Utility of cytology in head and neck pathology- A one year study

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Abstract

Introduction: Head and neck lesions most commonly arise in cervical lymphnodes followed by thyroid gland, soft tissues and salivary gland. Fine Needle Aspiration Cytology (FNAC) is a pre surgical procedure done on OPD (Out Patient Department) basis having advantages like; it is simple, minimally invasive, cost effective and repeatable diagnostic tool. Even though these lesions are common, clinicians routinely face problems in their diagnosis. Hence FNAC plays an important role in providing quick and accurate diagnosis guiding the clinician for appropriate treatment.

Aims and objectives: 1.To study the occurrence of various head and neck lesions in this region; 2.To study the cytological features of various head and neck lesions; 3.To correlate the cytological features with clinical data; 4.To emphasize the utility of FNAC in the diagnosis of head and neck lesions.

Materials and Methods: A retrospective study was conducted among 500 patients with palpable head and neck lesions including oral cavity attending GIMS Hospital Kalaburagi and the Department of Pathology Gulbarga Institute of Medical Sciences, Kalaburagi from January 2018 to December 2018. Relevant clinical details were recorded and written consent was obtained.

Results: A total of 500 FNAC cases of head and neck lesions were included in the present study in which 172(34.4%) were males and 328(65.6%) were females. Patients age ranged from 8 months to 80 years. Peak incidence was seen in between 21-40 years of age. Lymph node lesions 201(40.2%), were the most common lesions followed by thyroid lesions 138(27.6%).Soft tissues 123(24.6%) and lesions from major and minor salivary glands 25(5%) were the other head and neck lesions seen in this study. Reactive lymph node hyperplasia (n=105), colloid goiter (n=78), epidermoid cyst (n= 62) and pleomorphic adenoma (n=12) were the predominant diagnosis of lymphnodes, thyroid gland, soft tissues and salivary gland lesions respectively. Secondaries to the lymph nodes was seen in 13(6.46%) cases.

Conclusion: We conclude that FNAC is a reliable and first line investigative procedure in the diagnosis of head and neck lesions. It helps in screening and initial diagnosis of palpable and non-palpable lesions in the body. It differentiates inflammatory from neoplastic lesions and guides the clinician for appropriate treatment and avoids unnecessary surgeries for non-neoplastic lesions.

Keywords: FNAC, Head and neck, Lymphnode hyperplasia, Thyroiditis, Salivary gland tumors.

Introduction

The Head and Neck area is one of the most complex regions of the body because of its anatomical and functional diversity. Lesions of head and neck are commonly encountered by physicians and surgeons. These lesions seen in all age groups from pediatrics to geriatrics, range from common reactive lymphnode hyperplasia to malignancies. Fine needle aspiration cytology (FNAC), a minimally invasive technique, is particularly suitable in this sensitive area where an incisional biopsy can cause problems. In any case even if a definitive and type-specific diagnosis is not possible, FNAC can provide cytological categorization of the disease process with a list of differential diagnoses to guide further investigations and plan for treatment.

FNAC is a method to sample the superficial masses found in the head and neck region. It was first introduced by Martin in 1930.[1] Being an outpatient department procedure it causes minimal trauma to the patient. An early differentiation of benign from malignant condition is useful as it greatly influences the planned treatment.[2]

The utility of FNAC is not limited to neoplastic lesions but is also valuable in the diagnosis of inflammatory, infectious and degenerative conditions; in which samples can be used for microbiological and biochemical analysis in addition to cytological preparations.[3]

Among the most frequently sampled palpable head and neck lesions are lymph nodes (LN), thyroid, soft tissue swellings and major salivary glands along with other rarely encountered lesions like lesions of skin appendages and oral cavity. The majority of aspirates from the head and neck lesions will be to confirm an otherwise suspected diagnosis or to confirm clinical staging for a metastatic carcinoma.

FNAC is the preferred first line pathological investigation of a salivary gland and thyroid swelling because of the associated risk of recurrence and complications with tissue biopsies.[4] According to the British Society for Clinical Cytology (BSCC) Code of Practice, the combination of physical examination/clinical history, radiological assessment, careful needle sampling, appropriate cell preparation, subsequent interpretation and multidisciplinary clinical discussion are essential for a successful outcome.[5] Sample collection is a major factor influencing both the adequacy and the accuracy of FNAC.

