

## Original Research Article

# A CLINICAL STUDY OF LATERAL NECK SWELLINGS IN ADULTS IN TERTIARY CARE HOSPITAL

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## ABSTRACT

**Background:** Lateral neck swellings in ENT have various causes, commonly found in the anterior triangle of the neck. Accurate diagnosis through imaging, FNAC, and biopsy is crucial for appropriate treatment, ranging from conservative management to surgery. Understanding incidence, etiology, pathology, and clinical behaviour is important for effective management and follow-up.

**Materials and Methods:** Institutional Ethical committee approval was obtained and informed consent was taken from the study subjects. Patients with lateral neck swellings underwent clinical examination and FNAC, followed by further investigations based on FNAC reports. Lymph node biopsies were taken for histopathological examination. Management was based on the final diagnosis, and patients were followed up for six months. Results were analyzed and tabulated.

**Results:** In our study of 96 patients, lateral neck masses were most common in individuals aged 46-59, with an equal male-to-female ratio. The majority of cases (82.29%) were from low socioeconomic status. Metastasis in cervical lymph nodes was the most frequent cause of lateral neck swellings, primarily in males aged over 45, and tubercular lymphadenitis was the second most common cause in females aged 18-30. The clinical diagnosis had high sensitivity (87.18%) and specificity (92.98%) for detecting malignant lesions, and these values increased when the histopathological examination was used as the gold standard.

**Conclusion:** To evaluate and manage lateral neck swellings, a multidisciplinary approach is necessary, including medical history, clinical examination, imaging, and pathological investigations like FNAC and HPE. Prompt and accurate diagnosis is critical to prevent morbidity and mortality, and management depends on the underlying cause. Effective management requires close communication between the clinician and the pathologist.

**Keywords:** Cervical Lymphadenopathy; non-thyroid neck swellings; Benign; Malignant; Fine-needle aspiration cytology; Histopathological examination; Neck metastasis; Tuberculosis; Lymphoma.

## INTRODUCTION

Neck swellings are a common occurrence in the otorhinolaryngology department. They can be of various types, including congenital, acquired, inflammatory, neoplastic, and non-neoplastic.<sup>[1]</sup> Depending on the incidence of the different causes, neck swellings can be classified into three primary

age groups - paediatric (< 15 years), adults (16-59 years), and elderly (> 60 years).

In the paediatric age group, neck swellings are typically congenital or inflammatory but are rarely malignant. In contrast, adults may present with either inflammatory or malignant neck swellings. The most common cause of neck swelling is tubercular cervical lymphadenitis, which affects approximately 1.5% of the population in India.<sup>[2,3]</sup> Other frequently

encountered swellings include secondaries in the neck, acute lymphadenitis, chronic nonspecific lymphadenitis, and lymphomas.<sup>[4]</sup>

The sternocleidomastoid muscle divides the neck into anterior and posterior triangles, with neck swellings most commonly found in the anterior triangle and rare in the posterior triangle. Anterior triangle swellings can be further divided into anterior midline neck swellings and anterior lateral neck swellings. Anterior lateral neck swellings can be cystic or solid in nature, with the most common being lymph node swellings (both benign and malignant), submandibular salivary gland enlargement, branchial cysts and lipoma. Therefore, Lateral neck swellings can be classified into neoplastic or non-neoplastic to provide the appropriate treatment modality.<sup>[5]</sup>

In this present study, we have tried to review the literature and to know the disease occurrence in the adult age group and its distribution-and to find out the possible etiological factors of the lateral neck swellings with fine needle aspiration cytology and histopathological Correlation and also to summarize the results of different forms of treatment for various lateral neck swellings.

## MATERIAL AND METHODS

The study commenced following approval from the Institutional Ethics Committee of Mysore Medical College and Research Institute, with informed written consent obtained from all participants after a clear explanation of the study's objectives in their preferred language.

Conducted at our tertiary care hospital from January 2021 to June 2022, this study focused on patients aged 18-59 years presenting with lateral neck swellings at the ENT OPD. Exclusions comprised individuals with trauma-related neck swellings, prior radiotherapy, or suspected thyroid-related swellings upon clinical assessment.

