

AN AUDIT OF NECK BIOPSIES DIAGNOSED AT THE ORAL PATHOLOGY
DEPARTMENTAL LABORATORY OF A TERTIARY CENTER

**Adeola LADEJI¹, Samson OLOWE¹, Mofoluwaso OLAJIDE¹, Kehinde ADEBIYI¹,
Ikechukwu OKOYE¹, Olufemi ADESINA², Kanmi KUYE², Yinka KUMAPAYI¹, Aderemi
ADEWALE¹**

¹Department of Oral Pathology and Oral Medicine, Lagos State University College of Medicine,
Ikeja, Lagos, Nigeria.

²Department of Oral and Maxillofacial Surgery, Lagos State University College of Medicine,
Ikeja, Lagos, Nigeria.

***Corresponding author:** Adeola Ladeji. adeola.ladeji@gmail.com

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ABSTRACT

BACKGROUND

Clinicians are trained to approach diagnosis of neck pathologies through an organized and efficient diagnostic method. This is however impossible without adequate knowledge of the differentials of neck pathologies, their frequencies and socio-demographic characteristics. This study aims to determine the range and analyze the socio-demographics of neck pathologies seen at the Oral Pathology laboratory of the Lagos State University College of Medicine.

METHODOLOGY

This is a retrospective study conducted at the Oral Pathology laboratory of the department of Oral Pathology and Oral Medicine, Lagos State University College of Medicine, over a period of five years and six months (January 2013 to June 2019). Information regarding the type, frequency, age, gender and site distribution of neck pathology were retrieved from the archival records of the Oral Pathology laboratory. Lesions were grouped into 6 categories, namely: Lymphomas, Chronic granulomatous infections, Salivary gland neoplasms, Reactive lesions, Developmental lesions and Non Specific lymphadenitis. Ethical approval was obtained and statistical analysis done using the Statistical Package for Social Sciences version 21. Level of statistical significance was set at p value <0.05.

RESULTS

Neck pathologies constituted 5.6% (49 cases) of the 873 head and neck biopsies received within the study period. Lymphoma group was the largest category of lesions constituting 55.1% (27 cases), followed by the Salivary gland neoplasms and developmental lesions, each with 12.2% (6 cases). Lesions were seen within the age range of 2 to 82 years, with a mean age of 39.9 ± 21.2 years. Relationship between type of lesion and age group was significant at $p=0.03$. There was a

slight male predominance with a Male: Female ratio of 1.1:1. Lateral neck accounted for 89.6% of all neck lesions. There was a strongly significant relationship between type of lesion and the site at $p=0.000$

CONCLUSION

A diverse range of pathologies can be encountered in the neck, with Non-Hodgkin's lymphomas being the most predominant. It is however important that clinicians and pathologists equip themselves with knowledge of these differentials and their socio-demographics, as this will go a long way in better patient management.

KEY WORDS: Masses, differentials, pathologies, socio-demographics, lymphoma, granulomatous, lymphadenitis.

INTRODUCTION

Neck masses are pathological swellings found in the neck, a region anatomically defined as being between the mylohyoid muscle and clavicle¹. These pathologies arise from any of the structures in the neck ranging from the vertebrae to muscle, adipose tissues, vascular channels and visceral organs. Most neck swellings originate within cervical lymph nodes, thyroid and salivary glands, these organs present with a range of pathologies from infections to neoplasms². Various infectious/inflammatory, congenital, developmental, traumatic, cystic and neoplastic pathologies have been found in the neck^{1,2,3}, the dilemma usually is arriving at a diagnosis based on the aetiology. Making differential diagnosis of neck masses, entails a thorough systematic and coordinated evaluation of patient's sociodemographics, symptoms, signs and physical examination. Definitive diagnosis is made after various investigations and histopathologic examination^{4,5}. Age is a very important sociodemographic factor to consider in drawing differential diagnosis of neck masses as inflammatory/reactive and developmental lesions have been observed more commonly in the paediatric age group, while neoplasms top the list in adults^{6,7}. