International Academy of Pathology
Malaysian Division

FINAL REPORT

QUALITY ASSURANCE PROGRAM
GENERAL DIAGNOSTIC HISTOPATHOLOGY
CYCLE 02/2024

NOTES FROM THE COORDINATOR

1. For this cycle 02/2024, a total of 31 institutions responded online by the closing date of 24 November 2024.

2. Excerpts of previously circulated information about this quality assurance program are reproduced here:
    - **IAP-MD QAP provides a platform via evaluation reports to compare and identify diagnostic insufficiency based on the outcomes of submitted diagnoses and targeted diagnoses.**
    - **In the evaluation reports of each cycle, the targeted diagnosis for each case is provided, followed by a tabulated list of diagnoses submitted by participating laboratories, and followed by discussion and possible differential diagnoses on the case.**
    - **Evaluation of performance of each laboratory is conducted by participating laboratory by comparing own submitted diagnoses with the diagnoses provided in the evaluation reports. Evaluation of performance shall be the responsibility of each participating laboratory.**

3. Any queries regarding this final report for cycle 02/2024 could be directed to Dr. Ch'ng Ewe Seng, e-mail: iapmdqap@gmail.com.

4. The coordinator would like to acknowledge the contributions from Prof. Emerita Dr. Nor Hayati Othman, Prof. Dato Dr. Norain Karim, Datin Dr. Nik Raihan Nik Mustapha, Dr. Razmin Ghazali, Dr. Noraini Mohd Dusa, PM Dr. Nor Haizura Abd Rani, Dr. Suhaila Abdullah, and Dr. Asmawiza Awang.

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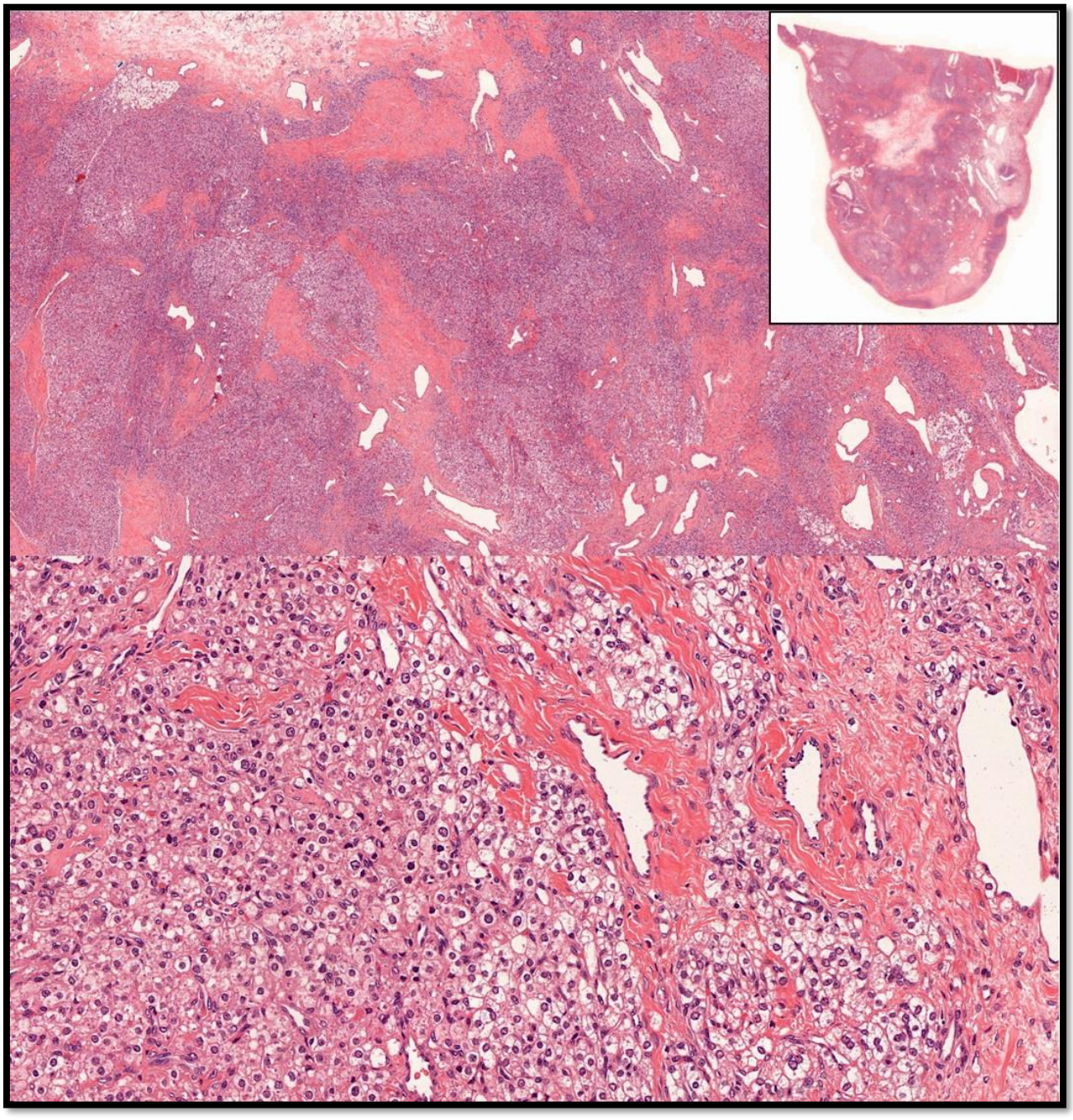
Coordinators for IAP-MD QAP

Case 1

Case 1: A 54-year-old female with prolonged menses and dysmenorrhea. Computed tomography showed a right ovarian mass of 5x6cm.

Targeted Diagnosis: **Sclerosing stromal tumor**



Case 1

Submitted Diagnoses by Participating Institutions	Number	
Sclerosing stromal tumor; Benign sex cord stromal tumor, favor sclerosing stromal tumor	22	Acceptable
Steroid cell tumor; Steroid cel tumor and differentials	6	Acceptable
Benign sex cord stromal tumor (steroid cell tumor/thecoma)	1	Acceptable
Thecoma	1	
Sex-cord stromal tumor, possible steroid cell tumors with some features of aggressive malignant behavior such as hemorrhage and increased mitosis	1	

Educational notes:

1. The ovarian mass is well-circumscribed, consisting of tumor nodules interspersed with stromal areas that range from fibrotic to edematous. These stromal regions are characterized by the presence of prominent staghorn-shaped blood vessels. The tumor nodules are composed primarily of a mixture of epithelioid and spindle-shaped cells. The epithelioid cells exhibit mild nuclear pleomorphism, with round to oval nuclei and eosinophilic to clear, vacuolated cytoplasm that shows distinct cellular borders. These histological features are consistent with a sclerosing stromal tumor of the ovary.
2. A sclerosing stromal tumor is a benign, pure stromal neoplasm of the ovary, typically characterized by pseudolobulation, prominent stromal vessels, and a mixture of epithelioid and spindle-shaped cells.
3. While the presence of epithelioid cells with eosinophilic to clear, vacuolated cytoplasm may suggest a steroid-secreting morphology, a feature commonly seen in steroid cell tumors, the prominent pseudolobular pattern and the staghorn blood vessels in the stromal regions are distinct features of sclerosing stromal tumors. These features help differentiate this case from a steroid cell tumor of the ovary.
4. In contrast, thecomas typically exhibit a diffuse growth pattern with tumor cells that have pale-grey cytoplasm and indistinct cell membranes, giving them a syncytial appearance. This is in contrast to the distinct cellular borders observed in sclerosing stromal tumors, aiding in the differential diagnosis.

