymphocytes, with a predominance of small lymphocytes. The epithelial cell density is higher than that seen in type B1 thymoma. Small lymphocytes percolate through loose aggregates of epithelial cells that contain rounded to oval nuclei and visible nucleoli with no morphological features suggesting an overt malignancy (Fig. 8.3).

Type B3 thymoma (epithelial rich) is characterized by large three-dimensional clusters of overlapping epithelial cells with sparse lymphocytes. The neoplastic epithelial cells of type B3 thymoma have round to oval nuclei with moderate nuclear atypia, slight nuclear irregularity, and small distinct nucleoli (Fig. 8.4).

Type AB thymomas are characterized by spindle cells and admixed immature T lymphocytes.

Thymic carcinomas (formerly classified as type C thymomas) have overtly malignant cytologic features. Malignant cells are aggregated in tight clusters with no percolating lymphocytes. The tumor cells are large in size and contain enlarged nuclei, coarse chromatin, and conspicuous nucleoli. Note, depending on the subtype that the carcinoma arises from, the malignant epithelium may show epithelioid or spindled morphology. Mitotic figures and necrosis are frequently present (Fig. 8.5).

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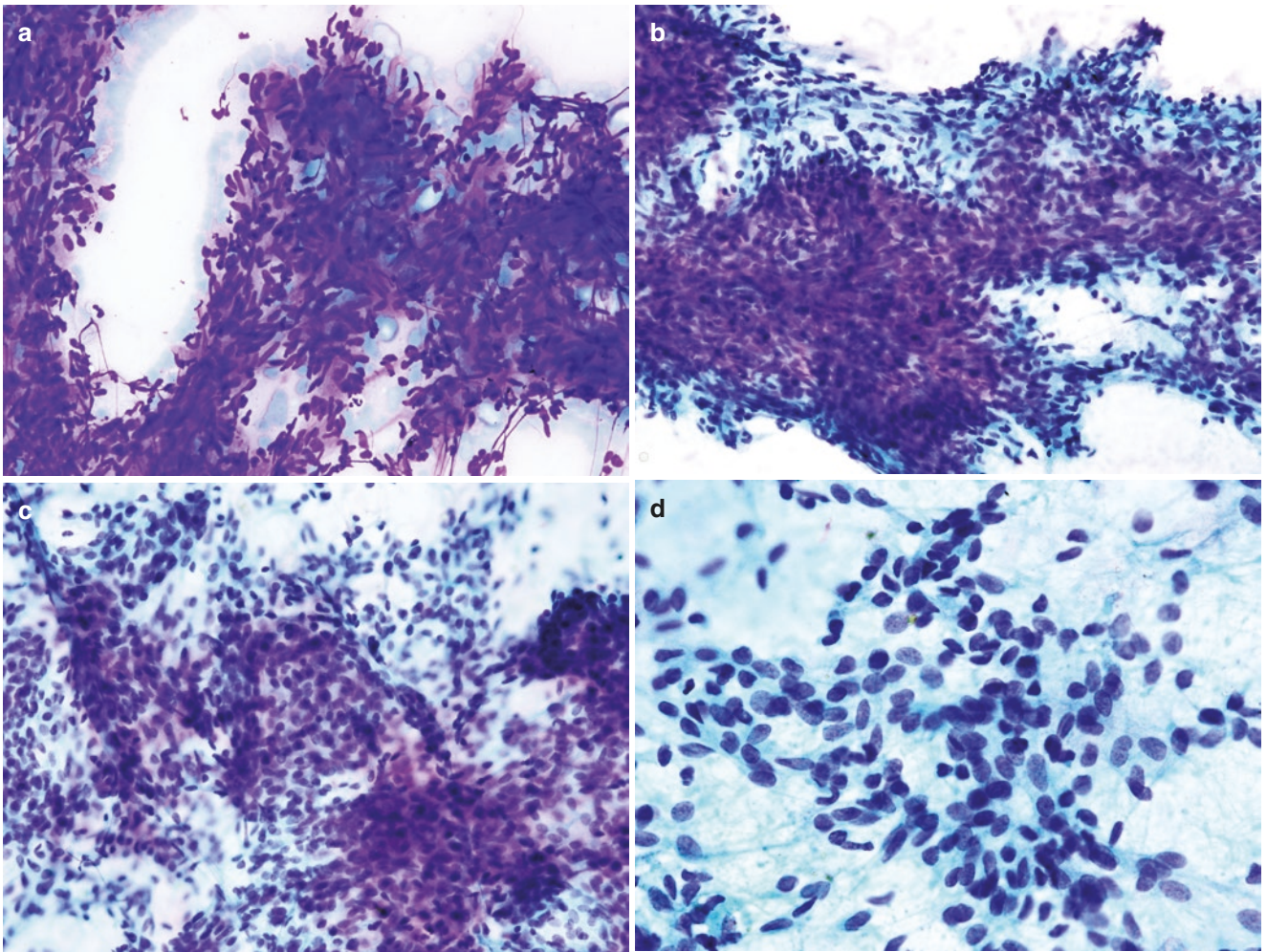


