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Accuracy of Fine Needle Aspiration Cytology in Common Surgical Conditions: A Prospective Study

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Abstract
FNAC remains the first choice for the initial investigation and diagnosis of both superficial and deep lesions though core needle biopsy is extremely valuable in selected cases. Clinical value of FNAC is not only limited to neoplastic conditions, but also valuable in the diagnosis of inflammatory, infectious and degenerative conditions It is relatively painless, produces a speedy result and cheap. This study was conducted at sree mookambika college of medical sciences at department of general surgery from the year of dec 2023-jan 2025. Total number of patients participated in this study was around 200 patients. Statistical analysis was done using the statistical package for social sciences (SPSS). Different statistical methods were used as appropriate. Mean±SD was determined for quantitative data and frequency for categorical variables. In our study it was 94.5% and almost matches the literature sensitivity. The commonest benign swelling of the breast, fibroadenoma, is also diagnosed with sensitivity of 94.4%\Ashcroft and Von Henle achieved a diagnosis of Thyroid neoplasm in accuracy of over 90%. Papillary thyroid carcinoma had accuracy of 80% in this study. The sensitivity for lymphoma, Tuberculosis and metastasis node were 90.0%, 62.5% and 100% respectively from this study. This almost approaches the recommended values from other studies of 84-98% for lymphoma and 90-96% for metastasis. The study conducted at PGI, Chandigarh showed sensitivity for lymphoma, TB and Metastasis as 64.7%, 60.4% and 71.5% respectively. FNAC is highly sensitive in diagnosing malignancies of breast, Thyroid and parotid. Lymphomas can be found out by FNAC but typing of lymphoma needs Excision biopsy. Benign swelling of breast (Fibrodenoma), parotid (Pleomorphic Adenoma), Soft tissue (Lipoma) can be diagnosed with high accuracy by FNAC.

INTRODUCTION

FNAC remains the first choice for the initial investigation and diagnosis of both superficial and deep lesions though core needle biopsy is extremely valuable in selected cases. Clinical value of FNAC is not only limited to neoplastic conditions, but also valuable in the diagnosis of inflammatory, infectious and degenerative conditions It is relatively painless, produces a speedy result and cheap. Its accuracy in many situations can approach that of histopathology in providing an unequivocal diagnosis in the experienced hands. It is applicable to lesions that are easily palpable[1-4]. The risk of needle tract seedling is extremely low when truly fine needles of 22 gauge or less are used. The success of FNAC depends on representativeness and adequacy of sample and high quality of preparation. At the community level, 5FNAC may be regarded as simple screening test for serious disease, which needs further investigation and referral to specialist. In the major hospital, it is an essential component of the final preoperative or pretreatment investigations on which the management of the problem is based."There would be so little danger in extracting a small quantity of tissue from an obscure growth by the aid of a needle, trocar or cannula, so little substance is there necessary for the microscope that the diagnosis of cancer would no longer be embracing or vogue."

Aim and Objectives of the Study: The aim of this dissertation is to evaluate the accuracy of fine needle aspiration cytology to diagnose common surgical conditions in consecutive 200 cases. Correlation of FNAC results with postoperative Histopathological reports.

MATERIALS AND METHODS

This study was conducted at sree mookambika college of medical sciences at department of general surgery from the year of dec 2023 to jan 2025. Total number of patients participated in this study was around 200 patients. Disposable (Gamma-irradiated) hypodermic needles of size 23 and of length between 1-11/2 inches. Disposable sterile 5 ml syringe. Pistol syringe holder (Cameco Syringes) is preferred. But here it's not used. Swabs with spirit (or) skin sterlising solutions. Several 76x26 mm size microscope slides are suitably labeled and numbered with suitable instrument. Koplin-Jar for keeping the smeared slides in the fixative, the fixative being Isopropyl alcohol. 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 transportation. Complete laboratory request form with full clinical details. Stain: Hematoxylin and Eosin stains The skin is cleaned and the lump is located and firmly held between the thumb and the fore finger of the free hand. The syringe is held by outside of the barrel and the needle tip is pushed into the lesion vertically. The plunger is partially retracted, creating a negative pressure, without loosing the pressure or pulling the needle tip out of skin, the whole syringe is rotated by the movement of the wrist and gently moved in and out. The cutting edge of the needle tip frees the cells inside the lesion, which are sucked into the fine bore of the needle. Using continuous negative pressure by pulling firmly on the plunger of the syringe, guide the cutting tip of the needle forwards and backwards and obliquely through the firmly held lump and twisting the wrist to apply a rotating as well as a forward and backward action, the cells are sucked into the lumen of the needle. Nothing is usually visible in the body of the syringe between the bottom of the plunger and the needle head, a cyst being an obvious exception. Now, slowly release the pressure on the plunger so that there is no more suction effect. Withdraw the syringe and the needle gently from the skin. It is important, releasing of the pressure is not performed before removing the needle, air will rush up the needle and loose the specimen into the body of the syringe. After the needle is withdrawn from the patient, it is removed from the syringe.The syringe filled with air and the needle is replaced firmly. Some workers using an air reservoir technique is not used here. The syringe is held vertically with the needle tip above the surface of the microscopic slide, the plunger is pushed down and the contents of the needle are blown gently on the slide or slides. When aspirating the thyroid, a vascular organ, a bloody aspirate is sometimes obtained. A technique similar to that of karolinska Institute, Stockholm is used, the syringe contents are emptied quickly on to one or two slides before the blood clots. If there is semisolid material on the slide, the spreader slide is turned over and the flat surface is pressed gently on to those tiny fragments and the slides pulled apart ending up with evenly spaced cells on both slide surfaces. Statistical analysis was done using the statistical package for social sciences (SPSS). Different statistical methods were used as appropriate. Mean±SD was determined for quantitative data and frequency for categorical variables. The independent t-test was performed on all continuous variables. The normal distribution data was checked before any t-test. The Chi-Square test was used to analyze group difference for categorical variables. A p- value<0.05 was considered significant.