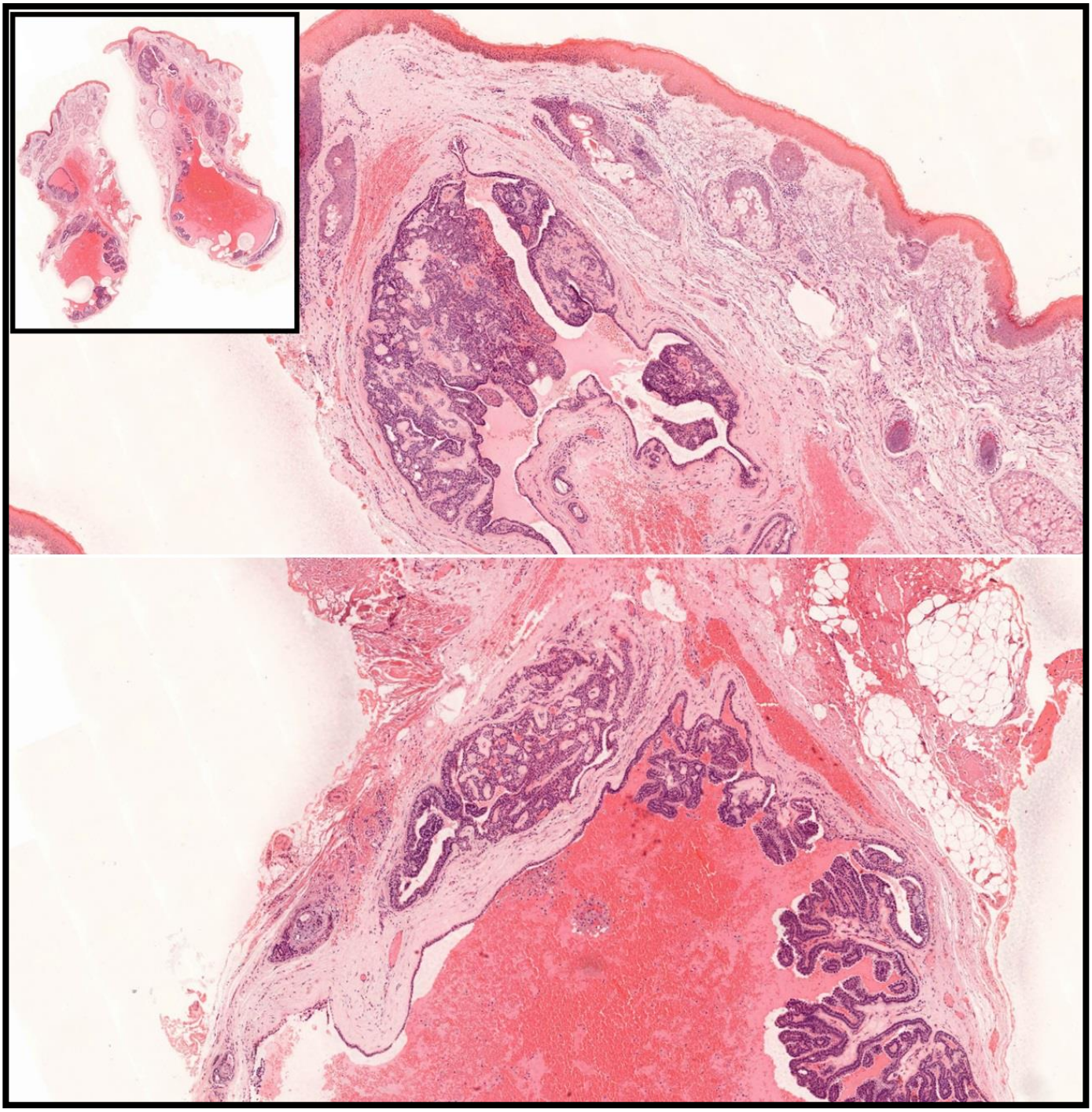
Reference:

1. WHO Classification of Tumours Editorial Board. Female Genital Tumours. Lyon (France), WHO classification of tumours series, 5th ed., 2020
2. Devins, Kyle M., Robert H. Young, and Jaclyn C. Watkins. "Sclerosing stromal tumour: a clinicopathological study of 100 cases of a distinctive benign ovarian stromal tumour typically occurring in the young." Histopathology 80.2 (2022): 360-368.

Case 2

Case 2: A 63-year-old female with a cyst over the nasal bridge.

Targeted Diagnosis: **Apocrine cystadenoma**



Case 2

Submitted Diagnoses by Participating Institutions	Number	
Apocrine cystadenoma/hidrocystoma	20	Acceptable
Syringocystadenoma papilliferum	5	Acceptable
Hidradenoma papillferum	4	Acceptable
Papillary eccrine adenoma	1	Acceptable
Benign skin adnexal tumour. Differentials Papillary eccrine adenoma, syringocysadenoma papilliferum and hidradenoma papiliferum.	1	Acceptable

Educational notes:

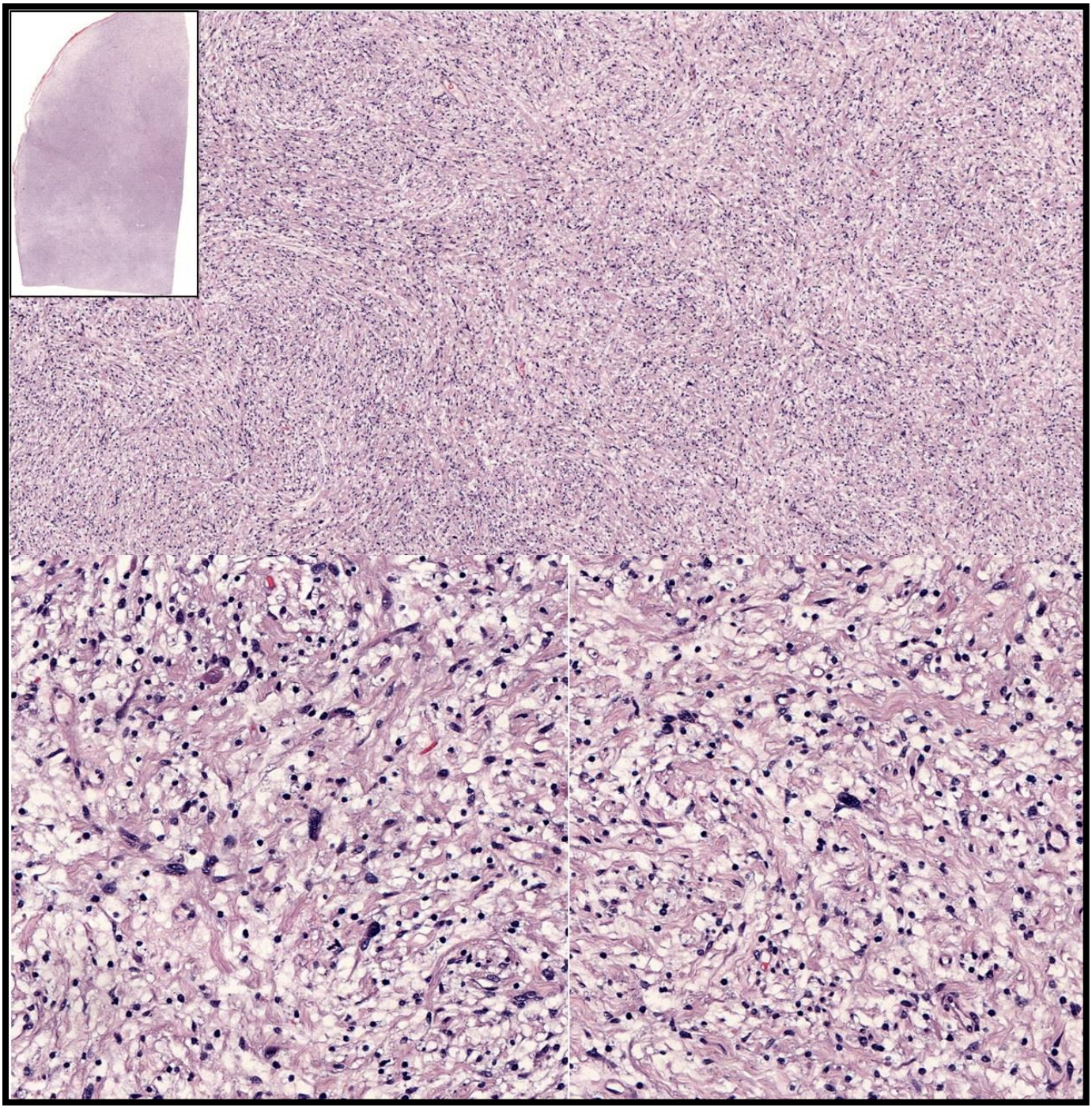
1. There are cystic spaces in the dermis lined by a bi-layered epithelium appearing focally in papillary projection and complex anastomosing glandular architecture. The luminal columnar epithelium shows decapitation secretion. The underlying myoepithelial cells are discernible. These histological features are consistent with apocrine cystadenoma.
2. Apocrine hidroadenoma/cystadenoma is a benign cystic neoplasm of sweat duct origin. It appears as simple cysts (hidroadenoma) to complex glandular architecture(cystadenoma). As opposed to eccrine differentiation, apocrine differentiation displays decapitation secretion.
3. In contrast to syringocystadenoma papilleferum, apocrine hidroadenoma/cystadenoma has no connection to epidermis/hair follicle. The overlying squamous epithelium of syringocystadenoma papilleferum also often displays papillomatous or wart-like proliferation.
4. Hidradenoma papilliferum is a benign site-specific appendageal tumour associated with anogenital mammary-like glands presenting as a nodule or cyst-like lesion resembling intraductal papilloma of the breast.

