

Co-Relation between FNAC Findings and Histopathological Diagnoses of Neck Masses-A Study of Sixty Cases

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Abstract

Sixty cases of neck masses were studied in this series out of which 27 were male and 33 were female. Age range was 10 to 75 years, with a maximum frequency in the 4th decade. All these cases were undergone FNAC examination followed by histopathological examination after definitive operation or excision biopsy and the findings were co-related with each other. Histopathologically 20 cases were diagnosed as nodular goitre, 10 cases were diagnosed as pleomorphic adenoma of salivary gland, 5 cases were diagnosed as tubercular cervical lymphadenopathy, 5 cases as metastatic neck masses & 4 cases as thyroid malignancy. Rest were benign, congenital, developmental & nonspecific inflammatory conditions. Correct diagnoses were made by FNAC in 51 cases. Among which 17 cases were nodular goitre, 10 were pleomorphic adenoma of salivary gland, 4 were tubercular lymphadenitis, 5 were diagnosed as metastatic carcinoma and 4 as thyroid malignancy. In the rest 9 cases, 2 smears were unsatisfactory and gives inconclusive results, only in 7 thyroid cases follicular cells, colloid was seen & no definitive FNAC diagnoses were made. Sensitivity of FNAC in the diagnoses of neck masses was found 80% for tuberculosis, 100% for metastatic carcinoma & also same for nodular goitre, salivary tumour and some benign & congenital lesion e.g. lipoma, thyroglossal cyst. But it is only 60% sensitive in case of thyroid malignancy, as FNAC can not demarcate clearly between follicular adenoma and follicular cell carcinoma, but its accuracy in diagnosing papillary cell carcinoma of thyroid is almost 100%.

Hence, keeping the limitations in mind, FNAC can reduce substantially the need of open biopsy for histopathological examination. So we can say, "diagnosis by aspiration is as reliable as the combined intelligence of the clinician & pathologist makes it"¹ & it will be a safe, reliable, less time consuming, almost noninvasive and cost effective alternative of conventional open biopsy.

Introduction

A great number of diseases manifest as a palpable and or visible swelling (mass) in neck these may be due to

- (1) Congenital & Developmental error of the structures in this region.
- (2) Inflammatory lesion in the structures in this region.

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- (3) Reactionary changes in the lymph node due to obvious infection and inflammation in the structures of the draining area of that lymph node.
- (4) Neoplastic diseases of the structures of this region which may be benign or primary malignant or may be due to the extension or metastasis of the malignant lesions affecting the lymph node or other structures in this region (Secondaries).

Aetiology differs from country to country, with age and sex and other factors within the same geographic area. "The medical profession all must be reminded emphatically of the frequency with which cervical metastasis may appear as the first and only symptom in cancer of the mouth, pharynx and larynx, less often elsewhere in the body. There can be no possibility of cure until the primary lesion is found & treated properly. The immediate removal of lymph node for diagnosis will never goes in favour of the best interest of the patient"².

Conventionally neck masses were diagnosed with the aid of a toll of diagnostic procedures including Hematological, Serological, Ultrasonography and other Imaging aid & confirmed by open Excisional biopsy & Histopathological examination.

But now the Head Neck Surgeons have advocated a careful search for primary malignancy, if any, before the presenting neck mass is biopsied. The reasons for avoiding ill advised early biopsy have been well described & include seedling of tumour cells into avascular planes making them resistant to curative radiotherapy or chemotherapy, and the placing of biopsy incision in an area which may subsequently inappropriate for radical neck dissection flaps. It is generally accepted that when metastatic squamous cell carcinoma in the neck recurs after an original ill advised neck node biopsy, it invariably does so at the site of that biopsy, regardless whether the patient is treated by radical radiotherapy, radical surgery or combination of both³.

Moreover the open biopsy is an invasive procedure requiring surgical skill & facilities, it is time consuming, costly & sometime hospitalization and general anaesthesia may be needed. Hazard of temptation for open biopsy is going on despite the efforts of several generation of head and neck surgeon. In an attempt to provide an alternative to premature biopsy of masses in the head and neck region. FINE NEEDLE ASPIATION CYTOLOGY' (FNAC) is an effective alternative.

FNAC is of the greatest assistance with metastatic lesions, for preoperative diagnosis & planning of treatment⁴. This method came into prominence with the work of Martin and Ellis². Some other workers reported a high percentage of success 90 to 98 percent accuracy^{3,5,6,7}. FNAC has been found to be a highly cost-effective, almost painless, safe and rapid diagnostic technique. In experienced hands, it is accurate, sensitive and specific⁸. The technique is an ideal office

procedure in a medical institution or practice in which the volume of oncology cases is high and patient turnover is rapid⁹.

