Challenging Cases

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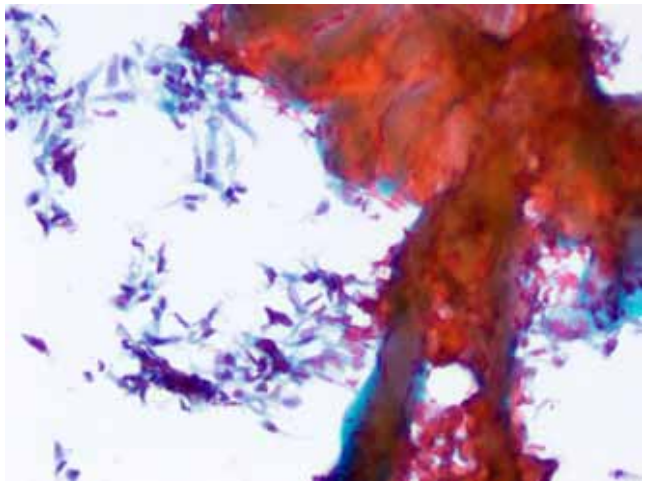
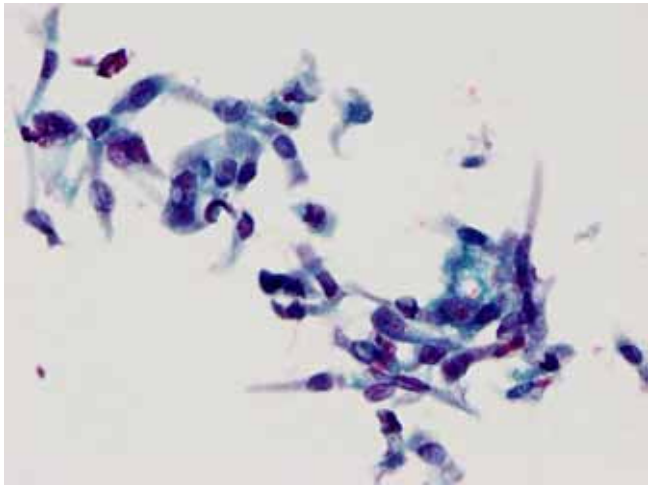
Case #1

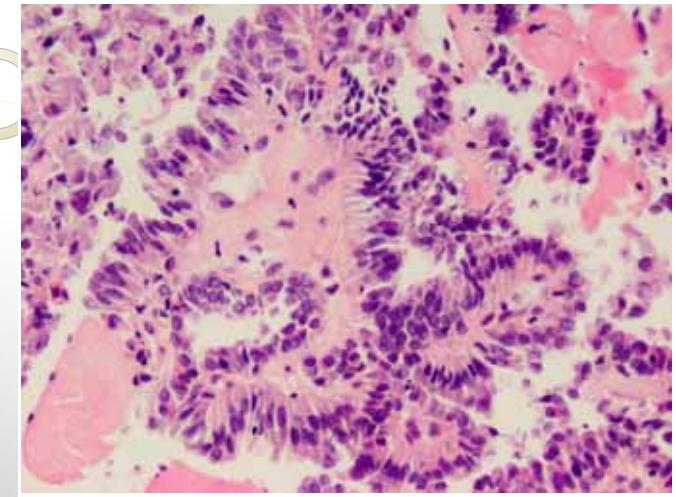
FNA of nodule in left lobe of thyroid in 67 y.o. woman





DDx of elongated cells in thyroid FNAs

- Papillary Thyroid Carcinoma
  - Tall Cell Variant
  - Columnar Variant
- Medullary Thyroid Carcinoma
- Anaplastic Thyroid Carcinoma
- Metastasis
  - Melanoma
  - Colonic Adenocarcinoma
- Cyst-lining cells
- Ciliated glandular cells from
  - Thyroglossal duct cyst
  - Contaminants from needle tract (trachea)