Reference:
1. WHO Classification of Tumours Editorial Board. Skin Tumours. Lyon (France), WHO classification of tumours series, 5th ed., 2023.

Case 3

Case 3: A 30-year-old male with underlying Neurofibromatosis Type 1. Mass on the left posterior neck.

Targeted Diagnosis: **Neurofibroma with atypia**



Case 3

Submitted Diagnoses by Participating Institutions	Number	
Neurofibroma	8	Acceptable
Neurofibroma with atypia (ancient neurofibroma)	10	Acceptable
Atypical neurofibroma	7	Acceptable
Ancient neurofibroma versus ANNUBP 1	1	Acceptable
Atypical neurofibromatous neoplasm of uncertain biological potential (ANNUBP)	2	Acceptable
Malignant peripheral nerve sheath tumor (MPNST)	1	
Ancient schwannoma; Benign neural tumor, likely nerve sheath myxoma	2	

Educational notes:

1. This tumor is circumscribed mass with a thin fibrous capsule, and it is composed of a mixture of spindle cells with slender wavy nuclei and those with elongated plump nuclei. There are occasional large, atypical cells with enlarged hyperchromatic bizarre nuclei. The stroma background is mxyoid with collagen fibers appearing as shredded carrots. There is hardly any mitosis. These features are consistent with neurofibroma with atypia.
2. Neurofibromatosis type 1 (NF1) is characterized by the development of multiple neurofibromas, with 8-15% of affected individuals experiencing malignant transformation into malignant peripheral nerve sheath tumors (MPNSTs) over their lifetime. Nuclear atypia is commonly observed in NF1-associated neurofibromas, but its presence alone is typically not clinically significant. These tumors are often classified as neurofibromas with atypia (or ancient neurofibromas), which are distinguished by the presence of scattered bizarre nuclei with smudgy chromatin.
3. However, in addition to cytological atypia, loss of the characteristic neurofibroma architecture, high cellularity, and/or mitotic activity >1/50 HPF but <3/10 HPF raise concern for malignancy. When at least two of these four features are present, the tumor is classified as atypical neurofibroma / atypical neurofibromatous neoplasm of uncertain biological potential (AN/ANNUBP). If an AN/ANNUBP shows increased mitotic activity (3-9/10 HPF) but no necrosis, it is upgraded to low-grade MPNST. Conversely, MPNSTs exhibiting necrosis or a higher mitotic count ($\geqslant$ 10/10 HPF) are classified as high-grade MPNSTs.
4. In recent updates, there has been a shift towards incorporating molecular findings into the diagnostic framework for NF1-associated tumors. Notably, the term "low-grade MPNST" has been replaced with ANNUBP with increased proliferation, reflecting the ongoing uncertainty regarding the biological potential of these tumors.

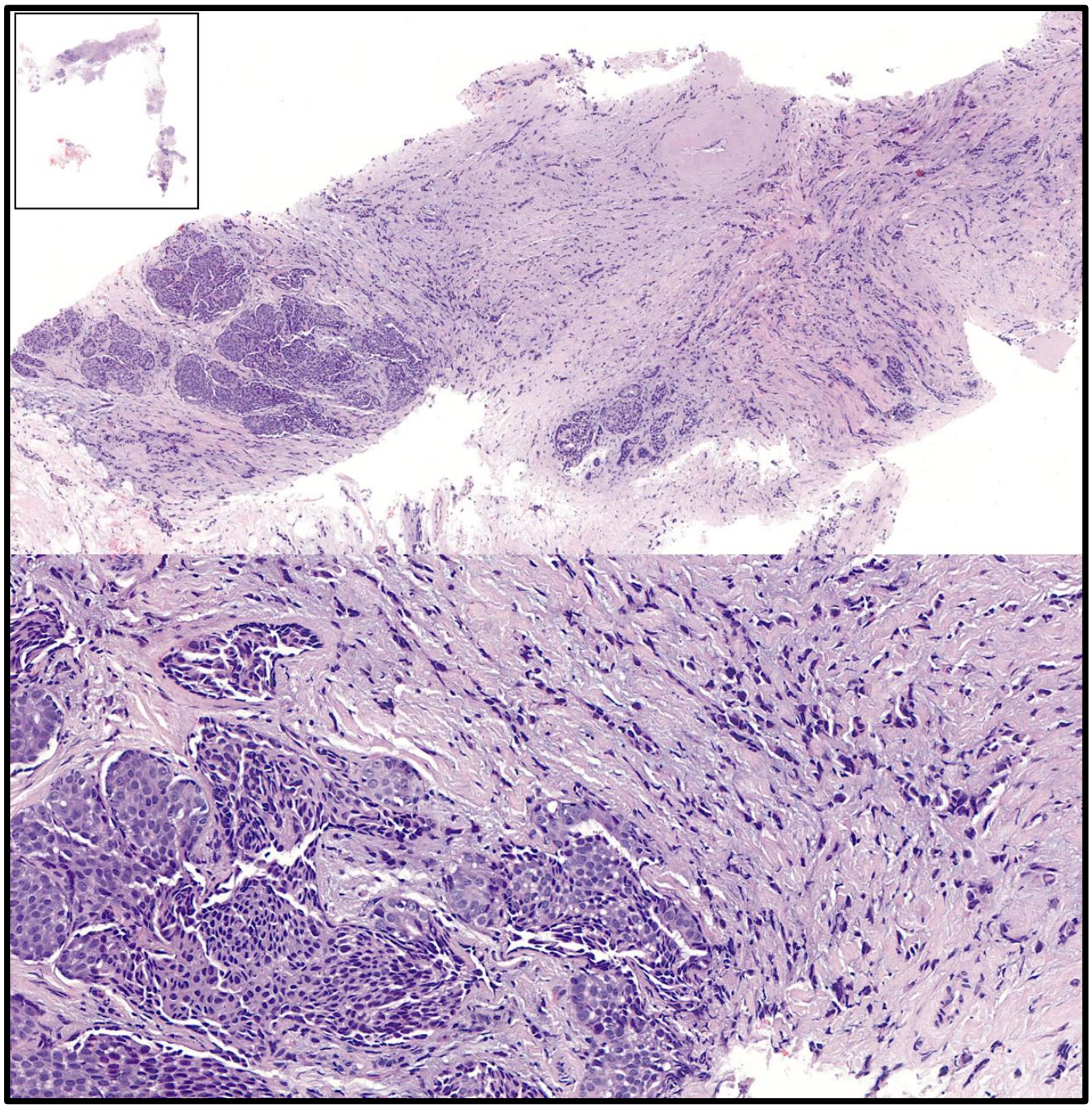
Reference

1. Miettinen, Markku M., et al. "Histopathologic evaluation of atypical neurofibromatous tumors and their transformation into malignant peripheral nerve sheath tumor in patients with neurofibromatosis 1—a consensus overview." Human pathology 67 (2017): 1-10.
2. Lucas, Calixto-Hope G., et al. "Consensus recommendations for an integrated diagnostic approach to peripheral nerve sheath tumors arising in the setting of Neurofibromatosis type 1 (NF1)." Neuro-Oncology (2024): noae235.

Case 4

Case 4: A 57-year-old female with a left breast mass. Ultrasound guided biopsy.