In our country FNAC is gradually becoming a more popular as a preoperative, accurate cost-effective diagnostic tool. With this background we tried to correlate and establish the accuracy of preoperative FNAC Findings with histopathological report of neck masses, in three pioneer Otolaryngology and Head-Neck Surgery department of our country.

Materials and Methods

This study includes the patients with neck masses attending to Otolaryngology & Head-Neck Surgery department of Sir Salimullah Medical College & Mitford Hospital, Bangabandhu Sheikh Mujib Medical University Hospital & Dhaka Medical College Hospital, Dhaka; from January-2002 to July 2002. Information about the particulars of the patient, history of present and past illness clinical examination including thorough ENT & relevant systemic examination, preoperative thorough investigation including FNAC in all cases and also post operative histopathological examination of the masses all were recorded in a standardized protocol prefixed for the present study. Then these were compiled & tabulated in order to obtain statistical & comprehensive results of the study.

Results

Sixty patient, twenty seven male and thirty three female of various age groups ranging from 10 to 75 years with palpable neck masses were studied by fine needle aspiration cytology (FNAC), Which was confirmed by histopathology & then co-related with each other.

Table-I: Age distribution of the patients:

Age group	No of Cases	Percentage
0-20	14	23.3
21-30	15	25.0
31-40	19	31.7
41-50	4	6.7
51-60	6	10.0
>70	2	3.3
Total	60	100

Table I: Shows the maximum incidence 31.7% in the 4th decade with the 3rd and 2nd decades in following suits.

Table-II Sex distribution of the patients:

Sex	Number of Patients (n=60)	Percentage (%)
Male	27	45.0
Female	33	55.0
Total	60	100.0

Table-II: This table shows male female distribution of the patients. The male female ratio is 1:1.22.

Table-III FNAC diagnosis of the neck masses:

Clinical Diagnosis	FNAC Diagnosis	Total No. of cases (n=60)	Percentage (%)
Cervical Lymphadenopathy (11)	Tubercular lymphadenitis	4	6.67
	Metastatic carcinoma	5*	8.33
	Non-specific lymphadenitis	1	1.67
	Unsatisfactory Smears	1	1.67
Thyroid and related Neck Mass (29)	Nodular goitre	17	28.4
	Papillary Ca of thyroid gland	3	5.00
	Follicular cells with Blood cells & colloid	7	11.67
	Thyroglossal cyst	2	3.35
Salivary Gland Swelling (13)	Pleomorphic adenoma of salivary gland, (Parotid-8, Submandibular-2)	10	16.7
	Non-specific submandibular sialoadenitis	3	5.0
Other Congenital and Developmental Neck Mass (3)	Branchial Cyst	1	1.67
	Submental dermoid	1	1.67
	Unsatisfactory Smears	1	1.67
Miscellaneous: Neurogenous tumours, Lipoma (4)	Lipoma	3	5.00
	Suggestive of Neurogenous tumour	1	1.67
	Total	60	100

FNAC Suggested positive diagnoses in 51 cases but could not find any conclusive diagnoses in other 9 cases.

* One cases was diagnosed as metastatic papillary carcinoma of thyroid which was previously diagnosed as tubercular lymphadenitis clinically.

Table-IV: Histopathological diagnosis of the neck masses:

Clinical Diagnosis	Histopathological Diagnosis	Total No. of cases (n=60)	Percentage (%)
Cervical Lymphadenopathy (11)	Tubercular lymphadenitis	5	8.35
	Metastatic carcinoma	5	8.35
	Non-specific lymphadenitis	1	1.67
Thyroid and related Neck Mass (29)	Nodular goitre	20	33.40
	Papillary Ca of thyroid gland	3	5.00
	Follicular Ca of thyroid	1	1.67
	Follicular adenoma	3	3.35
	Thyroglossal cyst	2	3.35
Salivary Gland Swelling (13)	Pleomorphic adenoma of salivary gland, (Parotid-8, Submandibular-2)	10	16.7
	Non-specific submandibular sialoadenitis	3	5.00
Other Congenital and Developmental Neck Mass (3)	Branchial Cyst	1	1.67
	Submental dermoid	2	3.35
Miscellaneous: Neurogenous tumours, Lipoma (4)	Lipoma	3	5.00
	Neurofibroma	1	1.67
	Total	60	100

Histopathological study shows that 33.40% cases belong to nodular goitre, pleomorphic adenoma of salivary gland appeared in 16.7% cases, tubercular lymphadenitis in 8.33% and metastatic carcinoma in 8.33%.