Cytological Dx

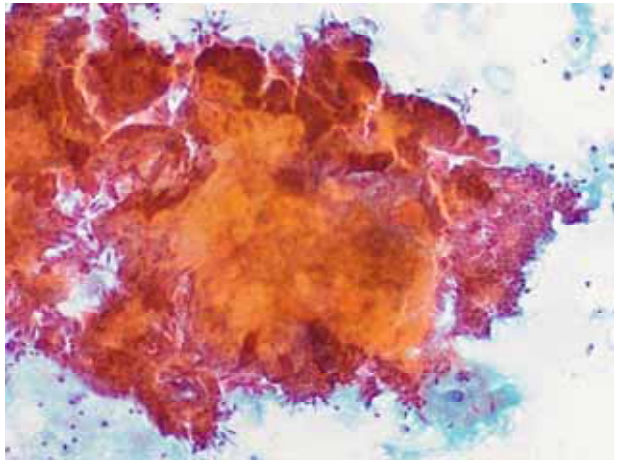
Papillary Thyroid Carcinoma

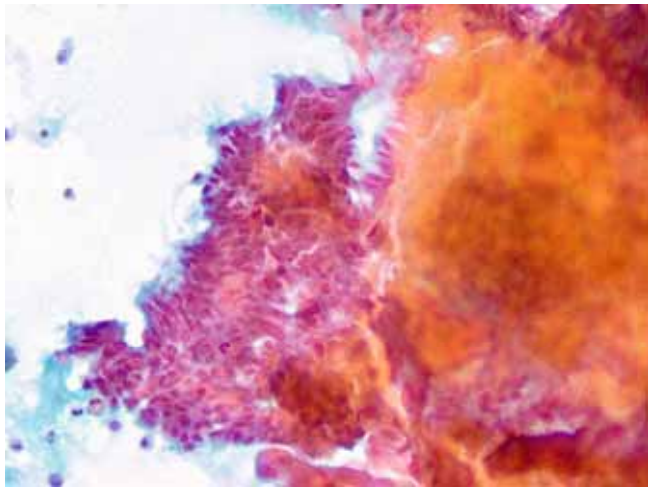
Comment: The cytological features raise the possibility of the Tall Cell Variant

Final Dx

PTC, Tall Cell Variant

Columnar Cell Variant, PTC

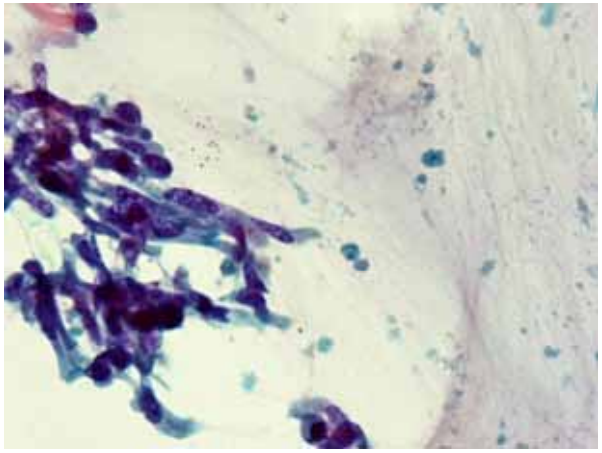




Columnar Cell Variant, PTC

- One of the least common variants of PTC, and occurs primarily in males
- Characterized by columnar cells with hyperchromatic, oval, and pseudostratified nuclei and supranuclear or subnuclear cytoplasmic vacuoles
  - reminiscent of colonic adenoma or secretory-type endometrium