Targeted Diagnosis: **Invasive lobular carcinoma and lobular carcinoma in situ**



Case 4

Submitted Diagnoses by Participating Institutions	Number	
Invasive lobular carcinoma and lobular carcinoma in situ	23	Acceptable
Invasive lobular carcinoma and carcinoma in situ.	2	Acceptable
Invasive lobular carcinoma and pleomorphic lobular carcinoma in situ/ Pleomorphic invasive lobular carcinoma and lobular carcinoma in situ	2	Acceptable
Pleomorphic invasive lobular carcinoma and ductal carcinoma in situ	1	Acceptable
Invasive carcinoma, ductal and lobular features and high-grade carcinoma in situ (ductal or pleomorphic lobular carcinoma in situ)	2	Acceptable
Invasive carcinoma, histologically grade 2 with lobular cancerization.	1	

Educational notes:

1. The biopsy shows invasive lobular carcinoma (ILC) associated with extensive lobular carcinoma in situ (LCIS). The invasive component is composed of infiltrative single files and dispersed single malignant cells with occasional intracytoplasmic lumina. Mammary acini involved by lobular carcinoma in situ are distended by a single monotonous population of neoplastic cells, which are discohesive with occasional intracytoplasmic lumina.
2. ILC is defined by individually dispersed or linear discohesive infiltrative cells. Different variants of ILC, some based on growth pattern (i.e. solid, alveolar, and tubulo-lobular) and others based on cytological features (i.e. pleomorphic, histiocytoid/apocrine) are recognized. Pleomorphic lobular carcinoma (invasive and in situ) in particular displays marked nuclear pleomorphism (> 4 times the size of lymphocytes or equivalent to that of high-grade ductal carcinoma in situ). Regardless of E-cadherin results, when an invasive carcinoma shows clear ILC morphology, the tumor should be classified as such.
3. It is not uncommon to find invasive carcinoma, NST with a lobular growth pattern. Nonetheless, the lobular growth pattern is usually focal; cohesive malignant cells, marked pleomorphism, associated DCIS (but not LCIS), and E-cadherin membranous staining would help to differentiate from ILC.
4. Although current treatment for ILC is similar to invasive carcinoma, NST based on stage and receptor profiles, ILC differs from invasive carcinoma, NST with regard to prognosis, recurrence at bone and atypical sites such as gastrointestinal tract, peritoneum and gynecological tract.

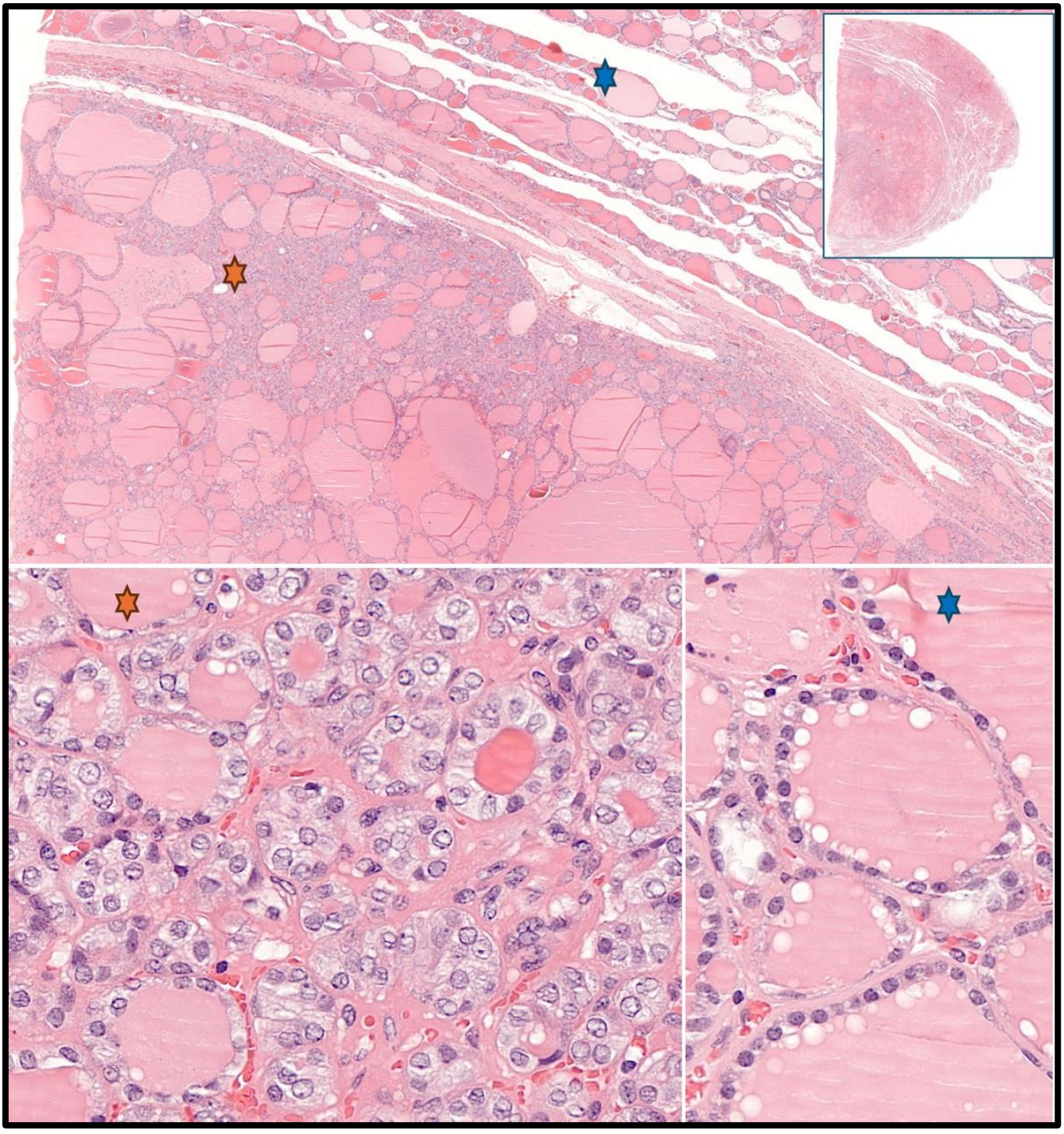
Reference

1. Kuba MG, Brogi E. Update on lobular lesions of the breast. Histopathology. 2023 Jan;82(1):36-52.

Case 5

Case 5: A 55-year-old female with a solitary thyroid nodule. Entirely submitted.

Targeted Diagnosis: **Non-invasive Follicular Thyroid Neoplasm with Papillary-like Nuclear Features (NIFTP)**



Case 5

Submitted Diagnoses by Participating Institutions	Number	
Non-invasive Follicular Thyroid Neoplasm with Papillary-like Nuclear Features (NIFTP)	23	Acceptable
Adenomatoid Hyperplastic Thyroid Nodule/Follicular Adenoma	2	Acceptable
Invasive Encapsulated Follicular Variant of Papillary Thyroid Carcinoma (IEFVPTC)/ Infiltrative Follicular Variant Papillary Thyroid Carcinoma (FVPTC)/ Encapsulated Angioinvasive Follicular Variant Papillary Thyroid Carcinoma	3	
Papillary Thyroid carcinoma, follicular variant/ Papillary Thyroid carcinoma	3	

Educational notes:

1. The nodule is a completely encapsulated nodule with a thin fibrous capsule without capsular invasion or vascular invasion beyond the capsule. There are larger follicles and microfollicles mixed within the nodule; the microfollicles predominantly located at the periphery. The nuclei of the follicular cells of the microfollicles at scattered areas show characteristic nuclear enlargement with nuclear membrane irregularity, nuclear clearing and margination of chromatin to the membrane. No papillary structure, psammoma body, solid or trabecular pattern of growth is noted. These are features of non-invasive follicular thyroid neoplasm with papillary-like nuclear features (NIFTP).
2. NIFTP is one of the low-risk follicular cell-derived thyroid neoplasms, strictly defined by a set of criteria including encapsulation or clear demarcation, near complete follicular growth pattern with <1% papillae and/or <30% solid/trabecular/insular growth pattern, and nuclear features of papillary thyroid carcinoma (PTC). No vascular or capsular invasion or high-grade nuclear features are allowed.
3. NIFTPs are excluded from malignant neoplasms following a stepwise algorithm. For tumors without capsule or well-demarcation, infiltrative follicular variant PTC (FVPTC) is considered. With capsular invasion and/or lymphatic invasion, they are regarded as invasive encapsulated FVPTC. For tumors with papillae≥ 1% or ≥30% solid/trabecular/insular growth pattern, they are regarded as variants of PTC. Mitotically active neoplasms are classified as mitotically active encapsulated PTC with a predominant follicular growth pattern or non-invasive high-grade FVPTC based on mitotic count and/or tumor necrosis.
4. NIFTP differs from benign follicular adenoma as the latter lacks PTC nuclear alterations (PTC nuclear score 0-1).
5. NIFTP are extremely indolent neoplasms with no reported mortality. Lobectomy without radioactive iodine therapy is the treatment of choice.

