# **Original Research Article**

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# The clinical study and management of lateral neck masses

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#### **ABSTRACT**

**Background:** Tumors of neck are especially interesting to surgeons because of complex neck anatomy and difficult differential diagnosis. The aim is to study different type of lateral neck masses excluding thyroid and salivary swellings, there relation with age and se, there clinical features, presentation, and complications, diagnostic modalities and treatment according to the diagnosis and miscellaneous and rare lumps in the neck.

**Methods:** The study was conducted at Shri Vasantrao Naik Government Medical College, Yavatmal, Maharashtra, India from January 2012 to December 2015. In cases of tubercular lympahdenopathy, patients are treated with antitubercular chemotherapy regime DOT's. In cases of malignant secondaries in neck, patients were offered radical neck dissection, radical radiotherapy or neoadjuvant chemotherapy followed by neck dissection.

**Results:** Total 228 patients are studied. 74.56% were benign and 25.44% were malignant. Most common age group affected was 11-20 years. Malignant lesions were more common after 50 years. Male female ratio was nearly equal. Most common lesion overall was tubercular lymphadenopathy followed by malignant lymph nodes.

**Conclusions:** Lymphadenopathy predominated lateral neck swellings of which tubercular lymphadenopathy found to be commonest followed by malignant secondries. Tubercular infections are common during  $1^{st}$  and  $2^{nd}$  decade, while malignant lesions after  $5^{th}$  decade. FNAC was most common and most effective investigation. Treatment varies according to the cause of lateral neck mass.

Keywords: Lymph nodes, Neck

#### INTRODUCTION

Tumors of neck are especially interesting to surgeons because of complex neck anatomy and difficult differential diagnosis. They arise from definite anatomic structure and are very common in surgical OPD. Every time when a surgeon sees a neck mass, he has several questions in his mind like, weather it is congenital or acquired, inflammatory or non-inflammatory; tissue of origin; benign or malignant; primary or secondary lesion; if secondary, then source of primary; or could it be occult primary and what are the required diagnostic tools and treatment etc.<sup>1</sup>

All such queries make these neck masses, an important cause of concern. In India, incidence of tuberculosis

followed by head and neck malignancy are high. Most of the patients are from rural areas and usually present late. Patients are usually reporting with secondries in neck and usually they are not aware of primary lesion. As well as high incidence of tuberculosis make it important to rule out it first and then search for other causes.<sup>2</sup>

Secondly in India, home deliveries are still common, hence newborns with congenital anomalies present late.<sup>2</sup>

The aim was to study different type of lateral neck masses excluding thyroid and salivary swellings; there relation with age and sex; there clinical features, presentation, and complications; diagnostic modalities and treatment according to the diagnosis and miscellaneous and rare lumps in the neck.

#### **METHODS**

The study was conducted at Shri Vasantrao Naik Government Medical College, Yavatmal, Maharashtra, India from January 2012 to December 2015.

All patients attending the surgery OPD with neck swelling excluding thyroid and salivary gland swellings were included in the study.

Patients are evaluated as a whole, starting with clinical history and examinations as per-proforma. A provisional diagnosis is established and further investigations in the form of complete blood count, ESR, chest x-ray, FNAC, biopsy, computed tomography done. In some cases special investigations like ELISA, PCR has been done. After coming to final diagnosis, plan of treatment had been decided. Patients are divided according to age and sex. In cases of lympahdenopathy where the diagnosis was not established with FNAC, biopsy was performed and efficacy of FNAC has been calculated.

In cases of tubercular lympahdenopathy, patients are treated with antitubercular chemotherapy regime DOT's. In cases of malignant secondaries in neck, patients were offered radical neck dissection, radical radiotherapy or neoadjuvant chemotherapy followed by neck dissection. Patients with lymphomas were treated by standard chemotherapy regimes. Miscellaneous and rare swellings were studied according to presentation, investigations and treatment required. Clinicopathological correlation was judged in them.

### **RESULTS**

Table 1: Relative prevalence of benign and malignant swellings.

Swellings	No. of cases	Percentage
Benign	170	74.56%
Malignant	58	25.44%
Total	228	100

Benign swellings found predominantly than malignant swellings in a ratio of 3:1.

Table 2: Prevalence of cases according to age group.

Age	No. of cases	Percentage
< 10	39	17.1%
11-20	61	26.75%
21-30	45	19.73%
31-40	32	14.03%
41-50	16	7.01%
>50	35	15.35%
Total	228	100%

Maximum number of case, are found in second decade, 26.75% with first three decades constituting 65% of cases. Most of patients after 5th decade are malignant.

