

Role of Fine Needle Aspiration Cytology in Neck Swelling in Tertiary Care Centre in South West Bihar

Sanjeev Ranjan¹, Ravi Ranjan Singh², Sanjeev Kumar³, Kumari Pallavi, Tutor⁴, Gaurav Kumar Singh⁵

¹Senior Resident, Department of Pathology, Narayan Medical College and Hospital, Jamuhar, Sasaram, Bihar, India

²Assistant Professor, Department of Pathology, Narayan Medical College and Hospital, Jamuhar, Sasaram, Bihar, India

³PG-Student, Department of Pathology, Narayan Medical College and Hospital, Jamuhar, Sasaram, Bihar, India

⁴NPIAS, GNSU, Jamuhar, Sasaram, Bihar, India

⁵Department of Pathology, Narayan Medical College and Hospital, Jamuhar, Sasaram, Bihar, India

Received: 10-3-2023 Revised: 18-04-2023 / Accepted: 20-05-2023

Corresponding author: Dr. Ravi Ranjan Singh

Conflict of interest: Nil

Abstract

Aim: The aim of the present study was to assess the prevalence of different types of neck lesions and to test the utility of Fine Needle Aspiration Cytology (FNAC) in the diagnosis of neck lesions.

Methods: The present study include outdoor and indoor cases of palpable neck swelling in Department of pathology, in NMCH, Sasaram for the period of 12 months. Patients of all age and sex were included and proper clinical history was taken. The patient were positioned to allow the most optimal digital palpation of the mass. The present study included 500 cases.

Results: Site wise distribution of head and neck FNAC showed lymph nodes lesion (32%) was the predominant site followed by thyroid lesions (30%), miscellaneous (23%) and salivary gland lesions (15%). The youngest patient in the study was 2-year-old and the oldest was 78 years of age with mean age of 36.84 years and 36 year median and peak incidence of age group was third decade. Head and neck lesions were cytologically categorised into nonneoplastic (52%), neoplastic (45%) and remaining (3%) were inadequate due to scant cellularity and haemorrhagic aspirate. Out of 160 (32%) cases of lymphnode lesions, most common lesion was reactive lymphadenitis (30%) followed by granulomatous lymphadenitis (27.50%). In malignant lesions, metastasis from squamous cell carcinoma was the predominant finding (12.50%) followed by non-Hodgkin's lymphoma (1.25%), metastasis from adenocarcinoma (0.62%). Total 75 (15%) cases of salivary gland lesions were observed.

Conclusion: In our study most common nonneoplastic, benign neoplastic and malignant neoplastic lesion are reactive lymphadenitis, colloid goiter of thyroid and metastasis of squamous cell carcinoma in lymphnode. Study has made, it clear that FNAC is one of the best investigation one can ask for with fairly good accuracy. Hence we conclude that fine needle aspiration cytology is simple, rapid, safe diagnostic tool for differentiating nonneoplastic from neoplastic lesions of palpable neck region.

Keywords: Fine Needle Aspiration Cytology (FNAC), Head and Neck lesions, Lymph Node

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

A great number of diseases of the head and neck region can manifest as a palpable and /or visible lump. These can also be called swellings, growths, tumors, or lumps. Each disease may have a different mode of presentation. For these reasons, diagnosis often becomes difficult in neck swelling. The lesions of the head and neck region comprised several different congenital, inflammatory conditions, and benign or malignant tumors. [1] In palpable head and neck lesions, the most commonly encountered lesion are lymph nodes, thyroid, and major salivary glands along with other rarely encountered lesions like subcutaneous tissue swellings, lumps of skin appendages, and oral cavity lesions. [2] It greatly influences on planned treatment, when these lesions are early diagnosed and differentiated from inflammatory to neoplastic etiology. [3]