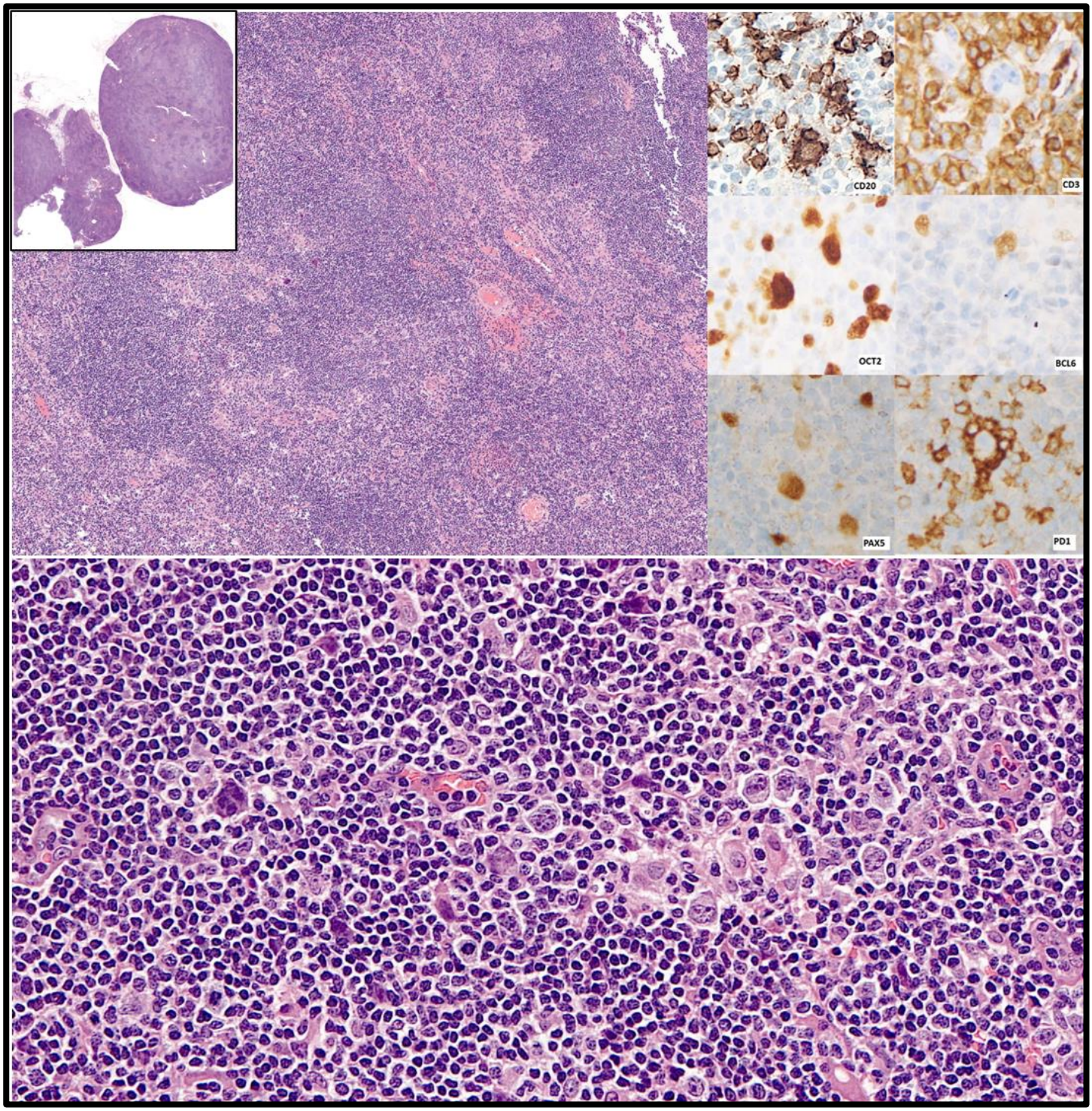
Reference

1. Seethala, Raja R., et al. "Noninvasive follicular thyroid neoplasm with papillary-like nuclear features: a review for pathologists." Modern Pathology 31.1 (2018): 39-55.

Case 6

Case 6: A 51-year-old female with left axillary lymphadenopathy. IHC: CD20 (whole slide image), CD3, PAX5, OCT 2, BCL6, PD1.

Targeted Diagnosis: **Nodular lymphocyte-predominant Hodgkin lymphoma**



Case 6

Submitted Diagnoses by Participating Institutions	Number	
Nodular lymphocyte-predominant Hodgkin lymphoma.	30	Acceptable
Nodular lymphocytic predominant Hodgkin lymphoma (NLPHL). Differential diagnosis T cell / histiocyte rich large B cell lymphoma.	1	Acceptable

Educational notes:

1. The nodal architecture is effaced, with the presence of vague nodules composed of small lymphocytes. Scattered atypical cells are observed, some of which are mononuclear, while others are binucleate or multilobed, characteristic of lymphocyte-predominant (LP) cells. These atypical cells exhibit clumped chromatin, prominent large nucleoli, and a moderate amount of cytoplasm. They are found within nodules of small lymphocytes and scattered throughout the internodular area. Immunohistochemical analysis reveals that the atypical cells are positive for CD20, PAX5, OCT2, and BCL6, but negative for CD3. These cells are surrounded by small lymphocytes that express PD1. The diagnosis is consistent with Nodular Lymphocyte-Predominant Hodgkin Lymphoma (NLPHL).
2. The presence of at least focal nodular architecture is a key criterion for the diagnosis of Nodular Lymphocyte-Predominant Hodgkin Lymphoma (NLPHL). The immune microenvironment in NLPHL is characterized by small B and T lymphocytes, histiocytes, and follicular dendritic cells, with the absence of eosinophils and neutrophils. The neoplastic cells are clonal germinal-center B cells. Six distinct growth patterns based on morphology and immunophenotyping have been identified, with patterns C–F being associated with an increased risk of relapse (Figure 1).

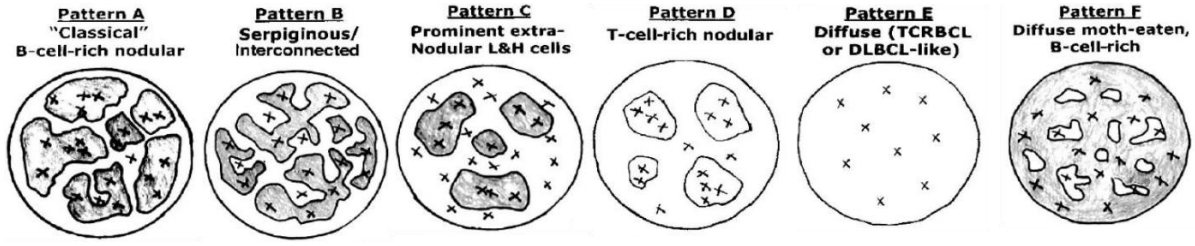


Figure 1 Immunoarchitectural patterns in NLPHL in schematic form (X: L&H cells, gray background; B-cell-rich background, blank/white background; T-cell-rich background) (Am J Surg Pathol 2003;27:1346–1356)).

3. T-cell/histiocyte-rich large B-cell lymphoma (THRLBCL) may exhibit overlapping features with NLPHL. Differentiation between the two is made based on clinical presentation and the presence of at least one clear nodule in NLPHL. Features supportive of NLPHL include the preservation of the CD21/CD23+ follicular dendritic cell meshwork and the presence of abundant T cells expressing T follicular helper markers, such as PD1, which form rosettes around the neoplastic B cells.