Table 3: Prevalence according to sex.

Sex	No. of cases	Percentage
Male	115	50.43%
Female	113	49.57%
Total	228	100%

Both sexes have approximately similar prevalence of cases.

Table 4: Distribution of cases according to sex.

Diagnosis	Males	Females	Total
Tuberculous lymphadenitis	38	73	111
Secondary malignant LN	31	06	37
Lymphomas	13	08	21
Suppurative lymphadenitis	4	12	16
Non-specific lymphadenopathy	4	03	07
Others	25	11	36
Total	115	113	228

Thus tubercular lymphadenopathy is found common in females and malignant lymph nodes are found common in males.

Constitutional symptoms are found more commonly associated with tubercular lymphadenopathy followed by lymphomas. Dysphagia, change in voice is found mainly in malignant secondary lymphadenopathy. Swelling was found to be most common complaint.

Matted lymph nodes are found mainly associated with tuberculous lymphadenopathy, rubbery nodes in lymphomas and hard fixed nodes in malignant secondary. The complications like abscess and sinus formation are found associated with long duration symptomatology i.e. more than 5 months.

Mean duration of presentation was maximum for miscellaneous lesions and minimum for suppurative lymphadenopathy.

Smoking was found commonly associated with carcinoma of oropharynx and pyriform fossa. Tobacco chewing was found to be associated with carcinoma of oral cavity. Patients who did not have any addiction were of secondaries from testis, stomach, esophagus etc.

Table 5: Symptomatology of respective diseases.

Diagnosis	Fever	Anorexia	Pain	Pus	Dysphagia	Dyspnoea	Voice change	Trismus	Cough	Only swelling
TB nodes	45 (54%)	31 (27.9%)	3 (2.7%)	11 (9.9%)	-	1 (0.9%)	-	-	7 (6.3%)	53 (47.77%)
Nonsp. LN	4 (57.1%)	-	-	-	-	-	-	-	-	3 (42.85%)
Malignant secondries	-	8 (21.62%)	5 (13.5%)	-	13 (35.13%)	7 (18.91%)	18 (46%)	-	3 (8.1%)	7 (18.91%)
Non- Hodgkin's	3 (23.07%)	1 (7.6%)	-	-	-	02 (15.38%)	1 (7.6%)	-	-	6 (48.15%)
Hodgkin's	2 (25%)	4 (50%)	-	-	-	2 (25%)	-	-	-	2 (25%)
Acute infections	21 (100%)	-	21 (100%)	-	3 (14.28%)	3 (14.28%)	-	3 (14.28%)	-	-
Congenital	1 (10%)	-	-	1 (10%)	-	1 (10%)	-	-	-	8 (80%)
Neurogenic	-	-	-	-	-	-	-	-	-	3 (100%)
Vascular	-	-	-	-	-	-	-	-	-	3 (100%)
Others	-	-	-	1 (10%)	-	-	-	-	-	9 (90%)

Table 6: Clinical findings in respective diseases.

Diagnosis	Sinus	Fungation	Platysma sign	s/o medical comp.	Evident primary	Matted nodes	Discharging nodes	Rubbery nodes	Fluctu- ation	Solitary swelling
Tuberculo us LN	11 (9.9%)	-	-	1 (0.9%)	-	73 (65.38%)	35 (31.5%)	-	3 (2.7%)	-
Nonspecifi c LN	-	-	-	-	-	-	7 (100%)	-	-	-
Malignant secondary	-	3 (8.1%)	19 (51.35%)	3 (8.1%)	31 (83.78%)	-	-	-	-	-
Lymphom as	-	-	1 (5.7%)	3 (14.28%)	-	-	-	20 (95.23%)	-	-
Acute infections	-	-	-	-	-	-	-	-	18 (85.7%)	-
Congenital swelling	1 (10%)	-	-	-	-	-	-	-	7 (70%)	2 (20%)
Vascular lesions	-	-	-	-	-	-	-	-	1 (33.3%)	2 (66.66%)
Neurogeni c	-	-	-	-	-	-	-	-	-	-
others	1 (10%)	-	-	-	-	-	-	-	4 (40%)	5 (50%)

Raised ESR more than 20 mm at end of 1<sup>st</sup> hour is found mainly associated with tubercular lymphadenopathy 61.26%. FNAC was found to be effective overall in 77.77% patients and mainly positive in tubercular and malignant lymphadenopathy.

Biopsy is needed mainly in cases of suspected diagnosis. It is needed in all cases of lymphomas. There are no serious complications of biopsy apart from wound infection.

