

Index

A

- Adenolipoma, 87, 92
- Adenomatoid nodule, 85, 86
- Adequate thyroid FNA, 27
- Afirma gene expression classifier (GEC), 229
- Afirma Genomic Sequencing Classifier (GSC), 73
- Air-dried Diff-Quik (DQ), 33
- American Thyroid Association (ATA), 1, 23, 45
- Anaplastic carcinoma of thyroid, 13, 219
- Anaplastic (undifferentiated) thyroid carcinoma (ATC), 197, 199–203
 - differential Diagnosis, 203
- Ancillary immunohistochemical studies, 210
- Ancillary testing, 20
- Architectural atypia, 62–64
- Architectural atypia with microfollicle formation and minimal nuclear atypia, 65
- Atypia not otherwise specified (AUS-NOS), 67
- Atypia of Undetermined Significance/Follicular Lesion of Undetermined Significance (AUS/FLUS), 57
 - with architectural and nuclear atypia, 64
 - diagnosis, 58
 - malignancy rates, 73
 - management, 73
 - molecular tests, 73
 - ROM, 73
 - subclassification, 57
- Atypia of Undetermined Significance with Mild Nuclear Atypia, 58
- Atypia with Hürthle Cell Predominance/Oncocytic Change, 69, 70
- Atypical cell of undetermined significance, 57–73
- Atypical cells of cystic PTC, 62
- Atypical cyst-lining cells (ACLC), 58, 60, 61
- Atypical lymphoid cells, 72
 - Rule Out Lymphoma, 72

B

- Benign cyst-lining cells (CLC), 60
- Benign follicular nodule (BFN), 37, 38, 40, 44, 45, 145
- Benign Hürthle cell lesion vs. HCN, 105
- Benign lesions in LBP and conventional smears, 36
- Benign thyroid lesions on SP and TP, 37
- Benign thyroid nodules
 - cytologic criteria, 35
 - LBP, 35, 37
 - prevalence, 35
- Bethesda System for Reporting Thyroid Cytopathology (TBSRTC), MTC, 185
- BRAF V600E antibody, 216

C

- Cell block preparation in FA, 100
- Cell block preparations from LBP, 94
- Cell enrichment process, 10
- Cellient™ CBs, 32
- Chronic lymphocytic (Hashimoto's) thyroiditis (CLT), 13, 48, 49, 110, 216
- Classic papillary thyroid carcinoma (c-PTC)
 - BRAFV600E* mutation, 145
 - colloid and multinucleated giant cells, 150
 - cytologic criteria, 143–145
 - architectural criteria, 141
 - cellular features, 142
 - nuclear criteria, 141–142
 - psammoma bodies, 142
 - differential diagnosis, 145
 - gross, cytologic and histologic features, 147
 - histologic variants, 145
 - Hobnail cells, 149
 - infiltrative tumor, 141
 - molecular abnormalities, 149
 - molecular profile, 145–149
 - pathologic features, 141, 142
 - psammoma bodies, 149
 - on SurePath™, 146
 - TBSRTC, 141
- Columnar cell variant of PTC (CCV-PTC)
 - cytologic features on CS and TP, 178–179, 181
 - differential diagnosis, 179
 - gross and histologic features, 180
 - immunohistochemistry, 179
 - nuclear features, 178
 - pathological features, 178
 - preoperative diagnosis, 178
- Combination testing, 231
 - interpretive algorithm, 233
- Conventional smears (CS), 2, 35
 - advantages and disadvantages, 2
 - artifacts, 5, 7, 8
 - blood and colloid, 7
 - contamination, 7
 - diagnostic criteria, 127
 - limitations and artifacts, 2
 - vs. liquid-based preparations
 - cytological differences, 3
 - technical comparison, 3
 - thyroid lesions, 4
 - nuclear features, 4
 - of parathyroid fine needle aspiration specimens, 221

