International Journal of Otorhinolaryngology and Head and Neck Surgery
Singh S et al. Int J Otorhinolaryngol Head Neck Surg. 2025 Oct;11(5):555-559
http://www.ijorl.com
pISSN 2454-5929 | eISSN 2454-5937
DOI: https://dx.doi.org/10.18203/issn.2454-5929.ijohns20252988

Original Research Article

The first prick counts: evaluating head and neck masses with fine needle aspiration cytology

Shivam Singh[1]*, Sunil Bajoliya[1], Sweta Sharma[1], Rituraj Mourya[2]

[1]Department of ENT, Nandkumar Singh Chouhan Government Medical College, Khandwa, Madhya Pradesh, India
[2]Department of Pathology, Nandkumar Singh Chouhan Government Medical College, Khandwa, Madhya Pradesh, India

Received: 22 August 2025
Revised: 19 September 2025
Accepted: 20 September 2025

***Correspondence:**
Dr. Shivam Singh,
E-mail: shiv.demon900@gmail.com

ABSTRACT

Background: Cervical swellings are common clinical presentations with causes ranging from benign inflammatory conditions to malignant neoplasms. Fine needle aspiration cytology (FNAC) is a safe, rapid, minimally invasive, and cost-effective first-line diagnostic tool for their evaluation. The objective was to study the spectrum of head and neck swellings and assess the diagnostic utility of FNAC.
Methods: This observational study was conducted at Government Medical College, Khandwa, from February 2024 to February 2025, and included 100 patients with palpable head and neck swellings. After informed consent, FNAC was performed under aseptic precautions. Smears were stained with Papanicolaou, Giemsa, and Hematoxylin and Eosin (H&E) stains and evaluated cytomorphologically.
Results: Among 100 patients, 61% were females and 39% males (ratio 1.56:1), with a mean age of 35.5 years. Inflammatory lesions constituted 43%, benign lesions 46%, and malignant lesions 11%. Lymph node swellings (35%) were most common, predominantly tuberculous lymphadenitis (17%). Thyroid lesions formed 21%, chiefly colloid goiter. Salivary gland lesions comprised 14%, with pleomorphic adenoma as the most frequent. Malignancies (11 cases) included metastatic squamous cell carcinoma, lymphoma, and papillary thyroid carcinoma.
Conclusions: FNAC is a reliable, rapid, and economical diagnostic modality for head and neck swellings. It provides high diagnostic accuracy in distinguishing inflammatory, benign, and malignant lesions, guiding appropriate management and reducing unnecessary surgical procedures, especially in resource-limited settings where tuberculosis is still prevalent.

Keywords: Head and neck swellings, FNAC, Tuberculous lymphadenitis, Colloid goiter, Cytopathology

INTRODUCTION

Cervical swellings constitute one of the most commonly encountered clinical presentations in general medical and surgical practice. Due to their superficial anatomical location, these swellings are relatively accessible for clinical evaluation and diagnostic intervention, thereby facilitating both patient comfort and physician assessment. In many instances, these swellings are asymptomatic and are discovered incidentally, either during routine self-examination, grooming, or by an observer. A meticulous and structured approach is imperative in the assessment of a neck mass, particularly in adults, as it may represent the sole manifestation of a potentially serious or malignant underlying pathology.[1]

The differential diagnosis for cervical swellings is extensive and varies considerably across different age

groups. Therefore, a comprehensive clinical history and physical examination are essential to narrow down the diagnostic possibilities and to guide appropriate investigative steps, which are often organized in a structured algorithm. Initial evaluation should commence with a thorough history-taking, followed by a detailed examination of the head and neck region, with particular attention to the mucosal surfaces of the upper aerodigestive tract.[2]

Cytopathology is defined as the microscopic examination of exfoliated or aspirated cells obtained via brushing, scraping, washing, or needle aspiration techniques. A palpable lump remains the most common clinical presentation involving the cervical region.[3] Owing to their superficial location, many lesions in the head and neck region are particularly amenable to fine needle aspiration (FNA). The clinical evaluation of a neck mass poses a frequent diagnostic challenge to clinicians.[4] The technique of needle aspiration was first employed by Kun in 1847, and its application for the assessment of head and neck swellings was formally introduced by Martin in 1930.[5]

Cervical swellings may arise from a broad spectrum of pathological entities. Common etiologies include lymphadenitis (specific and non-specific, both acute and chronic), metastatic carcinoma, lymphoma, thyroid lesions (including goitres, nodules, and cysts), and salivary gland pathologies such as sialadenitis, benign tumors, cysts, and malignancies. Less frequently encountered causes include carotid body tumors, branchial cleft cysts, thyroglossal duct cysts, cystic hygromas, pharyngeal diverticula, and cutaneous adnexal lesions.[6]