Table-V: Correlation between FNAC and histopathological diagnoses of cervical lymphnode masses:

Clinical diagnosis	No of cases	FNAC diagnosis	No of cases	Histopathological diagnosis	No of cases
Tuberculosis	7	Tubercular lymphadenitis	4	Tubercular lymphadenitis	4
		Metastatic Papillary Carcinoma of thyroid	1	Metastatic Papillary Carcinoma of thyroid	1
		Non specific lymphadenitis	1	Non specific lymphadenitis	1
		Unsatisfactory smears	1	Tubercular lymphadenitis	1
Metastatic carcinoma	4	Metastatic carcinoma	4	Metastatic carcinoma with known primary site	3
				Metastatic carcinoma occult primary	1

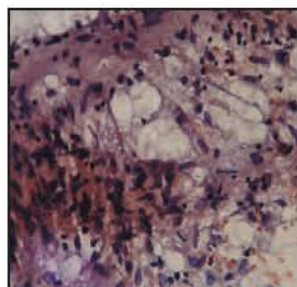
So that it is obvious the FNAC is highly specific & also sensitive for the granulomatous disease (TB of the neck). Which can be calculated by the following formula. (Cuslinary).

		Diagnosis	
		Disease Present	Disease Absent
Test	Positive	True Positive (a)	False Positive (c)
	Negative	False Negative (b)	True Negative (d)

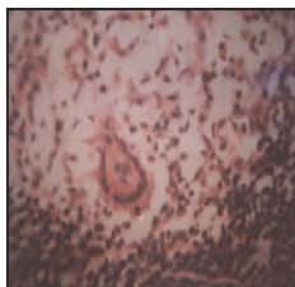
* Sensitivity $a/(a+b) \times 100\%$

* Specificity $d/(d+c) \times 100\%$

So from this formula it is found that FNAC for tubercular masses $4/(4+1) \times 100\% = 80\%$ sensitive & $3/(3+0) \times 100\% = 100\%$ specific.



FNAC from the mass of a boy showing Epithelioid cell with horse shoe shaped giant cell



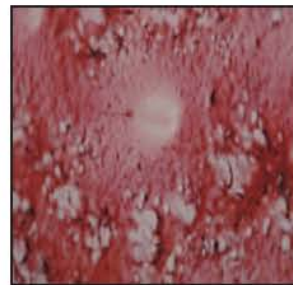
Histopathological slide from neckmass of the same boy, showing horse shoe shaped giant cell

Table-VI: Correlation between FNAC and histopathological diagnosis of thyroid & related disease:

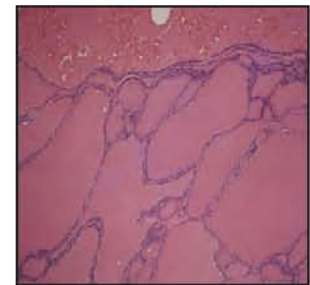
Clinical diagnosis	No of cases	FNAC diagnosis	No of cases	Histopathological diagnosis	No of cases
Goitre	27	Nodular goitre	17	Nodular goitre	17
		Papillary Carcinoma of Thyroid	3	Papillary Carcinoma of Thyroid	3
		Follicular cells with Blood cells and Colloid	7	Follicular Carcinoma of Thyroid	1
				Follicular Adenoma of Thyroid	3
Nodular goitre	3				
Thyroglossal cyst	2	Thyroglossal cyst	2	Thyroglossal cyst	2

In case of thyroid diseases FNAC is $17/(17+3) \times 100\% = 85.0\%$ sensitive & $5/(5+0) \times 100\% = 100\%$ specific for nodular goitre.

$3/(3+2) \times 100\% = 60\%$ sensitive for as a whole thyroid malignancy but $3/(3+0) \times 100\% = 100\%$ sensitive & specific for papillary carcinoma of thyroid and in fact it can not clearly demarcate between follicular adenoma and follicular carcinoma (in 7 cases in this series) so in this group its sensitivity and specificity is low



FNAC from the thyroid swelling shows features of nodular goitre



Histopathological slide from thyroid swelling of same patient shows features of nodular goitre

Table-VII Correlation between FNAC and histopathological diagnosis of salivary gland disease :

Clinical diagnosis	No of cases	FNAC diagnosis	No of cases	Histopathological diagnosis	No of cases
Salivary gland tumor, Parotid-8 Submandibular-2	10	Pleomorphic adenoma	10	Pleomorphic adenoma	10
Chronic submandibular sialoadenitis	3	Chronic submandibular sialoadenitis	3	Chronic submandibular sialoadenitis	3

In case of salivary gland disease it is 100% sensitive and specific for pleomorphic adenoma of salivary gland and also 100% sensitive and specific for chronic sialoadenitis. In this series one clinically unsuspected pleomorphic adenoma was also detected by FNAC which was confirmed by histopathology.