**Table 7: Mean duration of presentation.** 

Diagnosis	Mean duration
Tuberculous LN	2.9 months
Malignant secondary LN	5.7 months
Non-specific LN	3 months
Suppurative LN	14.9 days
Acute infections	8.8 days
Others	12.5 months

Table 8: Association of addiction in secondary metastatic lymphadenopathy.

Total no of cases for metastatic lymphadenopathy: 37.

Addiction	No of cases	Percentage
Smoking	18	48.64%
Tobacco chewing	10	27.02%
Both	05	13.5%
None	04	10.8%

Table 9: ESR values in various diseases.

Diagnosis	0-10	10-20	>20	Total
Tubercular	9	34	68	111
LN	(8.1%)	(30.63%)	(61.26%)	111
Non-specific	6	1		7
LN	(85.71%)	(14.29%)	-	/
Acute	14	5	2	21
infections	(66.66%)	(23.8%)	(9.5%)	21
Malignant	10	21	6	37
secondaries	(27.02%)	(56.75%)	(16.21%)	31
I vanambanasa	3	14	4	21
Lymphomas	(14.28%)	(66.66%)	(19.04%)	21
Othors	28	3		21
Others	(90.32%)	(9.68%)	-	31

Table 10: Efficacy of FNAC in diagnosis of lateral neck masses.

Disease	Positive results	Negative results
Tuberculous	93	16
LN (109)	(85.3%)	(14.6%)
Malignant secondary LN (37)	34 (91.8%)	3 (8.2%)
Lymphomas (21)	12 (57.1%)	9 (42.9%)
Others (13)	1 (7.1%)	12 (92.3%)
<b>Total (180)</b>	140 (77.77%)	40 (22.22%)

Table 11: Biopsies required and percentage of repeat biopsies.

Diagnosis	Biopsy	Repeat biopsy
Tubercular LN	19 (17.11%)	2 (10.52%)
Malignant secondary LN	03 (8.1%)	1 (33.33%)
Lymphomas	21 (100%)	1 (4.7%)
Others	13 (100%)	1 (7.6%)

CT evaluation was needed for confirmation of diagnosis, to evaluate the extent of disease and involvement of surrounding structures.

Table 12: CT evaluation in neck swellings.

Diagnosis	No of cases
Tuberculous LN	4
Malignant secondary LN	4
Lymphomas	1
Cystic hygromas	3
Parapherengeal abscess	2
Ganglioneuromas	1
Sclerosing hemangiomas	1
Vascular malformation	1
Brachial cyst	1
Actinomycosis	1
Lymphangiohemangimas	1
Carotid body tumor	1
Total	21

Table 13: Prevalence of different diseases in lateral neck.

Disease	No of cases	Percentage
Tubercular LN	111	48.68%
Malignant LN	37	16.22%
Lymphomas	21	9.21%
Neck abscess	16	7.01%
Nonspecific LN	07	3.07%
Retropharyngeal abscess	02	0.87%
Ludwig's angina	03	1.31%
Cervical actinomycosis	01	0.43%
Kimura's disease	01	0.43%
Lipoma	03	1.31%
Sebaceous cyst	02	0.87%
Neurogenic tumors	07	3.07%
Dermoid	01	0.43 %
Vascular tumors	03	1.31%
Plunging ranula	04	1.71%
Cystic hygromas	04	1.71%
Brachial cysts	02	0.87%
Lymphatic cysts	02	0.87%
Sternocleidomastoid tumor	02	0.87%
Total	228	100%

Overall tubercular lymphadenopathy was found to be most common cause of lateral neck mass followed by malignant secondary.

#### Treatment modalities

All the patients of tubercular lymphadenopathy are initially treated by DOT's regime. Recurrence occurred in 4 patients (3.6%). Five patients required surgical drainage (4.5%), and 1 patient required excision of lymph nodes due to post-operative wound infection and fistula formation.

Malignant secondary lymph nodes are mainly due to oropharyngeal primaries followed by laryngeal malignencies. Six patients had occult primary after through investigations. Out of 37 patients with malignant lymph nodes, 12 were treated by neoadjuvant chemotherapy. 3 patients had recurrence after chemotherapy and required palliative radiotherapy in post-operative period. 10 patients were treated by radical radiotherapy. Rest 15 patients were treated by radical neck dissection.