- Cribriform-morular variant of PTC (CMV-PTC), 174
 characteristic features, 175
 cytological features, 176, 177
 on TP and CS, 177–180
 differential diagnoses, 177
 gross appearance, 175
 histologic and immunohistochemical features, 175, 176
 immunostaining, 176
 management, 177
 molecular profile, 177
 pathologic features, 174–176
- Crush artifact, 3
- Cystic degeneration in LBP and CS, 46
- Cystic PTC, 61, 163
 vs. benign cystic nodules, 168
 cytologic findings, 165, 166
 and histologic findings on LBP, 167
 and histologic findings on SP, 169
 cytopathology, 165–168
 diagnostic pitfalls, 168
 gross and histologic features, 165
 imaging features, 163–165
 pathological features, 165, 167
- Cytological and architectural atypia, 67, 68
- Cytologic atypia, 63, 64
- Cytologic interpretation errors, 35
- Cytomorphology between SP and TP, 19
- D**
- Diffuse large B-cell lymphoma, 208
- Diffuse sclerosing PTC, 141
- Direct to vial method, 10
- E**
- Encapsulated FVPTC (eFVPTC), 91
- Encapsulated invasive FVPTC, molecular profile, 155
- Expanded NGS Panel (ThyGeNEXT), 231, 232
- Extensive but mild cytologic atypia, 58
- Extensive mild nuclear atypia, 60
- F**
- FNHCT/SFNHCT
 with large cell dysplasia, 114
 in LBP, 112
 management, 122
 with small cell dysplasia, 113
 on SP, 116
 with vascular proliferation, 115
- FN/SFN Diagnosis and Application in LBP, 79
- Focal cytologic atypia, 58
- Follicular adenoma (FA), 77, 85, 88–90
- Follicular adenoma, oncocytic variant (FA-OV), 120
- Follicular carcinoma (FC), 77, 89, 94, 96
 ICC/IHC, 216
- Follicular carcinoma, oncocytic variant (FC-OV), 119
- Follicular cells, 67
- Follicular lesion of undetermined significance (FLUS), 57–73, 224
- Follicular neoplasm, 217
- Follicular neoplasm (FN)/Suspicious for follicular neoplasm (SFN)
 architecture features, 79
 branching 3-D ribbon-forming cell sheets, 84
 cellularity, 79
 colloid, 80
 cytologic criteria, 79
 cytologic differential diagnosis, 85
 definition, 77
 diagnosis and management, 78
 diagnostic surgical excision (lobectomy), 98
 dispersed isolated cells, 83, 85
 histopathologic follow-up, 97
 microfollicles, 81
 molecular tests, 98
 multilayer rosettes, 83, 84
 multivariate model, 97
 nuclear and cytoplasmic features, 83
 ROM, 97
 trabecular arrangement, 80, 83
- Follicular Neoplasm Hürthle Cell (oncocytic) Type/Suspicious for Follicular Neoplasm Hürthle Cell (oncocytic) Type (FNHCT/SFNHCT), 77
 cytologic criteria, 104
 diagnostic criteria, 104
 TBSRTC, 103–105
- Follicular Neoplasm or Suspicious for Follicular Neoplasm (FN/SFN), 57
 occasional intranuclear inclusions, 222
- Follicular thyroid lesions, 106
- Follicular variant of papillary thyroid carcinoma (FVPTC), 25, 64, 77, 89–91, 97, 121, 132, 149, 152
 classification, 149–151
 clinical and imaging features, 151
 on CS and SP, 153, 155
 cytological features, 151–155
 encapsulated/well-demarcated, 149
 infiltrative, 149, 155
 on LBP, 153, 154
 molecular profile, 155
 and NIFTP
 cytoplasmic cuff, 161
 molecular testing, 159
 nonmalignant and modified ROM, 159
 TBSRTC, 157, 159
 ThinPrep®, 161
 pathological features, 151
- G**
- Galectin-3, 216
- Graves' disease, 52, 54
- H**
- Hashimoto thyroiditis (HT), 30, 48, 49, 103–106, 145
 clinical presentation, 51, 52
 cytology, 48, 51
 diagnosis, 48
 LBP vs. CS, 49, 52
 in TP and SP, 50
- Histiocytoid cells, 61, 62
- Hürthle (oncocytic) cell, 103, 106
- Hürthle cell adenoma (HCA), 111, 121
 cytological criteria, 106–108
- Hürthle cell carcinoma (HCC), 117, 228
- Hürthle cell lesions, 57, 64, 67, 69, 70
 differential diagnosis, 105–120
 ROM, 106
- Hürthle cell metaplasia, 40, 44, 45, 48

