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Analysis of False Negative in Thyroid Swellings

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Abstract:
Objectives: *Is to find the accuracy rate of FNAC in Thyroid swelling and to analyse false negative FNAC*
Methods and Materials: *A prospective study done for a period of 2 yrs in Tanjavur Medical College Hospital FNAC taken from Thyroid swelling and Histopathological examination of operated Thyroid specimen compared for false negativity.*
Results: *Out of 96 cases 75 cases were found as True positive (78.12%) correlating with FNAC and Biopsy reports. 2 cases were found as false positive (2.08%) 19 cases were found to be false negative (19.805)*
Conclusion: *With the significant negativity 19.80% we cannot rely on FNAC alone and we have to consider clinical examination, FNAC and postoperative Biopsy all together for complete treatment of thyroid swellings.*
Keywords: *Fine needle aspiration cytology (FNAC), Thyroid swelling, Benign, Malignant, Thyroiditis, Histopathalogical reports.*

I. Introduction

Fine needle aspiration of the thyroid for cytologic diagnosis is a method that has been extensively applied in various medical centers for several decades. It is an important yet un fulfilled application in surgical practice. It is the most useful component of clinical tissue cytology or non exfoliative cytology.

In the thyroid swelling the utility of **Fine Needle Aspiration Cytology** depends upon the accuracy with which it can predict Neoplasia in thyroid swelling there by providing the potential for the avoidance of essentially diagnostic surgery in bengn conditions and for the planning of surgical strategy for carcinoma and for the avoidance of open biopsy in an advance Neoplastic carcinoma.

AIM

The aim of this dissertation is to evaluate the accuracy of Fine Needle Aspiration Cytology in thyroid swelling, and to analyze false negative Fine Needle Aspiration Cytology in patients with thyroid swellings.
FNAC is an eavoy preoperative diagnostic tool in the evaluation of goitus.
Principle beriom of thyroid gland that may be identified in aspiration cytology are as follows

1. Cysts
2. Colloid stribe cadenomatous differing
3. Thyrodities .

II. Materials, Methods and Technique

Materials

1. Disposable (Gamma – irradiated) Hypodermic needles of size 23 and of length between 1 to 1.5 inches.
2. Disposable sterile 5 ml syringe. Pistol syringe holder (Cameco – Syringe) is preferred. But It's not used.
3. Swabs with spirit (or skin sterilizing solutions).
4. Several 76 x 26 mm size micro scope sliders are suitably labeled, numbered with suitable instrument.
5. Koplin – Jar for keeping the smeared slides in the fixative, the fixative being Isopropyl alcohol.
6. Small transport box for slide preparations in which the specimen slides are held separately so that the face of the slide is not damaged and not contaminated during transportations.
7. Complete laboratory request form with full clinical details.
8. Stain: Hematoxylin and Eosin stains.

Thyroid Diseases Diagnosed by FNAC

1. Simple colloid goiter

Smear showing normal cytological appearances (Or abundant or very thick. colloid)

2. Nodular Goitre

Abundant thick or thin colloid
Follicular cells in monolayer sheets

Hyperplastic involllutional & Oxyphilic follicular cells with fragile cytoplasm many bare nuclear.
Degenerative features like old blodd & cell debris.

3. Thyriditis
Acute suppurative Thyriditis Smear shows neutrophils necrotic cells debris and intra cellular bacteria

4. Follicular Neoplam
- Moderate to high cellularity
- Bloody usually colloid free background
- Prominent micfrofollicular pattern
- Rosettes Syncytial groups and equal sized cell clusters
- Nuclear crowding & Overlapping
- Positive immunostaing for thymoglobulin & TTF 1

5. Papillary Carcinoma
Smears are cellular with cells forming syncytial aggregats with distinct anatomical border & nuclear crowding and overlapping.
Cells occur in flaty sheets and papillary tissue fragments with or without fibro vascular core.
Nuclei enlarged ovoid, pale, with finally granular powdery chromatin intramuscular cytoplasm inclusion & nuclear grooves.
Scanty, viscous stingy (Chewing gum) colloid – variables psammona bodies variables.
Positive immunostaing for CK 19, CD44 & HBME

6. Medullary Carcinoma
Cellular smears mainly dispersed cells
Variables cell pattern, plasmacytoid, Small cell, spindle cell.
Moderate anisonucleosis , Scattered very large nucleie binucleate and multinucleate forms.
Uniform stippled Nuclear chromatin
Amorphous pink / Violet background material (Amyloid)
Positive staining for calcitonin

7. Anaplastic Carcinoma
Necrotics background with dissociated and / or clustered highly pleomorphic malignant cells.
Multinucleat bizarre giant cells and / or spindls / squamoid cells showing market atypia.
Frequent abnormal mitosis.