In lymphomas out of 21 patients, 13 were Non-hodgkin's and 8 were Hodgkin's lymphomas. They were treated with chemotherapy alone. The study was conducted at Shri Vasantrao Naik Government Medical College, Yavatmal, Maharashtra, India from January 2012 to December 2015. During our study, out of 228 patients, 74.26% swellings were benign and 25.74% were malignant. Danley P et al in his largest study of 1216 cases of neck masses, over 5 years found 50% of them to be lateral neck masses.<sup>3</sup> Of the lateral neck masses 55% were benign and 45 % malignant, which is comparable to our study. In contrast to our study M Glesson et al, in his study of 8500 patients found incidence of malignant swellings about 70% because he had done meta-analysis and maximum number of patients were in elderly age group.4

Age plays the major role in occurrence and prevalence of particular disease, in particular age. In our study maximum number of cases i.e. 26.75% found to be in second decade. More cases in first 2 decades are mainly due to occurrence of tuberculosis in that age group, while after 5th decade increased incidence was due to malignancy. Jain M et al in his study of pediatric head and neck lesions, of the 748 cases he studied, 81% were of lymph nodes and only 1.5% malignant. This supports our study.<sup>5</sup>

Sex plays an important role in occurrence of diseases, due to different factors involved like addictions and substance abuse more common in males and poor nutrition and ignorance about health in females of rural areas. The clinical symptoms were studied according to the disease particular.

In tubercular lymphadenopathy, constitutional symptoms like low grade fever were found in 54% cases followed by anorexia 7.92% and pain in 2.7% cases. These findings were comparable to Eamranod P et al.<sup>6</sup>

Cough was found in 6.3% of cases, associated with pulmonary tuberculosis but sputum negative for AFB. Similar findings were found in Research committee of India study (2.5%).<sup>7</sup>

Sinus and pus discharge was seen in 9.9% patients. Doctor HG found similar findings due to late presentation of patients. Character of lymph nodes is very important clue for diagnosis. In present study 65.38% patients have

matted nodes, while 31.5 % had discrete nodes. Research committee of tuberculosis of India showed 55% matted nodes and 45% discrete nodes.

Dyspnoea was seen in only one case and had associated mediastinal lymphadenopathy and pyothorax. Prabhakar BR et al, found generalized lymphadenopathy in 3 patients and also had mediastinal lymphadenopathy but isolated mediastinal lymphadenopathy was not found. Fraser H et al in his study of 30 patients, found 10% association with mediastinal lymphadenopathy. 8,9

Second most common swelling of our study was malignant secondary lymphadenopathy. It presented with voice change in 46%, dysphagia in 35.13% and dyspnoea in 18.91%. Similar findings were observed in M.Glesson and Dolan RW et al studies. 4.10 Secondries are mainly hard and fixed in 54.05%. Phillp M et al found large and fixed nodes in 20%, while Morris J et al found it in 40%. 11.12

Third most common lateral neck mass was primary malignancy of neck i.e lymphomas. Of the total non-Hodgkin's lymphoma 23.07% had fever while 7.6% had loss of weight and appetite. Dysphagia was seen in 15.38%. In Hodgkin's lymphomas 25% had fever, 50% had loss of appetite and weight and 50% had dysphagia. Urba WJ et al, in his reported study showed fever and loss of appetite in 50% of patients and 20% patients had mediastinal lymphadenopathy represented by cough and dyspnoea. 13

Nonspecific lymphadenitis patients presented mainly with fever 57.14%, which was associated with sore throat. MM Carr et al proposed that 60-70% of patients who had lymph node enlargement secondary to sore throat also had fever.<sup>14</sup>

Acute infections presented mainly with fever and pain, followed by dyspahgia, dyspnoea and trismus. Scobic et al and Hibbert J et al suggest similar findings. 15,16

In congenital swellings only cystic hygroma was found to cause dyspnoea in 10% of patients. Barnard MG et al in a series of 9 patients found stridor as main complaint, but stated it to be uncommon.<sup>17</sup>

Katz A et al in his study of 15 patients of neurogenic tumors, found neurological symptoms as main finding, which is in contrast to our study.<sup>18</sup>

Investigations play an important role in diagnosis and management. ESR was done in more than 90% of cases and it was found to be raised in mainly tubercular lymphadenitis while non-lymphoid benign tumors showed normal ESR. Jeffry A proposed that, ESR was found to be raised in mainly granulomatous and autoimmune diseases. FNAC was done in 187 patients. In tubercular lymphadenopathy it was positive in 85.3%. In 5.5% false negative result obtained. Sensitivity was found

to be 85% and specificity was 95%. Lau SK et al showed similar results of sensitivity of 93% and specificity of 77%. <sup>19</sup>

In secondary malignant lymphadenopathy FNAC was done in all the cases and positive results obtained in 91.8% with sensitivity of 90% and specificity of 98%. Similar findings obtained in studies of Nada A et al and Podar AK et al showing sensitivity of 90% and specificity of 98%. <sup>20,21</sup>

Biopsy, an invasive procedure was considered to be second modality of diagnostic evaluation. In 17.11% cases of tuberculous lymphadenopathy biopsy was performed and repeat biopsy was required in 10.52% cases of them.