The Martin and Ellis introduced the first modern technique of FNAC in 1930 for the evaluation of various palpable lumps and now this technique has become a popular procedure due to its easy accessibility of target sites and minimally invasive nature. [4] FNAC is particularly suitable in the head and neck areas due to its easy accessibility of target sites, minimally invasive nature, excellent patient compliance, and helping of avoidance of surgery in certain conditions like non-neoplastic, inflammatory conditions, and some tumors. [5] FNAC has been found to be a safe, relatively painless, rapid, and highly cost-effective technique. Also, it is an accurate, sensitive, and specific method found by some experienced workers. [6] The advantage of FNAC is that it is an outdoor procedure, requires minimal equipment, causes minimal discomfort to the patient, repeatable to obtain adequate material for cytological analysis, and reduces the rate of the exploratory procedure. [7]

Fine Needle Aspiration Cytology (FNAC) is a simple and a rapid diagnostic technique and it is now being considered as a valuable diagnostic aid because of the early availability of results, simplicity, minimal trauma and absence of complications such as in the thyroid, lymph nodes, major salivary glands and other neoplasm's. FNAC is of great value in the head and neck regions because of the multiplicity of accessible organs and heterogeneous pathologies encountered. [8] The close proximity of various types of tissues at this site and a wide range of primary and metastatic neoplasm's make it one of the most interesting and challenging in FNAC diagnosis. This technique is an outpatient department procedure and causes minimal trauma and no risk of complication. It can be performed under local anaesthesia (if required), and is particularly useful if a neck lump is thought to be malignant. [9] In head and neck swellings differential diagnosis include a broad spectrum of diseases with differing implications for management. FNAC provides for a suitable and useful method of assessment of these lesions. [10]

The aim of the present study was to assess the prevalence of different types of neck lesions and to test the utility of Fine Needle Aspiration Cytology (FNAC) in the diagnosis of neck lesions.

Materials and Methods

The present study includes outdoor and indoor cases of palpable neck swelling in Department of pathology, in NMCH, Sasaram for the period of 12 months. Patients of all age and sex were included with proper clinical history was taken. The patients were positioned to allow the most optimal digital palpation of the mass. The present study included 500 cases.

Taking all aseptic measures, the mass was fixed with the hand. A 5cc or 10cc plastic

disposable syringe with an attached 22-to-26-gauge needle was placed inside the mass. Several rapid short strokes were made in different directions then needle was withdrawn after aspiration and haemostasis was achieved with gauze pad. Aspirated material from needle was smeared on clean glass slide with the help of another slide. In this way, two to four smears were prepared air-dried smear stain with May Grunwald Giemsa and ethyl alcohol fixed smears were stained with Papanicolaou stain. Special stains used were Ziehl-Neelsen (ZN) stain for acid fast

bacilli. The stained slides were mounted by DPX and examined under the light microscope and reported.

Statistical Analysis:

Data was recorded in MS office 2007 and analyzed according to age and gender, site of pathology, nature of swelling, and cytological diagnosis. Percentages were calculated for estimating the frequency of various cytological conditions diagnosed on FNAC in patients of neck swellings.

Results

Table 1: Site and Cytological category wise distribution of neck masses

| Site | No. of cases | Percentage% |
|-----------------------------|--------------|-------------|
| Lymph node | 160 | 32% |
| Thyroid | 150 | 30% |
| Salivary gland | 75 | 15% |
| Miscellaneous | 115 | 23% |
| Total | 500 | |
| Cytological category | | |
| Non- neoplastic | 260 | 52% |
| Neoplastic | 225 | 45% |
| Inadequate | 15 | 3% |
| Total | 500 | |

Site wise distribution of head and neck FNAC showed lymph nodes lesion (32%) was the predominant site followed by thyroid lesions (30%), miscellaneous (23%) and salivary gland lesions (15%). The youngest patient in the study was 2-year-old and the oldest was 78 years of age with mean age of 36.84 years and 36 year

median and peak incidence of age group was third decade. Head and neck lesions were cytologically categorized into nonneoplastic (52%), neoplastic (45%) and remaining (3%) were inadequate due to scant cellularity and haemorrhagic aspirate.