Fig. 8.1 Type A thymoma: (a) Diff-Quik-stained direct smear, intermediate magnification; (b) Papanicolaou-stained direct smear, intermediate magnification; (c) Papanicolaou-stained direct smear, intermediate magnification; (d) Papanicolaou-stained direct smear, high magnifica-

tion; (e) H&E-stained cell block, intermediate magnification; (f) H&E-stained cell block, intermediate magnification; (g) H&E-stained histologic specimen, intermediate magnification

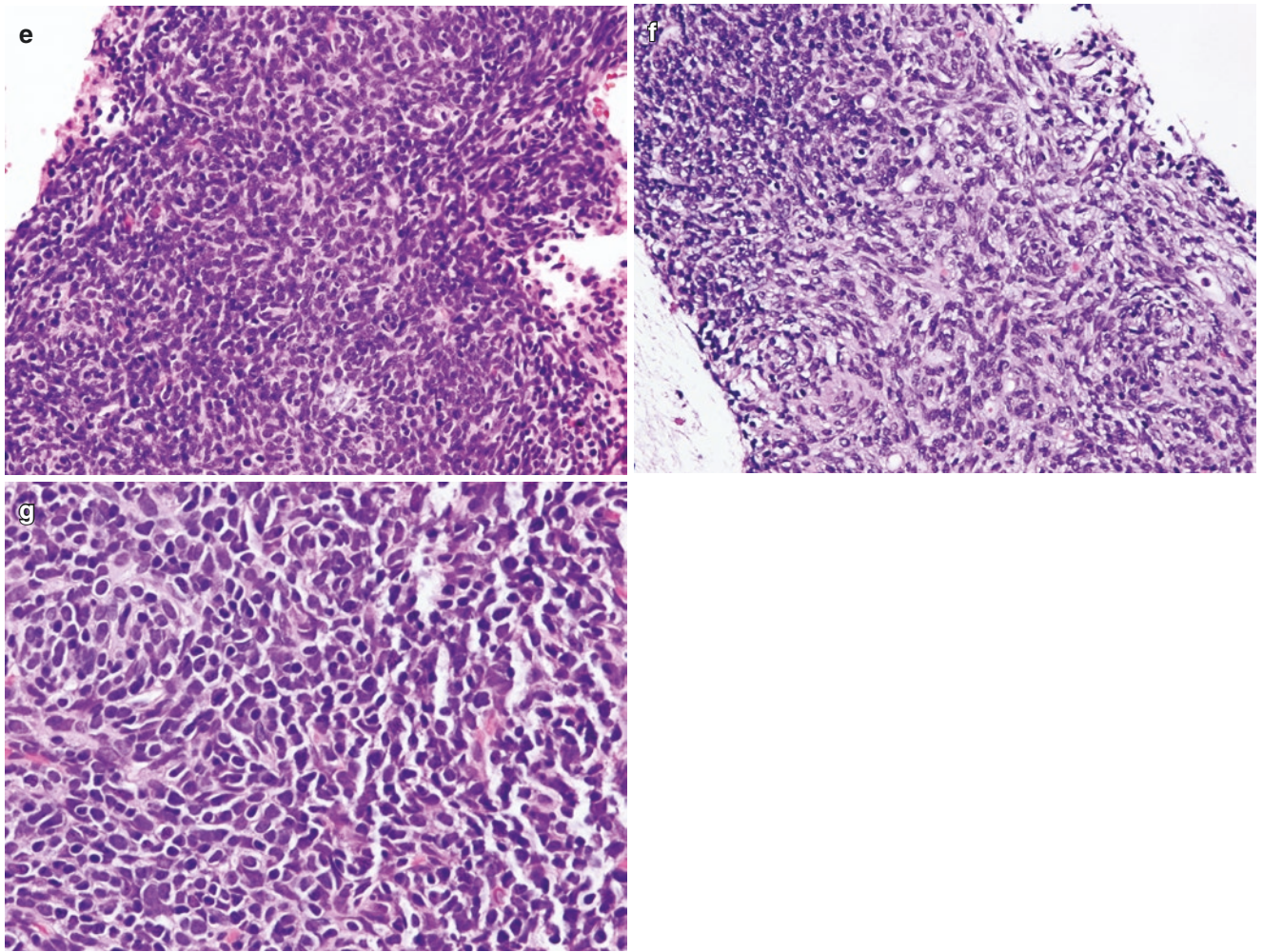


Fig. 8.1 (continued)

