Research Article

DIAGNOSTIC PITFALLS OF FINE NEEDLE ASPIRATION CYTOLOGY IN HEAD AND NECK LESIONS

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A R T I C L E I N F O	A B S T R A C T

Objective: To compare the cytomorphology and histopathology of head and neck lesions to find out the diagnostic pitfalls and efficacy of Fine needle aspiration cytology.

Material and method: This is a retrospective study of 51 casesof head and neck lesions in 6 months duration who underwent FNAC in the department of pathology. The final histopathological diagnosis was considered as gold standard. Efficacy of FNAC was determined in terms of sensitivity, specificity, positive predictive value (PPV), negative predictive value(NPV), False positive rate(FPR), False negative rate (FNR) and total accuracy.

Results: For thyroid lesions sensitivity, specificity, positive predictive value(PPV), negative predictive value(NPV), False positive rate(FPR), False negative rate(FNR) and total accuracy is 25%, 100% ,100% ,90.90%, 3.3% and 91.17% respectively. For Salivary gland lesions 40%, 66.6%, 66.7%, 40%, 33.3%, 60% and 50% respectively. In lymph node FNAC is 100% sensitive and specific.

Conclusion: Although FNAC is simple, reliable and highly sensitive and specific technique, it has its pitfalls in the diagnosis of diseases of head and neck lesions.
FNAC is a powerful screening tool and plays an important role in avoiding unnecessary surgeries, despite of its pitfalls.
To overcome the pitfalls adequate and extensive sampling is important.

INTRODUCTION

FNAC is of great importance in Head and Neck region because the target sites are easily accessible,excellent patient compliance due to its minimally invasive nature and avoidance of surgery.[1] With skilled cytologist accuracy of FNAC exceeds 92% with few false negatives and occasional false positive report.[2] It has its limitations and diagnostic pitfalls.[3] The reported pitfalls are those related to specimen adequacy , sampling techniques, skill of aspirator, experience of reporting pathologist and overlapping cytological features between some benign and malignant lesions of head and neck.[4] The aim of study was to compare cytology and histopathology of head and neck lesions to find out diagnostic pitfalls of cytology.

MATERIALS AND METHODS

This is a retrospective study of 6 months duration from Jan 2017 to June 2017, included FNAC performed of all the cases of head and neck swellings. The smears were Giemsa stained. Diagnosis was compared with the histopathological diagnosis which was considered the gold standard and the cases showing

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disparity were re-evaluated for the possible causes of discrepancy. The sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), False positive rate (FPR), False negative rate (FNR) and total accuracy of FNAC in thyroid, salivary gland and lymph node were calculated according to the following equation:

Sensitivity = True positive (TP) / True positive (TP) + False negative (FN)

Specificity = True negative (TN) / True negative (TN) + False positive (FP)

Positive Predictive Value (PPV) = True positive (TP) / True positive (TP) + False positive (FP)

Negative Predictive Value (NPV) = True negative (TN) / True negative (TN) + False negative (FN)

False positive rate (FPR) = False positive (FP) / False positive (FP) + True negative (TN)

False negative rate (FNR) = False negative (FN) / False negative (FN) + True positive (TP)

Total accuracy = True positive (TP) + True negative (TN) / Total number of cases.[5]

RESULTS

A total of 51cases were included in the study. Out of these 34 cases (66.66%) were of thyroid, 8(15.68%) of salivary gland, 6 cases (11.76%) of cervical lymph nodes and 3(5.88%) were

miscellaneous. Male to female ratio was 1:1.8.Age group included in the study was from 5 years to 64 years.Maximum number of cases (44) were in the age group of 21 to 60 years.

Table 1 Distribution of swelling according to the site involved.

Site	Number of cases	Percentage (%)
Thyroid	34	66.6%
Salivary gland	8	15.68%
Lymph node	6	11.76%
Miscellaneous	3	5.88%
Total	51	100%

Table 1: shows thyroid swelling formed the largest group (66.6%). Next in frequency were the salivary glands (15.68%) followed by the cervical lymph nodes (11.76%). The miscellaneous group includes 3 (5.88%) cases which included cyst, lipoma and schwanomma.

Table 2 Showing the cases with cytological and histopathological discordance

	Site	Cyto - diagnosis	Histo- diagnosis	No. Of cases	Comments
1.	Parotid gland	Pleomorphic adenoma	Mucoepidermoid carcinoma	one	Inadequate sampling, mucoid material was misinterpreted as chondromyxoid material
2.	Parotid gland	Benign cystic lesion	Mucoepidermoid carcinoma	one	Low cellularity, inadequate sampling, columnar cells were overlooked as cyst lining cells.
3.	Parotid gland	Mucoepidermoidcarcinoma	Lymphoepithelialsialadenitis	one	Inadequate sampling, only epithelial component was aspirated and misdiagnosed as carcinoma.
4.	Thyroid	Benign cyst	Papillary carcinoma	one	Low cellularity, numerous cystic macrophages
5.	Thyroid	Cystic colloid goitre	Papillary carcinoma	one	Low cellularity, cystic macrophages
6.	Thyroid	Nodular goitre	Follicular adenoma	one	Low cellularity and absence of architectural pattern

Table 3 Diagnostic accuracy of FNAC in thyroid lesions

Sensitivity	25%
Specificity	100%
Positive predictive value(PPV)	100%
Negative predictive value(NPV)	90.90%
False positive rate(FPR)	3.3%
False negative rate(FNR)	9%
Total accuracy	91.17%

Table 3 shows FNAC is highly specific(100%) and has high PPV(100%), NPV (90.90%)and total accuracy of 91.17%.Sensitivity is low with 25% and 3.3% FFR and 9% FNR.