- in adenomatoid nodule, 108, 109
 - in LBP and CS, 44
 - Hürthle cell predominance/oncocytic change, 64
 - Hyalinizing trabecular tumor (HTT)/adenoma (HTA), 87, 93, 192, 194, 196
 - Hyperplastic/adenomatoid nodule, 77, 80, 83–85
- I**
- Immunocytochemistry/immunohistochemistry (ICC/IHC)
 - chromogranin, 216
 - cytokeratin 19, 215
 - GAL-3 (galectin-3), 215
 - HBME-1 (Hector Battifora mesothelial-1), 215
 - on liquid-based cytology, 215
 - metastasis, 216, 219
 - synaptophysin, 216
 - Indeterminate thyroid FNA
 - combination testing, 232
 - cytology slide smears for molecular testing, 232
 - genomics, 228
 - interobserver variability and sample heterogeneity, 232
 - LBP, molecular tests, 228
 - molecular diagnostic tests, 227, 228
 - molecular genetics, 227
 - ThyGeNEXT, 233
 - Infiltrative FVPTC, 155
 - Infiltrative non-encapsulated (neFVPTC), 91
 - Interpace diagnostic testing, 230
 - Interpace testing sample types, 232
- L**
- Lipoadenoma, 87, 92
 - Liquid-based preparations (LBP), 2, 77, 203
 - advantages, 2, 19–20
 - alterations, 10, 11
 - architectural features, 13–17
 - cellular features, 11
 - cellularity and cell distribution, 11–14
 - and CS, morphologic differences, 143, 145
 - cytologic features, 11, 16–19
 - cytomorphological alterations, 19
 - disadvantages, 2, 20
 - preparatory techniques, 8, 10
 - processing techniques, 9
 - reproducibility, 19
 - residual sample, 19
 - technical differences, 11
 - for thyroid FNA, 7, 8
 - triage, 10
 - types of, 8, 10
 - Liquid-based technology, 10
 - Lobectomy, 125
 - Lymphomas, 208–210
 - ICC/IHC, 219
 - Lymphoplasmacytic lymphoma, 209
- M**
- Macrofollicles, 41
 - in LBP and CS, 42
 - Macrofollicular morphology in nodular hyperplasia, 82
 - MALT lymphoma, 208
 - Medullary thyroid carcinoma (MTC), 118, 218
 - calcitonin, 188, 194, 197
 - cytologic criteria, 185–188
 - cytology of MTC on SurePath™, 191
 - cytology on ThinPrep®, 189
 - differential diagnosis, 192
 - familial MTC, 185
 - fine needle aspiration, 187
 - growth patterns, 185
 - histology, 193
 - ICC/IHC, 216
 - immunohistochemical profile, 192
 - management, 197–198
 - molecular/genetic alterations, 197
 - RET* proto-oncogene, 185
 - in sporadic and familial forms, 185
 - ultrasound features, 197, 198
 - variants and differential diagnosis, 188
 - Metastatic breast carcinoma, 212
 - Metastatic carcinoma
 - MTC, 197
 - thyroid Hürthle cell neoplasm, 120
 - Metastatic squamous cell carcinoma to thyroid gland, 211
 - Metastatic tumors to thyroid, 210
 - MIB-1 clone of Ki-67 immunostain, 87
 - Microfollicle, 78
 - in FN/SFN, 81
 - formation, 62, 64, 65
 - minimal nuclear atypia, 63
 - with nuclear atypia, 97
 - MicroPTC, 35
 - MicroRNA (ThyraMIR), 230
 - Mild Nuclear Atypia in Paucicellular Specimen, 59
 - Mild Nuclear Atypia with Rare Intranuclear Pseudoinclusions (INPI), 59
 - Minimal Nuclear Atypia, 65
 - Molecular testing, 1
 - Multinodular goiter/benign follicular nodule (MNG/BFN), 37, 38, 67
 - cytology, 38, 40
 - LBP vs. CS, 40, 44, 45
 - Multiple endocrine neoplasia (MEN) 2A/2B, 185
- N**
- ND/Unsat
 - colloid, 30
 - cyst fluid, 29
 - due smear-related artifacts, 28
 - with ultrasound gel, 29
 - Next-generation sequencing (NGS) analysis, 227
 - NGS-based analysis of DNA and messenger RNA (ThyGeNEXT), 230
 - NIFTP, *see* Noninvasive follicular thyroid neoplasm with papillary-like nuclear features (NIFTP)
 - Nondiagnostic/unsatisfactory (ND/Unsat), LBP, 27–33
 - Noninvasive follicular thyroid neoplasm with papillary-like nuclear features (NIFTP), 23, 64, 91, 98, 155, 156
 - consensus diagnostic criteria, 151
 - cytologic and histologic findings, 156, 158
 - cytomorphology, LBP, 160
 - diagnostic criteria, 155
 - imaging, gross and histologic findings, 156, 157
 - molecular testing, 157
 - pathological features, 156