Materials and Methods

The present study included 500 outdoor patients with head and neck swellings at tertiary care GIMS Hospital, Kalaburagi from January 2018 to December 2018. Detailed clinical history related to the swelling was taken from all the patients. The past and family history of tuberculosis and other relevant diseases were recorded. After obtaining written consent, FNAC was performed as an OPD procedure

under all aseptic precautions. 22-23 gauged needle with 10ml syringe was used for aspiration. The aspirated material was wet fixed or air dried followed by staining with Papanicolaou (PAP), Giemsa, and special stains like and ZN for Acid Fast Bacilli (AFB) whenever necessary.

Results

The study included 500 cases. The age ranged from 1 to 80 years with the peak incidence in 21-40years age group. Out of the 500 cases, 172(34.4%) were males and 328(65.6%) were females. Majority of the lesions were seen in the neck region rather than in the head region. Lesions from LN 201(40.2%) were most commonly sampled followed by thyroid 138(27.6%), 123(24.6%) from soft tissues, 25(5%) from salivary gland and oral cavity lesions constituted only 6(1.2%) cases. In this study the most common LN lesion was reactive hyperplasia. In thyroid gland, soft tissue and salivary glands the most common lesions were colloid goiter, epidermoid cyst and pleomorphic adenoma respectively.

Out of 201 cases of palpable LN lesions, 181 were non neoplastic, 17 were neoplastic and 3 lesions yielded acellular hemorrhagic material on repeated aspiration. Reactive lymphnode hyperplasia 105(52.2%), was the commonest non-neoplastic lesion followed by granulomatous lymphadenitis 61(30.3%), acute suppurative 9(4.47%) and necrotizing lymphadenitis 6(2.98%). 11 granulomatous inflammatory lesions in the LN showed AFB positivity by ZN stain. Out of 17 malignancies in the LN, 4 cases (1.9%) were primary Hodgkin's and non-Hodgkin's lymphoma and 13 cases (6.46%) were secondaries. The metastatic tumors to the lymph node included squamous cell carcinoma – SCC (9) (Fig 1), papillary carcinoma of thyroid (1), neuroendocrine carcinoma (1) (Fig. 2), undifferentiated carcinoma (1) and poorly differentiated carcinoma (1) (Fig. 3). [Table 1]

138 cases of thyroid lesions were sampled on FNAC of which 131 cases (94.8%) were female and 7cases (5.1%) were male patients. Colloid goiter was the predominant lesion which constituted 78 cases (36%). 29 cases (21%) were thyroiditis which includes Hashimoto's thyroiditis -15, Lymphocytic thyroiditis -12 and Granulomatous thyroiditis-2. 12 aspirates were colloid cysts and one aspirate was inadequate for interpretation. Remaining lesions 18 (13.04%) were neoplastic which included both benign and malignant. The neoplastic lesion included follicular neoplasm 13(9.42%), Hurthle cell neoplasm 1(0.72%). 3 cases (2.2%) of papillary carcinoma and 1 case undifferentiated carcinoma (0.72%). (Fig. 3)[Table 2]

Salivary gland lesions from both major and minor salivary glands accounted for 31(6.2%) cases. 13 lesions were neoplastic and 19 were non-neoplastic lesions. Neoplasms included 12(44%) pleomorphic adenomas and one mucoepidermoid carcinoma. 1 case of pleomorphic adenoma was seen in the minor salivary gland in the oral cavity and others were from major salivary glands of which parotid gland was the commonest site. Of the 19 non-neoplastic lesions, 10 cases (40%) were chronic sialadenitis, 5 were mucocele in minor salivary glands, 1 was abscess and 1was granulomatous sialadenitis. [Table.3]

126 of the 500 cases in this study were from the skin and soft tissue. 66 (53.65%) cases were benign cystic lesions which included epidermoid cyst - 62, thyroglossal cyst - 1, and others (3) were non-specific cystic lesions. 40(32.52%) cases were lipoma, 3(2.44%) were skin adnexal tumors and 1 case was metastatic malignant melanoma deposits in subcutaneous tissue. [Table 4]