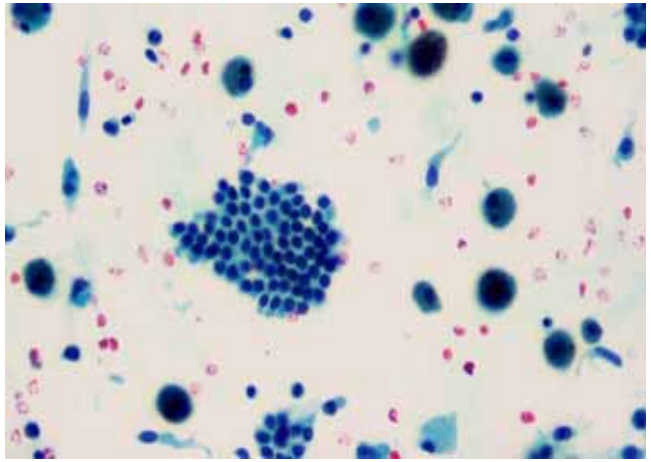
Metastatic Colonic Adenocarcinoma

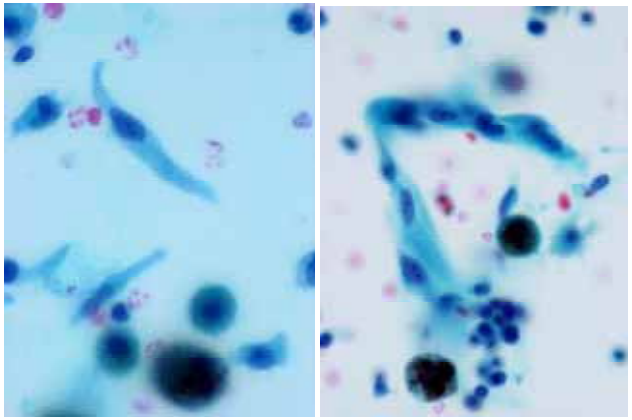


Columnar Cell Variant, PTC

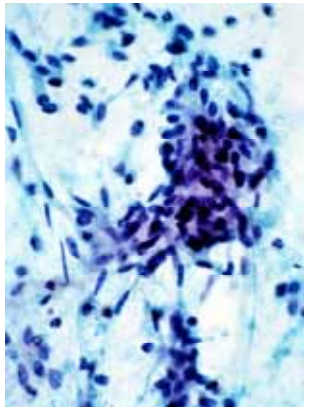
- Clinico-radiological correlation and/or judicious use of a limited immunopanel including thyroglobulin can solve the problem in difficult cases
- Other thyroid markers such as TTF-1 and PAX8 are also expressed in lung and gynecological carcinomas, respectively, while the intestinal marker CDX-2 is expressed in up to 50% of CCV
- The *BRAF*^{V600E} mutation, which is found in one-third of CCV cases may also be found in a subset of these metastatic carcinomas

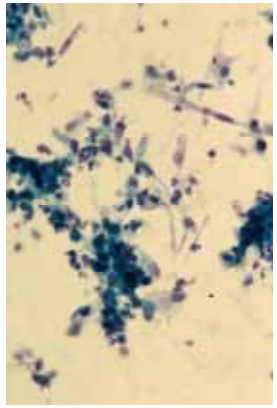
Cyst-lining cells





Medullary Thyroid Carcinoma Anaplastic Thyroid Carcinoma





Immunocytochemistry

Diagnosis	Thyroglobulin	TTF1	Calcitonin	Other
PTC	+	+	-	
MTC	-	+	+	CEA+ Chromogranin
Anaplastic Thyroid Ca	+/-	+/-	-	

