



Role of FNAC In Diagnosis of Non-Thyroidal Head and Neck Lesions

Tippu Ishar, Ram Kumar Gupta, Arvind Khajuria

Abstract

Fine needle aspiration cytology (FNAC) is of particular relevance in head and neck lesions because of easy assessability, excellent patient compliance, minimally invasive nature of procedure and helping to avoid surgery in non-neoplastic lesions, inflammatory conditions and also some tumors. The study was conducted on 160 patients presenting with non-thyroidal head and neck swellings. Swellings arising from lymphnodes formed largest group 110 (68.75%) cases, salivary gland origin lesions comprised of 15 (9.3%) cases and miscellaneous lesions 35 (21.8%) patients. Aspiration was satisfactory in 153 (95.63%) and unsatisfactory in 7 (4.40%) patients. The cytodagnostic yield was 147 (91.87%) cases in the study. In 46 patients surgical intervention and histopathological examination (HPE) of the specimen was undertaken. The sensitivity of FNAC compared with HPE where available in diagnosing lymphnode lesions was 83.33%, salivary gland lesions was 100% and miscellaneous swellings was 95.83%. The overall sensitivity in the study in diagnosing non-thyroidal head and neck lesion was 93.47%. No major complication was recorded.

Key Words

Fine Needle Aspiration Cytology , Non-thyroidal, Head and Neck lesions, Lymphnodes, Salivary Glands

Introduction

Lesions of head and neck are comprised of developmental, inflammatory and neoplastic conditions. Most commonly seen swellings are branchial cysts, thyroglossal cysts, dermoid cysts, lymphangioma, haemangioma, lymphadenitis, sialadenitis and neoplastic pathologies (1). FNAC is of particular relevance in the head and neck area because of easy accessibility of the target site, excellent patient compliance, minimally invasive nature of the procedure and helping to avoid surgery in non-neoplastic lesions, inflammatory conditions and also some tumors (2). Martin introduced this technique in the evaluation of head and neck lesions in 1930 and the procedure has since then become increasingly popular and is being frequently used in the evaluation of swellings of this region (3, 4). The FNAC has a accuracy rate exceeding 92% (5, 6). Role of FNAC in the diagnosis of metastatic disease is well established and the procedure not only confirms the diagnosis but also gives clues regarding the nature of primary tumor (7). Tuberculous lymphadenitis being common in head and neck area can be diagnosed with a sensitivity ranging from 70 to 90% (5). Salivary gland FNAC has gained wide spread acceptance with reported sensitivity and specificity for

diagnosing neoplasm almost more than 90% (8). Moreover, FNAC has also been reported to be most accurate at diagnosing epithelial cysts (9). Although there are several series confirming the reliability of FNAC in diagnosing head and neck lesions including thyroid, very few studies have been done to evaluate the role of FNAC in diagnosis of non-thyroidal head and neck swellings in India.

Material & Method

The study was conducted on 160 patients presenting with non-thyroidal head and neck swellings over a period of 1 year 2 months. All patients were subjected to relevant history, history regarding the swelling, general physical examination, systemic examination, local examination of the swelling and routine and other relevant haematological investigations. Some special investigations like Ultrasound, CT scan and MRI scan were done where required. In all the cases FNAC was performed by the cytopathologist in the department. Aspiration was carried out using 20ml disposable syringe with 23-25 gauge needle attached to Franzen's aspiration handle. One or two wet smears were fixed in 95% ethyl alcohol and others were air dried and routinely stained with Papanicolaou (PAP)/Haematoxylin

From the Post Graduate Department of Pathology, ASCOMS, Sidhra-Jammu- J&K India

Correspondence to : Dr Tippu Ishar, East Railway Colony, Near Shankar Hotel, Ext. Trikuta Nagar. Jammu - 180 012

and Eosin (H&E) and May Grunwald Gimesa (MCG) stains respectively. Special stains like Ziehl Neelson (ZN) stain and Periodic Acid Schiff (PAS) stain were used wherever required. Findings of FNAC were recorded and patients were advised non-operative treatment and follow up or biopsy and surgical intervention depending upon the pathology. The surgical specimen was fixed in 10% neutral formalin and subjected to gross examination, processing, paraffin embedding, section cutting, staining by H&E and mounting by DPX. The cytomorphological features of various diseases were studied. FNAC and HPE of the same lesion were correlated where available. The sensitivity of FNAC in diagnosing lesions of different tissue origin and the overall sensitivity in the study were calculated.