Organ-wise distribution of lesions

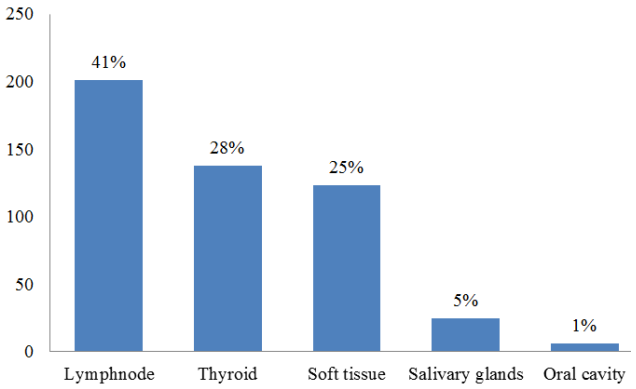

Table 1: Distribution of lesions in lymph nodes

Type of lesion		Total no of cases	Percentage
Non neoplastic			
Inflammatory	Reactive lymphoid hyperplasia	105	52.23%
	Non-specific/suppurative lymphadenitis	09	4.47%
	Necrotizing lymphadenitis	06	2.98%
	Granulomatous lymphadenitis	61 (AFB positive-11)	30.34%
Neoplastic (primary)	Hodgkin's lymphoma	01	0.50%
	Non-Hodgkin's lymphoma	03	1.49%
Metastasis (13)	SCC	09	4.47%
	Neuroendocrine carcinoma	01	0.50%
	Undifferentiated carcinoma	01	0.50%

	Papillary carcinoma thyroid	01	0.50%
	Poorly differentiated adenocarcinoma	01	0.50%
Inadequate	Acellular hemorrhagic	03	1.49%
Total		201	100%

Table 2: Distribution of thyroid lesions

Type of lesions	Total no of cases	Percentage
Benign nodular goiter	78	56.52%
Cystic lesion	12	8.69%
Thyroiditis	29	21.01%
Follicular neoplasm	13	9.42%
Hurthle cell neoplasm	01	0.72%
Papillary carcinoma	03	2.22%
Undifferentiated Ca	01	0.72%
Inadequate	01	0.72%
Total	138	100%

Table 3: Distribution of salivary gland lesions

Type of lesions		Total no of cases	Percentage
Non neoplastic (18)	Abscess	01	3.22%
	Granulomatous sialadenitis	01	3.22%
	Chronic non-specific sialadenitis	10	32.2%
	Benign cystic lesion	06	19.35%
Benign neoplasm	Pleomorphic adenoma	12	38.7%
Malignant neoplasm	Mucoepidermoid carcinoma	01	3.22%
Total		31	100%

Table 4: Distribution of soft tissue lesions

Type of lesions			Total no of cases	Percentage
Non neoplastic		Acute suppurative lesions	13	10.56%
		Benign cystic lesions	66	53.65%
Neoplastic	Benign	Benign soft tissue tumor	40	32.52%
		Benign skin adnexal tumors	03	2.44%
	Malignant	Metastatic malignant melanoma	01	0.81%
Total			123	100%

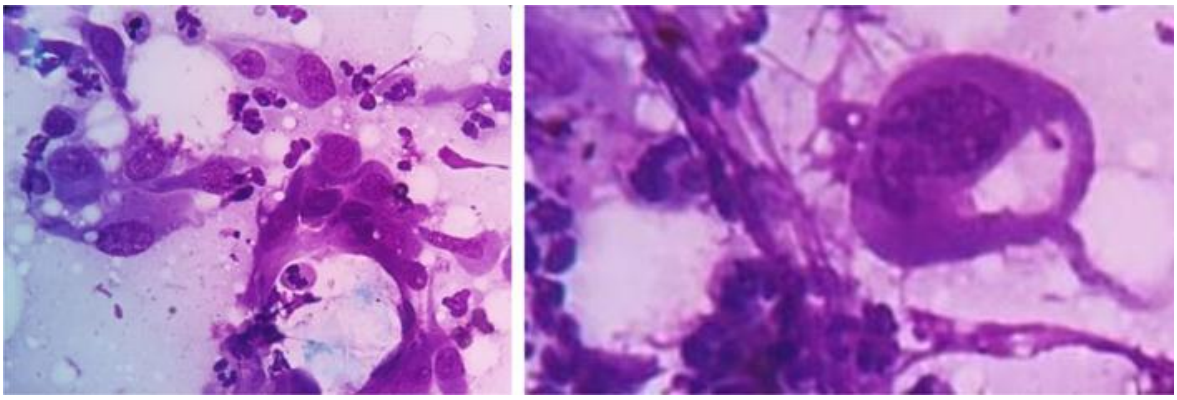

Fig. 1: Photomicrographs showing FNAC of lymphnode features of moderately differentiated squamous cell carcinoma cell and tadpole cell in acute inflammatory cell background (40x)

