

conclusive for malignancy, the category “suspicious for malignancy” is used. Some aspirates, particularly those that raise the possibility of a lymphoma of MALT-type but lacking corroborative immunophenotyping data, are more appropriately categorized as “atypia of undetermined significance (AUS)” (See Chap. 4, Sample Report Example 9). If an aspirate is interpreted as malignant, suspicious, or AUS, it is implied that the sample is adequate for evaluation (an explicit statement of adequacy is optional).

Example 1

MALIGNANT

Diffuse large B-cell lymphoma.

Note: Flow cytometry shows a CD45- and CD20-positive monoclonal B-cell population.

Example 2

SUSPICIOUS FOR MALIGNANCY

Suspicious for metastatic adenocarcinoma of the breast

References

1. Willis RA. The spread of tumors in the human body. London: Butterworth; 1952. p. 271–5.
2. Disibio G, French SW. Metastatic patterns of cancers: results from a large autopsy study. Arch Pathol Lab Med. 2008;132(6):931–9.
3. Czech JM, Lichtor TR, Carney JA, van Heerden JA. Neoplasms metastatic to the thyroid gland. Surg Gynecol Obstet. 1982;155(4):503–5.
4. Ivy HK. Cancer metastatic to the thyroid: a diagnostic problem. Mayo Clin Proc. 1984;59(12):856–9.
5. Shimaoka K, Sokal JE, Pickren JW. Metastatic neoplasms in the thyroid gland. Pathological and clinical findings. Cancer. 1962;15:557–65.
6. Schroder S, Burk CG, de Heer K. Metastases of the thyroid gland—morphology and clinical aspects of 25 secondary thyroid neoplasms. Langenbecks Arch Chir. 1987;370(1):25–35.
7. Cibas ES, Alexander EK, Benson CB, et al. Indications for thyroid FNA and pre-FNA requirements: a synopsis of the National Cancer Institute thyroid fine needle aspiration state of the science conference. Diagn Cytopathol. 2008;36(6):390–9.
8. Derringer GA, Thompson LDR, Frommelt RA, Bijwaard KE, Heffess CS, Abbondanzo SL. Malignant lymphoma of the thyroid gland: a clinicopathologic study of 108 cases. Am J Surg Pathol. 2000;24:623–39.
9. Lehar PA, Cote RA, Poisson J, Boctor M, Elhilali M, Kandalaft N. Thyroid metastasis of clear-cell renal carcinoma. Can Med Assoc J. 1983;128(2):154–6.
10. Shima H, Mori H, Takahashi M, Nakamura S, Miura K, Tarao M. A case of renal cell carcinoma solitarily metastasized to thyroid 20 years after the resection of primary tumor. Pathol Res Pract. 1985;179(6):666–72.
11. Lasser A, Rothman JG, Calamia VJ. Renal-cell carcinoma metastatic to the thyroid. Aspiration cytology and histologic findings. Acta Cytol. 1985;29(5):856–8.