Tall Cell Variant, PTC

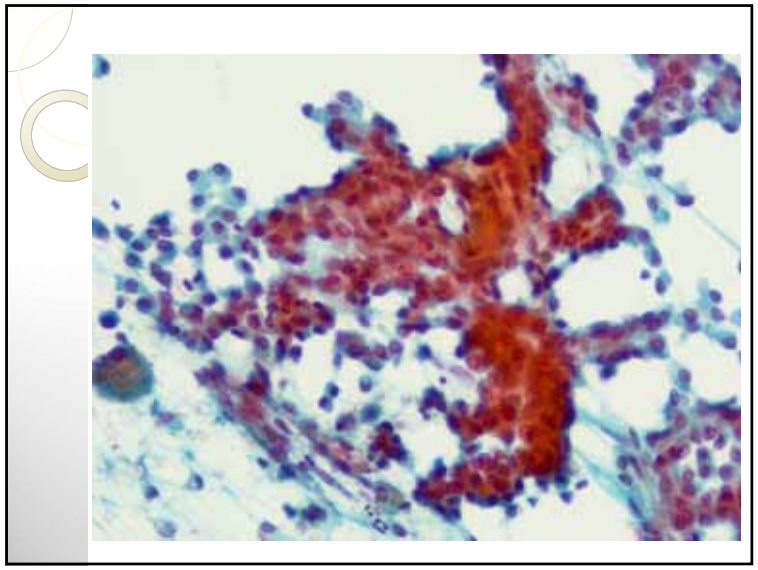
- The most common aggressive variant of PTC (1-13%)
- Up to 90% of TCV have the *BRAF*^{V600E} mutation
- *TERT* promoter mutations are also significantly more prevalent in TCV (31%) compared to conventional PTC (<10%)
  - *TERT* promoter mutations play an important role in cellular immortality and tumorigenesis by increasing telomerase activity

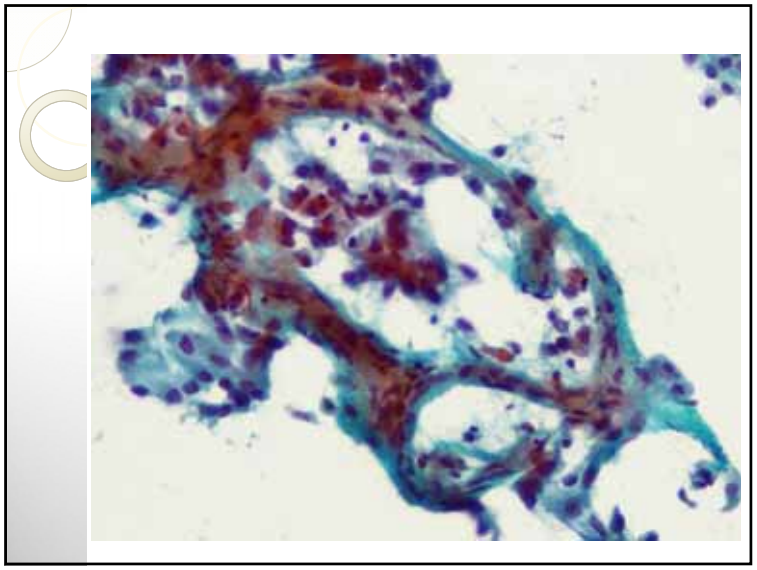
Tall Cell Variant, PTC

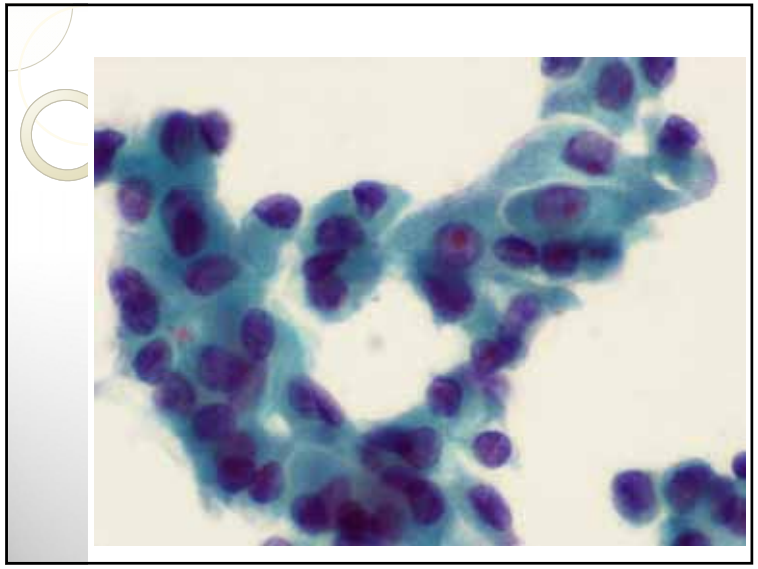
- Clinico-pathological studies have shown that >10% of tall cell features within a PTC is already associated with an adverse clinical outcome
  - therefore, the identification of tall cell features should be mentioned, whether it is on thyroid FNA prior to surgical treatment or on final pathology reports