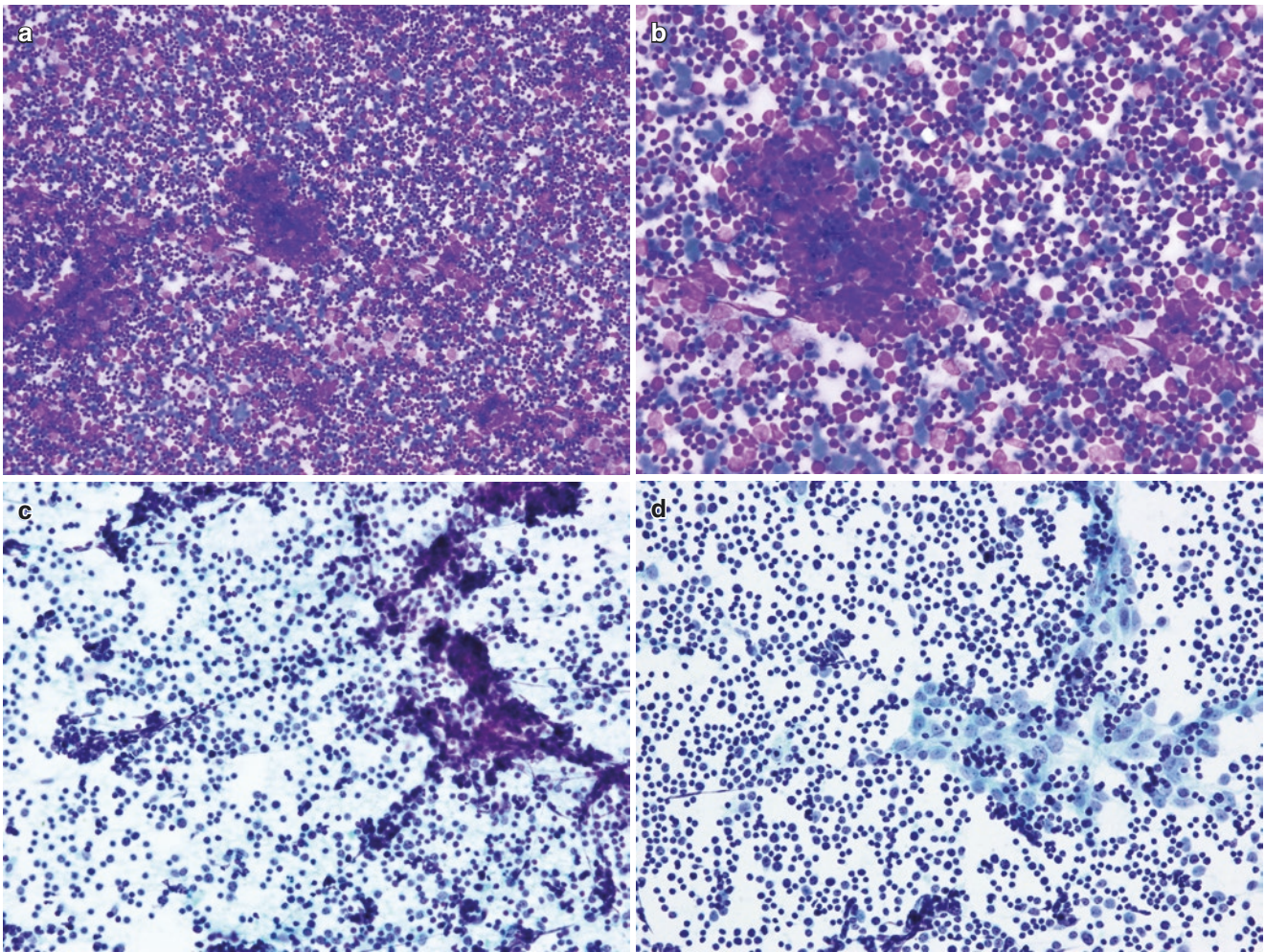


Fig. 8.2 Type B1 thymoma: (a) Diff-Quik-stained direct smear, low magnification; (b) Diff-Quik-stained direct smear, intermediate magnification; (c) Papanicolaou-stained direct smear, intermediate magnification; (d) Papanicolaou-stained direct smear, intermediate magnification;