RESULTS AND DISCUSSIONS

Table 1: Breast

Age (Years)	Diseases		
	FA	Phylloides	IDC
10-20	22	-	-
21-30	10	1	4
31-40	7	2	13
41-50	-	1	9
>50	-	-	9

Table 2: Thyroid

Age (Years)	Diseases		
	Adenoma	MNG	PTC
10-20			
21-30	2	10	2
31-40		10	3
41-50	2	5	
>50	2	1	1

Table 3: Lymphnode

Age (Years)	Diseases		
	TB	Lymphoma	Metastasis
<10	1	-	-
11-20	2	3	-
21-30	3	2	-
31-40	-	2	1
41-50	-	2	1
>50	-	4	2

Table 4: Parotid

Age (Years)	Diseases	
	Pleomorphic Adenoma	Carcinoma
10-20		1
21-30	2	2
31-40		2
41-50	1	
>50	2	2

The literature sensitivity in the diagnosis of carcinoma breast was 90-95%. In our study it was 94.5% and almost matches the literature sensitivity[6]. The commonest benign swelling of the breast, fibroadenoma, is also diagnosed with sensitivity of 94.4%\Ashcroft and Von Henle achieved a diagnosis of Thyroid neoplasm in accuracy of over 90%. Papillary thyroid carcinoma had accuracy of 80% in this study. The sensitivity for lymphoma, Tuberculosis and metastasis node were 90.0%, 62.5% and 100% respectively from this study. This almost approaches the recommended values from other studies of 84-98% for lymphoma and 90-96% for metastasis. The study conducted at PGI, Chandigarh showed sensitivity for lymphoma, TB and Metastasis as 64.7%, 60.4% and 71.5% respectively[7-12]. Karolinska produced accuracy of >90% in neoplasm's of salivary glands. In 1994 reviews, they produced sensitivity of 81-100% and accuracy of typing in 61-80%. Our study results were 100% sensitive to both benign and malignant neoplasms. The reported sensitivity of 100% for lipoma, 80% for mesenchymal malignancy in this study little bit contrasts the literature results of 85% for benign and 89% for malignant soft tissue tumours. The less sensitivity of FNA to the diagnosis of Fibrodenosis is due to variable responsiveness of breast tissue portions to hormonal stimuli and cytology taken from unrepresentative fibrous portions[13-15]. The false positivity in case of papillary carcinoma and Follicular neoplasm in MNG may be due to papillary and Follicular pattern observed from the follicle lining epithelium, while they are in atransforming sate of non-toxic to toxic[16,17]. This can be minimized by careful study of cytological features. Lymphomas would not be typed from the FNAC, even though it is reported as lymphoproliferative disorder. So it would be better to go for excision biopsy if Lymphoma is suspected.

CONCLUSION

FNAC is highly sensitive in diagnosing malignancies of breast, Thyroid and parotid. Lymphomas can be found out by FNAC but typing of lymphoma needs Excision biopsy. Benign swelling of breast (Fibrodenoma), parotid (Pleomorphic Adenoma), Soft tissue (Lipoma) can be diagnosed with high accuracy by FNAC. FNAC is useful in conjunction with clinical radiological findings to provide best possible initial assessment. The diagnostic accuracy not only depends on representativeness of the aspirate but also on the quality of cytological preparation. Repeat FNB samplings over a period of time reduces the false negative rates.

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