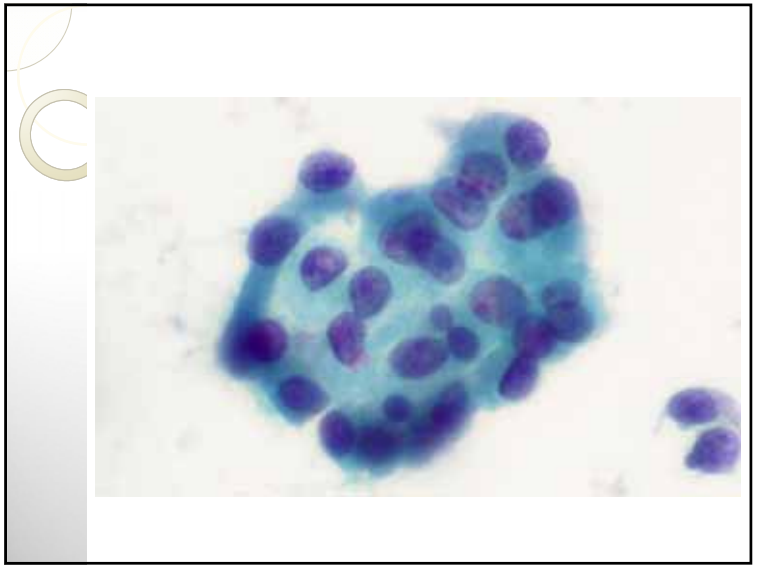
Case #2

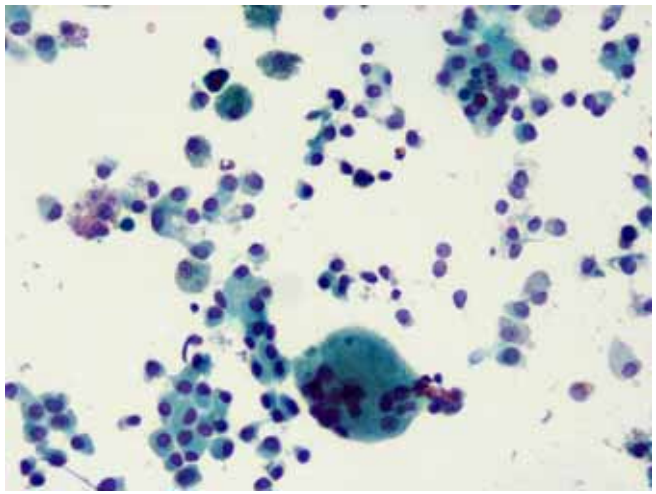
FNA of nodule in right lobe of thyroid in 69 y.o. woman





