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Should FNAC be Restricted to an Elite Estigation-an Experience of 20,237 Aspirations Including More than 8000 Aspirations from Head and Neck Region

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Method: this study was done in pathology department of Me - dical College & Hospital, Kolkata for a period of 10 years. Aspirates were classified into one of the three interpretation groups (easy, moderately difficult, and highly difficult) according to set up criteria. Cytohistological correlations were done in all possible cases.

Results: out of total 20,237 cases undergoing cytological evaluation during study period, 1774 cases (8.77%) needed guidance for aspiration.3.16%of the rest 18,463 cases could not be reported for lack of adequate aspirate.

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Results: out of total 20,237 cases undergoing cytological evaluation during study period, 1774 cases (8.77%) needed guidance for aspiration.3.16%of the rest 18,463 cases could not be reported for lack of adequate aspirate. Rest 17879 cases were categorized in 3 interpretation groups as follows: easy- 90.03% (16098 cases), moderately difficult- 6.72% (1203 cases), highly difficult- 3.25% (578 cases). Breast aspirates seemed comparatively easier to interpret whereas salivary aspirates were much difficult. Cytohistological correlations were possible in 5807 cases yielding 84.78% correlation. The study was alsoquite sensitive and specific in detecting malignancy with 14.93% false positive and 10.48% false negative results.

Conclusion: it is evident from the present study that FNAC is not only a useful method of tissue diagnosis but also the only cheap method requiring moderately trained personnel for interpretation in majority of cases. So its blessings should be extended to the block level.

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I. Introduction

Needle aspiration cytology was successfully utilized by Greig and Gutheri as early as 1904 for diagnosis of sleeping sickness from cervical lymphnode aspirates[1].but for the next 50 years this method of diagnosis was largely ignored due to complications like tissue injury and needle track dessim–ination[2]. Later on Cardoza (1954),Franzen, Geirtz and Zajicek (1960) etc workers introduced the technique of FNAC with lesser complications and reasonable success rate[3,4].

Last 4 decades experienced spectacular developments in the field of aspiration cytology and now it has emerged as diagnostic method of preoperative assess -ment any type of swelling. Use of thinner needle has reduced tissue injury to a minimum enabling aspiration from vascular hamartomas or large thyroid lesions[5]. Reported incidence of needle track dissem-ination after FNAC was also negligible[2]. Even testicular malignancies can now be aspirated safely[6].

FNAC is also a reasonably accurate method of diagnosis. Different workers reported more than 75% accuracy in predicting a definite diagnosis on cytological evaluation[5, 7, 8, 9, 10]. This is quite comparable with success rate of modern radiological or serological investigations. FNAC can also be used in tandem with modern radiological procedures like USG, mamm - ography, CT scans with improved diagnostic accuracy in comparison to outcome of any single procedure employed[9].

Principal limiting factor of accurate cytodia - gnosis is adequacy of aspirate[11]. In spite of repeated aspirations every worker has reported variable percent - tage of failed aspirations in their series[5, 9, 10]. Radiological guidance often helps in obtaining enha - nced amount of aspirates at the cost of increased expenditure[12]. Another major handicap of FNAC is diagnosis of a large lesion with heterogeneous tissue composition. In those cases variability of aspirates from different sites causes considerable confusion[11, 13]. Guiding methods can be helpful in choosing appropriate site / sites for aspiration in these cases[9, 12, 13].

In spite of those two serious drawbacks, FNAC became an important wing of diagnostic medicine because it delivers report with minimum expenditure of money and time in comparison to any other method with comparable safety and accuracy[12]. In our series, a large number of aspirate from all parts of body were evaluated to establish the reliability of this method of diagnosis. Aspirates from head and neck region accounted for almost half of the cases. Our main objectives were:

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- To show that interpretation of aspiration in majority of the cases are simple and straight forward.
- To establish that FNAC is a cheap procedure capable of predicting final tissue diagnosis with reasonable accuracy and should be encouraged to be done at grass root level.