Each patient underwent a comprehensive assessment involving detailed history-taking, thorough clinical examination, and relevant investigations as per a predefined proforma. Subsequently, all cases were referred to the pathology department for fine needle aspiration biopsy (FNAC). Further diagnostic steps, including ultrasonography and computed tomography with or without contrast, were pursued based on FNAC findings. Incisional or excisional biopsy followed, with histopathological examination conducted by the pathology department. Clinical, cytological, and histopathological findings were harmonized to establish a definitive diagnosis, guiding appropriate treatment. Patients were diligently monitored at monthly intervals for a minimum of six months, assessing progress through clinical examinations. Data were meticulously compiled, analyzed, and presented in tabular form to yield comprehensive and statistically significant results.

## RESULTS

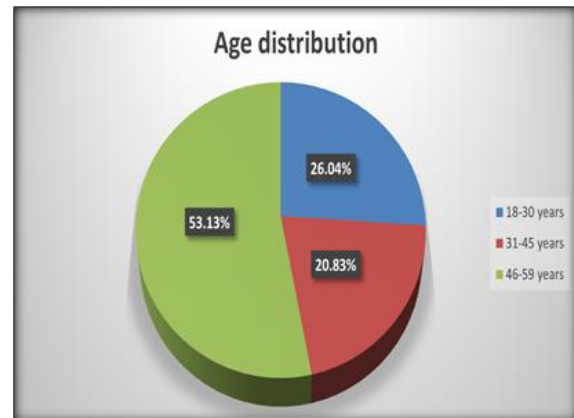


Figure 1: Age Wise distribution of study participants

In the study 96 patients with lateral neck mass were divided into different age groups. The highest incidence of neck mass was noted in the age group 46-59 years.

The distribution of neck swellings varied by age and disease. Chronic sialadenitis was prevalent in the 46-59 years group, while pleomorphic adenoma of the parotid gland was common in 31- 45 years. Mucoepidermoid carcinoma of the parotid and submandibular glands also had higher incidences in the 46-59 years group. [Table 1]

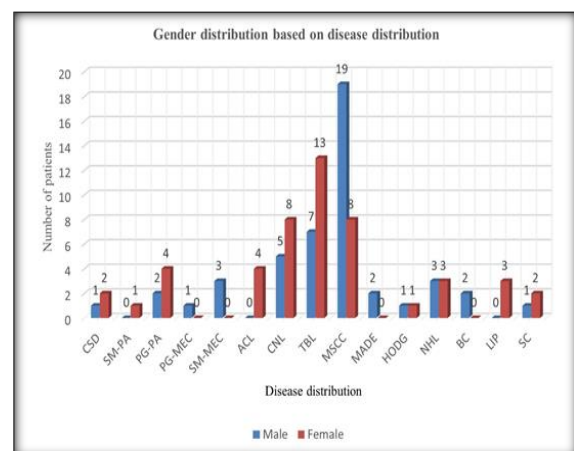
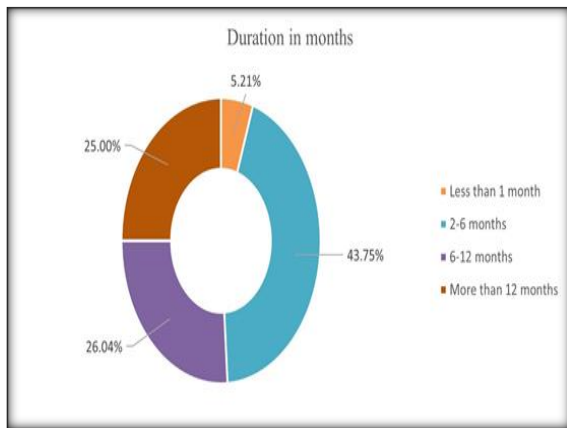


