

Study of Cytodiagnosis of Head and Neck Neoplastic Lesions and Comparison with Histopathology

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INTRODUCTION

The development of aspiration cytology is one of the biggest advances in anatomic pathology. Cancer has become one of the ten leading causes of death in India. Head and neck neoplasia is a major form of cancer in India, accounting for 23% of all cancers in males and 6% in females. The advantages of FNAC are : it is safe, gives a rapid report, is sensitive and specific for the diagnosis of malignancy, requires little equipment, causes minimal discomfort to the patient, is an outpatient procedure, avoids the use of frozen section, reduces the rate of exploratory procedures, allows a definitive diagnosis of inoperable cases, is repeatable and cost effective. Fine needle aspiration cytology (FNAC) is of particular relevance in head and neck lesions because of easy assessability, excellent patient compliance, miminally invasive nature of procedure and helping to avoid surgery in non-neoplastic lesions, inflammatory conditions and also some tumors. To test the utility of FNAC, to establish the diagnostic accuracy of cytology by comparison with histopathology diagnosis and to establish the sensitivity and specificity of this technique in head and neck neoplastic lesion. The present study was undertaken in the Department of pathology, Government medical college and hospital, Nashik between January 2008 - June 2009. In the present study, maximum number of aspirates from head and neck neoplastic lesions were found to be of lymph nodes (56.37%). Of the total 378 cases, 71.69% were malignant. 6th decade was the most common age group affected (26.46%). Mean age group was found to be 45.84 years. Males were more commonly affected (65.34%). The male to female ratio was 1.8: 1. Out of 92 cases available for follow-up, 85.87% of the cases were same as histopathological diagnosis. Excisional biopsy remains the gold standard for diagnosis of head and neck neoplastic lesion, cytological study can establish the diagnosis of the majority of head and neck neoplastic lesions and can be recommended as an adjunct to histopathology.

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].

The idea to obtain cells and tissue fragments through a needle introduced into the abnormal tissue was by no means new. The development of aspiration cytology is one of the biggest advances in anatomic pathology in the forthcoming decade would be the development and application of aspiration cytology [7].

Cancer has become one of the ten leading causes of death in India [8]. Head and neck neoplasia is a major form of cancer in India, accounting for 23% of all cancers in males and 6% in females [9,10]. India has also the dubious distinction of having the world's highest reported incidence of Head and neck neoplasia in women [10].

Fine needle aspiration cytology is of particular relevance in the Head and neck area because of easy accessibility of target sites, excellent patient compliance, minimally invasive nature of the technique and the important aspect of avoidance of surgery in situations like non neoplastic or inflammatory conditions and metastatic tumours [2].

The advantages of FNAC are : it is safe, gives a rapid report, is sensitive and specific for the diagnosis of malignancy, requires little equipment, causes minimal discomfort to the patient, is an outpatient procedure, reduces bed occupancy, allows pre operative diagnosis, avoids the use of frozen section, reduces the rate of exploratory procedures, allows a definitive diagnosis of inoperable cases, is repeatable and cost effective [11].

Correlation of cytological diagnosis with histopathological findings in the surgical specimen aids in developing a level of comfort with the pathologist's cytological interpretation [12]. Stewart's opinion of the technique is still valid today as it was in 1933 when he stated "diagnosis by aspiration is as reliable as the combined intelligence of the clinicians and pathologists makes it" [13].

Aims and Objectives

1. To test the utility of FNAC in diagnosis of head and neck neoplastic lesions.
2. To establish the diagnostic accuracy of cytology by comparative study with histopathological diagnosis.
3. To establish the sensitivity and specificity of this technique in head and neck neoplastic lesion.

MATERIALS AND METHOD

The present study was undertaken in the Department of pathology, Shree Shankar Rao Chavan Government Medical College and Hospital, Nanded between January 2008 – June 2009. Few patients were also taken from leading histopathology laboratory in the city.

Approval from the institutional ethical committee and from ethical committee of Maharashtra University of health sciences (MUHS), Nashik was taken before commencing study.

The patients presented with superficially palpable head and neck lesion, patient admitted in hospital ward of this institute with clinical diagnosis of any head and neck neoplastic lesions and patients attending cytological OPD in a private laboratory with head and neck lesion were selected for this study.