Discussion

Patient with palpable & or visible neck mass is a quite common presentation to an Otolaryngologist. So one should be rational & methodical for the diagnosis and management of such a patient. In the present study we wish to establish the crucial role of FNAC in the management of such patients by establishing its diagnostic accuracy and sensitivity & specificity in comparison with histopathological one, which is an accurate but costly, time consuming and also an invasive procedure.

In the present study, we analysed FNAC report of 60 Cases. Here satisfactory smears were found in 58 (96.66%) cases. In 2 (3.33%) cases smears were unsatisfactory as they showed inadequate material, definitive diagnosis of all cases were made by histopathology. Of them 1 was tubercular lymphadenopathy, and another one was submental dermoid. Literature review also revealed that unsatisfactory smears in some of the other studies, the rate of which in this study is in close proximity to that of other workers. It was 6.7% in Das gupta¹⁰, Much higher (22%)¹¹ un-satisfactory smears was shown in a study of Bangladesh done in 1990 may be on that time FNAC was a newer technique in the country.

In this study, of the total 60 cases 27 (45%) were male & 33 (55%) were female. The male to female ratio was 1:1.22. The male to female ratio is consistent with the study of others¹⁰.

In the present study, age of the patient ranged from 10 to 75 yrs. The highest number of neck mass cases we found in 4th decade. This was followed by 3rd and 2nd decade.

In the present series 48.33% of neck masses were of thyroid in origin, which is consistent with David wright and Guy Kenyon¹². But cases of neck mass of thyroid origin is much higher than a study of Bangladesh done in 1990, which showed only 7.5%¹¹ of patients in this group. This may reflect the fact that the patient having thyroid swelling are attending in otolaryngology clinics in a greater number. Of the 48.33% thyroid swellings, 31.67% were nodular goitre, 8.33% were malignant thyroid swelling. Here, FNAC shows high sensitivity (85.0%) & specificity (100%) for Nodular Goiter. But in case of thyroid malignancy its sensitivity is very low (60%) as it can't demarcate clearly between follicular carcinoma & follicular adenoma. Although it is highly sensitive (100%) for papillary carcinoma of thyroid.

In case of salivary lesion, which forms the second highest bulk (21.7%) in this series, it is found that FNAC is very useful tool for diagnosis as it is nearly 100% sensitive & specific for such lesion. Which is almost same as MS Islams series where it is 95.56%¹³.

Cervical lymph node masses (18.33%) scored the third position of which tuberculous lymphadenitis was about 8.33%. Its incidence varies in series to series, country to country and also in socio-economic groups, e.g. 34% in Mishra & Gray¹⁴, 10% in Kamrul's¹¹ series. The cause of low incidence of tubercular mass in this series may be due to the fact that we studied only the hospitalized patients. These cases under gone operative treatment under anaesthesia as these swelling were diagnosed as tubercular by both clinically and FNAC but did not respond to antitubercular drug for 4-6 weeks after the onset of treatment. Tubercular lymphadenopathy were detected and treated mainly in out patient department and lymph node biopsies for these cases also done mainly with local anaesthesia with out hospitalizing the patient. But in our study the sensitivity (80%) and specificity (100%) of FNAC for diagnosing tubercular lymphadenopathy is high and aligned with other study, e.g. 77%¹⁵, 79.5%¹⁰. In our series only one false negative result was reached for tubercular lymphadenopathy by FNAC which may be due to failure of representational aspiration, or inadequate aspiration or observer error.

Metastatic Carcinoma also forms about 8.33% and the sensitivity and specificity of FNAC for diagnosing such lesion is nearly 100% which was aligned with other like Pilloti-96.5%¹⁶.

Regarding some benign & congenital lesion e.g. lipoma, Branchial cyst, submental dermoid which form about 11.7% of neck masses in this series was also diagnosed by FNAC nearly with 100% accuracy.

The overall sensitivity and specificity of FNAC in relation to Histopathology is 80% & 100% respectively which are compatible with other studies e.g. Young et.al³ 91.5% & 97.10%, Frable and Frable⁴ 92.10% & 100% and Tarafiler¹¹ 76.92% & 78.57%. The overall accuracy of the FNAC was found is 85.0%, which is a beat lower than some other series, Like Frable and Frable⁴ and Young¹³.