8. Lymphoma
Smear shows a dispersed population of predominantly large abnormal lymphoid cells of blaster type.
A mixed cell population including plasma cells suggestive of florid reactive process.

9. Metastatic malignancies
Lung, GIT, breast, Kidney, Melamonoma and Lymphona are the most frequent sites of origin.
Clear cells – RCC, Salivary gland ca, Clear cell melanoma, thyroid and parathyroid
Papillary – Papillary ca of thyroid, breast ca
Oncocytes Hurthle cell tumour, Oncocytic variant of papillary ca & Medullary ca, RCC, Salivary gland ca.
Mucin, Producing cells - Colonic and lung ca, salivary gland ca,
Squamous – Anaplastic ca, laryngeal ca, lung ca,
Spindle cell – Medullary ca, anaplastic ca, primary and metastatic spindle cell sarcoma melanoma sarcomatoid RCC.
Pleomorphic multinucleate giant cells- Anaplastic ca, Metastaic Pleomorphic sarcoma, giant cell ca of pancrease and lung.

III. Principles of Reporting

The reports we receive fall into 4 categories
1. **No epithelial cells seen:** This indicate inadequate specimen, that where a carcinoma was suspected, the lesion was missed or failed to aspirate and only bold and a little fat or adipose tissue obtained.
2. **No malignant cells seen:** This report is issued when benign cells expected from this site are present and this presumes a representative aspirate. A description of the types of cells and their condition and numbers are of

help to establish a bengin diagnosis. **A report of no malignant cells seen does not exclude malignancy.** It merely indicates there were no malignant cells in this preparation studied.

3. **Malignant cells present:** This report must be used when there is no doubt that the lesion is malignant **and corroborated by a colleague within the department.** Such a report should result in the patient receiving treatment for cancer.

4. **Suspicious, but not diagnostic of malignancy:** This report should be avoided whenever possible, because it is of little help to the clinician. It may, however, be necessary and unavoidable if the specimen is very scanty or the specimen is cellular and suggest well differentiated malignancy, but it is not sufficiently clearcut to submit patient to definitive treatment for cancer. **The aspirate is then repeated and preferably a biopsy is recommended.**

Table 1 – AGE

	1 < 20 Yrs	II 21-30 Yrs	III 31-40 Yrs	IV 41-50 Yrs	V > 50 Yrs	Total
Male	-	1	8	2	1	12
Female	6	29	25	16	18	84
Total	6	30	33	18	9	96
Percentage	6%	30%	33%	18%	9%	96

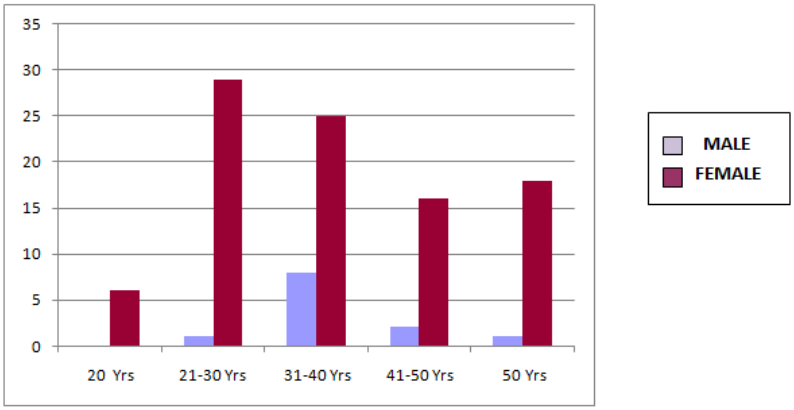

Table I1 – SEX

Male	Female	Total
12	84	96
(12.5%)	(87.5%)	(100%)