Results

The age range of the patients varied between 1 month to 85 years with a male to female ratio of 1.5:1. The swellings arising from the lymphnodes formed the largest group 110 (68.75%) cases, salivary gland origin lesions comprised of 15 (9.38%) cases and miscellaneous group i.e. arising from blood vessels, skin, soft tissue, neural tissue, congenital etc. 35 (21.87%) patients. In 153 (95.63%) cases the quality of aspirate was satisfactory (Figure 1 to 4 microphotographs). In 7 (4.4%) cases the aspirate was unsatisfactory and in all of them no definitive diagnostic opinion could be given. Also in 6 (3.75%) cases inspite of satisfactory aspirate no definitive diagnosis was possible. So overall in the study in 147 (91.87%) patients on FNAC diagnostic opinion were given and in 13 (8.13%) no diagnosis could be made (Table I). The cytodagnostic yield was 147 (91.87%) in the study but when patients with indeterminant group were excluded, the disease specific cytodioagnostic yield was 144 (90%). In 46 patients, HPE was undertaken which included 12 cases of lymphnode biopsy, 10 lesions of salivary gland origin and 24 patients with miscellaneous swelling and in them comparasion between FNAC and HPE was made (Table II).

After FNAC and HPE the final diagnosis in the lymphnode swellings was reactive 50, tubercular 26, malignancy 22 and lymphadenitis 4 and no opinion in 8 patients with overall sensitivity of 83.33% in this group (Table III). In salivary gland swellings the final diagnosis was sialadenitis 4, benign tumor 7, malignant tumor 4 and no opinion 1. The FNAC diagnosis was concordant with HPE in all the 10 cases where comparasion was available thus giving a sensitivity of 100% (Table III). Among the miscellaneous swellings, in 23 out of 24 cases, the diagnosis on FNAC and HPE was concordant with a sensitivity of 95.83%. The overall sensitivity in the present

study where comparasion was available between FNAC and HPE of various lesions, was 93.47% (81.07 - 98.30)

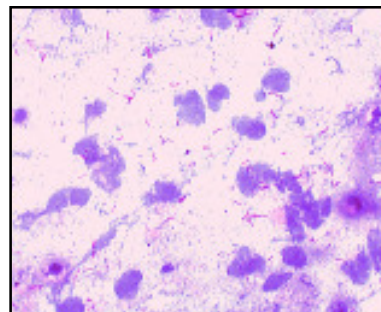


Fig 1. Tubercular Lymphadenitis Showing Acid Fast Bacilli (ZN X 1000)

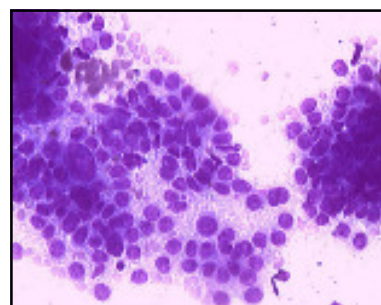


Fig. 2 Metastatic Deposits of Adenocarcinoma in Lymph Node (MGG X 400)

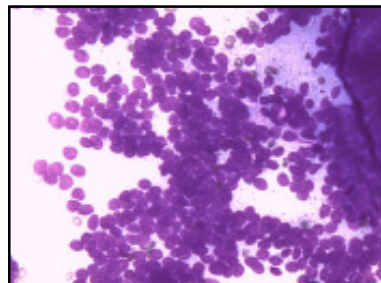


Fig. 3 Acinic Cell Carcinoma Smear Showing Abundant Cellularity with Monomorphic Population of Cells (MGG X 400)

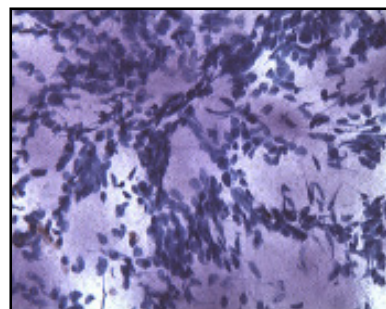


Fig. 4 Schwannoma Showing Spindle Cells with Intercellular Fibrillary Material (MGG X 400)