(e) Papanicolaou-stained direct smear, high magnification; (f) H&E-stained cell block, intermediate magnification; (g) cell block labeled with pancytokeratin immunoperoxidase stain showing relatively rare epithelial cells, intermediate magnification

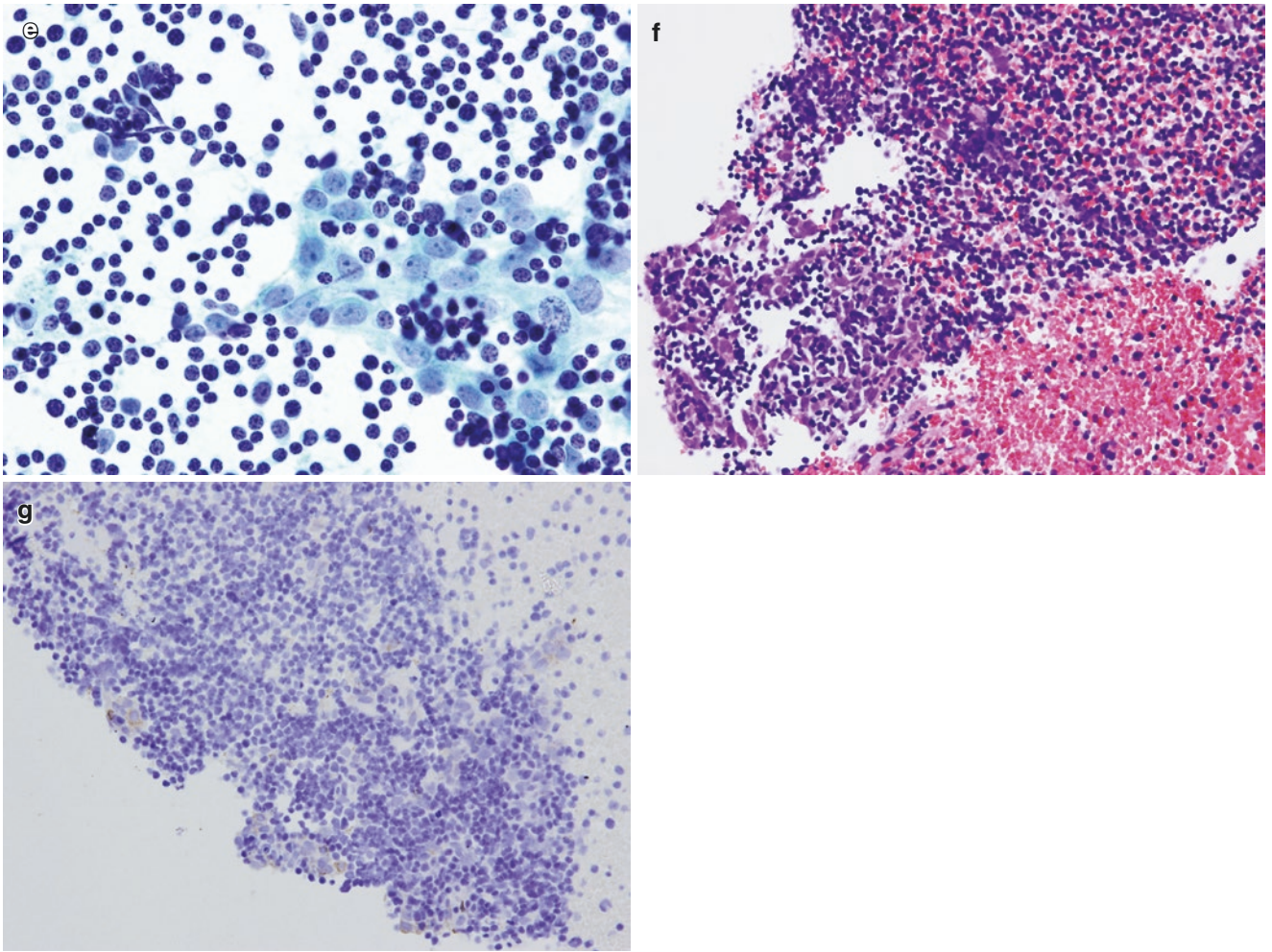


Fig. 8.2 (continued)