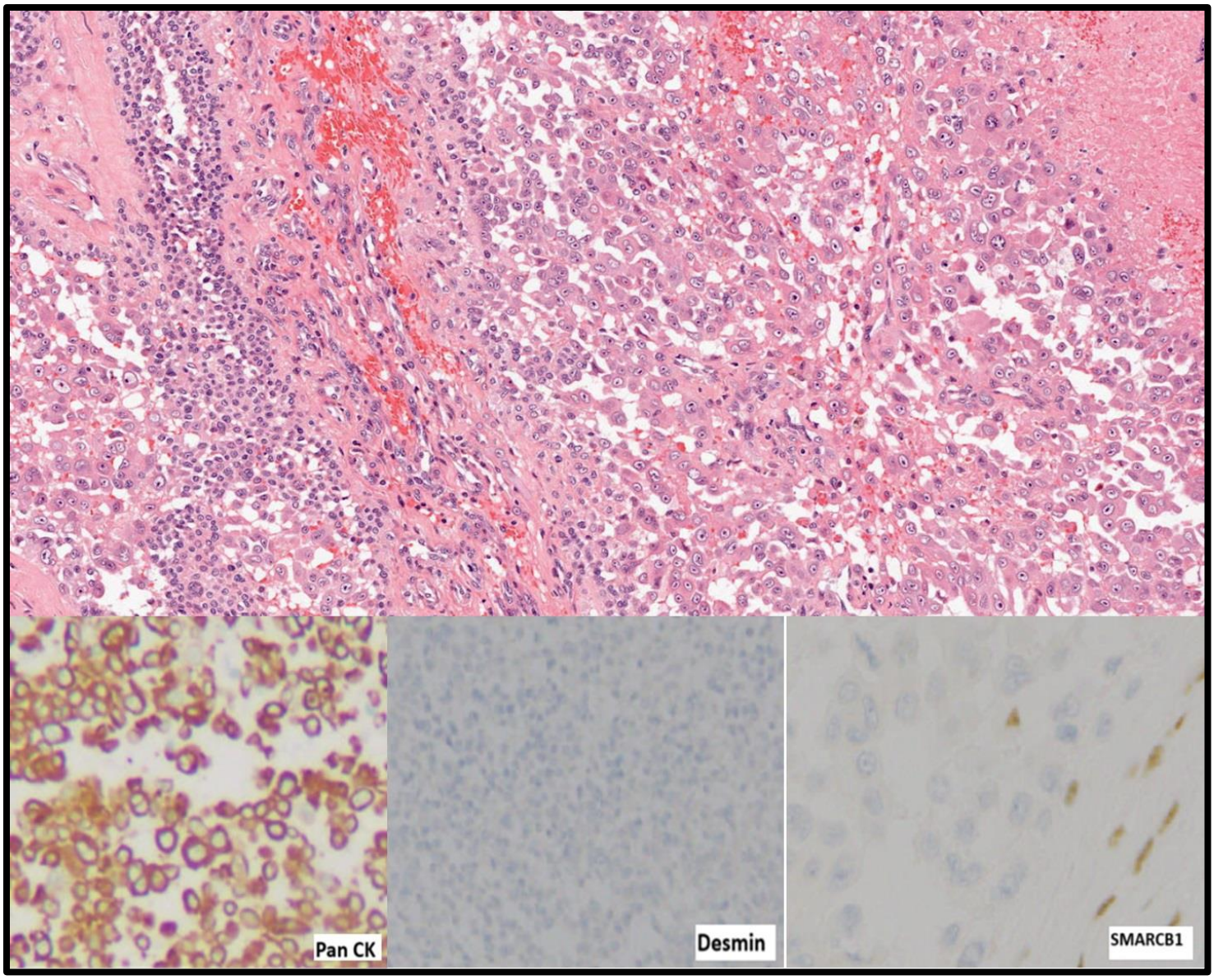
Reference

1. WHO Classification of Tumours Editorial Board. Haematolymphoid tumours [Internet]. Lyon (France): International Agency for Research on Cancer; 2024

Case 7

Case 7: An 11-year-old boy with left gluteal swelling encasing the pubic rami. IHC: Pan-cytokeratin, Desmin, SMARCB1 (INI1).

Targeted Diagnosis: **Extrarenal rhabdoid tumour**



Case 7

Submitted Diagnoses by Participating Institutions	Number	
Extrarenal rhabdoid tumour / Malignant rhabdoid tumour	11	Acceptable
Atypical teratoid rhabdoid tumour (malignant rhabdoid tumour)	1	Acceptable
Extrarenal rhabdoid tumour, differentials include epithelioid sarcoma / Malignant tumour with rhabdoid morphology, differentials include extrarenal malignant rhabdoid tumour and epithelioid sarcoma / High grade epithelioid tumour with INI1 loss favours epithelioid sarcoma, another differential is extrarenal rhabdoid tumour.	5	Acceptable
Epithelioid sarcoma, proximal type / Epithelioid sarcoma	14	Acceptable

Educational notes:

1. The tumor cells have rhabdoid morphology with eccentric vesicular nuclei, irregular nuclear membrane and prominent nucleoli, arranged in sheets and discohesive growth pattern. Most tumor cells appear small and round with eosinophilic cytoplasm. Focally there are larger rhabdoid cells with abundant, glassy cytoplasm containing eosinophilic hyaline globules. These tumor cells are immunohistochemically positive for Pan-cytokeratin but negative to Desmin. There is loss of SMARCB1 (INI1) expression. The features are of extrarenal rhabdoid tumor (ERRT).
2. ERRT mainly affects infants and children. The loss of SMARCB1 (INI1) expression is due to characteristic biallelic inactivation of the tumor suppressor gene SMARCB1 in chromosome band 22q11.2. Tumors with similar morphology and genetic alteration are also seen in the kidney and brain. Rarely, the mutation involves SMARCA4 gene in 19p13.2.
3. Most proximal type epithelioid sarcoma (PES) show loss of SMARCB1 expression. The tumor is positive for ERG in 40-70% of cases and CD34 in >50% of cases. Although positive CD34 immunohistochemistry is helpful, this stain is not consistently expressed in PES. Features in favor of PES would be an older age of presentation (young to middle-age), more tumor of the larger rhabdoid morphology and more nuclear pleomorphism. However, PES containing a large proportion of rhabdoid cells is indistinguishable from extrarenal rhabdoid tumor.