II. Material and Methods

This method was conducted in the Pathology department of Medical College Hospital, Kolkata for a period of 10 years (1st January, 2000 to 31st December 2010). All cases coming to pathology department for FNAC during the mentioned period were included in our study group. FNAC was done using standard proce - dures and aspirates were stained with May- Grunwald – Giemsa (MGG) stain, Haematoxylin and Eosin (E & O) stain, Papanicolaou stain[12]. Stained slides of each case were evaluated by two separate observers simultan - eously to be categorized into one of the three groups mentioned below:

- Interpretation easy:Two observers reached same definitive diagnosis on initial assessment separately without consultation of any reference material.
- Interpretation moderately difficult: two observers reached same definitive diagnosis only after consu -ltation of reference books or journals individually and / after discussion between each other.
- Interpretation highly difficult: two observers failed to substantiate a unanimous definitive diagnosis even after consultation of books and discussion between each other.

Cytological correlations were done in all the cases with available histology considering histological diagnosis as 100% accurate.

III. Observation

Table 1 : No of cases

Total cases	No. of cases needed guidance	%	No ofcases without guidance	%
20237(100%)	1774	8.77	18463	91.23

Out of 20237 cases 1774 (8.77%) needed guided aspiration.

Table 2 : adequacy of aspiration

No of cases aspirated without guidance	No. of inadequate aspirates	%	No. of adequate aspirate	
18463(100%)	584	3.16	17879	96.84

Despite repeated aspiration 584 (3.16%) cases was failed.

Table 3 : Categorization of aspirates

No. of adequate aspirate	Interpretative categorization					
	Interpretation easy		Interpretation moderately difficult		Interpretation highly difficult	
17879 (100%)	No	%	No	%	No	%
	16098	90.03	1203	6.72	578	3.25

Moderately difficult interpretation was in 6.72 %(1203) and highly difficult in 3.25%(578).

Table 4 : region wise distribution of cases

No. of cases adequately aspiration	Regions aspirated					
	Head and neck	Thorax	Superior extrimity	Inferior extrimity	Abdomen	Multiple region
17879(100%)	8466 (47.30%)	4119 (23.10%)	2693 (15.10%)	1911 (10.70%)	207 (1.10%)	483(2.70%)

Maximum no of cases (8466 / 17879) 47.30% were done from head and neck region followed by thorax (23.1%) & superior extremity (15.1%). Out of the 8466 head and neck aspirates lymph node biopsy are the most common (37.8%). Closely followed by thyroid (34.5%).

Table 5 : organ wise distribution of head and neck lesion

Total no. of aspirates from head and neck region	Organ wise distribution						
	Lymph node	Thyroid	Salivary gland	Nasal, naso & oropharyngeal	Skin and soft tissue and oral	Orbital	Multiple sites
8466 (100%)	3205 (37.8%)	2923 (34.5%)	978 (11.5%)	439 (5.2%)	386 (4.5 %)	276 (3.3%)	259 (3.2%)

Table 6 : organ wise distribution of all cases with interpretation categorization

No of adequate aspirates	Sites of aspiration	No of cases	%	Interpretation categorization					
				Easy		Moderately difficult		Highly difficult	
				No	%	No	%	No	%
17879 (100%)	Lymph node	5134	28.71	4433	86.3	402	7.8	299	5.9
	Breast	3961	22.15	3749	94.64 (max)	143	3.61 (min)	69	1.75 (min)
	Thyroid	2923	16.35	2648	90.6	216	7.38	59	2.02
	Skin and soft tissue	1957	10.94	1836	93.82	85	4.34	36	1.84
	Bone and joints	1186	6.63	1076	90.72	71	5.99	39	3.29
	Salivary glands	978	5.47	761	77.8 (min)	189	19.32 (max)	28	2.88
	Nasal & naso/oropharyngeal	439	2.45	396	90.2	34	7.74	9	2.06
	Orbital	276	1.54	257	93.11	13	4.71	6	2.18
	Intra-abdominal	138	0.77	117	84.78	9	6.52	12	8.70 (max)
	Intra-thoracic	65	0.36	54	83.07	6	9.23	5	7.70
	Multiple sites	822	4.59	771	93.79	35	4.26	16	1.95

Lymph nodes were the single most common target of aspiration (28.71%), followed by breast; thyroid, skin etc. intra-abdominal, intra-thoracic sites are the least common. Breast aspirates are easier to interpret (94.64%) but salivary gland aspirates are least easy to interpret (77.8%). Intra-abdominal cases are the most difficult (8.70%) to interpret.