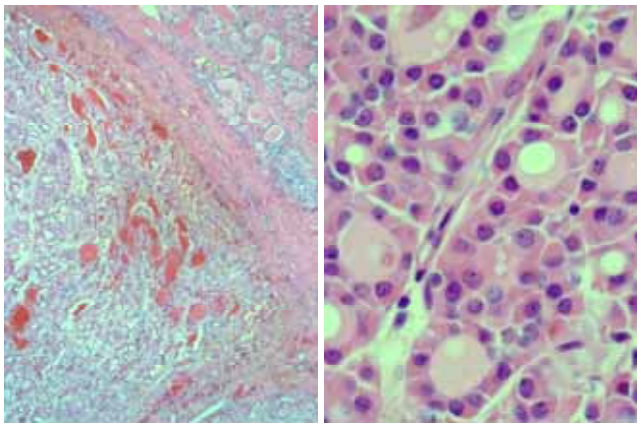






Cytological Dx

Follicular Neoplasm, Hürthle (oncocytic) type

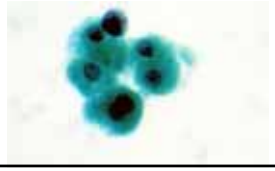


Final diagnosis

Follicular adenoma, Hürthle (oncocytic) type

DDx for Hürthle cell lesions

- Hürthle cell metaplasia in non-neoplastic lesions
  - Nodular goiter
  - Lymphocytic thyroiditis
- Hürthle cell neoplasm
- Hürthle cell metaplasia in neoplastic lesion
  - Papillary Thyroid carcinoma
    - Focal oncocytic changes: common
    - Oncocytic variant
    - Warthin-like variant



Follicular neoplasm, Hürthle cell (oncocytic) type -cytological features

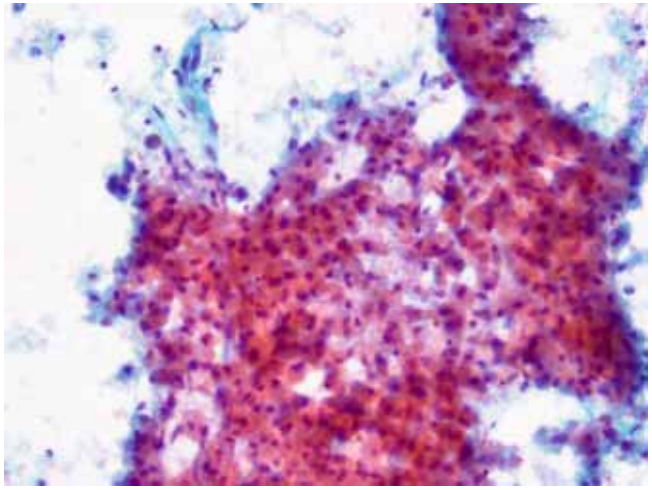
- Moderately to markedly cellular specimens
  - Exclusively (or almost exclusively) composed of Hürthle cells
    - Typically with prominent nucleoli
    - Arranged as single cells and/or syncytial or microfollicular pattern and/or trabeculae

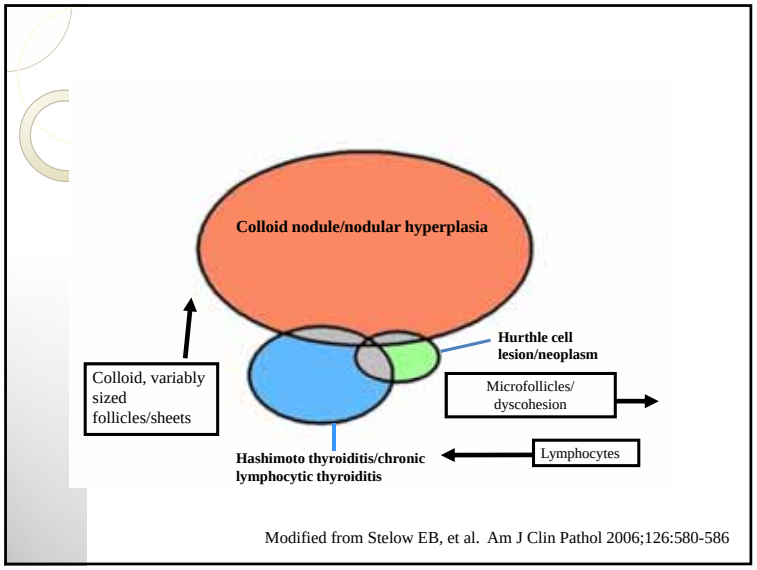
FNA biopsy of Hürthle cell lesions of the thyroid gland- a cytomorphologic study of 139 cases with statistical analysis

