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## A Prospective Clinicopathological Study of Lateral Neck Masses

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### Abstract

**Background:** To study the clinical profile of lateral neck masses in general population in Central India; different etiological, its diagnosis and management & different investigation and treatment option of lateral neck masses **Methods:** 100 study subjects with lateral neck masses excluding thyroid and salivary gland swelling to department of otorhinolaryngology, clinical presentation and relevant investigation were analysed and appropriate management was carried and followed up at 15 days, 1 month and 3 months. **Results:** Male 72% and female 28% Malignant cases were 62% Benign were 38%. The various pathologies were malignant secondary (53%), tuberculosis (12%), cervical abscess (8%), and Reactive / granulomatous lymphadenitis (7%). Dysphagia (37%) was the most common complaint, followed by Difficulty breathing (32%), cough (28%), fever (25%), voice change (21%). FNAC correctly diagnosed 92% with sensitivity of 91.4% and specificity 63% of our cases, with USG provided initial diagnosis in 87% cases. Histopathology showed 100% accuracy. Malignant secondaries were most often treated with chemotherapy and radiotherapy (98.1%), followed by surgical resection (22.6%) **Conclusions:** This study highlights the diverse etiologies and clinical presentations of lateral neck masses, and various diagnostic approach and their role in the initial evaluation of these masses for continued research to improve diagnostic and therapeutic strategies.

**Keywords:** Malignant secondaries, TB lymphadenitis, FNAC, HPE, chemotherapy.

### Introduction

Lateral neck masses (LNM) are defined as abnormal growths or swellings situated in the lateral aspect of the neck, specifically within the posterior triangle, delineated anatomically by the posterior border of the sternocleidomastoid, the anterior border of the trapezius, and the clavicle. These masses encompass a variety of conditions ranging from congenital tumours, inflammatory diseases, benign neoplasms, to malignant neoplasms, excluding thyroid and skin tumours. <sup>(1)</sup>In the adult population, the presence of a lateral neck mass often indicates a metastatic tumour originating from a primary cancer, commonly found in the upper respiratory or alimentary tract. <sup>(2)</sup>Malignancy is rare in young children but can be seen in older children and adolescents, accounting for about 12 to 15% of all neck masses in children. Common pathologies identified in children include reactive lymphadenopathy, lymphadenitis, and atypical mycobacterial infections. <sup>(4)</sup>Clinical and Ultrasound Findings play a pivotal role in establishing a differential diagnosis for lateral neck masses <sup>(4,5)</sup> Exclusion of Central Neck Swellings: The omission of central neck swellings, which commonly involve thyroid swellings and midline masses such as thyroglossal cysts, is deliberate in order to streamline the focus towards lateral neck masses. This deliberate exclusion aids in delineating the differences in etiology and clinical implications between lateral and central neck swellings<sup>(5,6)</sup>. <sup>(7)</sup>The early and accurate detection of malignant masses can substantially enhance the prognosis by providing efficient treatment plans.

### Methods

#### Inclusion Criteria-

1. All patients who presented to the ENT OPD with lateral neck Masses
2. All neck masses of benign, malignant, infective and inflammatory nature.

**Exclusion Criteria-**

1. Patients who had midline neck masses i.e thyroid swelling, ranula and thyroglossal cysts.
2. Patients who weren't willing to participate in the study.

Patients of all ages with clinical diagnosis of lateral neck masses. The patients suffering from lateral neck masses were screened on the basis of history examination and relevant investigation. After relevant investigation

appropriate conservative or surgical management was carried out depending on the pathological diagnosis. Patients were asked to follow up at 15 days, 1 month and 3 months. Patient's particulars,

**Results**

-In Present study out of 100 patients male 72(72%) and female 28(28%) [Table 1]

**Table 1:** Distribution of patients with respect to age and benign/malignant disease.

Age	Benign	Malignant
10 and below	3 (100%)	0 (0%)
11 – 20	6 (85.7%)	1 (14.3%)
21 – 30	7 (58.3%)	5 (41.7%)
31 – 40	6 (60.0%)	4 (40.0%)
41 – 50	12 (54.5%)	10 (45.5%)
Above 50	4 (8.7%)	42 (91.3%)
p-value	p= .001	

The most common pathology in our study was a malignant secondary (53%), followed by tuberculosis (12%), cervical abscess (8%), and Reactive / granulomatous lymphadenitis (7%), Spindle cell neoplasm was the rarest presentation in our study (1%).