Table 7 : Cytohistological correction

No. of cases with histology	cytodiagnosis	No of cases	Histological diagnosis			Cases with correction		Cases with disparity	
			Non-neoplastic	Benign	Malignant	No	%	No	%
5807 (100%)	Non-neoplastic	906	752	109	45	4923	84.78	884	15.22
	Benign	2282	50	1943	289				
	Malignant	2619	38	353	2228				

Table 8 : detection of malignancy

No of cases with histology	cytodiagnosis	No	Histological diagnosis		False positive malignant cases		False negative malignant cases		sensitivity	specificity	Predictive value	Negative predictive value
			Non malignant	Malignant	No	%	No	%				
5807 (100)	Nonmalignant	3188	2854	334	391	14.93	334	10.48	85.07	59.52	86.96	87.95
	Malignant	2619	391	2228								

It shows the efficacy in detecting malignancy of FNAC. It has sensitivity of 85.07% and specificity of 59.52%.

IV. Discussion

In the present study, 1774 cases (8.77%) were aspirated under various radiological guidance (CT scan, USG, fluoroscopy). These cases were not included in final analysis because of higher expenditure and poor availability of the guiding techniques at peripheral levels. Among the cases aspirated without guidance (18463), 3.16% (584 cases) could not be reported due to inade - quate aspirate. Reported incidence of inadequate aspir - ate in various studies ranges from 32.2% to 2.5%[7, 8, 14]. Comparatively lower incidence in our series could be attributable to repeated aspiration attempts by multiple persons in more than one sitting.

More than 90% cases (16098 out of 17879) of present group were categorized into easy to interpret, 6.72% cases were moderately difficult and 3.25% were highly difficult demanding highest level of collective expertise – only available at referral centers. Different workers reported incidence of misdiagnosis during cytological evaluation of large number of cases in their series ranging from 0% to as high as 33%[10, 9, 15, 16].

Head and neck lesion accumulated for majority of the cases (47.3%) in our series. Lymph nodes were the commonest target (37.8%) among head and neck aspirates. Similar data was also published by other researchers[10, 12].

In our study breast aspirates were comparatively easy with less than 2% cases belonging to highly difficult. Similar results were shared by other workers[8, 9]. We faced maximum difficulty during distinction between proliferative breast disease with variable dysplasia and breast carcinoma in situ as also by other researchers[17]. In cases of salivary glands only 77.8% were easy to interpret. Different workers admitted various pitfalls and problems during salivary gland aspiration study[18, 19]. 8.7% of abdominal aspirates were highly difficult to interpret.

In this study we achieved almost 85% Cyto-histological correction. Reported incidences of false positive and false negative malignant cases were 14.93% and 10.48% respectively. Sensitivity, specificity, positive and negative predictive value for detection of malignancy was between 85.07% to 89.52%. These data's quite clearly establish the diagnostic value of aspiration cytology. Comparable results were published by a lot of cytopathologists dealing with large number of cases[7, 8, 10, 16].

V. Conclusion

from the above discussion it is quite clear that FNAC is a reliable method of pathological diagnosis, for lesion of all parts of body including head and neck region.

But we want to interpret our results from another angle. During the last 4 decades diagnostic medicine has undergone a sea of changes. Unfortunately all the diagnostic approaches of recent discovery are much costly. But apart from human resources one has to spend less than RS 1000 for FNAC. Butwith routine stains cost is less than Rs 20. FNAC can quickly diagnose malignancy around 90% of cases. In developing countries FNAC is a very useful tool for tissue diagnosis.