Table I : Cytologic Diagnosis by FNAC in the study

Organ of Origin	Diagnostic Group	Cytologic Diagnosis	No. of Cases	Percentage
Lymph Node (No. 110)	Inflammatory & Non-neoplastic	Reactive Lymphadenitis	50	31.25%
		Tubercular Lymphadenitis	27	16.87%
		Acute Lymphadenitis	3	1.87%
		Lymphoma	7	4.37%
		Metastatic Sq. cell Carcinoma	6	3.75%
	Malignant Tumor	Undifferentiated Carcinoma	5	3.12%
		Metastatic Adeno Carcinoma	1	0.62%
		Metastatic Malignant Melanoma	1	0.62%
		Leukaemic Infiltration	1	0.62%
		No Opinion	-	9
Salivary Gland (No. 15)	Inflammatory & Non-neoplastic	Sialadenitis	4	2.55%
		No Opinion	-	9
	Benign Tumor	Pleomorphic Adenoma	6	3.75%
		Warthin's Tumor	1	0.62%
		Mucoepidermoid Carcinoma	1	0.62%
	Malignant Tumor	Acinic Cell Tumor	1	0.62%
		Carcinoma Ex Pleomorphic Ade noma	1	0.62%
	No Opinion	-	1	0.62%
		Epidermal Inclusion Cyst	5	3.12%
		Thyroglossal Cyst	2	1.25%
Miscellaneous (No. 35)	Inflammatory & Non-neoplastic	Haematoma	2	1.25%
		Dermoid Cyst	1	0.62%
		Mucous Cyst	1	0.62%
	Benign Tumor	Indeterminant but Benign Pathology	3	1.87%
		Lipoma	6	3.75%
		Haemangioma	5	3.12%
		Cystic Hygroma	3	1.87%
		Schwannoma	2	1.25%
		Alveolar Rhabdomyosarcoma	1	0.62%
		Basal Cell Carcinoma	1	0.62%
No Opinion	-	3	1.87%	
	-	-	3	1.87%
Total	-	-	160	100.00%

(Table III). There was no major complication of FNAC in the study except an area of ecchymosis and some tenderness at the aspiration site in few cases.

Discussion

The differential diagnosis of a head and neck swelling covers a broad spectrum of disease with differing implications for management. The nature of lesion will determine whether patient can be managed non-operatively or has to be subjected to a major surgical procedure and in malignant lesions whether further chemotherapy or radiotherapy is required. The gold standard for diagnosing head and neck swellings is open biopsy (incisional/excisional) and HPE of the specimen with inherent risk of surgical and anaesthetic complications particularly local recurrence in malignant lesions (10). But aspiration cytology has the advantages of relatively less morbidity, quick to perform, no need for anaesthesia, less cost and almost without any contraindications (11). In the present study the aspirate was satisfactory in 95.63% cases and unsatisfactory in 4.40% cases. The

unsatisfactory aspirate was mostly from lymphnodes and swellings which were less than 1 cm in size or in those lesions where fibrous tissue was involved. Similar findings have been reported in the literature (12, 13, 14). The cytodiagnostic yield was 90% in our study and in 10% of aspirates no diagnosis could be made as either the material was unsatisfactory or non-representative of the lesion. Such a high diagnostic yield has also been found by other authors (2, 15, 16, 17). In our study 46 (28.7%) patients underwent surgical intervention and HPE. There were 4 cases with lymphadenitis leading to abscess formation, 2 were diagnosed as pyogenic and 2 as tubercular on FNAC. But after HPE of the granulation tissue in 1 case tuberculosis was ruled out i.e. false positive. Chaturvedi et. al. has also found diagnostic difficulties on aspirations of lymphnodes with superadded infection (18). There was 1 patient where lymphnode size was less than 1 cm and aspirate was non-representative for cytodiagnosis and HPE after biopsy revealed metastatic adenocarcinoma. The sensitivity of 83.33% (50.88-97.05) in diagnosing