The commonest pathology among males was malignant secondaries (65.3%), followed by tuberculosis (8.3%). Whereas women were equally likely to have malignant secondaries or tuberculosis (21.4% each). [Table 2]

**Table 2:** Distribution of patients with respect to benign and malignant disease.

	No of pt(%)
Benign	9 (9.0)
Malignant	62 (62.0)
Inflammatory lesions	29 (29.0)

In patients' who smoked, malignant secondaries (86.1%) was the most common diagnosis, followed by cold abscess

(11.1%), and reactive lymphadenitis (2.8%). [Table 3]

**Table 3:** Distribution of patients with respect to habits and benign/malignant disease.

		No Habits	Smoking	Chewing tobacco	Alcohol
Benign	No of pt	23	5	10	6
	%	69.7%	13.9%	18.5%	18.8%
Malignant	No of pt	10	31	44	26
	%	30.3%	86.1%	81.5%	81.3%
p-value		.001	-	-	-

Malignant secondaries (81.5%) was the most common diagnosis in the tobacco chewers, followed by cold abscess (5.6%), lipoma (3.7%), cervical abscess (3.7%), pharyngeal abscess (3.7%), and schwannoma (1.9%).

antecedent illness, clinical presentation, physical examination, laboratory evaluation and radiological findings were analysed. FNAC was successful in correctly diagnosing 66.7% patients with tubercular lymphadenitis, 57.1% cases of reactive lymphadenitis, and only 33.3% cases of carotid body tumours. It failed to diagnose either of the two cases of schwannomas (0%).[Table 5]

Alcohol consumption was also most commonly seen in patients with malignant secondaries (78.1%), followed by cold abscess (9.4%), lipoma (6.3%), NHL (3.1%), and cervical abscess (3.1%).

Patients who did not consume tobacco in any form, and did not drink alcohol had a benign diagnosis in 69.7% cases as the age group was lesser in those patients. Whereas among those who smoked and consumed alcohol, 86.1% and 81.5% respectively, had a malignant disease. While among those who consumed alcohol, 81.3% had a malignant disease. These findings were found to be significant with a p-value of 0.001.

**Table 5:** Correlation between FNAC results and Histopathology results.

Final Diagnosis	FNAC	Histopathology
Malignant secondaries(53)	53	53
Cold abscess(9)	9	9
TB lymphadenitis(3)	2	3
NHL(4)	4	4
HL(4)	4	4
Lipoma(4)	4	4
Reactive /granulomatous lymphadenitis(7)	4	7
Carotid body tumor/paraganglioma(3)	1	3
Cervical abscess(5)	5	5
Spindle cell neoplasm(1)	1	1
Schwannoma(2)	0	2
Total (95)	82	95

Overall FNAC correctly diagnosed 92% of our cases which was statistically significant. 95% patients required an FNAC as part of the workup to assess the lateral neck swelling, while only 5% patients were managed without an FNAC with sensitivity of 91.4% and specificity of 63%.

USG was done for all the patients. It could successfully diagnose all cases of NHL (100%), reactive lymphadenitis (100%), and cervical abscesses (100%). USG was also successful in correctly diagnosing the majority of cases of malignant secondaries (92.5%), cold abscesses (88.9%), Hodgkin's lymphoma (75%), lipomas (75%), and carotid body tumours (66.7%). Whereas it wasn't quite specific in diagnosing cases of tubercular lymphadenitis (33.3%), pharyngeal abscesses (50%), or schwannoma (50%). Overall, USG provided a correct initial diagnosis in 87% cases.

Using computed tomography, a correct diagnosis was possible in all cases of cold abscess, tubercular lymphadenitis, NHL, Hodgkin's, lipoma, carotid body tumour, cervical abscess, pharyngeal abscesses, and schwannomas. A majority of malignant secondaries (98.1%) were also correctly diagnosed. However, it failed to correctly diagnose the lone case of a spindle cell neoplasm. Overall accuracy of CT scans was 98% in our study.