Table 2: Distribution of cytological diagnosis of lymphnode swellings

| Cytological diagnosis | No. of cases | Percentage (%) |
|--|--------------|----------------|
| Inflammatory | | |
| Nonspecific lymphadenitis | 20 | 12.50 |
| Reactive lymphadenitis | 48 | 30 |
| Tuberculous lymphadenitis | 24 | 15 |
| Granulomatous lymphadenitis | 44 | 27.50 |
| Malignant | | |
| Non-Hodgkin's lymphoma | 2 | 1.25 |
| Secondary from squamous cell carcinoma | 20 | 12.50 |
| Secondary from adenocarcinoma | 1 | 0.62 |
| Inadequate | 1 | 0.62 |
| Total | 160 | 100 |

Out of 160 (32%) cases of lymphnode lesions, most common lesion was reactive lymphadenitis (30%) followed by granulomatous lymphadenitis (27.50%). In malignant lesions, metastasis from squamous cell carcinoma was the predominant finding (12.50%) followed by non-Hodgkin's lymphoma (1.25%), metastasis from adenocarcinoma (0.62%).

Table 3: Distribution of cytological diagnosis of thyroid lesions

| Cytological diagnosis | No. of cases | Percentage (%) |
|-------------------------|--------------|----------------|
| Inflammatory | | |
| Hashimoto's thyroiditis | 23 | 15.34 |
| Subacute thyroiditis | 1 | 0.66 |
| Thyroglossal cyst | 6 | 2 |
| Benign | | |
| Colloid goiter | 102 | 68 |
| Follicular neoplasm | 12 | 8 |
| Hurthle cell neoplasm | 1 | 0.66 |
| Malignant | | |
| Papillary carcinoma | 3 | 2 |
| Medullary carcinoma | 1 | 0.66 |
| Inadequate | 1 | 0.66 |
| Total | 150 | 100 |

Thyroid gland lesions comprised of 150 (30%) cases of all neck lesions. Most common lesion was colloid goiter comprising of 102 cases (68%) followed by Hashimotos thyroiditis (15.34%), follicular neoplasm (8%), thyroglossal cyst

(2%) and sub-acute thyroiditis (0.66%). In malignant lesion papillary carcinoma (2%) was more common followed by medullary carcinoma (0.66%) of thyroid. Inadequate was in 1 case (0.66%).

Table 4: Distribution of cytological diagnosis of salivary gland lesions

| Cytological diagnosis | No. of cases | Percentage (%) |
|--|--------------|----------------|
| Inflammatory | | |
| Sialadenitis | 32 | 42.66 |
| Simple cystic lesions | 14 | 18.66 |
| Benign | | |
| Pleomorphic adenoma | 17 | 22.66 |
| Lymphoepithelial lesions | 2 | 2.66 |
| Malignant | | |
| Mucoepidermoid carcinoma Acinic cell carcinoma | 2 | 2.66 |
| | 1 | 1.33 |
| Adenoid cystic carcinoma | 1 | 1.33 |
| Carcinoma ex Pleomorphic adenoma | 1 | 1.33 |
| Inadequate | 5 | 6.66 |
| Total | 75 | 100 |

Total 75 (15%) cases of salivary gland lesions were observed. Most common salivary gland lesion observed was sialadenitis 32 (42.66%) cases. Pleomorphic adenoma was common benign neoplasm comprising of 17

(22.66%) cases of all salivary gland lesions with female predominance, followed by 2 cases of lymphoepithelial lesions consisting of 2 (2.66%) cases. There were total 5 malignant salivary gland lesions; two diagnosed as

mucoepidermoid carcinoma (2.66%), one as acinic cell carcinoma (1.33%), one as adenoid cystic carcinoma (1.33%) and one

as carcinoma ex pleomorphic adenoma (1.33%).