Table II : Comparison of FNAC diagnosis with HPE diagnosis in the study

Organ of Origin	Diagnostic Group	Final Diagnosis	FNAC Diagnosis	Histopathologic Diagnosis
Lymph Node (No. 12)	Inflammatory & Non-neoplastic	Abscess (pyogenic)	2	3
		Abscess (tubercular)	2	1
	Malignant Tumor	Malignant Tumor Lymphoma	7	7
		Metastatic Adeno Carcinoma	-	1
Salivary Gland (No. 10)	Benign Tumor	Pleomorphic Adenoma	6	6
		Warthin's Tumor	1	1
		Mucoepidermoid Carcinoma	1	1
	Malignant Tumor	Acinic Cell Tumor	1	1
		Carcinoma Ex Pleomorphic Adenoma	1	1
		Inflammatory & Non-neoplastic	Epidermal Inclusion Cyst	5
Miscellaneous (No. 24)	Benign Tumor Lymph Node (No. 12)	Thyroglossal Cyst	2	2
		Dermoid Cyst	1	1
		Lipoma	6	6
		Haemangioma	3	3
		Cystic Hygroma	2	2
		Schwannoma	2	2
		Fibroma	-	1
		Alveolar Rhabdomyosarcoma	1	1
		Basal Cell Carcinoma	1	1
		Total	- -	44

Table III : Sensitivity of FNAC in diagnosis of Head and Neck Lesions in the study.

Organ of Origin	FNA C/HPE Number	Sensitivity
Lymphnode	10/12	83.33% (50.88 – 97.05)
Salivary gland	10/10	100%
Miscellaneous	23/24	95.83% (76.88-99.78)
Total	43/46	93.47% (81.07-98.30)

Table IV : Showing Sensitivity of various studies

Author	FNAC	HPE	Sensitivity/Accuracy
Schwarz <i>et al.</i> (14)	182	77	92%
Fulciniti <i>et al.</i> (13)	218	218	86.4%
Abrari <i>et al.</i> (2)	150	120	93%
Williams <i>et al.</i> (26)	625	238	92%
Curent Study	160	46	93.47%

lymphnode lesions on FNAC in present series is low as compared to other series (17, 19, 20, 21), which may be attributed to small number of 12 cases where HPE was done. In one case of swelling in the parotid region of less than 1.5 cm size no opinion could be given as the aspirate was unsatisfactory and patient was lost to follow-up. Otherwise in all the 10 cases of salivary gland swellings where FNAC and HPE comparasion was available, the findings were concordant giving a sensitivity of 100% comparable to other studies (22, 23). The high degree of sensitivity of aspiration in diagnosing salivary gland pathologies, documents the utility of FNAC as first line investigation in the evaluation of such swellings. There was one case of fibroma on HPE in our series which

was not picked up on FNAC as the aspirate inspite of being satisfactory was non-representative of the lesion i.e. false negative. In the present study in 23 out of 24 specimens; the FNAC diagnosis was corroborative with HPE, giving a sensitivity of 95.83% (76.88-99.78) in diagnosis of miscellaneous lesions as also reported by other authors (19, 24, 25). The present study was not limited to a single type of pathology and comprised of swellings of different kind of tissue origin present in the head and neck area excluding the thyroid. Therefore, the overall sensitivity of FNAC in diagnosing non-thyroidal head and neck lsions where both FNAC and HPE was done, was also calculated i.e. 93.47% (81.07 - 98.30) (Table III). Such a high degree of sensitivity has also

been reported by Schwarz et al. - 92% (14), Fulciniti et al. - 86.4% (12), Abrari et. al. - 93% (2), Williams et al. - 92% (26) (Table IV). From the present study and past series it is evident that FNAC has a high degree of sensitivity of more than 90% in diagnosing non-thyroidal head and neck lesions.

Conclusion

We recommend that FNAC to be a safe and reliable technique in diagnosis of non-thyroidal head and neck lesions. It is a quick, convenient and accurate method of tissue diagnosis and should be considered as first line investigation in the evaluation of lesions in head and neck region. The procedure is cost effective, free from complications and is well tolerated by the patient including the pediatric population. It has a high degree of diagnostic yield and sensitivity to diagnose lymphnode lesions thereby obviating the need for open biopsy, and in salivary gland swellings and benign tumours or cystic lesions in head and neck area to plan the surgery preoperatively.

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