Patients suffering from malignant secondaries were most

often treated with chemotherapy and radiotherapy (98.1%), followed by surgical resection (22.6%), Neck dissection (17%). Those that had tuberculosis were exclusively treated with medical therapy (100%). Patients diagnosed with Lymphomas were treated with CT (100%), and surgery (25%). The cases requiring surgical management are lipomas, schwannomas, carotid body tumor and spindle cell neoplasm. Both medical and surgical treatment was required in cervical and para pharyngeal abscess. Patients diagnosed with lymphomas were treated with CT (100%). Cases of lipoma received surgical treatment (100%). All patients of reactive/granulomatous lymphadenitis were treated with medical therapy (100%). Carotid body tumour/paraganglioma cases were treated surgically (100%). Patients of cervical abscesses required both medical (87.5%) and surgical (62.5%) treatment. Those that had parapharyngeal abscess received both medical (100%) and surgical (50%) treatment as well. Simple cell neoplasm and Schwannoma cases were treated by surgical intervention (100%).

### Discussion

The current study aimed to provide a comprehensive clinicopathological profile of lateral neck masses, excluding thyroid and salivary gland swellings, by analysing 100 patients.

**Table 6:** Comparison of age group.

	Present Study	Manjula et al	Despande et al
Most common age grp (in yrs)	>50 yrs	>50yrs	11-20
Percentage (%)	46%	26.78%	26.78%

A particular age group may be more susceptible due to cumulative exposure to risk factors or age-related biological changes, environmental factors, health seeking behaviour, and personal habits. Understanding these patterns can aid in early detection and management for patients within a particular demographic.

Another aspect of our findings pertains to the distribution of benign, malignant, and inflammatory cases. Our study revealed that malignant masses were the predominant type, followed by inflammatory and benign conditions. This distribution provides an interesting comparison with other studies in the literature

**Table 7:** Comparison of benign and malignant cases.

	Present study	Manjula et al(11)	Despande et al (12)	Danle P et al (13)
Malignant	62%	27.36%	25.44%	-
Benign	32%	74.56%	74.56%	55%

Our findings are in an excess of those reported in earlier studies, this could be due to the health seeking behaviour, patients presenting late with complications. It could also be because ours is a tertiary care centre, and a good proportion

are referrals.

In our study, we examined the association between lifestyle factors such as alcohol consumption, smoking, and tobacco use with the type of lateral neck mass, whether benign or

malignant. 36% consuming alcohol, 31% smokers, and 35% used tobacco. Interestingly, a significant correlation was observed between these lifestyle factors and the incidence of malignant diseases. Specifically, 85.71% of the patients who consumed alcohol had malignant masses, and 86.1% of smokers and 81.5% of tobacco users were also diagnosed with malignant conditions. In contrast, the majority of patients with benign masses (69.7%) did not engage in these lifestyle habits as the patients were of young age group.

In comparison, Landler et al.<sup>(14)</sup> found that Smoking has been identified as a factor that elevates the likelihood of head and neck cancer (HNC), exhibiting the highest level of risk in laryngeal cancer (current smoker hazard ratio [HR], 9.36; 95% CI, 5.78-15.15 compared to a nonsmoker) The above significant link between alcohol, smoking, tobacco use, and malignancy emphasizes the need for public health interventions and lifestyle modifications and

assessing for counselling and support for lifestyle.

We compared the diagnostic accuracy of FNAC against histopathology results for various conditions. The accuracy of FNAC in diagnosing malignant secondaries was 100 %, cold abscesses 100%, tuberculosis 66.7%, non-Hodgkin's lymphoma (NHL) 100%, Hodgkin's lymphoma 100%, lipoma 100%, reactive lymphadenopathy 57.1%, carotid body tumor 33.3%, cervical abscess 100%, spindle cell tumors 100%, and schwannoma 0%. Overall, FNAC correctly diagnosed 92% of the cases when compared with HPE with sensitivity of 91.4% and specificity of 63% The high diagnostic accuracy of FNAC underscores its value as an excellent initial investigative tool