Table 5: Distribution of cytological diagnosis of miscellaneous lesions

| Cytological diagnosis | No. of cases | Percentage (%) |
|------------------------------------|--------------|----------------|
| Epidermal cyst | 52 | 45.21 |
| Benign | | |
| Lipoma | 50 | 43.47 |
| Benign adnexal tumor | 4 | 3.47 |
| Malignant | | |
| Sarcoma | 2 | 1.73 |
| Positive for epithelial malignancy | 2 | 1.73 |
| Inadequate | 5 | 4.34 |
| Total | 115 | 100 |

Miscellaneous lesions were accounted for 115 (23%) cases, in which most common lesion was epidermal cyst consisting of 52 (45.21%) cases. Common benign lesion was lipoma comprising of 50 (43.47%) cases, followed by benign adnexal tumor of 4 (3.47%) cases. In malignant miscellaneous lesion, there were 4 cases, 2 sarcoma and 2 porocarcinoma.

Discussion

Needle aspiration had a fleeting course during 1930s, first reported by Hayes Martin for management of head & neck malignancies but it re-emerged as Fine Needle Aspiration Cytology in 1970s. With vital structures situated in head and neck region, complete excision biopsy would later lead to mortality and therapeutic biopsy of any malignant mass would later lead to its invasion into deeper tissue, hence these procedure were often fatal. [11,12] In case of Fine Needle Aspiration Cytology, skin track may be created by needle but there is no proof till now that it may lead to invasion. [13] With advent of Fine Needle Aspiration Cytology which reduced trauma and had other benefits due to its simple technique was often employed.

Site wise distribution of head and neck FNAC showed lymph nodes lesion (32%) was the predominant site followed by

thyroid lesions (30%), miscellaneous (23%) and salivary gland lesions (15%). The youngest patient in the study was 2 year old and the oldest was 78 year of age with mean age of 36.84 years and 36 year median and peak incidence of age group was third decade. Head and neck lesions were cytologically categorised into nonneoplastic (52%), neoplastic (45%) and remaining (3%) were inadequate due to scant cellularity and haemorrhagic aspirate. Out of 160 (32%) cases of lymphnode lesions, most common lesion was reactive lymphadenitis (30%) followed by granulomatous lymphadenitis (27.50%). In malignant lesions, metastasis from squamous cell carcinoma was the predominant finding (12.50%) followed by non-Hodgkin's lymphoma (1.25%), metastasis from adenocarcinoma (0.62%). Similar observations were also noted by other studies such as Lalji Valiya et al [14], Deval N Patel et al [15], Yogesh Pawade et al [16] and Bhagat VM et al. [17] Tilak et al [18] state that Hodgkin's lymphoma may start at one place in the lymph node and the needle may not hit that particular area. Sometimes one or two lymph nodes in a group may be involved by Hodgkin's lymphoma. But sampling may occur through non-involved lymph nodes resulting in misdiagnosis of reactive lymphadenopathy. Granulomatous lymphadenitis was second common cause

of lymphnode lesion on cytology it shows granuloma with absence of acid fast bacilli. Tuberculous lymphadenitis lesions were 14.16 % of all lymphnode cases.

Thyroid gland lesions comprised of 150 (30%) cases of all neck lesions. Most common lesion was colloid goiter comprising of 102 cases (68%) followed by Hashimotos thyroiditis (15.34%), follicular neoplasm (8%), thyroglossal cyst (2%) and sub-acute thyroiditis (0.66%). In malignant lesion papillary carcinoma (2%) was more common followed by medullary carcinoma (0.66%) of thyroid. Inadequate was in 1 case (0.66%). In present study, most of the thyroid lesions were benign which were comparable with other studies such as Kishor H et al [19] M Kate et al [20] and R Goswami et al [21] studies.