Although open surgical biopsy with subsequent histopathological evaluation remains the gold standard for definitive diagnosis, it is associated with a higher risk of complications, including wound infection, local recurrence, and distant metastasis, especially if performed before definitive treatment. FNAC, by contrast, is a minimally invasive, rapid, safe, and cost-effective alternative. FNAC has emerged as a valuable first-line diagnostic modality for evaluating palpable masses, particularly in the head and neck region. The diagnostic yield of FNAC is significantly influenced by the expertise of the clinician or pathologist, and by the integration of clinical context, including patient history, examination findings, and relevant laboratory investigations.

METHODS

This observational study was conducted over a period of one year, from February 2024 to February 2025, at Government Medical College, Khandwa. The study included all patients who underwent FNAC for evaluation of swellings in the head and neck region. A total of 100 patients were enrolled, with data collected from individuals presenting with palpable lesions across various anatomical sites of the head and neck. Patients were referred from the departments of otorhinolaryngology, pediatrics, and general surgery.

Prior to inclusion, ethical clearance was obtained from the Institutional Ethics Committee, and written informed consent was secured from each participant after providing a detailed explanation of the study objectives, procedures, and potential risks.

A comprehensive clinical history was obtained for all patients, with specific emphasis on characteristics of the swelling and relevant etiological factors. This included assessment of current symptoms, previous medical conditions, family history of tuberculosis, and any history suggestive of sexually transmitted infections, including syphilis and HIV/AIDS. Clinical evaluation guided the selection of lesions for aspiration.

FNAC was performed using standard aseptic techniques. Sterile, disposable 23-gauge needles (1.5 inches in length) attached to 10 ml plastic disposable syringes were used for the aspiration. Clean, grease-free glass slides (75×25 mm) and standard 22 mm² coverslips were prepared in advance. A fixative composed of equal parts of ether and 95% ethanol was used for immediate fixation of smears.

Following aspiration, the collected material was expressed onto labeled glass slides and evenly spread using a second slide to prepare thin smears. A minimum of three slides were prepared for each case. One slide was immediately fixed in the ether-alcohol fixative for Papanicolaou staining, another was air-dried for Giemsa staining, and a third was left unfixed for subsequent Haematoxylin and Eosin (H&E) staining or special staining as required.

All smears were processed and stained in accordance with standard cytological staining protocols to facilitate cytomorphological evaluation.

RESULTS

The present study included 100 patients with head and neck swellings, aged between 1 and 85 years of age. Among them 61% were females and 39% were males. Female to male ratio was 1.56:1. The majority of the patients belonged to the 21-30 years age group. Among patients of all ages, the youngest was 1 year old and the oldest was 82 years old. The mean age was 35.51 years. An inflammatory lesion was diagnosed in 43 patients, while benign and malignant lesions were found in 46 and 11 patients, respectively.

The majority of pathologies involved lymph nodes and were present in 35 patients, while the salivary gland lesions were the least and present in only 14 patients. Out of 14 patients of salivary gland lesions, incidence of parotid involvement was highest and was present in 10

patients. Among salivary gland lesions, incidence of pleomorphic adenoma was highest and was present in 9 patients.

Out of 35 patients of lymph node lesion, 17 patients were having tuberculous inflammation and 13 patients had reactive/non-specific lymphadenopathy. Out of 5 malignant cases of lymph node, metastatic lesions were the highest which include metastatic deposits from squamous cell carcinoma, which was present in 4 patients, while 1 patient had lymphoma. Among all lymph node lesions, the most common site of lymph node involvement was submandibular region while least common was supraclavicular region, which was present in 11 and 5 patients respectively.

Out of 21 cases of thyroid lesions, 17 patients were having benign neoplastic lesions. Two patients of papillary carcinoma were noted in our study as malignant thyroid lesions.

Table 1: Distribution of all patients according to age.

Age group (in years)	No. of patients
1-10	7
11-20	18
21-30	25
31-40	11
41-50	14
51-60	6
>60	19
Total	100

Table 2: Case distribution of head and neck masses.

Organ involved	Total cases	Inflammatory lesion		Neoplastic lesion	
		Non-specific	Tuberculous	Benign	Malignant
Lymph node	35	13	17	-	5
Thyroid	21	2	-	17	2
Salivary gland	14	3	-	9	2
Soft tissue and miscellaneous	30	8	-	20	2
Total	100	26	17	46	11

Table 3: Distribution of site of involvement of lymph nodes.