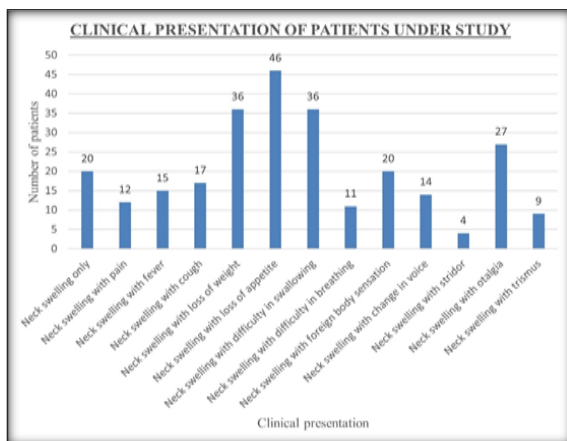
Figure 2: Gender distribution based on disease distribution

With an equal gender distribution 1:1 male: female ratio, we observed gender-specific variations in the incidence of different lateral neck swellings. Chronic sialadenitis and acute suppurative cervical lymphadenitis were more prevalent in females, while mucoepidermoid carcinoma of the parotid and submandibular glands was more common in males. Pleomorphic adenoma of the parotid gland and chronic non-specific lymphadenitis showed higher rates in females.



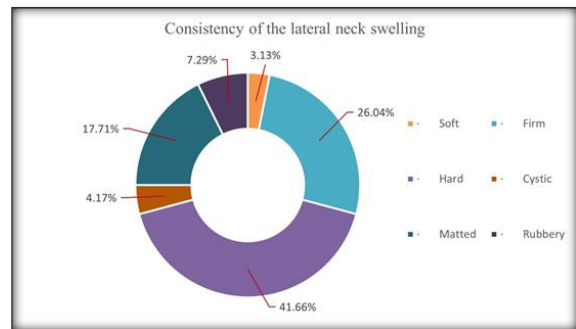
**Figure 3: Duration in Months**

In this study most of the patients are from low socioeconomic status, with 82.29% of the cases. The majority of lateral neck swellings in the adult age group persist between 2 and 6 months. A significant proportion of patients (26.04%) had neck swelling for a duration between 6 and 12 months, while 25% of patients had the neck swelling for more than 12 months. The smallest proportion of patients (5.21%) had the neck swelling for less than 1 month.



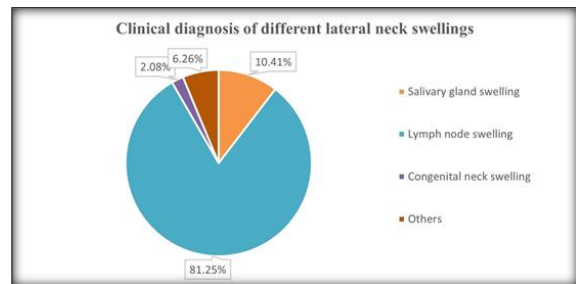
**Figure 4: Clinical Presentation of Study participants**

Among 96 patients, 91.77% of them had unilateral neck mass and only 8.33% resented with bilateral neck swelling. Of the 96 patients, 20 (20.83%) had neck mass as their only complaint, while 12 (12.5%) presented with a neck mass and pain. 15 patients (15.63%) had neck mass associated with fever, 17 (17.71%) with a neck mass and cough, and 36 (37.5%) with a neck mass and difficulty in swallowing. 36 patients (37.5%) also reported a loss of weight, and 46 (47.92%) reported a loss of appetite (most common). 11 patients (11.46%) had neck mass associated with difficulty in breathing, 20 (20.83%) with foreign body sensation in the throat, 14 (14.58%) with changes in voice, 4 (4.17%) with stridor (least common), 27 (28.13%) with otalgia, and 9 (9.38%) with trismus.