- O**
- Oncocytic variant of MTC (MTC-OV), 195
 - vs. Hürthle cell neoplasm, 188
 - Oncocytic variant of PTC (OV-PTC), 110, 168
 - clinical behavior and prognosis, 169
 - cytological features on CS and SP, 171
 - cytological features on CS and TP, 171
 - cytological features on TP, 172
 - gross and histologic features, 169, 170
 - incidence, 169
- P**
- Palpation-guided FNA (PGFNA) vs. ultrasound-guided FNA (USGFNA), 35
 - Papillary carcinoma, ICC/IHC, 215, 216
 - Papillary thyroid carcinoma (PTC), 25, 35, 121
 - cytologic features, 127
 - diagnostic accuracy of cytology, 141
 - incidence, 141
 - long-term prognosis, 141
 - lymphatics to regional lymph nodes, 141
 - oncocytic type, 110
 - risk factors, 141
 - TBSRTC modification, 143
 - thyroid nodule, 141
 - unequivocal features, 143
 - Paraganglioma, 196
 - Parathyroid adenoma/hyperplasia, 77, 91, 94, 99, 108, 196, 222–226
 - Parathyroid aspirates, 221
 - Parathyroid carcinoma, 226
 - Parathyroid cells, 221, 222
 - Parathyroid cysts, 224, 225
 - Parathyroid follicular cells, 222
 - Parathyroid glands, 221
 - SurePath™ samples, 222
 - Parathyroid hormone (PTH) and thyroglobulin, 223
 - Parathyroid lesions, 226
 - ICC/IHC, 219
 - Partially cystic thyroid nodules (PCTNs), 163
 - in MNG/BFN, 45
 - PCR-based microRNA classifier, 230
 - Poorly differentiated and anaplastic carcinomas, ICC/IHC, 216
 - Poorly differentiated thyroid carcinoma (PDCa), 197, 199, 203–207
 - PrepStain™ processor, 9
 - Primary thyroid lymphoma (PTL), 199, 207
 - Psammomatous calcifications, 72
 - PTC with histiocytoid cell morphology, 63
- R**
- Rapid on-site adequacy evaluation (ROSE), 33
 - Riedel's thyroiditis (RT), 52, 53
- S**
- Solid nodule with cytologic atypia, 30
 - Solid nodule with thyroiditis, 30
 - Split-sample technique, 10, 32, 33
 - Squamous metaplasia (SM), 45, 47
 - with reactive atypia, 46
 - SurePath™ (SP) technique, 2, 8, 9
 - Suspicious for lymphoma, 127, 129
 - Suspicious for malignancy (SM), 57
 - cyto-histologic correlations and discrepancies, 132
 - cytopathology, 125
 - diagnosis, 137
 - differential diagnosis, 126–127
 - differential diagnosis on liquid-based preparations, 126
 - lymphoma, 127, 129, 136, 138
 - management, 138
 - medullary thyroid carcinoma
 - in SurePath, 136
 - in ThinPrep, 134, 135
 - metastatic malignancy, 129
 - molecular tests, 125, 137–138
 - for papillary thyroid carcinoma, 125, 128–133
 - TBSRTC, 127
 - ultrasound, 125
 - US features, 137
 - Suspicious for Malignancy, Not Otherwise Specified (SM-NOS), 132, 139
 - Suspicious for Metastatic Malignancy, 129, 132
- T**
- Tall cells, 159
 - Tall cell variant of PTC (TCV-PTC)
 - clinical and imaging features, 159
 - cytologic findings, 161, 164
 - imaging, gross and histologic findings, 162
 - molecular alterations, 163
 - pathological features, 159
 - The Bethesda System for Reporting Thyroid Cytopathology (TBSRTC), 1, 23, 24
 - for adequate thyroid FNA specimen, 27–28
 - atypical follicular cells, 31
 - AUS/FLUS specimens, 57, 73
 - colloid nodule, 30
 - c-PTC, 141
 - cystic lesions, 28
 - for FN/SFN, 78–79
 - indeterminate diagnoses, 23, 25
 - intra-laboratory quality control monitoring, 25
 - modifications, 25
 - molecular testing, 25
 - for ND/Unsat specimen, 31, 32
 - ND/Unsat thyroid FNA, 31
 - risk of malignancy, 24, 25, 28
 - treatment approaches, 73
 - The Cancer Genome Atlas, 228
 - Thick colloid in LBP and CS, 43
 - Thin colloid in LBP and CS, 42
 - ThinPrep® (TP) technique, 2, 8, 9
 - ThyGeNEXT/ThyaMIR combination testing, 73, 228, 230–232
 - ThyGenX panel, 230
 - ThyraMIR®, 73
 - Thyroglossal duct cyst (TDC), 45, 47
 - Thyroid cancer, 1
 - Thyroid fine needle aspiration (FNA), adequacy criteria, 27
 - Thyroid follicular cells, 107
 - Thyroid nodules, 1
 - fine needle aspiration, 1
 - indications, 2
 - ThyroSeq, 233, 234
 - patient management, 236
 - ThyroSeq GC Test, 237
 - ThyroSeq v3 Genomic Classifier (GC), 73, 227, 234–237

U

Ultrasound classification of thyroid nodules, 73
Ultrasound-guided FNA (USGFNA), 33

W

Warthin-like variant of PTC (WLV-PTC)
clinical presentation and prognosis, 170
cytological features on SP, 174

cytological features on TP, 173
differential diagnosis, 174
genetic profile, 174
gross and histologic features, 172
imaging and pathological features, 171
papillary architecture, 171
preoperative diagnosis, 171
ultrasound features, 171