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 outpatient 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 accessibility, excellent patient compliance, minimally invasive nature of procedure and helping to avoid surgery in non-neoplastic lesions, inflammatory conditions and some tumors. FNAC is as reliable as the combined intelligence of the pathologist's cytological findings in the surgical specimen aids in developing a definitive diagnosis of malignancy, an outpatient procedure, avoids the use of frozen section, reduces the rate of exploratory procedures and allows a definitive diagnosis of inoperable cases.

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 needle aspiration cytology, Head and neck neoplastic lesions, Histopathological confirmation.


Source of support: Nil

Conflict of interest: None declared

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. 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. 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. 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. 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. India has also the dubious distinction of having the world’s highest reported incidence of head and neck neoplasia in women.

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. The advantages of FNAC are: It is safe, sensitive and specific for the diagnosis of malignancy, an outpatient procedure, repeatable and cost-effective, 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. 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’.
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 gauze 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]. 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) 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) 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) 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) 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) 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) 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 52.0 years while the mean age group was found to be 45.84 years. In study of El Hag et al (2008) the mean age group was found to be 33.0 years; in study of Shykhon et al, the mean age group was found to be 52.0 years while in study of Jandu and Webster et al 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 2: Cytodiagnosis of cases with head and neck neoplastic lesions

<table>
<thead>
<tr>
<th>Sr. no.</th>
<th>Lesions</th>
<th>Total</th>
<th>Benign</th>
<th>Malignant</th>
<th>Aspirates</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lymph node</td>
<td>217</td>
<td>00</td>
<td>217</td>
<td>015</td>
<td>03.96</td>
</tr>
<tr>
<td>2</td>
<td>Salivary gland</td>
<td>44</td>
<td>36</td>
<td>08</td>
<td>049</td>
<td>12.96</td>
</tr>
<tr>
<td>3</td>
<td>Thyroid</td>
<td>42</td>
<td>31</td>
<td>11</td>
<td>058</td>
<td>15.34</td>
</tr>
<tr>
<td>4</td>
<td>Soft tissue</td>
<td>57</td>
<td>55</td>
<td>2</td>
<td>093</td>
<td>24.60</td>
</tr>
<tr>
<td>5</td>
<td>Skin and subcutaneous</td>
<td>17</td>
<td>14</td>
<td>3</td>
<td>044</td>
<td>11.64</td>
</tr>
<tr>
<td>6</td>
<td>Nasal/PNS</td>
<td>06</td>
<td>03</td>
<td>03</td>
<td>009</td>
<td>26.46</td>
</tr>
<tr>
<td>7</td>
<td>Odontogenic/bony</td>
<td>02</td>
<td>02</td>
<td>00</td>
<td>002</td>
<td>26.46</td>
</tr>
<tr>
<td></td>
<td>Total cases</td>
<td>378</td>
<td>107</td>
<td>271</td>
<td></td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 3: Age-wise distribution of head and neck neoplastic lesions

<table>
<thead>
<tr>
<th>Sr. no.</th>
<th>Age group</th>
<th>No. of cases</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0-10</td>
<td>015</td>
<td>03.96</td>
</tr>
<tr>
<td>2</td>
<td>11-20</td>
<td>019</td>
<td>05.04</td>
</tr>
<tr>
<td>3</td>
<td>21-30</td>
<td>044</td>
<td>11.64</td>
</tr>
<tr>
<td>4</td>
<td>31-40</td>
<td>049</td>
<td>12.96</td>
</tr>
<tr>
<td>5</td>
<td>41-50</td>
<td>058</td>
<td>15.34</td>
</tr>
<tr>
<td>6</td>
<td>51-60</td>
<td>100</td>
<td>26.46</td>
</tr>
<tr>
<td>7</td>
<td>&gt;60</td>
<td>093</td>
<td>24.60</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>378</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 4: Site-wise sex distribution of head and neck neoplastic lesions

<table>
<thead>
<tr>
<th>Sr. no.</th>
<th>Lesions</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lymph node</td>
<td>169</td>
<td>48</td>
<td>217</td>
<td>65.34</td>
</tr>
<tr>
<td>2</td>
<td>Soft tissue</td>
<td>36</td>
<td>21</td>
<td>57</td>
<td>34.66</td>
</tr>
<tr>
<td>3</td>
<td>Salivary gland</td>
<td>24</td>
<td>20</td>
<td>44</td>
<td>100.0</td>
</tr>
<tr>
<td>4</td>
<td>Thyroid</td>
<td>08</td>
<td>34</td>
<td>42</td>
<td>100.0</td>
</tr>
<tr>
<td>5</td>
<td>Skin and subcut.</td>
<td>09</td>
<td>08</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Nasal/PNS</td>
<td>03</td>
<td>03</td>
<td>06</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Odontogenic/bony</td>
<td>02</td>
<td>00</td>
<td>02</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overall</td>
<td>247</td>
<td>131</td>
<td>378</td>
<td>100.0</td>
</tr>
</tbody>
</table>

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 found to be 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
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.

**ACKNOWLEDGMENT**

The authors thank all the patients, all staffs of Cytopathology and Histopathology Department of Government Medical College and Hospital, Nashik, Maharashtra.

**REFERENCES**


**ABOUT THE AUTHORS**

**Maniyar U Amit**

Assistant Professor, Department of Pathology, CU Shah Medical College, Surendranagar, Gujarat, India

**Harshid Laxmanbhai Patel**

Assistant Professor, Department of Pathology, GMERS Medical College, Dharpur, Patan, Gujarat, India

**Correspondence Address:** 229, Raj Bunglow, Near Raj Nagari Shanti Niketan School Road, Ambaji Nagar, Patan (NG), Gujarat-384265, India, e-mail: dhrlhp1975@gmail.com

**BH Parmar**

Professor and Head, Department of Pathology, GMERS Medical College, Dharpur, Patan, Gujarat, India