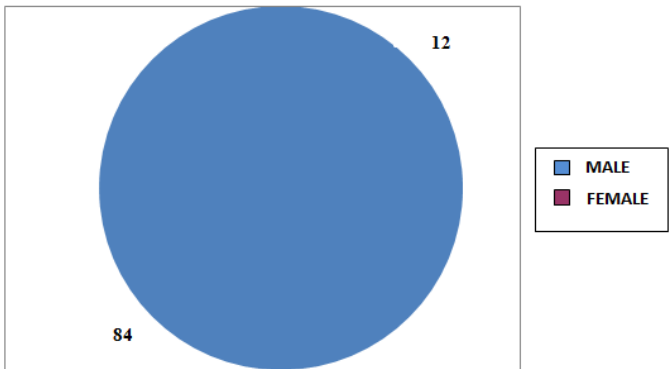

Table III. Pre Operative Fnac Diagnosis

DIAGNOSIS	NO.OF CASES
NODULAR GOITRE	16
MNG	29
ADENOMA	22
FOLLICULAR NEOPLASM	8
CARCINOMA	11
COLLOID GOITRE	10
TOTAL	96

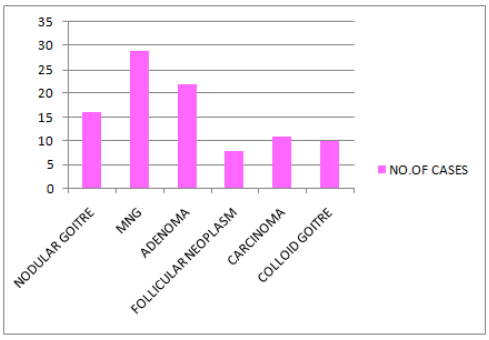

Table IV – Surgery

SURGERY	NO.OF CASES
HEMI THYROIDECTOMY	39
SUBTOTAL THROIDECTOMY	36
TOTAL THYROIDECTOMY	21
COMPLETION THYROIDECTOMY	2
TOTAL	96

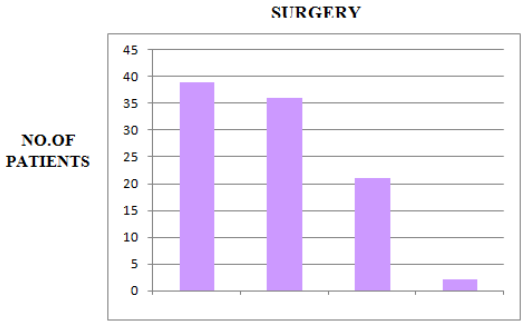

Table V – Accuracy Rate

Results	True positive	False Negative	False Positive
Total No.	75	19	2
Percentage	78.12%	19.80%	2.08%

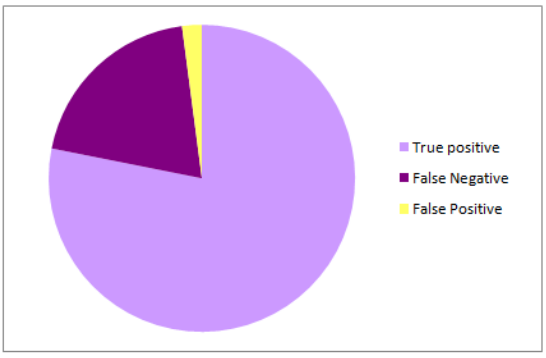

Table VI – Accuracy Rate

	Surgical Biopsy	FNAC
Diagnosis	Histopathological	Cytopathalogical
Diagnostic Facility	Narrow	Broad
Anaesthesia	Yes	No
Length of Procedure	More than 5 minutes	Less than 5 minutes
Report Arrival	5 days	Same day
False Positive	Nom	Rare
False Negative	Few	Some
Cost	High	Low
Speciment Obtained	In Operating theatre	As outpatient
Trauma	Yes	Little