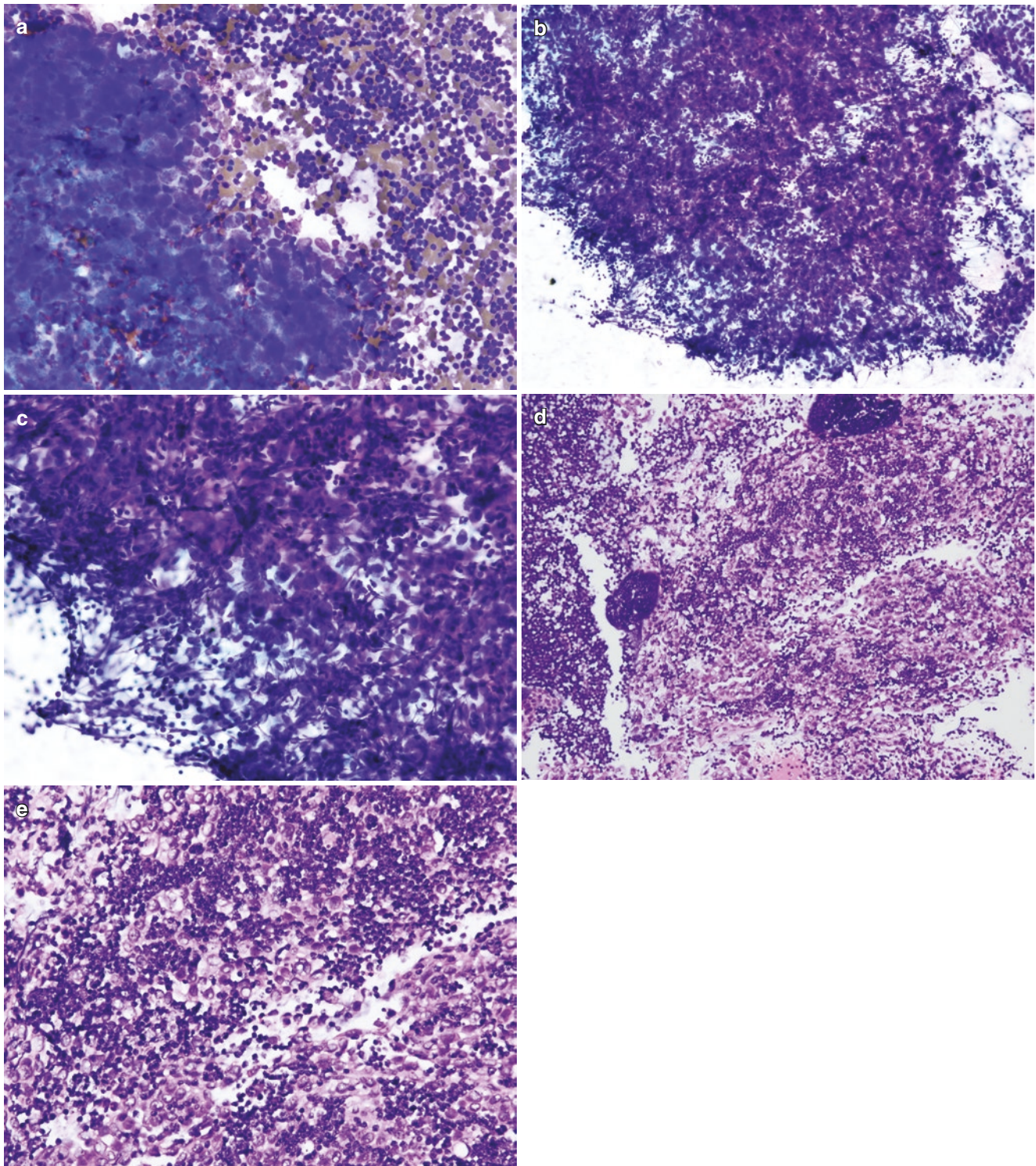


Fig. 8.3 Type B2 thymoma: (a) Diff-Quik-stained direct smear, intermediate magnification; (b) Papanicolaou-stained direct smear, low magnification; (c) Papanicolaou-stained direct smear, intermediate

magnification; (d) H&E-stained cell block, low magnification; (e) H&E-stained cell block, intermediate magnification