FNAC was done in cytology section of central clinical laboratory or in respective ward in which the patient was admitted. The method of fine needle aspiration cytology used in the present study is same as described by Franzen and their colleagues. Aspiration was carried out using 20ml disposable syringe with 23–25 gauge needle attached to Franzen's aspiration handle. Two or three wet smears were prepared following the guidelines laid down in the manual and atlas of fine needle aspiration cytology, Svante R Orell, Gregory F Sterrett, Darrel Whitaker. 4th edition, 2005 [14]. Then fixed in 95% ethyl alcohol and others were air dried and routinely stained with Papanicolaou (PAP) / Haematoxylin and Eosin (H&E) stains.

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 received post-operative 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.

RESULTS

In the present study, total of 385 aspirates from 378 cases were studied for cytohistological correlation in the head and neck neoplastic lesions.

Table No 1: Site wise distribution of various Head & Neck neoplastic lesions.

Sr. No.	Lesions	No. of aspirates	%
1	Lymph node	217	56.37
2	Salivary gland	044	11.44
3	Thyroid	042	10.90
4	Soft tissue	057	14.80
5	Skin + Subcutaneous	017	04.42
6	Nasal / PNS	006	01.55
7	Odontogenic / bony	002	00.52
	Total	385	100.0

Maximum number of aspirates from head and neck neoplastic lesions were found to be of lymph nodes (56.37%).

Table No 2: Cytodiagnosis of cases with Head and Neck neoplastic lesions.

Sr. No.	Lesions	Total	Aspirates	%	
1	Lymph node	217	Benign	00	--
			Malignant	217	100.0
2	Salivary gland	44	Benign	36	81.81
			Malignant	08	18.18
3	Thyroid	42	Follicular neoplasm	31	73.81
			Malignant	11	26.19
4	Soft tissue	57	Benign	56	98.25
			Malignant	01	01.75
5	Skin + Subcutaneous	17	Benign	10	58.82
			Malignant	07	41.18
6	Nasal / PNS	06	Benign	03	50.00
			Malignant	03	50.00
7	Odontogenic / bony	02	Benign	02	100.0
			Malignant	00	--
	Total cases	378	Benign	107	28.31
			Malignant	271	71.69

Of the total 378 cases with neoplastic head and neck lesions 71.69% were malignant and 28.31% were benign.

Table No 3: Age wise distribution of head and neck neoplastic lesions.

Sr. No.	Age group	No. of cases	%
1	0-10	015	03.96
2	11-20	019	05.04
3	21-30	044	11.64
4	31-40	049	12.96
5	41-50	058	15.34
6	51-60	100	26.46
7	>60	093	24.60
	Total	378	100.0

6th decade was the most common age group affected (26.46%) followed by >60 years age group. Mean age group for head and neck neoplastic lesions was found to be 45.84 years.

Table No 4: Site wise sex Distribution of head and neck neoplastic lesions.

Sr. No.	Lesions	Male	Female	Total
1	Lymph node	169	48	217
2	Soft tissue	36	21	57
3	Salivary gland	24	20	44
4	Thyroid	08	34	42
5	Skin + Subcut	09	08	17
6	Nasal / PNS	03	03	06
7	Odontogenic / bony	02	00	02
	Overall	247	131	378
	%	65.34	34.66	100.0

Males were more commonly affected (65.34%). The male to female ratio was 1.8 : 1.

Table No 5: Cytohistopathological correlation of Head and Neck neoplastic lesions.

Sr. No.	Lesions	Total cytology	Total histology	Consistent	Inconsistent
1	Lymph node	217	48	44	04
2	S.G.	44	17	13	04
3	Thyroid	42	10	08	02
4	Soft tissue	57	09	08	01
5	Skin + S.C.	17	05	05	00
6	Nasal / P.N.S.	06	02	01	01
7	Odonto / Jaw	02	01	00	01
	Total	385	92	79	13
	%	100.0	23.90	85.87	14.13

92 cases were available for follow-up and histopathological confirmation. Out of these, 79 (85.87%) of the cases were same as histopathological diagnosis. Whereas in 13(14.13%) cases the cytologic diagnosis and final histopathological diagnosis were different.

DISCUSSION

The present study was carried out at Department of Pathology, Government medical college and hospital, from January 2008 to June 2009. Total of 385 aspirates from 378 cases of head and neck neoplastic lesions were studied to test the efficacy and overall utility of cytology in the head and neck neoplastic lesions.