Table VII

19 Cases were found to be FALSE NEGATIVE as shown in the tabular column below:

FNAC.DIAG.	NO.OF FALSE NEGATIVE CASES	BIOPSY.DIAGNOSIS	NO.OF CASES
COLLOID GOITRE	2	AUTOIMMUNETHY ROIDITIS	2
MNG	10	PAPILLARYCARCINOMA AUTOIMMUNETHYROIDITIS FOLLICUALR. CARCINOMA	5 4 1
ADENOMA	3	PAPILLARY CARCINOMA FOLLICULAR CARCINOMA	2 1
NODULAR GOITRE	4	AUTOIMMUNETHYROIDITIS. PAPLLI.ARYCARCINOMA	2 2
FALSE NEGATIVE CASES	19		19

IV. Results

In my present study, surgery was done for 96 cases and the preoperative FNAC compared with post operative biopsy results. Out of 96 cases, 75 cases were found as **TRUE POSITIVE,** (78.12%) correlating with **FALSE NEGATIVE** [19.80%] as shown in the tabular column below:

FNAC.DIAG.	NO.OF FALSE NEGATIVE CASES	BIOPSY.DIAGNOSIS	NO.OF CASES
COLLOID GOITRE	2	AUTOIMMUNETHYROIDITIS	2
MNG	10	PAPILLARYCARCINOMA AUTOIMMUNETHYROIDITIS FOLLICULAR.CARCINOMA	5 4 1
ADENOMA	3	PAPILLARY CARCINOMA FOLLICULAR CARCINOMA	2 1
NODULAR GOITRE	4	AUTOIMMUNETHYROIDITIS. PAPLLI. ARYCARCINOMA	2 2
FALSE NEGATIVE CASES	19		19

Out of 11 reported cases of carcinoma, we clinically suspected malignancy in 7 cases even before surgery and proceeded with total thyroidectomy irrespective of FNAC results.

In the remaining 4 cases 2 cases which fall under low risk were followed up and 2 cases which fall under high risk underwent completion thyroidectomy. 19 cases were found to be **FALSE NEGATIVE** of 19.80%.

Analysis of False Negative Fineneedle Aspiration Cytolofy in Clinical Outcome in Thyroid Swelings of The case of 96 in our study 75 cases were **true positive** with a percentage of [78.12%]. 19 cases were False negative with a percentage of [19.80%] and false positive 2 [2.08%]

Chi –square calculated value.

Chi – Square Tests

	Value	Df	Asymp.Sig
Pearson Chi-Square	342.154[a]	100	.000
Likelihood Ration	168.274	100	.00
Not Valid Cases	100		

a. 116 cells (95.9%) have expected count less than 5. The minimum excepted count is .01.

Hence p is significant at 0.01 level. Hence excision biopsy findings and FNAC are not similar in all cases and statistically proved.

V. Discussion

From our data it is clear that diagnosis by Fine Needle Aspiration Cytology of the thyroid swelling helps in selection of patients for surgery with high degree of accuracy thought there is increased chance of false negativity.

In our study of 96 cases, 75 cases were true positive in a percentage of 78.12%, 19 cases were false negative in percentage of 19.80% and false positive 2 [2.08%]

Reasons for False Negative Results:

1. Aspiration not striking the representive area.
2. Inadequate aspiration
3. Failure in producing acceptable smears.
4. Faculty fixation.

VI. Conclusion

Fine Needle Aspiration Cytology is a safe and accurate method to establish whether a thyroid swelling is benign, malignant or inflammatory. Fine Needle Aspiration Cytology has a high degree of acceptance and compliance. Fine Needle Aspiration Cytology cannot differentiate follicular adenoma from follicular carcinoma with certainty, since HPE only can detect capsular or vascular invasion.

Patients with thyroid swelling can be submitted for Fine Needle Aspiration Cytology in the out-patient department itself. A report is obtained on the same day itself and patient can be evaluated completely for surgery. Diagnosis of Fine Needle Aspiration Cytology is reliable as he combined intelligence of the clinician and pathologist makes it "according to **STEW ART 1933".**

Thought the Fine Needle Aspiration Cytology is safe, acceptable and out-patient procedure, according to this study false negative diagnosis happens with Fine Needle Aspiration Cytology in few cases. The false negativity is probably due to imperfect technique or due of inexperience of the cutopathologist.

Thus with the significant negativity of 19.80%, we cannot rely on FNACE alone and we have to consider clinical examinations, FNAC and post operative biopsy all together for complete treatment of thyroid swellings.

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