

ROLE OF ASPIRATION CYTOLOGY AND BIOPSY IN THE RAPID DIAGNOSIS OF NASOPHARYNGEAL CARCINOMA – A COMPARATIVE STUDY FROM A TERTIARY CARE CENTRE .

Pathology

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ABSTRACT

BACKGROUND: Nasopharyngeal carcinoma accounts for a fair number of malignancies in the head and neck region. Cancerous growth in this location maybe very small and inconspicuous. Frequent clinical examination and repeated biopsy needs to be taken to come to an early diagnosis. FNAC can be utilized as a reliable and quick tool to aid in the early diagnosis of nasopharyngeal carcinoma before the patient is subjected to biopsy. FNAC if followed by biopsy rules out any false negative cases by FNAC and further reduces the chances of missing out on a diagnosis of nasopharyngeal carcinoma.

OBJECTIVES : To compare the role of FNAC and biopsy in the rapid diagnosis of nasopharyngeal carcinoma.

MATERIALS AND METHODS: All suspected case of nasopharyngeal carcinoma underwent FNAC followed by biopsy . FNAC smears were stained with Giemsa stain and biopsy sections were stained in hematoxyline and eosin (H&E) .Special stains were used whenever indicated.

RESULTS: Nasopharyngeal carcinoma affected males more than the females and most of the cases were in their 4th - 5th decade . There was a clear preponderance of nasopharyngeal carcinoma amongst the tribal community accounting for 69% of the cases. Metastatic lymph nodes in varied locations were found to be present in 60% of the cases studied. Success rate of FNAC in the first half of the cases was 26.6% which increased to 60% in the second half of the cases. Biopsy revealed a success rate of 80 % and 66.6 % in the first and second half of the cases respectively. Out of the 22 histopathologically confirmed cases of nasopharyngeal carcinoma, FNAC could correctly diagnose 63.3 % of the cases and there were no false positive cases. The overall diagnostic accuracy of FNAC was 68 % with a sensitivity of 46.7%, specificity of 100 % while predictive positive value was 100 % and predictive negative value was 55.5 %.

CONCLUSION: FNAC is a safe, reliable , cost effective technique for the early diagnosis of nasopharyngeal carcinoma . Other diagnostic modalities like endoscopic FNAC or CT guided FNAC may also be incorporated to improve the detection rate in early and deep-seated cases of nasopharyngeal carcinoma.

KEYWORDS

Nasopharyngeal carcinoma, Aspiration cytology, Biopsy.

INTRODUCTION

The idea of needle aspiration for tissue diagnosis dates back to the middle of the 19th Century {1}. Several factors account for the increasing popularity of cytological examinations, particularly fine needle aspiration. One of these is the increasing pressure to diagnose rapidly and manage patients in an outpatient setting to reduce medical cost. The nasopharynx by its anatomical location is so constructed and so hidden that clinical examination of the areas is most difficult. Cancerous growths in this location at times are very small and also may be submucosal with or without ulceration. Therefore, it is imperative that frequent careful clinical examination be performed and repeated biopsies should be taken of any irregularities in this area {2}. More than 80% of the nasopharyngeal tumours are unilateral. In order of frequency, the primary is found located at (1) the lateral wall, (2) the superior – posterior wall, (3) more than one wall , (4) the anterior wall and floor {3}. The incidence of nasopharyngeal carcinoma among the Chinese and other South – East Asians is about 10 to 50 times higher than in other countries. It is more common in males with a ratio of 2- 3: 1. The incidence rate curve begins to rise at the end of the second decade of life and reaches a peak in the fourth decade and then stays at a plateau {3}. In this study cases suspected of nasopharyngeal carcinoma directly underwent FNAC and biopsy to evaluate its applicability in the diagnosis of nasopharyngeal carcinoma and aims to compare the role of FNAC and biopsy in the rapid diagnosis of nasopharyngeal carcinoma.

MATERIALS AND METHODS

The study was carried out in cytology section of the department of Pathology in collaboration with the department of Otorhynolaryngology Regional Institute of Medical Sciences , Imphal during the period of feb 2018 to feb 2019. Ethical approval from the institute and informed consent from the patients were taken before the initiation of the study. All the cases suspected of having nasopharyngeal carcinoma were subjected to detailed clinical history, physical examination,

detailed ENT examination including anterior rhinoscopy, posterior rhinoscopy, digital palpation and other laboratory and radiographic investigations. The subjects underwent FNAC of the suspected areas of nasopharynx with the help of 22-23-gauge disposable syringe and Comeo syringe pistol with a negative suction from 20 ml syringe. Smears were prepared from the aspirate and air dried and then stained with Giemsa stain. Special stains like papanicolaou stain was performed whenever indicated. Subsequently FNAC was followed by biopsy mostly as a routine O.T procedure under general anaesthesia. The biopsy material was collected in 10% formaline solution and histopathological examination was done after staining with Haematoxyline – Eosin stain.