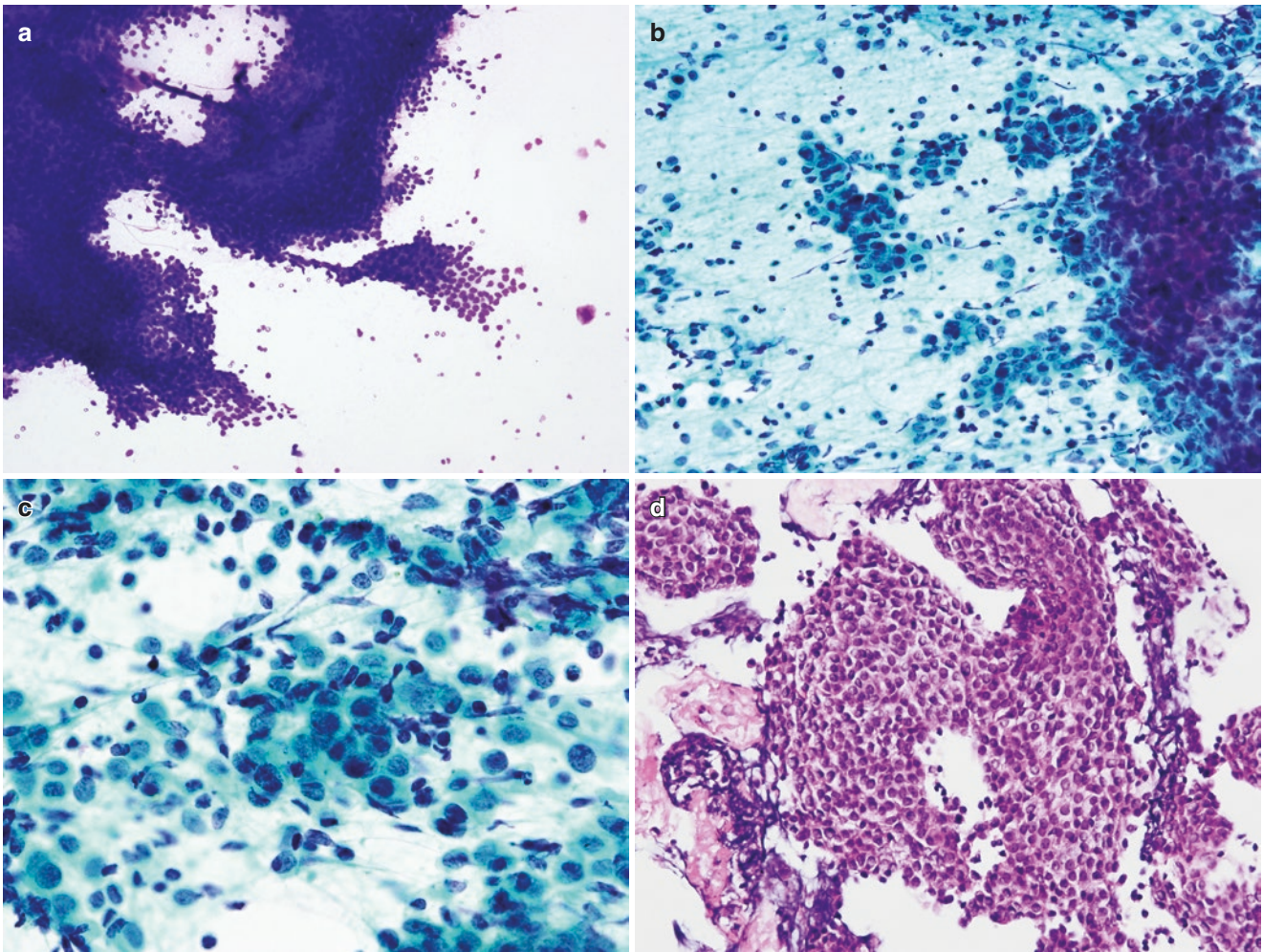


Fig. 8.4 Type B3 thymoma: (a) Diff-Quik-stained direct smear, intermediate magnification; (b) Papanicolaou-stained direct smear, intermediate magnification; (c) Papanicolaou-stained direct smear, high magnification; (d) H&E-stained cell block, intermediate magnification;