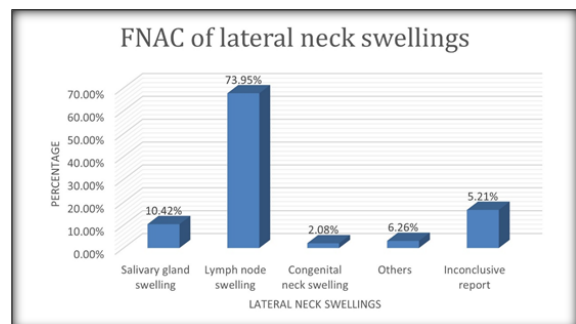
**Figure 5: Consistency of Lateral Neck Swelling**

On clinical examination tenderness was observed in 12.50% of the lateral neck swellings, which suggests that the underlying cause of the swelling may be an acute or infective condition. Among the observed consistencies. Hard consistency, constituting 41.66%, often indicates malignancy or a chronic condition. Firm consistency, at 26.04%, is typically associated with chronic benign conditions or occasionally chronic lymphadenitis. Matted lymph nodes, representing 17.71%, suggest tubercular lymphadenitis. Rubbery consistency, comprising 7.29%, is indicative of lymphomas.



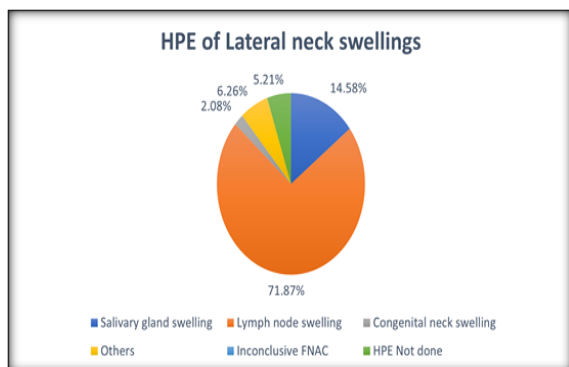
**Figure 6: Clinical Diagnosis of different lateral swellings**

The predominant clinical presentations of lateral neck swellings include lymph node swelling (81.25%), salivary gland swelling (10.41%), other neck swellings (6.26%), and congenital neck swellings (2.08%). Among salivary gland swellings, 7.29% involve the parotid gland, 2.08% present as chronic sialadenitis, and 1.04% as submandibular gland tumors. Lymph node swellings are primarily attributed to secondary metastatic involvement (38.54%), followed by tubercular lymphadenitis (21.88%) and chronic lymphadenitis (15.63%).



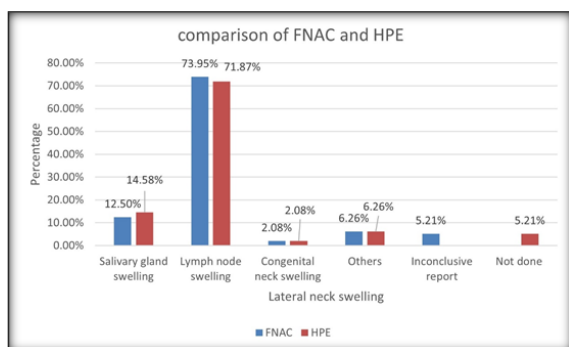
**Figure 7: FNAC of lateral neck swellings**

Fine Needle Aspiration Cytology (FNAC) analysis of lateral neck swellings revealed lymph node swellings as the most prevalent, constituting 73.95% of cases. Salivary gland swellings were identified in 12.5% of cases, with pleomorphic adenoma of the parotid gland being the most common 6.25%. Chronic sialadenitis accounted for 3.13% of cases. Malignant metastasis was the most frequent diagnosis in lymph node swellings, comprising 28.13% of cases, followed by tubercular lymphadenitis (17.70%) and chronic lymphadenitis (13.54%).