Total 75 (15%) cases of salivary gland lesions were observed. Most common salivary gland lesion observed was sialadenitis 32 (42.66%) cases. Pleomorphic adenoma was common benign neoplasm comprising of 17 (22.66%) cases of all salivary gland lesions with female predominance, followed by 2 cases of lymphoepithelial lesions consisting of 2 (2.66%) cases. There were total 5 malignant salivary gland lesions; two diagnosed as mucoepidermoid carcinoma (2.66%), one as acinic cell carcinoma (1.33%), one as adenoid cystic carcinoma (1.33%) and one as carcinoma ex pleomorphic adenoma (1.33%). Similar observations are made by Kishor H et al [19] study. Common neoplastic lesion was Pleomorphic adenoma in salivary gland neoplasm. These findings are similar to Solanki P et al, [22] M Kate et al, [20] Bhagat VM et al [17] studies. Miscellaneous lesions were accounted for 115 (23%) cases, in which most common lesion was epidermal cyst consisting of 52 (45.21%) cases. Common benign lesion was lipoma comprising of 50 (43.47%) cases, followed by benign adnexal tumor of 4 (3.47%) cases. In

malignant miscellaneous lesion, there were 4 cases, 2 sarcoma and 2 porocarcinoma.

Role of Fine Needle Aspiration Cytology in the thyroid lesions is vital and has been used since the 1950s and is one of the cost-effective methods in the diagnosis. The thyroid lesions are more common in females. Thyroid lesions usually present in the form of a nodule which are mostly detected by sonography in about 19 to 67 % cases and rarely with the palpation about 5 % of cases. [23-25] Thyroid nodules may cause hormonal imbalance, cosmetic problems and also have the malignant potential so they should be treated as early as possible to reduce the complications. [25,26] Fine Needle Aspiration Cytology plays a key role by differentiating between benign and malignant nodule and by this decrease needless surgery and start early treatment in malignant lesion by proper triage. Despite its recognized interest, it has various drawbacks, such as incomplete aspiration, false negative and false positive and inability to distinguish follicular adenoma from carcinoma. [27,28]

Conclusion

In our study most common nonneoplastic, benign neoplastic and malignant neoplastic lesion are reactive lymphadenitis, colloid goiter of thyroid and metastasis of squamous cell carcinoma in lymphnode. Study has made, it clear that FNAC is one of the best investigation one can ask for with fairly good accuracy. Hence, we concluded that fine needle aspiration cytology is simple, rapid, safe diagnostic tool for differentiating nonneoplastic from neoplastic lesions of palpable neck region.