(e) H&E-stained cell block, high magnification; (f) H&E-stained histologic specimen, intermediate magnification; (g) H&E-stained histologic specimen, high magnification

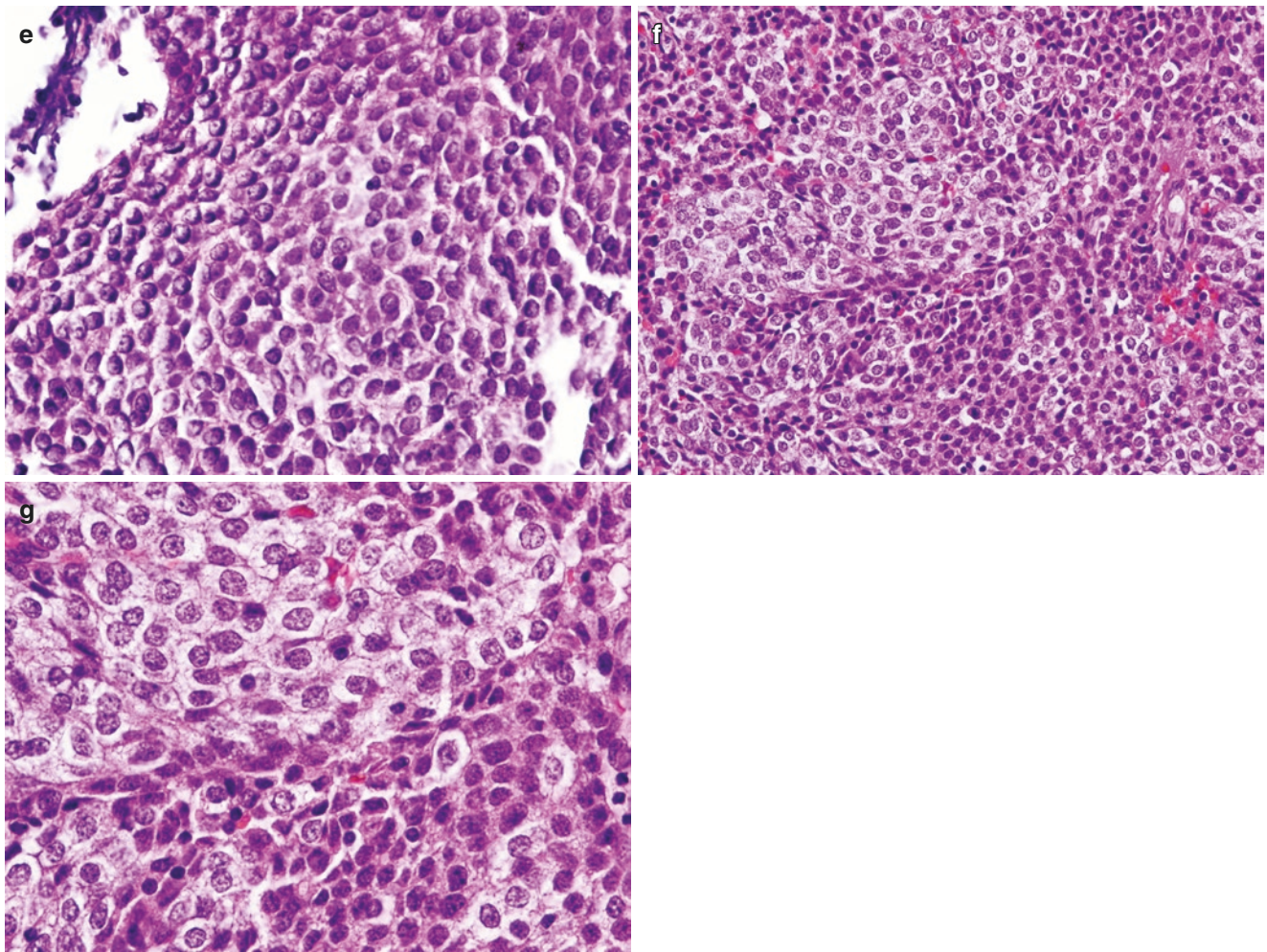


Fig. 8.4 (continued)