**Figure 8: HPE of lateral neck swellings**

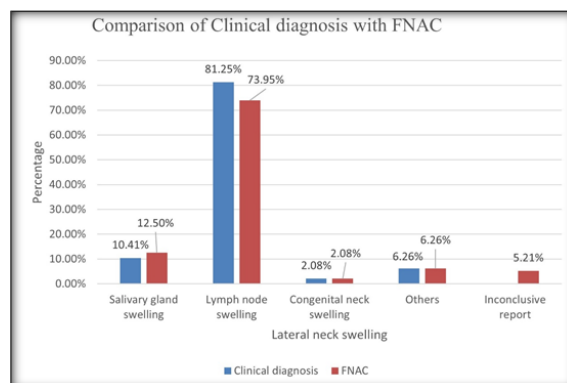
Histopathological examination (HPE) findings reveal that lymph node swelling is the most prevalent type (71.87%) among lateral neck swellings, followed by salivary gland swellings (14.58%) and other neck swellings (6.26%). Congenital neck swelling is the least common. In addition, 5.21% of the cases HPE was not done in 4 patients with acute suppurative lymphadenitis and 1 patient with secondary metastatic lymphadenopathy did not give consent for biopsy. Among salivary gland swellings, Pleomorphic adenoma of the parotid gland is the most common followed by chronic sialadenitis and Mucoepidermoid carcinoma of the submandibular gland.



**Figure 9: Comparison between FNAC and HPE**

In our study, FNAC demonstrated significant accuracy in diagnosing various lateral neck swellings. Specifically, FNAC exhibited a 95.65% positive correlation with HPE results for lymph node swellings, and a 100% correlation for congenital and other neck swellings. However, its

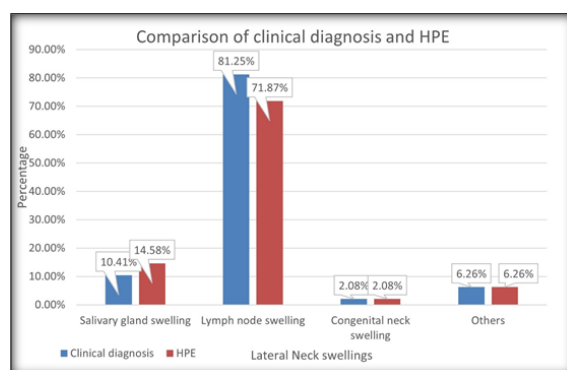
accuracy was slightly lower for salivary gland swellings at 85.71%. FNAC showed a sensitivity, specificity, and accuracy of 95.00%, 100%, and 97.80% respectively in detecting malignant lesions, with a 100% positive predictive value and a 96.23% negative predictive value.



**Figure 10: Comparison of clinical diagnosis with FNAC**

Clinical diagnosis alone showed varied accuracy across different types of neck swellings. It exhibited a relatively low accuracy of 71.43% for salivary gland swellings, emphasizing the necessity of confirming diagnoses with methods like HPE. However, clinical diagnosis performed better for lymph node swellings, with an accuracy of 89.61%. Congenital and miscellaneous neck masses were diagnosed accurately in all cases.

The sensitivity, specificity, and accuracy of clinical diagnosis in detecting malignancy were 87.18%, 92.98%, and 90.62% respectively, with positive and negative predictive values of 89.47% and 91.38% respectively. The chi-square statistic is 62.2208, the P value is < 0.00001 and it is statistically significant at  $p < 0.05$ . [Table 2]



**Figure 11: Comparison of clinical diagnosis with HPE**

Similar to the comparison with FNAC, clinical diagnosis alone had a lower accuracy for salivary gland swellings at 71.43%. However, it was more accurate for lymph node swellings, at 89.61%. Congenital and miscellaneous neck masses were consistently diagnosed accurately. In the cases where HPE was not performed, diagnosis relied on FNAC.

The sensitivity, specificity, and accuracy of clinical diagnosis in detecting malignant lesions were 87.50%, 96.08%, and 92.31% respectively, with positive and negative predictive values of 94.59% and 90.74% respectively. The Chi-square statistic is

64.903, P value is < 0.00001 and it is statistically significant at  $p < 0.05$ . [Table 3]