The cause of this lower accuracy in our series is mainly due to the inclusion of large number of thyroid cases in which

follicular adenoma & follicular carcinoma cannot be demarcated accurately by FNAC. So the total accuracy of the study was dropped. Other factors responsible are: sampling error, haemorrhagic aspirates, inadequate specimen, aspiration from necrotic sites, observer errors. All these factors can be alleviated by developing expertise on the part of both operator and observer.

To obtain maximum benefit from the procedure, close cooperation between the surgeon and the pathologist is very important. The role of an experienced cytopathologist is critical for correct diagnosis¹⁸. Adequate amount of aspirate from the lesion is essential for accurate diagnosis. Operator must be skilled in performing aspiration; the pathologist must be experienced in cytologic interpretation of the material aspirated. Close clinicopathologic co-relation is absolutely necessary for useful clinical interpretation⁹.

No complication of the procedure was noted in present series and patient's discomfort was uniformly minimal and transient.

This study shows that FNAC is a highly sensitive & specific, quick, reliable, simple, less invasive, less-expensive method in relation to the gold standard but invasive and expensive histopathological examination for diagnoses of various neck masses. It can be repeated if necessary. This study also concluded that FNAC could be effectively used in the diagnosis and planning management of neck masses.

References

1. Lew WYC: Fine needle aspiration Cytology: A Personal Experience with 800 Cases, Singapore Med. J. 1987;28:214-219.
2. Martin H, Romieu C: The diagnostic significance of a "Lump in the neck". Postgrad Med, NY. 1952;491-500.
3. Young JEM, Archibald SD, Sier KJ: Needle aspiration cytologic biopsy in head and neck masses. Am J Surg. 1981;142:484-489.
4. Chan MK, Mcguire LJ, King W, Li AKC, Lee JCK, Cytodiagnosis of 112 salivary gland lesions correlation with histologic and frozen section diagnosis. Acta Cytol. 1992;36:353-63.
5. Frable WJ, Frable MA: Thin needle aspiration biopsy in the diagnosis of head and neck tumours. Laryngoscope. 1974;82:1069-77.
6. Raju G, Kakar PK, Role of fine needle aspiration biopsy in head and neck tumours. J Laryngol Otol. 1988;102:248-251.
7. Lau SK, Wei WI, Hsu C, Engzell UC. Combined use of fine needle aspiration cytologic examination and tuberculin skin test in the diagnosis of cervical tuberculous lymphadenitis. Arch-otolaryngol Head-Neck Surg. 1991;117: 87-90.
8. Orell SR, Sterrett GF, Walters MN, Whitaker D. In: Manual and Atlas of fine needle Aspiration Cytology. 2nd edition. Churchill livingstone. Edinburg. 1992;44-59.
9. Aretz HT, Silverman ML, Fine needle aspiration: why it deserves another look. Postgrad. Med. 1984;75:49-56.

10. Gupta A, Ghosh RN, Poddar AK, Mukherjee C, Mitra PK, Gupta G, et al: Fine needle aspiration cytology of cervical lymphadenopathy with special reference of tuberculosis. *J-Indian-medicine Association*. 1994;92:44-6.
11. Tarafder K.H, Role of FNAC in the diagnosis of neck mass, *Bangladesh Medical Association Journal*. 1998;22:51-55.
12. David wright and Guy Kenyon, *Cancer of the neck, Scott-Brown's Otolaryngology*, 5th edn, London, Butterworth, Heinemann. 1987;322.
13. MS Islam, M Kamal, AK Akond, FA Azim, AJEN Rahman, Role of fine needle aspiration cytology in the diagnosis of salivary gland lesion, *SSMC J*. 2004;12:54-58.
14. Misra SK. And Gary BK. Cervical lymphadenopathy in children, *Ped. J*. 1972;9.
15. Thomas JO, Adeyi D, Amanguno H. Fine needle aspiration cytology in the management of peripheral lymphadenopathy in a developing country. *Diagn-Cytopath*. 1999;21:159-62.
16. Pilloti S, Di Palma S, Alasio L, Bartoli C, Rilke F. Diagnostic assessment of enlarged superficial lymph node by fine needle aspiration. *Acta Cytol*. 1993;37:853-66.
17. John Hibbert. *Metastatic Neck disease*, Alan G Kerr, John Hibbert Eds, *Scott-Brown's Otolaryngology*, Oxford-Butterworth, Heinemann 6th edn. 5/17/2-7.
18. Sismanis A, Strong MS, Merriam J: Fine needle aspiration biopsy diagnosis of neck masses. *Otolaryng Clin N Am*. 1980;13:421-429.