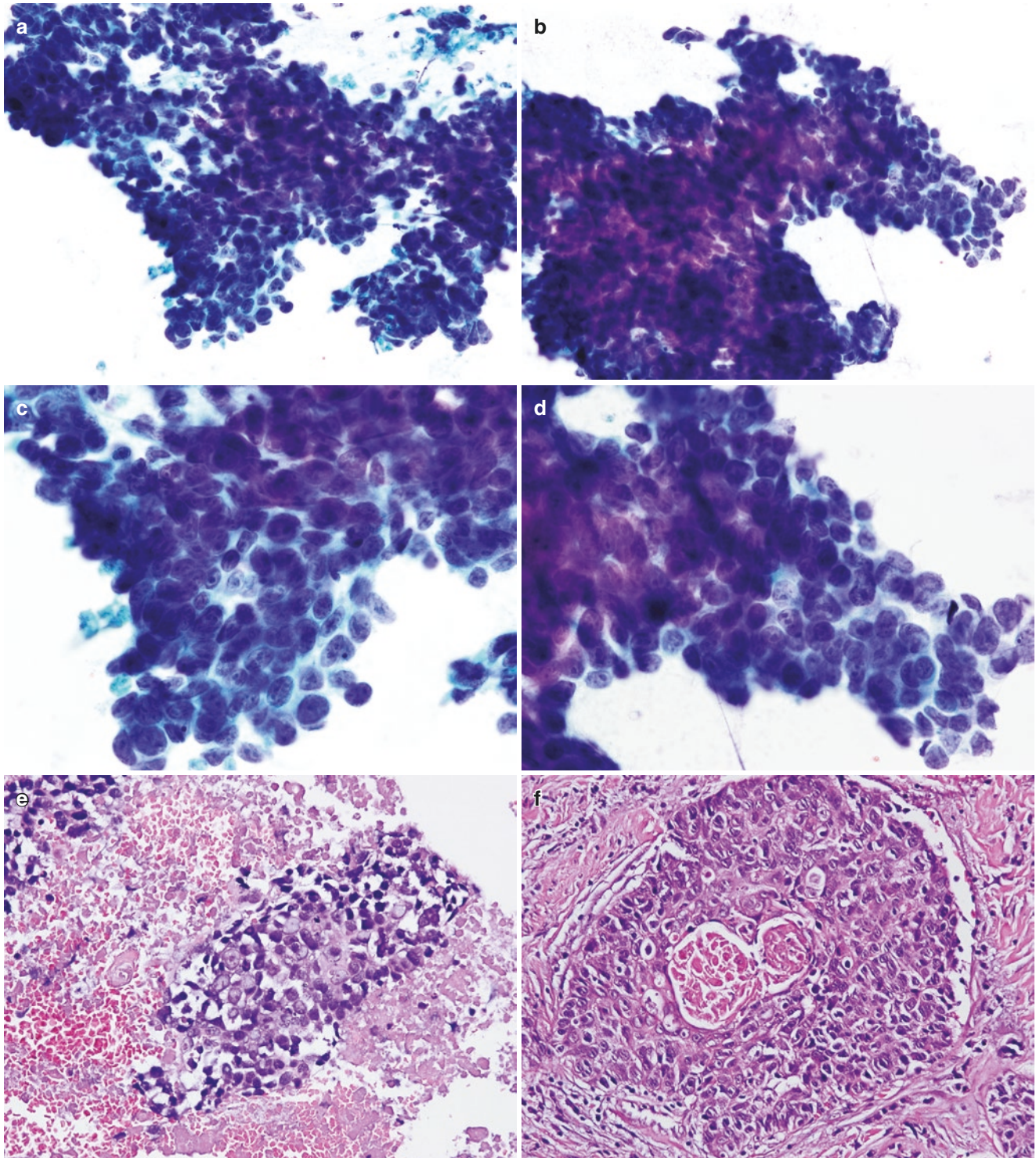


Fig. 8.5 Thymic carcinoma: (a) Papanicolaou-stained direct smear, intermediate magnification; (b) Papanicolaou-stained direct smear, intermediate magnification; (c) Papanicolaou-stained direct smear, high

magnification; (d) Papanicolaou-stained direct smear, high magnification; (e) H&E-stained cell block, intermediate magnification; (f) H&E-stained surgical specimen, intermediate magnification

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