**Table 1: Age wise distribution**

Disease distribution	18-30	31-45	46-59	Total
Chronic sialadenitis (CSD)	0	1	2	3
Pleomorphic adenoma of submandibular salivary gland (SM-PA)	0	0	1	1
Pleomorphic adenoma of parotid gland (PG-PA)	2	3	1	6
Mucoepidermoid carcinoma of parotid gland (PG-MEC)	0	0	1	1
Mucoepidermoid carcinoma of submandibular gland (SM-MEC)	0	0	3	3
Acute cervical lymphadenitis (ACL)	2	2	0	4
Chronic non-specific lymphadenitis (CNL)	4	5	4	13
Tubercular lymphadenitis (TBL)	9	6	5	20
Metastatic squamous cell carcinoma (MSCC)	0	3	24	27

**Table 2: Sensitivity and accuracy of clinical diagnosis in comparison with FNAC**

		FNAC		Total
		Malignant	Benign	
Clinical diagnosis	Malignant	34	4	38
	Benign	5	53	58
Total		39	57	96

**Table 3: Sensitivity and accuracy of clinical diagnosis in comparison with HPE**

		HPE		Total
		Malignant	Benign	
Clinical diagnosis	Malignant	35	2	37
	Benign	5	49	54
Total		40	51	91

**Table 4: Surgical treatment in the patients under study**

Final Diagnosis	Number of patients (n=96)	Surgery
<b>Salivary gland swellings</b>		
Chronic sialadenitis of the submandibular salivary gland	3	Submandibular gland excision
Pleomorphic adenoma of submandibular salivary gland	1	Submandibular gland excision
Mucoepidermoid carcinoma of submandibular salivary gland	3	MRND + PORT
Pleomorphic adenoma of the Parotid gland	6	Superficial parotidectomy
Mucoepidermoid carcinoma of Parotid gland	1	Total parotidectomy with MRND + PORT
<b>Lymph node swellings</b>		
Chronic Lymphadenitis	13	Lymph node excision biopsy
Tubercular lymphadenitis	20	Lymph node excision + ATT
Metastatic squamous cell carcinoma	27	
Carcinoma Supraglottis	7	Total Laryngectomy + MRND + PORT
	2	Lymph node excision + RT
Carcinoma Hypopharynx	5	Total Laryngectomy + MRND + PORT
	2	Lymph node excision + RT
Carcinoma Tongue	1	Hemi glossectomy + MRND + PORT
	2	Partial glossectomy + MRND + PORT
Carcinoma Buccal mucosa	4	Wide local excision + MRND + PORT
Carcinoma Tonsil	1	Lymph node excision + RT
Carcinoma Lip	2	Wide local excision + MRND + PORT
Carcinoma Base of tongue	1	Lymph node excision + RT
Metastatic adeno carcinoma	2	Lymph node excision + CRT
Hodgkin's lymphoma	2	Lymph node excision + Cyclophosphamide,

MRND- Modified Radical Neck Dissection, PORT- post operative radiotherapy, RT- Radiotherapy, ATT- Anti tubercular therapy, CRT- Chemo Radiation therapy. [Table 4]

## DISCUSSION

The current research examined 96 patients with palpable lateral neck masses, evenly split between genders. Findings revealed that 26.04% were aged 18-30, 20.83% aged 31-45, and 53.13% aged 46-59. These results align with Athavale et al,<sup>[2]</sup> study, which also showed a comparable age distribution. However, Karthikeyan et al,<sup>[3]</sup> study included all age groups, whereas our study focused on those 18 and older. Both our study and previous ones observed a 1:1 male-to-female ratio among participants.

In our study, the primary etiology observed was metastasis in cervical lymph nodes, predominantly in males aged over 45. Tubercular lymphadenitis emerged as the second most common cause, prevalent among females aged 18-30, followed by chronic non-specific lymphadenitis among females aged 31-45. Lymphomas were commonly found in those above 45, with an equal gender distribution. These findings are consistent with Athavale et al,<sup>[2]</sup> Karthikeyan et al,<sup>[3]</sup> and Jeevaraman et al,<sup>[4]</sup> albeit differing in the order of prevalence of primary causes. Moreover, our study, along with those by Ravi Merhotra et al,<sup>[5]</sup> and Biswas et al,<sup>[6]</sup> underscored a higher likelihood of malignant lesions among male patients, potentially linked to habits like smoking and alcohol consumption, established risk factors for malignancies.

