

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

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ABSTRACT

Introduction: The development of aspiration cytology is one of the biggest advances in anatomic pathology. Cancer has become one of the 10 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 fine needle aspiration cytology (FNAC) are: it is safe, sensitive and specific for the diagnosis of malignancy, gives a rapid report, requires little equipment, causes minimal discomfort to the patient, is an out patient procedure, repeatable and cost effective avoids the use of frozen section, reduces the rate of exploratory procedures and allows a definitive diagnosis of inoperable cases. FNAC is of particular relevance in head and neck lesions because of easy assessibility, excellent patient compliance, minimally invasive nature of procedure and helping to avoid surgery in non-neoplastic lesions, inflammatory conditions and also some tumors.

Aims and objectives: 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.

Materials and methods: The present study was undertaken in the Department of Pathology, Government Medical College and Hospital, Nashik, between January 2008 and June 2009.

Results: 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.

Summary and conclusion: 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.

Keywords: Fine niddle aspiration cytology, Head and neck neoplastic lesions, Histopathological confirmation.

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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, hemangioma, lymphadenitis, sialadenitis and neoplastic pathologies.¹ Fine needle aspiration cytology (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 10 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

FNAC 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 tumors.²

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

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 METHODS

The present study was undertaken in the Department of Pathology, Government Medical College and Hospital, Nashik, between January 2008 and 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 FNAC used in the present study is same as described by Franzen et al. Aspiration was carried out using 20 ml disposable syringe with 23 to 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 FNAC, [Svante R Orell, Gregory F Sterrett, Darrel Whitaker (4th ed), 2005].¹⁴ Then fixed in 95% ethyl alcohol and others were air dried and routinely stained with papanicolaou (PAP)/hematoxylin and eosin (H&E) stains.

Findings of FNAC were recorded and patients were advised nonoperative treatment and follow-up or biopsy and surgical intervention depending upon the pathology.

The received postoperative 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 histopathological examination (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.

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 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 (1992)¹⁵ aspirated 110 head and neck neoplastic lesions from which 46 (41.82%) were from lymph node, 7 (06.36%) were from thyroid and 14 (12.73%) were from salivary gland. Mui et al (1997)¹⁶ aspirated 35 head and neck neoplastic lesions from which 15 (42.86%) were from lymph node, 4 (11.43%) were from thyroid and 11 (31.43%) were from salivary gland. El Hag et al (2003)¹⁷ aspirated 49 head and neck neoplastic lesions from which 28 (57.14%) were from lymph node and 9 (18.37%) were from salivary gland.

Table 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 (2002)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 (2008)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 (2008)¹⁶ aspirated 35 neoplastic cases of head and neck lesions of which 14 (40%) were benign and 21 (60%) were malignant.

Table 3 shows that, in present study, the 51 to 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 to 51 years age group. The mean age group was found to be 45.84 years. In study of El Hag et al¹⁷ 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 and Webster et al¹⁹ the mean age group was found to be 51.0 years.

Table 4 shows that, in present study, out of the total 378 cases, 247 (65.35%) were males and 131 (34.65%) females. So, the male to female ratio was 1.8:1. In study of Cheng and

Table 1: Site-wise distribution of various head and 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 and 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%)

Dorman,¹⁵ it was 1.5:1, in study of Jandu and 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 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

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 6.49% cases.

A total of 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. One 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

Table 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 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 and 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 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 and 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 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	SG	44	17	13	04
3	Thyroid	42	10	08	02
4	Soft tissue	57	09	08	01
5	Skin and SC	17	05	05	00
6	Nasal/PNS	06	02	01	01
7	Odonto/jaw	02	01	00	01
	Total	385	92	79	13
	%	100.0	23.90	85.87	14.13

Around 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

procedure, free of complications, cost-effective, virtually painless and is well tolerated by the patient, including the pediatric population and on an outpatient basis.

CONCLUSION

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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REFERENCES

- McGuirt WF. Differential diagnosis of neck masses. In: Cummings CW, Flint PW, Harkar LA (Eds). Cummings Otolaryngology Head and Neck Surgery (4th ed). Mosby: Elsevier 2005:2542.
- Abrari A, Ahmad SS, Bakshi V. Cytology in the otorhinolaryngologists domain: A study of 150 cases, emphasizing diagnostic utility and pitfalls. *Ind J Otolaryngol Head Neck Surg* 2002;54(2):107-10.
- Martin H, Ellis EB. Biopsy of needle puncture and aspiration. *Ann Surg* 1930;92:169-81.
- Platt JC, Davidson D, Nelson CL, Weiseberger E. Fine needle aspiration biopsy. An analysis of 89 head and neck cases. *J Oral Maxillofac Surg* 1990;48:702-06.
- Johnson JT, Zimmer L. Fine needle aspiration of neck masses. Available from: <http://emedicine.medscape.com/article/1819862-overview>.
- Watkinson JC, Gaze MN, Wilson JA. *Stell and Maran's Head and Neck Surgery* (4th ed). Oxford: Butterworth Heinemann 2000: p21.
- Gray W, McKee GT. *Diagnostic cytopathology* (2nd ed). London: Churchill Livingstone; 2003:6.
- Rao YN, Gupta S, Agarwal SP. National Cancer Control Programme: Current status and strategies. In: Agarwal SP (Ed). Fifty years of cancer control in India. Dir Gen of Health Services, MOHFW, Government of India 2002;41-47.
- Ahluwalia H, Gupta SC, Singh M, Gupta SC, Mishra V, Singh PA, et al. Spectrum of head and neck cancers at Allahabad. *J Otolaryngol Head Neck Surg* 2001;53:16-20.
- Mehrotra R, Singh M, Gupta RK, Singh M, Kapoor AK. Trends of prevalence and pathological spectrum of head and neck cancers in North India. *Indian J Cancer* 2005;42:89-93.
- Geddie WR. Fine needle aspiration cytology: Diagnostic principles and dilemmas. *J Clin Pathol* 2007;60(3):335-36.
- Amedee RG, Dhurandhar NR. Fine needle aspiration biopsy. *Laryngoscope* 2001;111(9):1551-57.
- Silverberg SG, DeLellis RA, Frable WJ, LiVolsi VA, Wick MR (Eds). *Silverberg's principles and practice of surgical pathology and cytopathology* (4th ed). NY: Churchill Livingstone-Elsevier; 2006;22.
- Firat P, Ersoz C, Uguz A, Onder S. Cystic lesions of the head and neck: Cytohistological correlation in 63 cases. *Cytopathology* 2007;18(3):184-90.
- Cheng AT, Dorman B. Fine needle aspiration cytology: The Auckland experience. *Aust N Z J Surg* 1992 May;62(5):368-72.
- Mui S, Li T, Rasgon BM, Hilsinger RL, Rumore G, Puligandla B, et al. Efficacy and cost-effectiveness of multihole fine-needle aspiration of head and neck masses. *Laryngoscope* 1997 Jun; 107(6):759-64.
- El Hag IA, Chiedozi LC, al Reyees FA, Kollur SM. Fine needle aspiration cytology of head and neck masses. Seven years' experience in a secondary care hospital. *Acta Cytol* 2003;47(3): 387-92.
- Shykhon M, Macnamara M, El-assy A, Warfield AT. Role of repeat fine needle aspiration cytology in head and neck lesions: Preliminary study. *J Laryngol Otol* 2004;118(4):294-98.
- Jandu M, Webster K. The role of operator experience in fine needle aspiration cytology of head and neck masses. *Int J Oral Maxillofac Surg* 1999;28:441-44.

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