Elliott DD, Pitman MB, Bloom L, Faquin WC. Cancer Cytopathol 2006;108:102-109

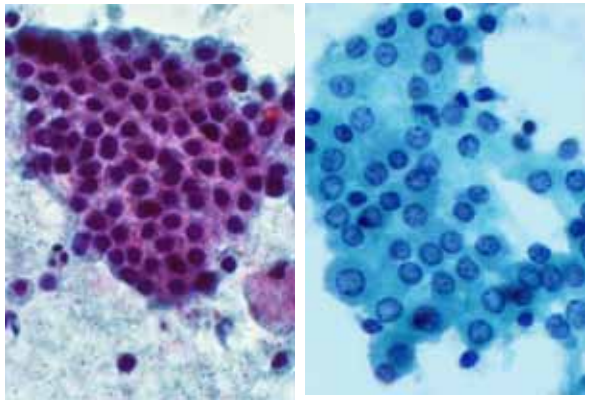
- Evaluated 14 cytological features of benign HCL and HCN
- Cytological features statistically significant

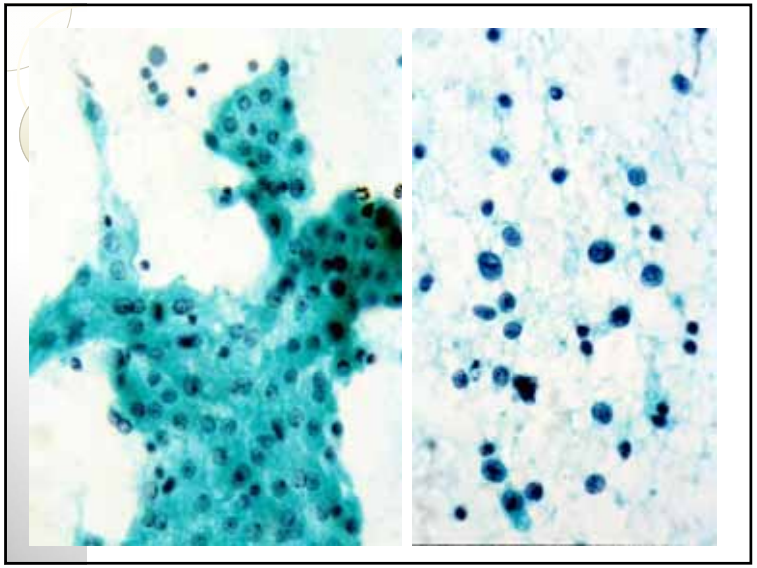
UNIVARIATE ANALYSIS	SLR ANALYSIS
Non-macrofollicular	Non-macrofollicular
Absence of colloid	Absence of colloid
No inflammation	No inflammation
Transgressing BV	Transgressing blood vessels
>90% Hurthle cells	
>10% single cells	