82.29% of patients were from a lower socioeconomic background, aligning closely with Karthikeyan et al,<sup>[3]</sup> findings, where 87.3% of participants shared a similar socioeconomic status. These results highlight the pervasive influence of lower socioeconomic status within the study population, potentially affecting their health outcomes.

Among 96 individuals with palpable lateral neck masses, the majority (73.95%) were attributed to cervical lymph nodes, followed by 14.58% from salivary glands, 2.08% due to congenital causes, and 6.25% classified as miscellaneous masses. The prevalence of lymph node masses aligns with previous studies by Mui et al,<sup>[7]</sup> Frable et al,<sup>[8]</sup> and Mobley et al.<sup>[9]</sup> Salivary gland masses were predominantly pleomorphic adenomas, consistent with Shariff MA et al<sup>[10]</sup>, Tilak et al.<sup>[11]</sup>

Clinical diagnosis for salivary gland masses achieved 71.43% accuracy, with variations in diagnosing benign versus malignant parotid and submandibular tumors. FNAC displayed an 85.71% diagnostic accuracy, akin to Poorey VK et al<sup>[12]</sup> and Basista H et al,<sup>[13]</sup> studies.

In tubercular lymphadenitis cases, FNAC's diagnostic accuracy was 61.90%, lower than Rajbhandari M et al,<sup>[14]</sup> findings but similar to Shariff MA et al<sup>[10]</sup> and Deshpande et al,<sup>[15]</sup> studies. However, FNAC's diagnostic accuracy increased to 80.95% when compared to HPE.

In our study, when considering fine needle aspiration cytology (FNAC) as the gold standard,

clinical diagnosis demonstrated a sensitivity of 87.18% and specificity of 92.98%, with positive predictive value (PPV), negative predictive value (NPV), and accuracy of 89.47%, 91.38%, and 90.62% respectively. These results align with Athavale V et al,<sup>[2]</sup> study, which also regarded FNAC as the gold standard, showing similar sensitivity, specificity, PPV, NPV, and accuracy. Considering histopathological examination (HPE) as the gold standard, clinical diagnosis exhibited a sensitivity of 87.50%, specificity of 96.08%, and an overall efficiency of 92.31%, with PPV and NPV of 94.59% and 90.74%, respectively. These findings correspond with studies by Chamyal et al,<sup>[1]</sup> and Athavale V et al.<sup>[2]</sup>

Issing WJ et al<sup>[16]</sup> also noted improved survival rates in patients who underwent surgery with neck dissection followed by postoperative radiotherapy compared to those who received primary radiotherapy alone. Hence, the recommended treatment for cervical metastasis involves surgical intervention followed by postoperative radiation therapy to optimize outcomes. For patients with Tubercular lymphadenitis, treatment with the DOTs regimen CATEGORY I, consisting of 6 months of antitubercular therapy, was effective without surgical intervention. This concurs with studies by Jeevaramam DS et al,<sup>[4]</sup> and Dhull K et al,<sup>[17]</sup> which demonstrate the efficacy of anti-tuberculosis therapy as primary treatment with positive prognoses.

## CONCLUSION

Fine-needle aspiration cytology (FNAC) and histopathological examination are necessary for a final diagnosis of different types of lateral neck swellings, whether they are benign or malignant in nature. FNAC can help make a prompt diagnosis, but it should not replace histopathological diagnosis. Therefore, these two methods should be used in conjunction with other diagnostic tools to achieve a more precise and accurate diagnosis for appropriate management. It is also essential to maintain communication between the clinician and pathologist to ensure diagnostic accuracy. The management of lateral neck swellings depends on the underlying cause. Conservative management or excisional biopsy is appropriate for benign swellings. However, malignant swellings require more aggressive treatment, such as surgery, chemotherapy, and/or radiation therapy, depending on the type and stage of cancer. Patients after appropriate management with surgery or radiotherapy should be checked at regular intervals with clinical examinations and imaging studies to detect recurrence and to reduce further morbidity.

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