THYROID CYTOPATHOLOGY

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Historical perspective

- **Fine needle aspiration (FNA) of the thyroid was documented in the Martin and Ellis paper of 1934.**
- **It was further developed by Tempka et al. and Piaggio-Blanco et al. in 1948**
- **The use of the technique was established subsequently by Scandinavian workers**

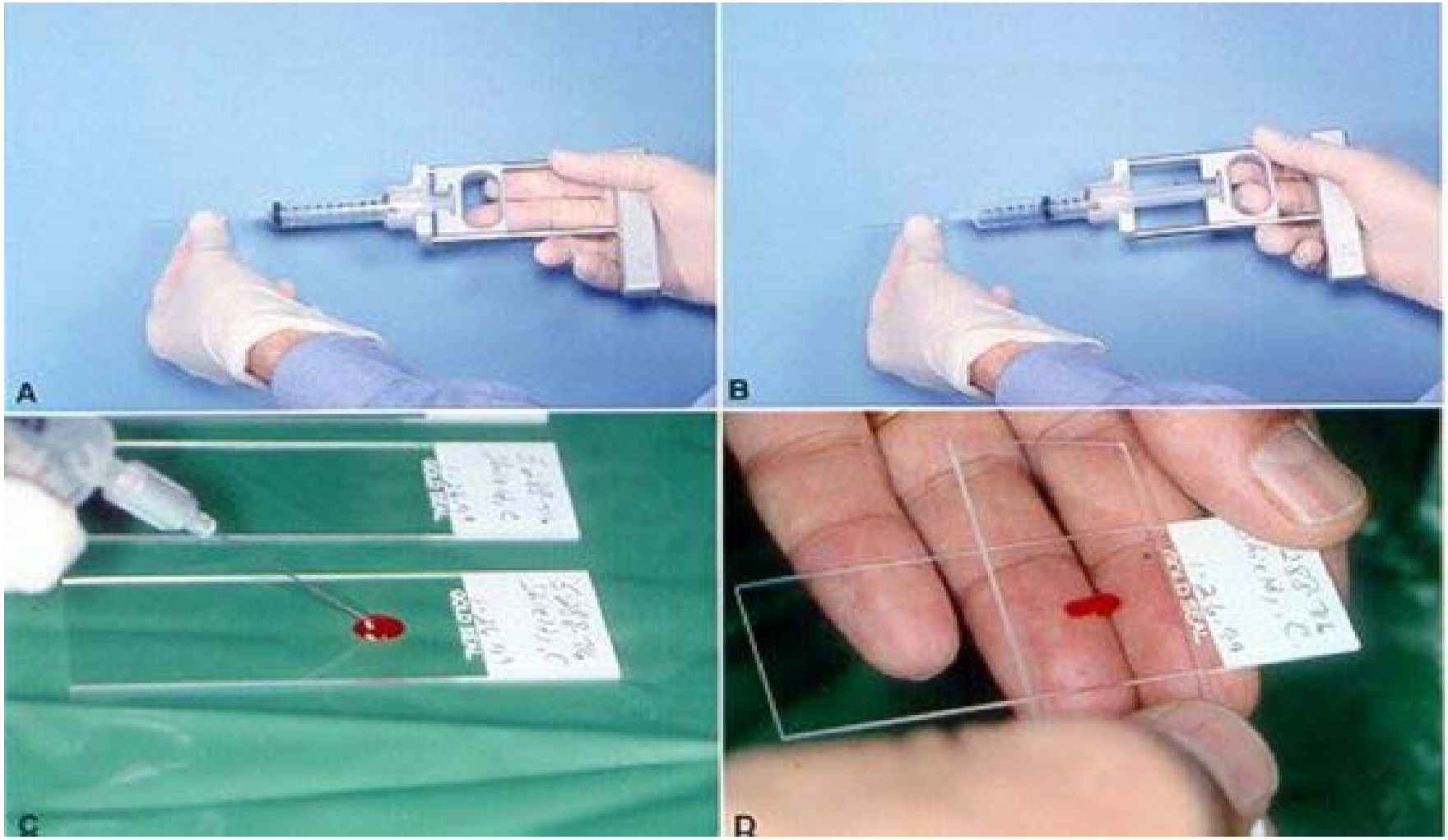
FNA OF THYROID

- **FNA is now recognized to be the first-line investigation for a solitary or dominant thyroid nodule and the thyroid is one of the organs most frequently sampled by means of FNA.**