12. Variakojis D, Getz ML, Paloyan E, Straus FH. Papillary clear cell carcinoma of the thyroid gland. *Hum Pathol*. 1975;6(3):384–90.
13. Layfield LJ, Ostrzega N. Fine needle aspirate smear morphology in metastatic melanoma. *Acta Cytol*. 1989;33(5):606–12.
14. Smith SA, Gharib H, Goellner JR. Fine-needle aspiration: usefulness for diagnosis and management of metastatic carcinoma to the thyroid. *Arch Intern Med*. 1987;147:311–2.
15. Pedersen RK, Pedersen NT. Primary non-Hodgkin's lymphoma of the thyroid gland: a population based study. *Histopathology*. 1996;28(1):25–32.
16. Lerma E, Arguelles R, Rigla M, et al. Comparative findings of lymphocytic thyroiditis and thyroid lymphoma. *Acta Cytol*. 2003;47(4):575–80.
17. Kossev P, Livolsi V. Lymphoid lesions of the thyroid: review in light of the revised European-American lymphoma classification and upcoming World Health Organization classification. *Thyroid*. 1999;9(12):1273–80.
18. Moshynska OV, Saxena A. Clonal relationship between Hashimoto thyroiditis and thyroid lymphoma. *J Clin Pathol*. 2008;61(4):438–44.
19. Saxena A, Alport EC, Moshynska O, Kanthan R, Boctor MA. Clonal B cell populations in a minority of patients with Hashimoto's thyroiditis. *J Clin Pathol*. 2004;57(12):1258–63.
20. Chen HI, Akpolat I, Mody DR, et al. Restricted kappa/lambda light chain ratio by flow cytometry in germinal center B cells in Hashimoto thyroiditis. *Am J Clin Pathol*. 2006;125(1):42–8.
21. Sangalli G, Serio G, Zampatti C, Lomuscio G, Colombo L. Fine needle aspiration cytology of primary lymphoma of the thyroid: a report of 17 cases. *Cytopathology*. 2001;12(4):257–63.
22. Murphy BA, Meda BA, Buss DH, Geisinger KR. Marginal zone and mantle cell lymphomas: assessment of cytomorphology in subtyping small B-cell lymphomas. *Diagn Cytopathol*. 2003;28(3):126–30.
23. Al-Marzooq YM, Chopra R, Younis M, Al-Mulhim AS, Al-Mommatten MI, Al-Omran SH. Thyroid low-grade B-cell lymphoma (MALT type) with extreme plasmacytic differentiation: report of a case diagnosed by fine-needle aspiration and flow cytometric study. *Diagn Cytopathol*. 2004;31(1):52–6.
24. Tani E, Skoog L. Fine needle aspiration cytology and immunocytochemistry in the diagnosis of lymphoid lesions of the thyroid gland. *Acta Cytol*. 1989;33(1):48–52.
25. Wang SA, Rahemtullah A, Faquin WC, Roepke J, Harris NL, Hasserjian RP. Hodgkin's lymphoma of the thyroid: a clinicopathologic study of five cases and review of the literature. *Mod Pathol*. 2005;18(12):1577–84.
26. Buss DH, Marshall RB, Baird FG, Myers RT. Paraganglioma of the thyroid gland. *Am J Surg Pathol*. 1980;4(6):589–93.
27. Zak FG, Lawson W. Glomic (paraganglionic) tissue in the larynx and capsule of the thyroid gland. *Mt Sinai J Med*. 1972;39(1):82–90.
28. Pusztaszeri M, Sauder K, Cibas E, Faquin W. Fine-needle aspiration of primary Langerhans cell histiocytosis of the thyroid gland, a potential mimic of papillary thyroid carcinoma. *Acta Cytol*. 2013;57:406–12.
29. Nath V, Parks GE, Baliga M, Hartle EO, Geisinger KR, Shenoy V. Mucoepidermoid carcinoma of the thyroid with concomitant papillary carcinoma: comparison of findings on fine-needle aspiration biopsy and histology. *Endocr Pathol*. 2014;25(4):427–32.
30. Dogan S, Wang L, Ptashkin RN, Dawson RR, Shah JP, Sherman EJ, et al. Mammary analog secretory carcinoma of the thyroid gland: a primary thyroid adenocarcinoma harboring ETUG-NTRK3 fusion. *Mod Pathol*. 2016;29(9):985–95.
31. Ali SZ, Erozan YS. Thymoma. Cytopathologic features and differential diagnosis on fine needle aspiration. *Acta Cytol*. 1998;42(4):845–54.
32. Hirokawa M, Kuma S, Miyauchi A. Cytological findings of intrathyroidal epithelial thymoma/carcinoma showing thymus-like differentiation: a study of eight cases. *Diagn Cytopathol*. 2012;40(Suppl 1):E16–20.
33. Gerhard R, Kanashiro EH, Kliemann CM, Juliano AG, Chammas MC. Fine-needle aspiration biopsy of ectopic cervical spindle-cell thymoma: a case report. *Diagn Cytopathol*. 2005;32(6):358–62.

34. Chan JK, Rosai J. Tumors of the neck showing thymic or related branchial pouch differentiation: a unifying concept. *Hum Pathol.* 1991;22(4):349–67.
35. Misra RK, Mitra S, Yadav R, Bundela A. Spindle epithelial tumor with thymus-like differentiation: a case report and review of literature. *Acta Cytol.* 2013;57(3):303–8.
36. Tong GX, Hamele-Bena D, Wei XJ, O'Toole K. Fine-needle aspiration biopsy of monophasic variant of spindle epithelial tumor with thymus-like differentiation of the thyroid: report of one case and review of the literature. *Diagn Cytopathol.* 2007;35(2):113–9.
37. Tanda F, Massarelli G, Bosincu L, Cossu A. Angiosarcoma of the thyroid: a light, electron microscopic and histoimmunological study. *Hum Pathol.* 1988;19(6):742–5.
38. Kikuchi I, Anbo J, Nakamura S, Sugai T, Sasou S, Yamamoto M, Oda Y, Shiratsuchi H, Tsuneyoshi M. Synovial sarcoma of the thyroid. Report of a case with aspiration cytology findings and gene analysis. *Acta Cytol.* 2003;47(3):495–500.
39. Conzo G, Candela G, Tartaglia E, Gambardella C, Mauriello C, Pettinato G, Bellastella G, Esposito K, Santini L. Leiomyosarcoma of the thyroid gland: a case report and literature review. *Oncol Lett.* 2014;7(4):1011–4.
40. Tong GX, Hamele-Bena D, Liu JC, Horst B, Remotti F. Fine-needle aspiration biopsy of primary osteosarcoma of the thyroid: report of a case and review of the literature. *Diagn Cytopathol.* 2008;36(8):589–94.
41. Maldi E, Monga G, Rossi D, Tosoni A, Mezzapelle R, Boldorini R. Extra-osseous Ewing sarcoma of the thyroid gland mimicking lymphoma recurrence: a case report. *Pathol Res Pract.* 2012;208(6):356–9.