In present study the accuracy is 92% compared to Khajuria et al<sup>(8)</sup> 87.5% and Nadesan et al<sup>(9)</sup> 96.33%.The sensitivity and specificity of present study is 91.4% and 63% compared to Mobley et al<sup>(10)</sup> 94.4% and 97%respectively [Table 8]

**Table 8:** Comparison of accuracy, sensitivity, specificity.

	Present study	Khajuria Et al	Nadesan Et al	Mobley Et al
Accuracy	92%	87.5%	96.33%	
Sensitivity	91.4%	-	-	94.4%
Specificity	63%	-	-	97%

The accuracy of USG in diagnosing malignant secondaries was 92.5%, cold abscesses 88.9%, tubercular lymphadenopathy 33.3%, non-Hodgkin's lymphoma (NHL) 100%, Hodgkin's lymphoma 75%, lipoma 75%, reactive lymphadenopathy 100%, carotid body tumor 66.7%, cervical abscess 100%, spindle cell tumors 0%, and schwannoma 50%. Overall, USG correctly diagnosed 87% of the cases when compared with the final diagnosis. USG is non-invasive, readily available, and provides real-time imaging, making it an indispensable tool in clinical practice. Das et al<sup>15</sup> (98%) and James et al<sup>16</sup> (1000%)

The accuracy of CT scan in present study is 97.14%. Patil et al<sup>17</sup> 97.5% and Shrestha et al<sup>18</sup> is 97.95%

The accuracy of CT scans in diagnosing malignant secondaries was 98.1%, cold abscesses 100%, tuberculosis 100%, non-Hodgkin's lymphoma (NHL) 100%, Hodgkin's lymphoma 100%, lipoma 93%, reactive lymphadenopathy 100%, carotid body tumor 100%, cervical abscess 100%, spindle cell tumors 0%, and schwannoma 100%. Overall, CT scans correctly diagnosed 97.14% of the cases when compared with the final Chaturvedi et al. however observed CT scan sensitivity rate of 72.2% in their study, with a specificity of 69.6% and a positive predictive value of 78.8%.

Patients have undergone surgical correction in 39.8% , 40.54% in present study and in study conducted by Despande et al respectively and chemotherapy and radiotherapy has been the treatment in 98.11%, 27.02%, 81.6%, 70%, 87% in present study and study conducted by Despande et al , Endicott et al<sup>19</sup>, Huo et al<sup>20</sup> , Kumai et al<sup>21</sup> respectively

In present study 100% of patients with NHL and HL receiving chemotherapy showed complete response. Non hodgkins lymphoma patients of 90%, 80% response to chemotherapy in Duan et al<sup>22</sup>, Gisselbrecht et al<sup>23</sup> 1% , 9%, 16.6% of patients in present study ,Asaduzaman et al<sup>24</sup> ,Azad et al<sup>25</sup> showed relapse to ATT respectively

Medical treatment was given to 40%, 47.5%, 47.49% of patients and surgical and medical management was given to 60% , 52.2%, 52.21% in present study , Rizzo et al<sup>(26)</sup>, Motaahari et al<sup>(27)</sup> with neck abscess respectively.

Granulomatous and reactive lymphadenitis (100%) were successfully treated with antibiotics alone. When compared with Leung et al, with 90%. Neven et al. reported that cases with granulomatous lymphadenitis secondary to non-tubercular mycobacterial infection or cat scratch disease and refractory to antibiotics, had complete resolution following lymph node excision with no need for further surgical procedures.<sup>(28,29)</sup> The high success rate of antibiotic therapy underscores its importance as the first-line treatment for neck abscesses. However, the need for surgical drainage in a subset of patients emphasizes the necessity of a flexible treatment approach.

**Conclusion:**

This study highlights the diverse etiologies and clinical presentations of lateral neck masses, emphasizing the importance of a comprehensive diagnostic approach. The high diagnostic accuracy of FNAC, USG, CT scans and HPE underscores their critical role in the initial evaluation of these masses. Treatment outcomes vary by disease type, with generally favourable results for reactive and granulomatous lymphadenitis and some challenges in managing malignant secondaries and lymphomas. These findings provide valuable insights into the management of lateral neck masses and the need for continued research to improve diagnostic and therapeutic strategies

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Informed Consent: Informed consent was obtained from all individual participants included in this study.

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