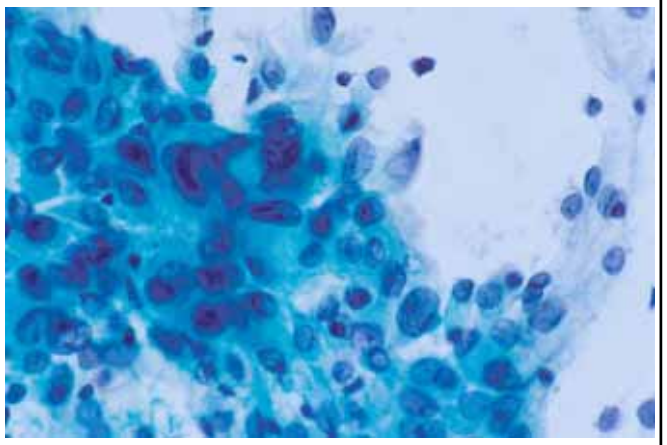


Hurthle cell metaplasia in non-neoplastic lesions





Papillary Thyroid Carcinoma, oncocytic variant versus Hürthle cell neoplasm

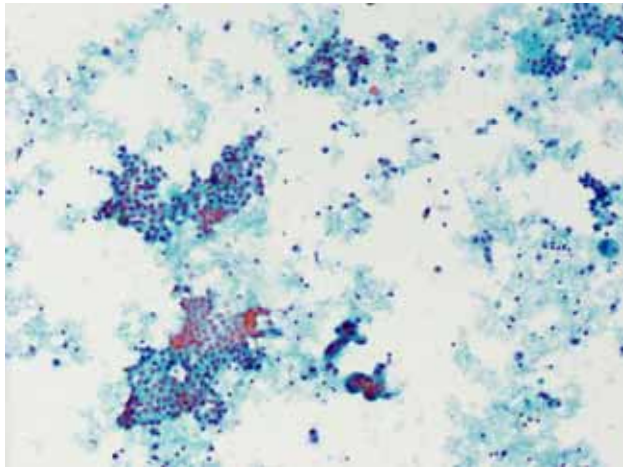


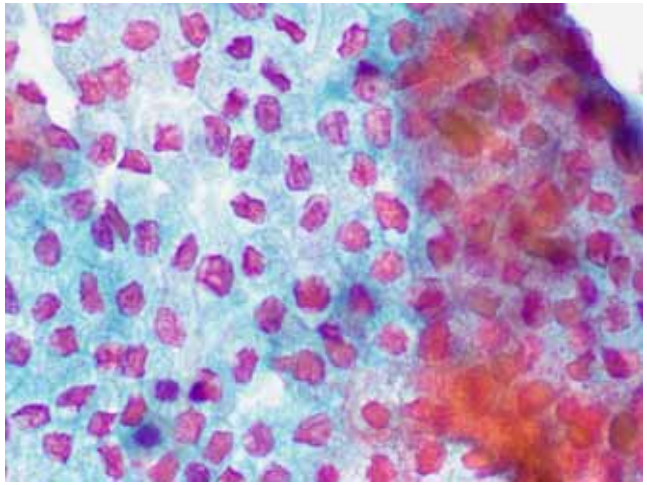
FNAC DDx oncocytic neoplasms

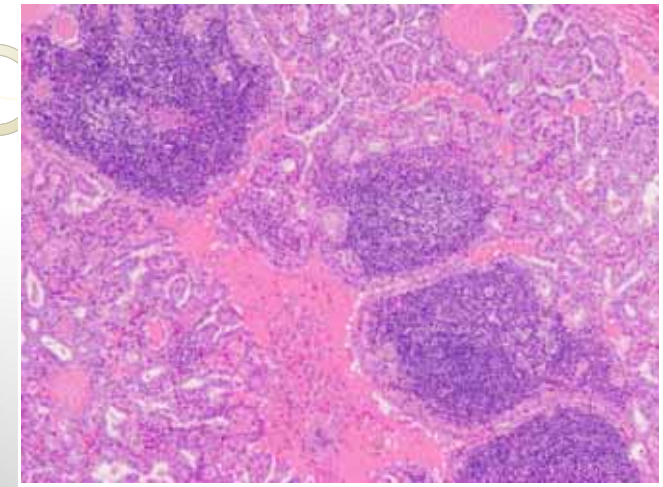
FNA Features	Oncocytic Variant PTC	Hurthle Cell Neoplasm
Nuclear Inclusions	50%	12%
Nuclear Grooves	80%	12%
Prominent Nucleoli	Absent	57%

Modified from Moreira et al. Acta Cytol 48:137, 2004

Warthin-Like Variant, PTC







FNHCT Management and 2015 ATA guidelines

- Diagnostic surgical excision (lobectomy) is the long-established standard of care for FNHCT
- After consideration of clinical and US features, molecular testing may be used to supplement malignancy risk assessment data instead of proceeding directly to surgery
  - However, the accuracy of molecular testing may be lower for FNAs of oncocytic lesions
    - There is an increased rate of “suspicious” results in benign oncocytic lesions using the Afirma GEC
      - up to 1/3 of FNHCT have a negative GEC analysis and can be spared surgery
- Mutational analysis in general unhelpful to distinguish Hurthle adenoma from CA
- RET/PTC rearrangements and RAS mutations are seen in both
- PAX8/PPARY are rare in Hürthle cell CA