- **The main purpose of thyroid nodule evaluation is to exclude thyroid cancer which is seen in 5% to 10% of cases requiring surgical intervention.**

- **The prevalence of thyroid nodularity and thyroid cancer is related to age, gender, radiation exposure history, family history of thyroid carcinoma in first degree relative**

FNA Procedure



- **Fine needle aspiration method**

- **Fine needle non aspiration method**

- **Informed consent**

- **22 to 27 gauge needle with 10-20 cc syringe size**

US-guided FNA VS manual thyroid FNA :

- **Small sized nodule (US-FNA)**
- **Initial non-diagnostic smears should undergo repeat FNA under US guidance**
- **US-FNA is more sensitive and specific yields in comparison with manual thyroid FNA**

- **Number of FNA procedure in MNG**
- **Aspiration of thyroid cystic lesions**
- **Central zone aspiration should be avoided**

- **Prepared smears can be air dried for Romanowsky stain or fixed in 95% alcohol or spray fixed for Papanicolaou stain.**
- **A portion or an entire thyroid FNAB pass maybe processed for molecular diagnosis.**

FIXATION METHODS

- Wet Fixation
- Air drying
- Spray Fixation
- Liquid-based Fixation for Papanicolaou Tests
- Lysing Fixation for Bloody Samples

WET FIXATION

95% Ethyl Alcohol (Ethanol)	• ideal fixative recommended • dehydrating agent • desired amount of cell contraction • yield optimal chromatin detail characteristics
100 % ethanol	•similar effect on cells •more expensive
Ether alcohol mixture	• ether and 95% ethyl alcohol • 1 : 1 • excellent fixative
100% Methanol	• produces less shrinkage than ethanol • more expensive
80% Propanol and Isopropanol	•cause slightly more cell shrinkage
Denatured alcohol	• 90 parts **of 95% ethanol** + 5 parts of **100% methanol** + 5 parts of **100% isopropanol.**

Time of Fixation

- Minimum 15 minutes fixation
- Can be Prolonged
- several days or even few weeks
- If smears are to be preserved over a long period of time in alcohol, it is better to store them in capped containers in the refrigerator.

- **Specimen adequacy**

DIAGNOSTIC CLASSIFICATION

- **The Bethesda System for Reporting Thyroid Cytology (TBSRTC) was proposed in 2007 at the National Cancer Institute**
- **Many participants included endocrinologists, radiologists, surgeons, and pathologists agreed to a six-tiered scheme for classifying thyroid FNA's**

Bethesda system for reporting thyroid FNA interpretations

INSUFFICIENT FOR DIAGNOSIS

- Cyst Fluid Only
- Other

BENIGN

- Consistent with a benign follicular nodule
- Consistent with Hashimoto thyroiditis in the proper clinical context
- Other

ATYPICAL CELLS OF UNDETERMINED SIGNIFICANCE (ACUS)

SUSPICIOUS FOR A FOLLICULAR NEOPLASM

SUSPICIOUS FOR A HÜRTHLE CELL NEOPLASM

SUSPICIOUS FOR MALIGNANCY

- Suspicious for papillary carcinoma
- Suspicious for medullary carcinoma
- Suspicious for lymphoma
- Other

MALIGNANT

- Papillary carcinoma
- Medullary carcinoma
- Undifferentiated (anaplastic) carcinoma
- Lymphoma
- Metastatic malignancy
- Other

Implied Risk of Malignancy and Recommended Clinical Management

Category	Risk of Malignancy	Usual Management
Insufficient for Diagnosis	**1-4%**	Repeat FNA w/ U/S
Benign	**<1%***	Clinical follow-up
ACUS	**~5-10%†**	Repeat FNA
Susicious for a Follicular Neoplasm	**15-30%**	Lobectomy
Susicious for a Hürthle Cell Neoplasm	**15-45%‡**	Lobectomy
Suspicious for Malignancy	**60-75%**	Lobectomy or total thyroidectomy
Malignant	**97-99%**	Total thyroidectomy

*	0-3%
†	5-15%
‡	15-30%

- **FNA of cervical lymph node VS biopsy**

- **FNA of suspicious thyroid nodule VS biopsy specimen**