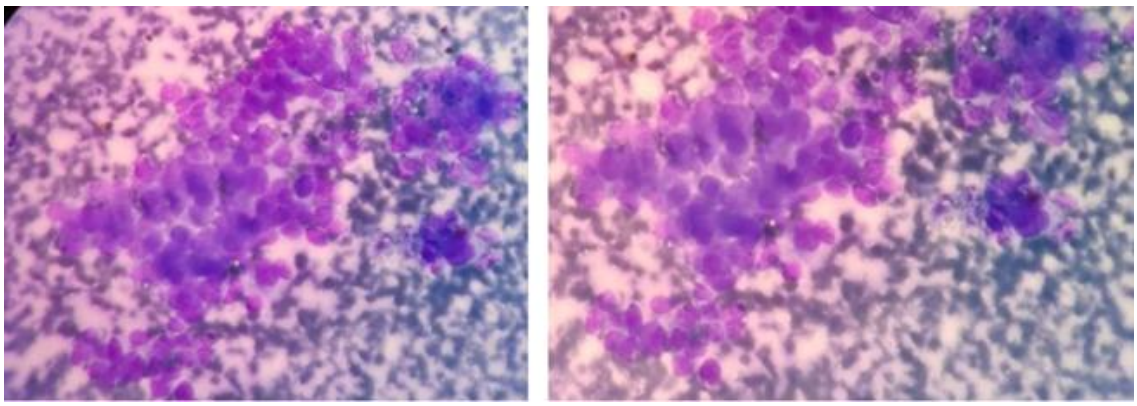

Fig. 2: Metastatic neuroendocrine carcinoma: 100X FNAC dhowing salt and pepper appearance nuclear chromatin

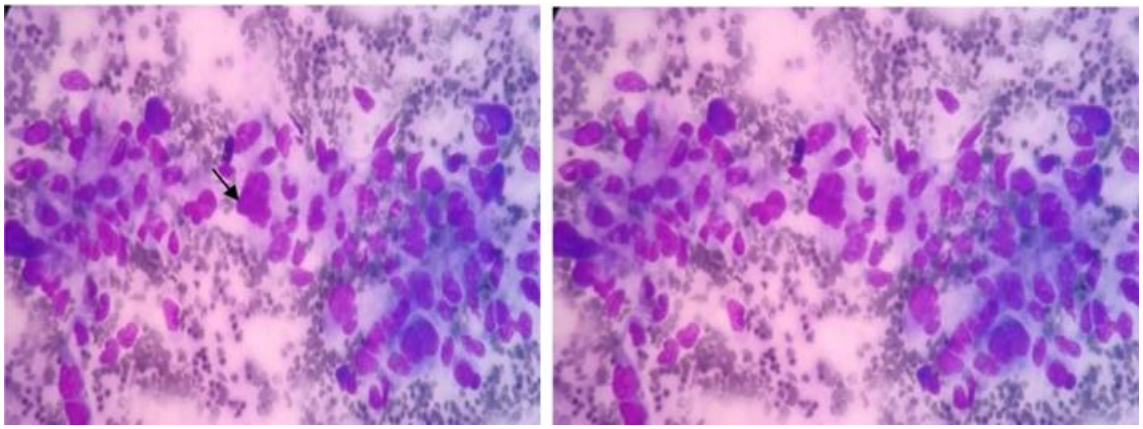

Fig. 3: Undifferentiated thyroid carcinoma: 40X FNAC smears showing cluster of pleomorphic malignant epithelial cell with multinucleate giant cell (Arrow)