Table No.1 shows the site wise distribution of various head and neck neoplastic lesions.

Maximum number of aspirates were from lymph nodes (56.37%) followed by soft tissue lesions (14.80%) whereas salivary gland lesions accounted for (11.44%) and thyroid lesions accounted for (10.90%) and miscellaneous lesions accounting for (06.49%) cases. Cheng and Dorman [15] aspirated 110 head and neck neoplastic lesions from which 46 (41.82%) were from lymphnode, 07 (06.36%) were from thyroid and 14 (12.73%) were from salivary gland. Mui et al [16] aspirated 35 head and neck neoplastic lesions from which 15 (42.86%) were from lymphnode, 04 (11.43%) were from thyroid and 11 (31.43%) were from salivary gland. El Hag et al [17] aspirated 49 head and neck neoplastic lesions from which 28 (57.14%) were from lymphnode and 09 (18.37%) were from salivary gland.

Table No. 2 shows that in present study total number of benign cases were found to be 107 (28.31%) whereas the malignant cases were 271 (71.69%) cases. Andleeb abrari et al [2] aspirated 115 neoplastic cases of head and neck lesions of which 55 (47.83%) were benign and 60 (57.12%) were malignant. El Hag et al [17] aspirated 49 neoplastic cases of head and neck lesions of which 20 (40.82%) were benign and 29 (59.18%) were malignant. Mui et al [16] aspirated 35 neoplastic cases of head and neck lesions of which 14 (40%) were benign and 21 (60%) were malignant.

Table No. 3 shows that in present study the 51 – 60 years age group (26.46%) is the most common affected by head and neck neoplastic lesions followed by the > 60 years age group and 41 – 51years age group. The mean age group was found to be 45.84 years. In study of El Hag et al [17] the mean age group was found to be 33.0 years, in study of Shykhon et al [18] the mean age group was found to be 52.0 years while in study of Jandu & Webster et al [19] the mean age group was found to be 51.0 years

Table No. 4 shows that in present study out of the total 378 cases, 247 (65.35%) were male and 131 (34.65%) were female. So, the male to female ratio was 1.8:1. In study of Cheng and Dorman [15] it was 1.5:1, in study of Jandu & Webster et al [19] it was 1.3:1 and in study of El Hag et al [17] it was 1.1:1. Male to female ratio is slightly higher in the present study compared to other studies.

Table No. 5 shows cytohistological correlation of various head and neck neoplastic lesions. In the present study, out of the total 385 aspirates 92 (23.90%) cases were available for follow-up and histopathology. Out of these 92 cases, in 79 (85.87%) cases cytological diagnosis was same as histopathological diagnosis. Whereas in 13 (14.13%) cases the cytologic diagnosis and final histopathological diagnosis were different.

SUMMARY AND CONCLUSION

This prospective study of cytodiagnosis of head and neck neoplastic lesions and mapping patterns of head and neck cancers was carried out at government medical college and hospital from January 2008 to June 2009.

A total number of 385 aspirates were obtained of head and neck neoplastic lesions. The majority of aspirates were from lymph nodes (56.37%) followed by soft tissue lesions (14.80%) whereas salivary gland lesions accounted for 11.44% and thyroid lesions accounted for 10.90% and miscellaneous lesions 06.49% cases.

71.69% cases of head and neck neoplastic lesions were reported as malignant on cytology.

The most common age group was 6th decade (26.46%) and mean age group of patients with head and neck neoplastic lesion was 45.84 years.

Male to female ratio for head and neck neoplastic lesion was 1.8: 1.

Out of the total 385 cases 92 cases (23.90%) were available for follow-up and histopathology. 1 false negative case was found but no false positive cases were found. The diagnostic accuracy of the present study of head and neck neoplastic lesion to be 98.91%. The sensitivity was found to be 98.46% and the specificity was 100%.

We recommend that FNAC to be a safe and reliable technique in diagnosis of 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.

This cytological study of head and neck neoplastic lesions showed that, FNAC is a simple, rapid, safe, atraumatic procedure, free of complications, cost effective, virtually painless and is well tolerated by the patient including the pediatric population and on an outpatient basis.

Thus to conclude, while excisional biopsy remains the gold standard for diagnosis of head and neck neoplastic lesion, cytological study can establish the diagnosis of the majority of head and neck neoplastic lesions and can be recommended as an adjunct to histopathology.

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