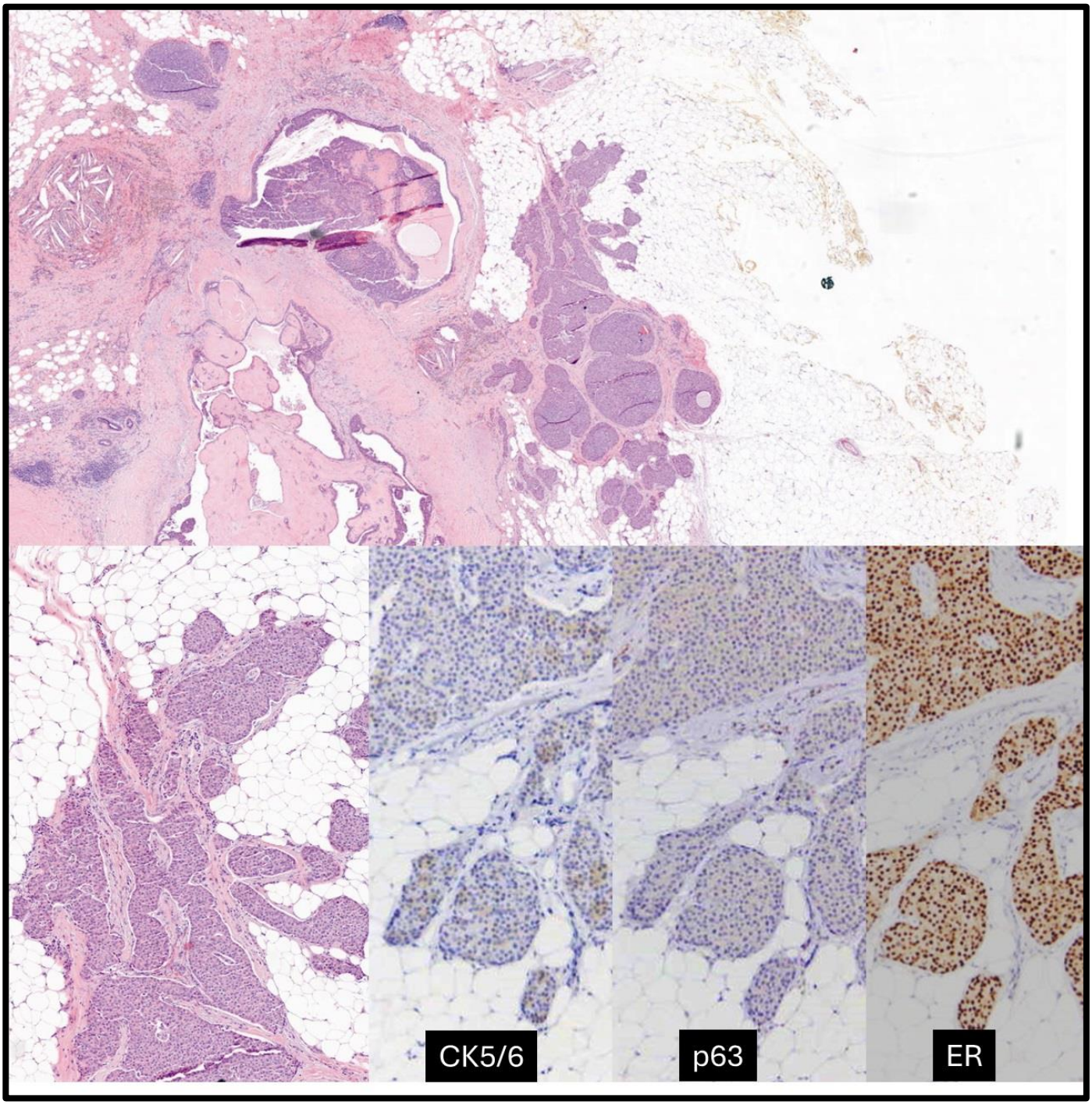
Reference

1. WHO Classification of Tumours Editorial Board. Soft tissue and bone tumours [Internet]. Lyon (France): International Agency for Research on Cancer; 2020.
2. Guillou, Louis, et al. "" Proximal-type" epithelioid Sarcoma, a distinctive aggressive neoplasm showing rhabdoid features: Clinicopathologic, immunohistochemical, and ultrastructural study of a series." The American journal of surgical pathology 21.2 (1997): 130-146.

Case 8

Case 8: A 70-year-old female with a left breast lump associated with nipple discharge. IHC: p63, CK5/6, ER

Targeted Diagnosis: **Invasive solid papillary carcinoma**



Case 8

Submitted Diagnoses by Participating Institutions	Number	
Invasive solid papillary carcinoma / Invasive solid papillary carcinoma with intraductal papilloma / Solid papillary carcinoma (in situ and invasive) / Invasive solid papillary carcinoma with SPC in situ and intraductal papilloma	13	Acceptable
Solid papillary carcinoma with invasion / Solid papillary carcinoma, with an area of invasion (4mm) / Solid papillary carcinoma with possible invasion /	8	Acceptable
Solid papillary carcinoma / Solid papillary carcinoma with intraductal papilloma	5	
Invasive carcinoma, low grade with background usual ductal hyperplasia and DCIS.	1	
Intraductal papilloma involved by ductal carcinoma in situ / Papillary lesion and intermediate grade DCIS with areas suspicious of microinvasion further IHC required / DCIS or DCIS-like carcinoma	4	

Educational notes:

1. The breast specimen reveals invasive solid papillary carcinoma (SPC) and SPC in situ, associated with a sclerosed intraductal papilloma. The SPC in situ is characterized by multiple solid, circumscribed nests of neoplastic cells containing delicate, inconspicuous fibrovascular structures. These nests are composed of monotonous cells with round to oval nuclei, fine chromatin, small nucleoli, scant eosinophilic cytoplasm, and occasional mitotic activity. SPC in situ is seen growing into an adjacent intraductal papilloma. The invasive component demonstrates irregular, anastomosing islands with ragged contours, creating a "jigsaw puzzle" appearance, and is associated with fat invasion. The neoplastic cells are strongly positive for estrogen receptor (ER) and negative for CK5/6. There is an absence of myoepithelial cell marker p63 within the invasive component.
2. SPC in situ is characterized by well-circumscribed, rounded contours, whether or not myoepithelial cells are demonstrated. Similar to ductal carcinoma in situ (DCIS), it is staged as pTis and graded based on nuclear features.
3. SPC with invasion exhibits two distinct patterns of invasion. In the first pattern, the invasive component may resemble various carcinoma subtypes, including no special type (NST), mucinous, lobular, cribriform, or tubular carcinoma. The second pattern, generally accepted as invasive SPC, is characterized by tumor nests with ragged, irregular contours, forming a geographical jigsaw puzzle appearance. This pattern is often accompanied by stromal desmoplasia, fat invasion, and/or vascular permeation.
4. While invasive SPC can metastasize, its prognosis is typically better than that of nonspecific invasive carcinomas.

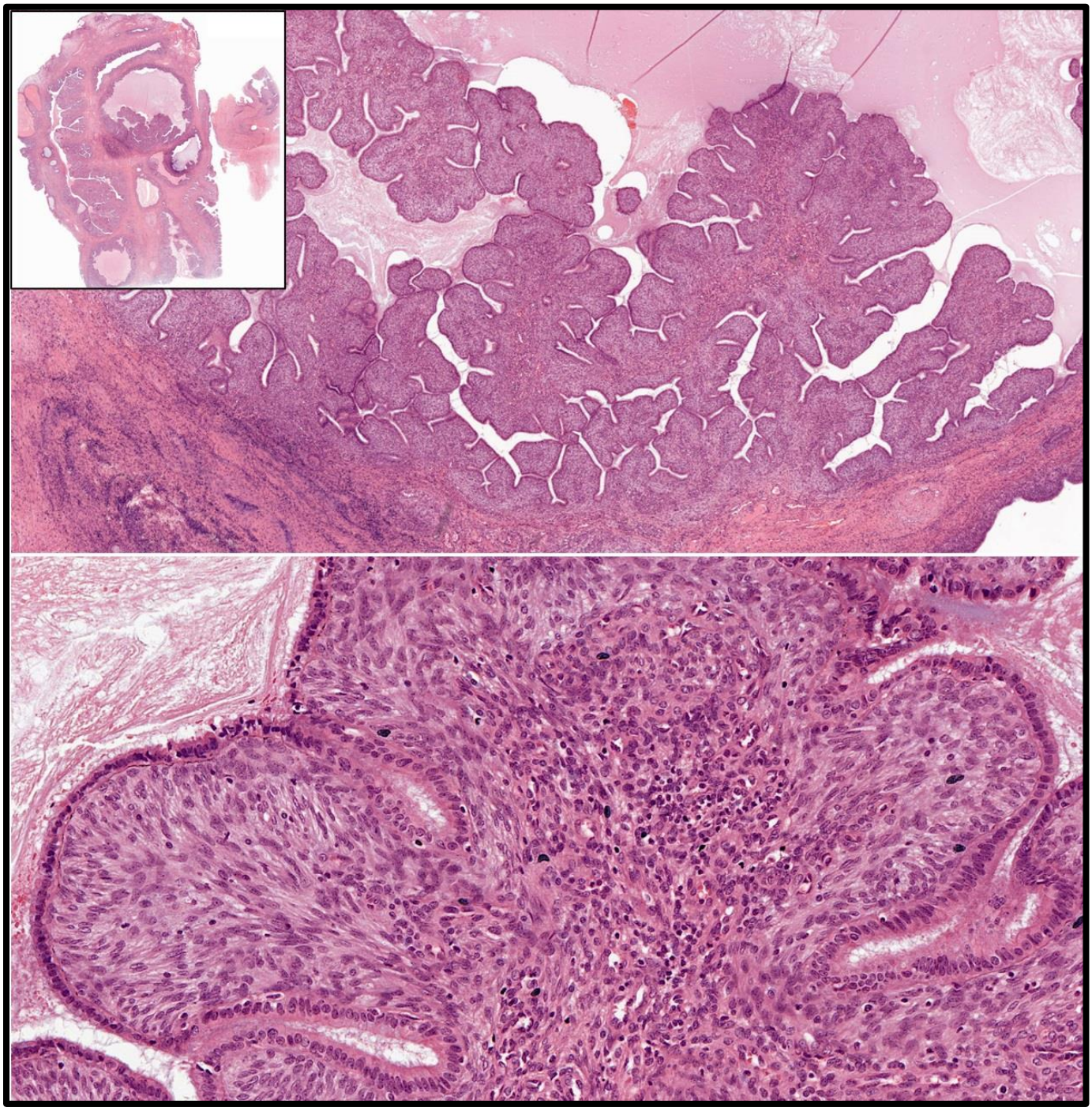
Reference

1. WHO Classification of Tumours Editorial Board. Female genital tumours [Internet]. Lyon (France): International Agency for Research on Cancer; 2020

Case 9

Case 9: A 46-year-old female with a cervical polyp.