Excisional biopsy was done in 13 cases, thus only in 1.8% cases, biopsy was found to be helpful. It is found in maximum number of studies mentioned above that although biopsy corrects some of the false positive and negative results of FNAC, it has to be considered as second choice and has sensitivity and specificity nearly 100%.

Martin H et al proposed about untimely lymph node biopsy and documented that an enlarged lymph node should never be excised as the first or even an early step in diagnosis, an aspiration biopsy should always precede an incisional biopsy.<sup>22</sup>

Nada A has advised biopsy for all cases of lymphoma which is correctly followed in our study.<sup>20</sup> Computed tomography scanning gives complete three-dimensional anatomical details of swelling, but is not needed in all patients in whom other clinical findings and other investigations are diagnostic. So it was done in following cases.

In tuberculous lymphadenopathy the computed tomography scanning was performed in patients for planning surgical treatment of patient, determining characteristic of lesion weather solid or cystic, mediastinal and cervical lymphadenopathy and to differentiate thyroid mass from tuberculous lymphadenopathy.

In malignant secondary lymphadenopathy computed tomography has been done in cases of patient had occult primary and found to have multiple brain metastasis, carcinoma of stomach, carcinoma esophagus and nasopharyngeal carcinoma.

In most of the other cases, which consist of cystic hygroma, ganglioneuroma, vascular malformation, sclerosing hemangioma, branchial cyst, computed tomography given a useful idea and anatomical relationship of the masses and helped to plan surgical treatment. Deborah L considered computed tomography

as excellent means of evaluating patients with neck masses.<sup>23</sup>

Disease specific in particular and according treatment modalities are varied in neck masses. Hence each of this has to be described separately. Benign swelling constituted 60.07% of the total and mainly constituted lymphadenopathies in 69.41% of cases, 13.52% were of acute infective origin, 4.7% were of congenital origin and 12.35% accounted for other lesions.

All malignant swelling are lymphoid in origin, of which 63.79% were malignant secondaries and 36.21% were primary lymphomas. Our study is comparable with study by Nada A, William F, Jain M. where benign swellings predominated the neck swellings exceeding 50% and more than 70% were of lymphoid origin. <sup>20,24,25</sup>

Considering the lymphadenopathy as commonly encountered pathology in neck, tuberculous lymphadenopathy is found to be the commonest accounting for 57.81% followed by secondaries in 19.27% cases, lymphomas in 10.93% of cases, nonspecific adenitis in 3.6% cases and suppurative adentits in 8.33% cases.

Research committee in 1987 observed in a study of 355 cases, incidence of tuberculosis was 65%, incidence of malignancy was 9.8%, and incidence of nonspecific and suppurative adenitis was 24%.<sup>7</sup> Of the malignant lymphadenopathies, 40% were secondaries and 60% were lymphomas. Study is comparable with ours except lower incidence of malignancies, may be because ours being a referral center, the percentage of malignancy patients was high and secondly the addictions are commonly seen in our region.

All the patients of tubercular lymphadenopathy are initially treated by DOT"s regime. Recurrence occurred in 4 patients (3.6%). Five patients required surgical drainage (4.5%), and 1 patient required excision of lymph nodes due to post-operative wound infection and fistula formation. Mericz in his study of 309 patients showed similar outcomes. Jones and Campbell26 (1963) also mentioned that surgical treatment is required only in cases which fails to respond to treatment and when complication arises.<sup>25</sup>

Malignant secondary lymph nodes are mainly due to oropharyngeal primaries followed by laryngeal malignencies. 6 patients had occult primary after through investigations. Out of 37 patients with malignant lymph nodes, 12 were treated by neoadjuvant chemotherapy. 3 patients had recurrence after chemotherapy and required palliative radiotherapy in post-operative period. 10 patients were treated by radical radiotherapy. Rest 15 patients were treated by radical neck dissection. Endicott JN in a study of 197 patients, where induction chemotherapy was used, 15% achieved complete response, 3.4% achieved partial response while rest had

stable disease. In another study of 158 patients by Keith et al, where adjuvant chemotherapy was used in head and neck malignencies and 50% response rate was found.<sup>27,28</sup>

In lymphomas out of 21 patients, 13 were Non-Hodgkin's and 8 were Hodgkin's lymphomas. They were treated with chemotherapy alone.

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