Table 4 Diagnostic accuracyof FNAC in salivary gland lesions

Sensitivity	40%
Specificity	66.6%
Positive predictive value(PPV)	66.6%
Negative predictive value(NPV)	40%
False positive rate(FPR)	33.3%
False negative rate(FNR)	60%
Total accuracy	50%

Table 4. shows FNAC is more specific than sensitive in diagnosing salivary gland diseases, with total accuracy of 50%. FPR and FNR are quiet high.

Table 5 Diagnostic accuracy of FNAC in Lymph node

Sensitivity	100%
Specificity	100%

Table 5 shows FNAC is highly sensitive and specific in diagnosing lymph node lesions.

DISCUSSION

FNAC is the first choice of investigation of swellings in the head and neck region in spite of its limitations. Thyroid swelling formed the largest group with 34 cases (66.6%) out of 51 cases. Next in frequency were the salivary glands with 8 cases (15.68%) followed by the cervical lymph nodes with4 cases (11.76%). The miscellaneous group includes 3 (5.88%) cases which included cyst , lipoma and schwanomma.

Male to female ratio was 1:1.8. Age group included in the study was from 5 years to 64 years.Maximumnumber of cases (44) were in the age group of 21 to 60 years.

Table 6 Comparison of sensitivity and specificity of FNAC in thyroid lesions with other studies

Study group	Sensitivity	Specificity
Saraf et al[6]	72.3%	86.6%
Arda et al[7]	100%	95%
Sinna et al[5]	92.8%	94.2%
Ryska et al[8]	65-98%	72-100%
Haberal et al[9]	92.6%	91.6%
Saldanha et al[10]	72%	93.5%
Present study	25%	100%

Table 6 shows that our study has very low sensitivity and is in discordant, while specificity is concordant to the studies of Saraf, Arda, sinna, Ryska, Haberal and Saldanha *et al*.

Table 7 Comparison of PPV and NPV of FNAC in thyroid lesions with other studies

Study group	PPV	NPV
Sinna et al[5]	94.9%	91.8%
Ryska et al[8]	34-100%	83-100%
Saldanha et al[10]	78.3%	91.1%
Present study	100%	90.9%

Table 7 shows the concordance of our study in respect of PPV and NPV of FNAC thyroid lesions to the Sinha, Ryska and Saldanha *et al*.

Table 8 Comparison of FPR and FNR of FNAC in thyroid lesions with other studies

Study group	FPR	FNR
Ryska et al[8]	7.2%	5.8%
Haberal et al[9]	5.7%	2.3%
Saldanha et al[10]	5.4%	7.6%
Jogai et al[11]	-	1-16%
Barbolzzi et al[12]	0.8%	-
Present Study	3.3%	9%

Table 8. shows that our study has similar FPR as with Hebral and saldanha *et al* while Ryska *et al* has slightly higher and Barblzzi *et al* has lower percentage.FNR of our study is in concordant to the study of Saldanha, Jogai and Ryska *et al*.

Table 9 Comparison of Total accuracy of FNAC in thyroid lesions with other studies

Study group	Total Accuracy
Saraf et al[6]	89.5%
Arda et al[7]	95%
Sinna et al[5]	93.6%
Saldanha et al[10]	97.8%
Present Study	91.17%

Table 9.shows that result of our study of total accuracy of FNAC in thyroid lesions is in concordant to Saraf, Arda, Sinna and Saldanha *et al*.

Table 10 Comparison of Diagnostic accuracy of FNAC in salivary gland lesions with other studies

Study group	Sensitivity	Specificity	PPV	NPV	FPR	FNR	Total Accuracy
Saraf *et al*[6]	89.5%	92.5%	-	-	-	-	-
Balkrishan *et al*[13]	58-96%	71-88%	-	-	-	-	-
Jayaram *et al*[14]	87.7%	98%	-	-	-	-	-
Present study	40%	66.6%	66.7%	40%	33.3%	60%	50%

Table 10. shows our study has low sensitivity(40%) and specificity(66.6%) as compared to other studies but it is somewhat close to study of Balkrishan *et al* (58-96%) and 71-88% respectively. Present study also calculated PPV (66.7%), NPV, (40%) FPR (33.3%), FNR (60%) and total accuracy (50%)of FNAC in salivary gland lesions.

Table 11 Comparison of Sensitivity and specificity of FNAC in cervical Lymph node with other studies

Study group	Sensitivity	Specificity
Saraf *et al*[6]	100%	100%
Chamyal *et al*[15]	93.6%	97.6%
Present study	100%	100%

Table 11 shows high sensitivity and specificity of FNAC in cervical Lymph nodes and is in concordance with the studies of Saraf and Chamyal *et al*.

CONCLUSION

- Although FNAC is simple, reliable and highly sensitive and specific technique, it has its pitfalls in the diagnosis of diseases of head and neck lesions.
- FNAC is a powerful screening tool and plays an important role in avoiding unnecessary surgeries, despite of its pitfalls.
- To overcome the pitfalls adequate and extensive sampling is important.

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