Cytopathology should not be treated as a highly sophisticated diagnostic procedure but a cheap and efficient measure that can be used routinely by trained persons. Hope this change of approach should come soon from our community to bloom the fullest potentiality of this unique diagnostic tool.

References Références Referencias

1. Greig EDM, Grey ACH,notes on the lymphatic glands in sleeping sickness. Lancet 1904; 1: 570.
2. Engzell U, Espoti PL, Rubio C, Sigurdson A, Zajicek J, Investigation of tumour spread in conection with aspiration biopsy.Acta Cytol 1971; 10: 385- 98.
3. Cardoza PL, 1954; quated by Tao et al; 1980, Loc Cit.
4. Franzen S, Giertz gajcek J,cytological diagnosis of prostatic tumor by transrectal aspiration biopsy. Brit J Urol 1960; 32:193.
5. Amrikachi M, Ramji I, Rubenfled S, Wheeler TM, Accuracy of fine needle aspirarion of thyroid :a review of 6226 cases and correlation with surgical and clinical outcome. Arch pathol Lab Med 2001; 125, 484- 88.
6. Verma K, Ram TR, Kapila K, value of fine needle cytology in the diagnosis of testicular neoplasm. Acta Cytol 1989, 33: 630- 34.
7. Tabaqchali MA, Hanson JM, Jhonson SJ, Wadehra V, Lennard TWJ, Proud G, Thyroid aspiration cytology in Newcastle: a 6 yers cytology/ histology correlation study. Ann R Coll Surg Engl 2000; 82, 149-55.
8. Alastice OI, Lalwal OO, Olasode OO, Adesunkami ARK. Breast fine needle aspiration cytology in a Nigerian tertiary hospital. East and Central African Journal of surgery 2006;
9. Eltahir A, Jibril AJ, Squair J et al. the accuracy of one stop diagnosis for 1110 patients presenting to a symptomatic breast clinic. J R Coll. Surg Edinb. 1999 (august);44: 226- 30.
10. Jain M, Majumder DD, Agarwal KK, Bais AS, Choudhury M, FNAC a diagnostic tool in paeditric head and neck lesion. Indian paeditrics 1999; 36: 921- 23.
11. Hall TL, Layfield LJ, Phillipe A, Rosenthal DL. Sources of diagnostic error in fine needle aspiration biopsy. AM J Surg 1885; 149: 540- 45.
12. Smit TJ, Safali H, Foster EA, Reinhold RB. Accuracy and cost- effectiveness of fine needle aspiration biopsy. Am J Surg 1985: 149; 540- 45.

13. Domanski H–. Fine needle aspiration cytology of soft tissue lesion. Diagnostic challenges. Diagn Cytopathol 2007: 35; 768- 73.
14. Rekhi B, Gorag BD, Kakadc AC, Chinoy RF. Scope of FNAC in the diagnosis of soft tissue tumors – A study from tertiary cancer referral center in India, Cytojournal 2007; 4:20.
15. Gatphoh ED, Gaytri S, Babina S, Singh AM. Fine needle aspiration cytology of liver. a study of 202 cases. Indian Journa of Medical Sciences 2003; 57 (1)22-5.
16. Park IA, Kim CW, FNAC of malignant lymphoma in an area with high incidence of T- cell lymphoma. Correlation of cytologic diagnosis with histologic subtype and immunophenotype. Acta cytol1999 (Nov- Dec) ; 43(6) : 1059- 69.
17. Frost AR, Aksu A, Kurstin R, Sidway MK, can non-proliferative breast disease and proliferative breast disease without atypia be distinguished by fine needle cytology? Cancer (cancer cytopathol) 1997; 81: 22-28.
18. Boccatoo P, Altavilla G, Blandamura S, fine needle aspiration biopsy of salivary gland lesion- a reappraisal of the pitfalls and problems. Acta Cytol 1998; 42: 888-98.
19. Orell SR, Nettle WJS, fine needle aspiration biopsy of salivary gland tumors- problems and pitfalls. Pathology 1988; 20: 332-37.