Site of lymph node involved	No. of patients
Submandibular	11
Sub-mental	5
Cervical	6
Posterior triangle	9
Supraclavicular	4
Total	35

Table 4: Distribution of various thyroid lesions.

Thyroid lesions	No. of patients
Inflammatory	2
Benign lesions	17
Colloid goitre	11
Follicular lesion	3
Thyroglossal cyst	3
Malignant lesions	2
Papillary carcinoma	2
Total	21

DISCUSSION

FNAC has gradually evolved into an indispensable diagnostic tool for evaluating head and neck swellings. Its origin dates back to 1904, when Grieg et al aspirated trypanosomes from a lymph node in patients suffering from sleeping sickness.[7] Over the following decades, its diagnostic potential expanded significantly. Guthrie contributed by correlating cytological findings with a spectrum of diseases, and later, Martin et al at Memorial Sloan-Kettering Cancer Centre in New York further refined its use in establishing the diagnosis of malignant conditions.[5,8] Since then, FNAC has become widely accepted as a safe, minimally invasive, cost-effective, and reliable method for investigating head and neck swellings.

The present study included 100 patients with head and neck swellings. A notable female predominance was observed, with lesions being more common in women than in men. This pattern is consistent with studies by Fernandes et al and Vijay Tilak et al both of which reported higher incidence in females.[9,10] In contrast, Chauhan et al found a male predominance in their series, highlighting that demographic variations may exist across populations depending on lifestyle, health-seeking behavior, and prevalence of specific underlying pathologies.[4]

In our study, lymph node swellings accounted for the largest group of cases, a finding comparable to those reported by Amatya et al.[11] Lymphadenopathy in the Indian subcontinent is most frequently attributed to infectious etiologies, especially tuberculosis. This is consistent with the burden of tuberculosis in developing nations where it remains endemic. Cytologically, tuberculous lymphadenitis demonstrates a wide

morphological spectrum. In the current series, we observed patterns including epithelioid granulomas with caseous necrosis, epithelioid granulomas without necrosis, necrosis alone without epithelioid granulomas, and necrotic backgrounds with polymorph infiltration with or without granulomas. These patterns are in line with previously reported findings and underline the diagnostic versatility of FNAC in distinguishing tuberculosis from other causes of lymphadenopathy.[12]

When compared with studies from other countries, epidemiological differences become evident. El Hag et al in a five-year study of 225 patients from Saudi Arabia, found reactive/non-specific lymphadenitis to be the most frequent etiology (33%), followed by tuberculous lymphadenitis (21%) and malignant lesions (13%).[13] In contrast, studies conducted in India by Rathod et al and Tariq et al consistently reported tuberculosis as the leading cause of lymph node pathology (42.12% and 36% of cases, respectively), followed by reactive lymphadenitis and metastatic carcinoma.[3,14] These findings demonstrate the influence of geographical and socio-economic factors on disease patterns. The higher prevalence of tuberculosis in developing countries is largely attributed to endemic infection, overcrowding, poor nutritional status, and limited healthcare resources. Conversely, in developed nations, malignant causes are relatively more common. For instance, Cheng in his study of 187 patients in Auckland, New Zealand, found malignancy to account for 50% of head and neck swellings, emphasizing the predominance of neoplastic conditions in industrialized settings.[15] Such observations highlight the importance of tailoring diagnostic approaches according to local disease epidemiology.

Apart from lymphadenopathy, thyroid swellings also represent a significant proportion of head and neck lesions. FNAC is considered the most valuable initial investigation for evaluating thyroid nodules, particularly in euthyroid patients. It prevents unnecessary surgeries in cases of benign nodules while accurately identifying malignant ones that require surgical excision. Moreover, FNAC may be therapeutic in cystic thyroid lesions, as aspiration often leads to involution of the cyst.[16] In our study, among benign thyroid lesions, colloid goiter was the most frequently encountered entity (11 cases), followed by thyroglossal cyst (3 cases) and follicular neoplasm (3 cases). These results are in agreement with global data, which show colloid goiter to be the predominant benign thyroid pathology.

The broader diagnostic importance of FNAC in head and neck swellings has been well established. Haynes et al. reviewed the diagnostic perspectives and emphasized the necessity of systematic evaluation. They highlighted that the first and most crucial step in assessing a neck mass is determining whether it is benign or malignant. Malignant lesions are particularly common in patients above 40 years, especially smokers. The etiology of neck masses can be classified based on their clinical course: acute (infective causes such as bacterial lymphadenitis), subacute (e.g., squamous cell carcinoma), or chronic (e.g., thyroid disease). In cases where history and physical examination are inconclusive, imaging modalities and cytological evaluation become critical. Contrast-enhanced computed tomography (CECT) is recommended as the first-line investigation in adults, while computed tomography angiography is superior to magnetic resonance angiography for assessing pulsatile neck swellings. Once vital structures are excluded, FNAC can be performed safely, providing not only cytological information but also microbiological and cultural data. The diagnostic accuracy of FNAC is remarkable, with sensitivity ranging from 77% to 97% and specificity from 93% to 100% in detecting malignancies.[17]