RESULTS

A total of fifty cases suspected of suffering from nasopharyngeal carcinoma were chosen to undergo FNAC of the affected site followed by biopsy. Out of these fifty cases thirty cases in whom a final diagnosis of nasopharyngeal carcinoma was already confirmed by histopathological examination were selected for the comparative study.

Table 1 Age and sex distribution of thirty cases of nasopharyngeal carcinoma.

Age in years	Male	Female	Total
31 - 40	3	1	4
41 - 50	11	2	13
51 - 60	4	1	5
61 - 70	3	2	5
71 - 80	3	0	3
Total	24	6	30

As showed in table 1, the maximum number of cases were in the 4 th and 5 th decade (43 %). Males dominated with a total of 24 cases followed by 6 females with a male and female ratio of 2.3: 1.

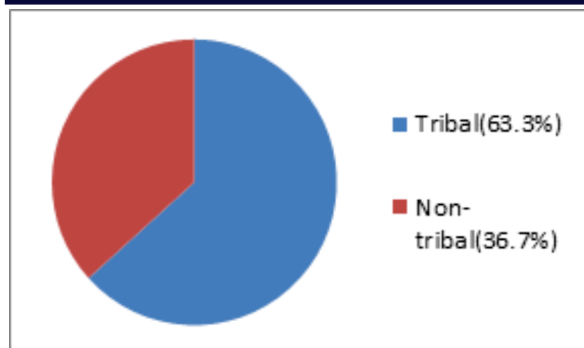


Fig – 1 Distribution of 30 cases of nasopharyngeal carcinoma on the basis of ethnicity.

According to ethnicity, the tribal community presented the maximum number of cases which accounted to 63.3 % of the cases while the non-tribal community all put together constituted only 36.7 % of the total of 30 cases studied.

Table - 2 Distribution of metastatic cervical lymph node in 30 cases of nasopharyngeal carcinoma.

Lymph node	No of cases	Percentage
1. Metastaic node present	18	60 %
Ipsilateral	13	72 %
Bilateral	3	17 %
Contralateral	2	11 %
2.Number of lymph node		
Single	14	78 %
Multiple	4	22 %
3. Mobility		
Mobile	15	83 %
Fixed	3	17 %
4. Metastatic node absent	12	40 %

Out of the 30 cases studied, 18 (60 %) of cases had a metastatic lymph node which was ipsilateral in the maximum of cases i.e 13 cases (72 %). Most of the metastatic node encountered were found singly in 78 % of the cases. A total of 15 cases (83 %) had a mobile metastatic node while only 3 cases (17 %) of cases had a metastatic node which was fixed to the skin or underlying structures. Metastatic nodes were absent in 12 (40%) of the cases studied.

Table 3 – Success rates of cytology and histopathology during the first and second halves of study period in 30 cases.

Successive halves	Cytology positive	%	Biopsy positive	%
First 15	4/15	26.6%	12/15	80%
Second 15	9/15	60%	10/15	66.6%

$\chi^2 = 4.64$
 $p < .05$
 Significant

$\chi^2 = 0.68$
 $p > .05$
 Insignificant

As depicted in table 3 , the success rate of FNAC was better in the second half of the study period than in the first half. The success rate of 60% in the second half and 26.6% in the first half with regard to FNAC was statistically significant (therefore $p < .05$). The success rate of histopathology in the first half of the case was 80% and that of the cases in the second half was 66.6%. This difference was found to be statistically insignificant ($p > .05$)

Table 4 – Cytological results in 50 cases in relation to 22 histopathologically confirmed cases of nasopharyngeal carcinoma.

Results	No of cases	True +ve	True -ve	False +ve	False -ve
Cytology	50	14	20	0	16
Biopsy	50	22	20	0	8

Out of the 22 histopathologically confirmed cases of nasopharyngeal carcinoma, FNAC could diagnose 63.6% of the cases correctly. There was no false positive case rather 8 cases (36.4%) which proved to be positive later on by biopsy turned out to be false negative cases, initially by FNAC as depicted in Table 4.

Table – 5 Various indices in relation to FNAC and biopsy in the

diagnosis of nasopharyngeal carcinoma.

Indices	Cytology in percent	Biopsy in percent
Sensitivity	46.7	73.3
Specificity	100	100
Overall accuracy	68	84
Predictive value (+ve)	100	100
Predictive value (-ve)	55.5	71.4

The diagnostic results of FNAC and biopsy were evaluated by the criteria of sensitivity, specificity, overall accuracy and predictive values for positive and negative results.