Discussion

Head and neck lesions are the commonly sampled lesions by FNAC. FNAC is a valuable diagnostic test in the initial assessment of the patients presenting with a mass in the head and neck region. In this study the most common head and neck masses were in lymph nodes followed by thyroid, soft tissues, salivary gland and minor percentage of oral cavity lesions which was similar to other studies that have shown lymph nodes as the most frequent site for FNAC in head and neck region.[6,7]

Among 201 cases lymph node lesions, reactive lymph node hyperplasia was the most common cytopathological finding followed by granulomatous lymphadenitis, metastatic carcinomas, suppurative lymphadenitis and lymphomas. Other studies also observed reactive lymph node hyperplasia as the most common lesion similar to our study.[8-10] But in contrast to our study tuberculosis was shown as the important cause of superficial lymphadenopathy in the head and neck region.[11-15] Based on cytological appearances tubercular lymphadenitis has been categorized as: A). Classical type- epithelioid granulomas with caseous necrosis, B). Epithelioid granulomas without necrosis, C). Necrosis only without epithelioid granulomas and D). Polymorphs with necrosis with or without epithelioid granulomas.[9] In our study out of 61 cases of granulomatous lymphadenitis, 55 cases showed classical epithelioid granulomas with caseous necrosis, 6 cases were reported as chronic necrotizing lymphadenitis. Acid fast bacilli was demonstrated on Zeihl Neelsen stain in 11 cases. Combination of FNAC and demonstration of AFB on ZN stain has significant value in diagnosis of tubercular lymphadenitis.

Malignant neoplasms constitute to only 8.45% of total cases. 3 cases were Non-Hodgkin's and 1 case was Hodgkin's Lymphoma. Metastatic squamous cell carcinoma to the lymphnode is one of the commonest malignancies in the head and neck region. Squamous cell carcinoma in the head and neck region usually presents late with nodal metastasis frequently being the first clinical manifestation, which can be diagnosed at the earliest by FNAC. In our study 9 cases of metastatic squamous cell carcinoma to lymph node were reported between 60 to 80 years of age similar to findings observed in the study conducted by Gupta et al.[15] One case each of metastatic neuroendocrine carcinoma, undifferentiated carcinoma, poorly differentiated adenocarcinoma and papillary carcinoma to LN were reported.

Majority of thyroid swellings in our study was found in age group of 20-40 years while Prasad et al, showed maximum number of cases between 30- 50 years of age. In study by Prasad et al F:M ratio was 5:1 and in present study

F:M ratio was 18:1. It clearly reflects that thyroid pathology is more in females as compared to males.

Out of 138 thyroid lesions, colloid goiter (56.52%) was commonest and papillary carcinoma (2.2%) was the predominant malignant lesion, similar to study done by Rathod et al,[13] Rajbhandari et al.[8] and Singal et al[16]

A rare case of undifferentiated carcinoma of thyroid has been reported during our study period.

Pleomorphic adenoma is the commonest tumor of salivary gland. In present study 12 cases of Pleomorphic adenoma and 1 case of mucoepidermoid carcinoma was reported which is similar to study by Khetrapal S et al.[6,15]

This study also included six cases of FNAC done in oral cavity minor salivary glands which showed 1 case of pleomorphic adenoma and 5 cases of mucocele. Most of the non-neoplastic lesions of salivary glands like cysts, sialadenitis and benign lympho-epithelial lesions require conservative treatment or minor surgical procedures. So FNAC will reduce the need of surgery for such benign lesions.

In our study epidermal cyst was the most common lesion in the skin followed by Lipoma in the head and neck region. Similar findings were observed by Suryawanshi et al.[18]

Conclusion

FNAC is rapid, safe and accurate outpatient method for diagnosis of accessible lesions especially in the head and neck region with minimal complications. The present study proves that FNAC of lymph nodes is an excellent first line method for investigating the nature of the lesions. FNAC serves as both complementary and substitute for histopathological examination and open biopsy. Being safe and avoiding unnecessary surgeries for benign lesions one can plan mode of treatment. Hence we conclude that utility of FNAC is a standard method for initial diagnosis of various head and neck lesions.

Conflict of Interest: None

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How to cite this article:, Ingin RJ, Geetanjali, Siddaganga SM. Utility of cytology in head and neck pathology- A one year study. *J Diagn Pathol Oncol* 2019;4(2):143-147.