Thus, the findings of the present study reaffirm the pivotal role of FNAC as an initial diagnostic modality in the evaluation of head and neck swellings. Its high diagnostic accuracy, simplicity, and cost-effectiveness make it especially valuable in resource-limited settings such as India, where tuberculosis remains prevalent. At the same time, the comparative analysis with studies from developed nations underscores the importance of considering epidemiological variations while interpreting results.

CONCLUSION

FNAC is a simple, safe, minimally invasive, and highly cost-effective diagnostic tool for the evaluation of head and neck swellings. In the present study, lymph node lesions formed the largest group, with tuberculous lymphadenitis being the most frequent pathology, reflecting the high prevalence of tuberculosis in India. Thyroid lesions represented the second most common group, with colloid goiter being the predominant benign entity. Malignant lesions, though less frequent, were reliably identified by FNAC. The findings underscore the pivotal role of FNAC as a first-line diagnostic modality in head and neck swellings. Its high sensitivity and specificity, coupled with rapid results and low complication rates, make it invaluable, particularly in resource-limited settings. By providing early and accurate diagnosis, FNAC not only guides appropriate clinical management but also helps avoid unnecessary surgical interventions.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Vemulapalli NK, Chitumalla PK. Study of cervical lymphadenitis, correlation between clinical features, FNAC and histopathology of cervical lymphadenitis. IJCMR. 2016;3(8):2231-4.

2. Sudhakar G, Devi KM. Study of ultra sound guided FNAC of liver lesions. Int J Contemp Med Res. 2017;4(7):1621-3.
3. Ahmad T, Nacem M, Ahmad S, Samad A, Nasir A. Fine needle aspiration cytology and neck swellings in the surgical outpatient. J Ayub Med Coll Abbottabad. 2008:20(3).
4. Setal C, Rathod D, Joshi DS. FNAC of Swellings of Head and Neck Region. Ind J Appld Basic Med Sci. 2011;13(7):1-6.
5. Martin H, Ellis EB. Biopsy of needle puncture and aspiration. Ann Surg. 1930;92:169-81.
6. Lumley JSP. Physical signs. 18th ed. Oxford: Butterworth-Hememann; 1997.
7. Grieg EDW. Gray ACH. Note on the lymphatic glands in sleeping sickness. Br Med J. 1904;1:1252.
8. Guthrie CG. Gland puncture as a diagnostic measure. Johns Hopkins Bull. 1921;32:266-9.
9. Fernandes H. Role of fine needle aspiration cytology in palpable Head and neck masses. J Clin Diagnost Res. 2009:1719-25.
10. Tilak V, Dhaded AV, Jain R. Fine needle aspiration cylology of head and neck masses. Ind J Pathol Microbiol. 2002;45:23-30.
11. Amatya BB, Joshi AR, Singh SK, Panth R, Basnet RB. A study of fine needle aspiration cytology of head and neck masses and their corrobation by histopathology. Post Grad Med J Natnl Acad Med Sci. 2009;6(2).
12. Heerde PV, Miliauskas J, Field A. Lymphnodes. In: Orell SR. Sterrett GF, Whitaker D, eds. Fine needle aspiration cylology; 4th ed. New York: Churchill Livingstone; 2005: 83-124.
13. El Hag IA, Chiedozi LC, Reyees FA, Kollur SM. Fine needle aspiration cytology of head and Neck masses. Seven years' experience in a secondary care hospital. Acta Cyto. 2003;47:387-92.
14. Rathod GB, Parmar P. Fine needle aspiration cytology of swellings of head and neck region. Ind J Med Sci. 2012:66(3):49-54.
15. Cheng AT, Dorman B. Fine needle aspiration cytology the Auckland experience. Aust NZ J Surg. 1992:62:368-72.
16. Cibas ES, Ali SZ. The Bethesda System for reporting thyroid cytopathology. Am J Clin Pathol. 2009;132:658-65.
17. Haynes J, Arnold KR, Aguirre-Oskins C, Chandra S. Evaluation of neck masses in adults. Am Fam Physician. 2015;91(10):698-706.

Cite this article as: Singh S, Bajoliya S, Sharma S, Mourya R. The first prick counts: evaluating head and neck masses with fine needle aspiration cytology. Int J Otorhinolaryngol Head Neck Surg 2025;11:555-9.