These criteria were calculated by the formulae given below:

$$\text{Sensitivity} = \frac{\text{TP}}{\text{TP} + \text{FN}} \times 100$$

$$\text{Specificity} = \frac{\text{TN}}{\text{TN} + \text{FP}} \times 100$$

$$\text{Overall accuracy} = \frac{\text{TP} + \text{TN}}{\text{TP} + \text{FP} + \text{TN} + \text{FN}} \times 100$$

$$\text{Predictive value (Positive)} = \frac{\text{TP}}{\text{TP} + \text{FP}} \times 100$$

$$\text{Predictive value (Negative)} = \frac{\text{TN}}{\text{TN} + \text{FN}} \times 100$$

TP = True positive, FP = False positive.
 TN = True negative, FN = False negative.

Various indices in percentage indicating reliability of FNAC in the diagnosis of nasopharyngeal carcinoma in 50 suspected cases are shown in Table 5. The overall diagnostic accuracy with FNAC was 68 % with a sensitivity of 46.7%. The specificity was 100 % and predictive positive value and predictive negative value was 100% and 55.5 % respectively. The overall accuracy of the biopsy was 84% and the sensitivity 73.3% with 100% specificity. The predictive value positive and predictive value negative of biopsy were 100% and 71.4% respectively.

DISCUSSION

Nasopharyngeal carcinoma is common in the North Eastern India occurring in 1.15 percent of the population which is quite high as compared to all India average of 0.6 percent found in a study by Barua et al [4]. It is more common in males with the age standardized male: female ratio of 2-3:1 as detected in a study conducted by Chew et al [3]. This finding is comparable to the finding encountered in the present study of 30 cases of nasopharyngeal carcinoma where the male female ratio was 2.3:1 .The mean age in 30 cases of nasopharyngeal carcinoma in the present study was 50 years which is similar to the findings in studies conducted by Weiland et al [5] , Hyams et al [6] and Barnes et al [7] . In the present study , 60% of the cases had metastatic lymph node at the time of diagnosis which is comparable to the findings of a study conducted by Easton et al [8] where it was observed that 60% - 72 % of the cases had unilateral or bilateral cervical lymph node metastasis at the time of diagnosis . In a study by Richard et al [9] the success rate of FNAC was 42% , 36% were false negative and 16% of the cases were unsatisfactory out of the 76 FNAC performed from the oral cavity, oropharynx and other nasopharyngeal site . However, in this study, there were 43.3% false negative and 10% unsatisfactory cases out of the 30 cases studied. Janet et al [10], in their study of 119 aspirates from head and neck sites, reported accuracy rate of 93 % with no false positive report. The accuracy rate in the present study is 68 % which is lower than the study conducted by them. This could be attributed to the fact that the reports of these proponents are from various head and neck sites including lymph nodes, salivary glands and thyroid glands. The location of masses in these situations are easily accessible not only to the clinical evaluation but also to approach of aspiration procedure as well , whereas the nasopharyngeal vault is so constructed and so hidden that the clinical examination of the area is most difficult and cancerous growth in this locality are at times very small and may be sub mucosal as stated by Acquarelli et al [2] . Janet et al [10] commented that the technique of aspirating a mass is simple to learn and technically, too, the cell yield improved with their subsequent experiences. They encountered inadequate aspirates in the first half of their series. In this study also, the success rate of FNAC which was 26.6% in the first half of 15 cases was low, but the success rate improved to 60% in the second half of the study. The difference is statistically significant ($p < .05$ by chi square test). The significant difference could be due to improved cell yield with the experience gained in the later part of the study. The predictive value of FNAC in the present study was 100 % which is similar to the findings in a study

conducted by Richard et al {9}. These findings support the diagnostic value of a positive FNAC report in determining the presence of malignancy in the nasopharyngeal region. In the present study, there were 3 cases where the FNAC aspirates were unsatisfactory for evaluation which were proven as nasopharyngeal carcinoma later on in all the 3 cases (100%). Therefore, in case an unsatisfactory report is encountered by FNAC, a repeat FNAC or biopsy should be carried out based on the clinician's suspicion and close follow up of the patient. The present study complies with the suggestion of utilizing endoscopic FNAC and CT guided FNAC by Mondal et al {11} for better results in the diagnosis of deep seated impalpable nasopharyngeal carcinoma masses and to improve the detection rate. The reports of 8 false negative diagnosis in 22 positive cases, initially confirmed by biopsy in this study suggests that FNAC should not be relied upon as the only method to determine the absence of malignancy when suspected clinically. The reason for the false negative cases could be sampling error or improper evaluation of the cytological specimens as suggested by Richard et al {9}. Such errors could not be ruled out in the present study and thus it emphasizes the importance of correlating the cytological diagnosis with the clinical impressions.

CONCLUSION

FNAC is a safe, reliable, cost effective and rapid technique which aids in the early diagnosis of nasopharyngeal carcinoma. However, a negative FNAC report does not rule out malignancy while an unsatisfactory aspirate neither confirms nor refutes the diagnosis of nasopharyngeal carcinoma and demands further investigation to come to a definite diagnosis. Other techniques like endoscopic FNAC, CT guided FNAC is suggested to improve the detection rate in early and deep-seated cases of nasopharyngeal carcinoma, whenever and wherever feasible.

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