References

1. Mc Guirt 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. p. 2542.

2. Chauhan S, Rathod D, Joshi DS. FNAC of swellings of head and neck region. *Indian J App Basic Med Sci.* 2011;13(17)1-6.
3. Rathod GB, Parmar P. Fine needle aspiration cytology of swellings of head and neck region. *Indian J Med Sci.* 2012;66(3-4)49-54.
4. Martin H, Ellis EB. Biopsy of needle puncture and aspiration. *Ann Surg.* 1930;92(2)169-181.
5. Abrari A, Ahmad SS, Bakshi V. Cytology in the otorhinolaryngologist's domain - a study of 150 cases, emphasizing diagnostic utility and pitfalls. *Indian J Otolaryngol Head Neck Surg.* 2002; 54(2)107-110.
6. Orell SR, Sterrett GF, Walters MN, Whitaker D. Introduction- Manual and Atlas of fine needle Aspiration Cytology. 2nd ed, Churchill livingstone Edinburg. 1992;44-59.
7. Maniyar AU, Patel HL, Parmar BH. Study of Cytodiagnosis of Head and Neck Neoplastic Lesions and Comparison with Histopathology. *Res Rev- J Med Health Sci.* 2013;2(2)54-59.
8. Nallagutta N, Reddy SE, Gour S, Ayesha S, G J, Kotikalapudi R. Fine Needle Aspiration Cytology of Head and Neck Masses. *Sch J App Med Sci.* 2016;4(11B):3990-2.
9. Shekhar H, Kaur A, Agrawal P, Pancharia A, Jadeja P. Fine needle aspiration cytology in head and neck swellings: a diagnostic and therapeutic procedure. *Int J Res Med Sci.* 2014;2(4):1667.
10. Afnan G, Vani BR, V SM. Fine Needle Aspiration Cytology Profile of Head and Neck Lesions in a Tertiary Care Hospital. *Indian J Pathol.* 2017;6(2): 372-7.
11. Martin HE, Ellis EB. Biopsy of needle puncture and aspiration. *Ann Surg* 1930;92(2):169-81.
12. Zajicek J, Eneroth CM. Cytological diagnosis of salivary-gland carcinomata from aspiration biopsy smears. *Acta Otolaryngologica Suppl* 1969;263:183-5.
13. Russel RCG, William NS, Bulstrode CJK. Bailey and Love's short practice of surgery. 24th edn. Taylor & Francis Ltd 2004.
14. Valiya LG, Padhariya BB, Baxi SN. Spectrum of FNAC in Palpable Head and Neck Lesions in a Tertiary Care Hospital in Western India- A 2 Years Study. *IOSR J Dent Med Sci.* 2016;15(6):14-9.
15. Deval N. Patel, Parth B. Patel, Himani V. Patel TJ, Gandhi. Fine needle aspiration cytology role in head and neck lesions. *Int Arch Integrated Med.* 2015;2(8):99-104.
16. Pawde Y, Kathale S. Fine Needle Aspiration Cytology As a Diagnostic Tool in Head and Neck Lesions. *J Evol Med Dent Sci J Evol Med Dent Sci.* 2014;3(45):11072-9.
17. Bhagat VM, Tailor HJ, Saini PK, Dudhat RB, Makawana GR, Ravi M. Fine Needle Aspiration Cytology in Non- Thyroidal Head and Neck Masses-a Descriptive Study in Tertiary Care Hospital. *Natl J Med Res.* 2013; 3(3):273-6.
18. Tilak V, Dhaded A., Jain R. Fine needle aspiration cytology of head and neck masses. *Indian J Pathol Microbiol.* 2002;45(1):23-30.
19. Suryawansh KH, Damle R, Dravid N et al. Spectrum of FNAC in palpable head and neck lesions in a tertiary care hospital in India-a 3 years study. *Indian J Pathol Oncol.* 2015;2(1):7-13.
20. Kate Minakshi SS. Spectrum of lesions in head and neck region on fine needle aspiration cytology. *Southeast Asian J Case Rep Rev.* 2015;4(6):2092-101.
21. Goswami RR, Baruah D, Devi G. Fncac Spectrum of Head and Neck Lesions - a Retrospective Study. *J Evid Based Med Healthc.* 2016;3(13):400-5.
22. Solanki PK, Patel AP, Taviad PP, Chaudhari VP, Patel S m. Fine needle aspiration cytology as a diagnostic

- procedure in head and neck swellings. *Natl j Community Med.* 2012;3(3):433–6.
23. Cooper DS, Doherty GM, Haugen BR, et al. Revised American thyroid Association management guidelines for patients with thyroid nodules and differentiated thyroid cancer. *Thyroid* 2009;19(11):1167-214.
24. Gharib H, Papini E, Paschke R. Thyroid nodules: a review of current guidelines, practices, and prospects. *Eur J Endocrinol.* 2008;159(5):493–505.
25. Tan GH, Gharib H. Thyroid incidentalomas: management approaches to nonpalpable nodules discovered incidentally on thyroid imaging. *Ann Intern Med* 1997;126(3):226-31.
26. Roman SA. Endocrine tumours: evaluation of the thyroid nodule. *Curr Opin Oncol* 2003;15(1):66-70.
27. Bagga PK, Mahajan NC. Fine needle aspiration cytology of thyroid swellings: how useful and accurate is it? *Indian J Cancer* 2010;47(4):437-42.
28. Bajaj Y, De M, Thompson A. Fine needle aspiration cytology in diagnosis and management of thyroid disease. *J Laryngol Otol* 2006;120:467-9.