Targeted Diagnosis: **Low grade adenosarcoma**



Case 9

Submitted Diagnoses by Participating Institutions	Number	
Low grade adenosarcoma, adenosarcoma	27	Acceptable
Mullerian adenosarcoma, low grade	2	Acceptable
Adenomyoma of cervix / Mullerian papilloma	2	

Educational notes:

1. The polyp consists of rigid cystic dilatations and intraglandular polypoid projections with a phyllodes-like architecture. The benign endocervical glandular cells are surrounded by peri-glandular stromal cuffing. The stroma shows increased cellularity, cytological atypia, and mitotic activity, consistent with low-grade adenosarcoma of the uterine cervix.
2. Adenosarcoma of the uterine cervix is a rare biphasic malignancy with benign epithelial elements and low-grade malignant stromal components. It may exhibit sarcomatous overgrowth, high-grade transformation, or differentiation into rhabdomyosarcoma or sex cord tumors.
3. The differential diagnosis of cervical adenomyoma is a benign tumor with cystically dilated glands surrounded by smooth muscle, while Müllerian papilloma, seen mainly in children, has papillary excrescences lined by benign epithelium and a fibrous stroma. Both lack leaf-like architecture, peri-glandular condensation, and nuclear atypia, differentiating them from adenosarcoma.

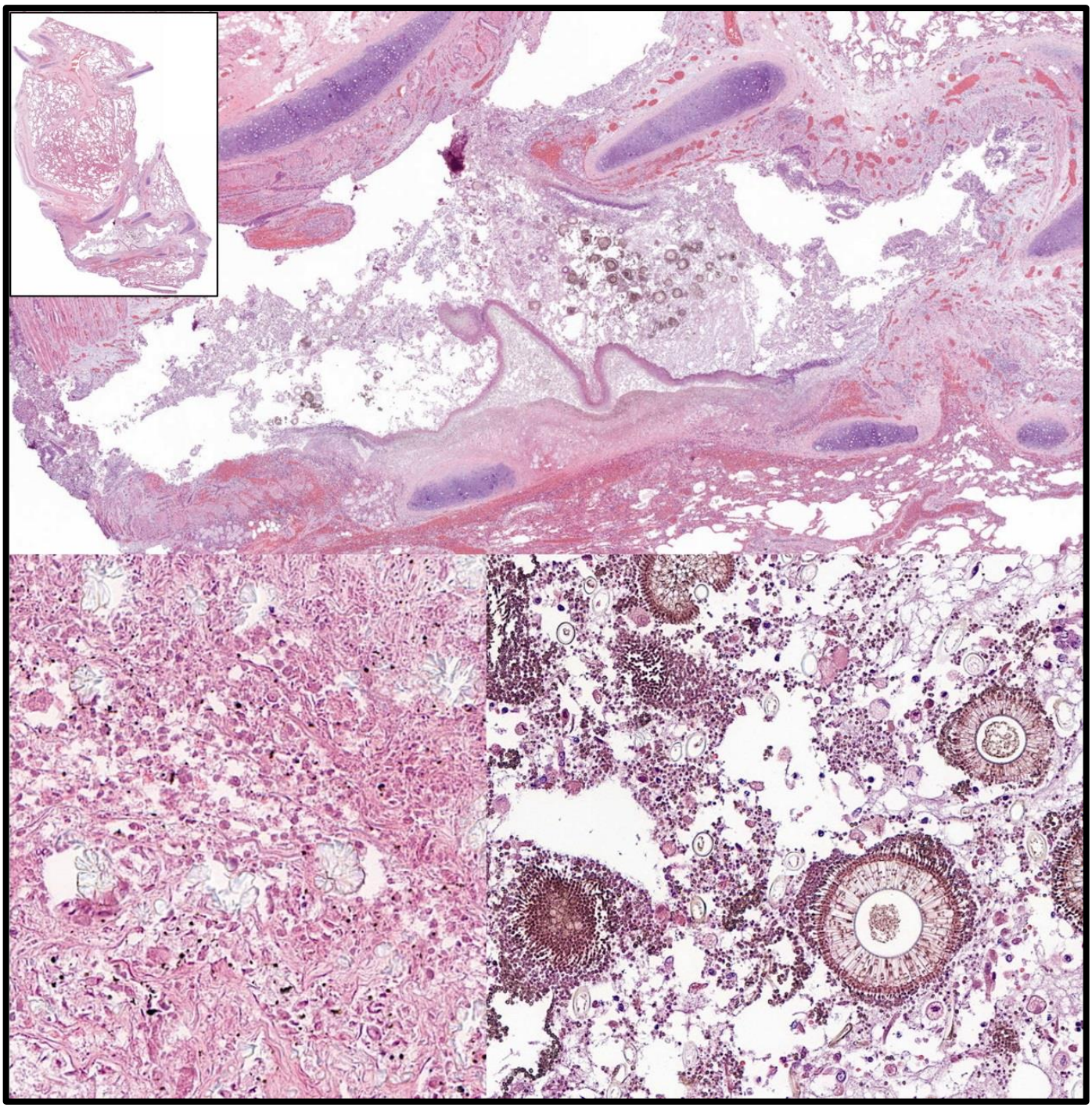
Reference

1. WHO Classification of Tumours Editorial Board. Female genital tumours. Lyon (France): International Agency for Research on Cancer; 2020.

Case 10

Case 10: A 51-year-old male, clinical autopsy. He complained of fever and cough one month prior to the presentation. Random section from the left lung.

Targeted Diagnosis: **Invasive aspergillosis (Aspergillus Niger) and paragonimiasis**



Case 10

Submitted Diagnoses by Participating Institutions	Number	
Mixed pulmonary aspergillosis, mucormycosis and paragonimiasis / Lung Aspergillosis with Paragonimiasis	2	Acceptable
Pulmonary aspergillosis/ Aspergillosis/ Invasive Pulmonary Aspergillosis / Invasive Aspergillosis favoring Aspergillus Niger / Lung fungal infection - Aspergillus Niger/ Aspergillus tracheobronchitis (Invasive pulmonary aspergillosis confined in the tracheobronchial tree)	27	Acceptable
Ascaris and fungal infection	1	
Aspergilloma	1	

Educational notes:

1. The airway contains a mass of pigmented mold with hyaline septate hyphae, demonstrating acute angle branching and parallel cell walls, accompanied by tissue necrosis, mixed acute and chronic inflammation, and focal vascular wall invasion. Oxalate crystals, a product of Aspergillus niger, are identified, along with eggs of the lung fluke Paragonimus mixed with the fungal elements. These features are diagnostic of invasive aspergillosis and paragonimiasis.
2. Aspergillus can cause various clinical syndromes, including invasive infection, chronic necrotizing infection, fungal ball, and allergic bronchopulmonary aspergillosis. Chronic necrotizing aspergillosis is invasive but localized and lacks vascular invasion. Aspergillus species, particularly A. niger, can form fungal balls in airspaces or tissue cavities without invading tissue.
3. Paragonimus eggs are birefringent, typically have a well-defined operculum with thickened abopercular areas, though size and shape can vary in histological specimens. P. westermani is the most common species infecting humans, while P. heterotremus is prevalent in Southeast Asia. Differentiation of species is not clinically significant.

Reference

1. Pritt B, Mathison B. 2018. Atlas of Fundamental Infectious Disease Histopathology A Guide for Daily Practice. Chapter 3 (Page 125-129) and Chapter 5 (Page 278-280) College of American pathologists.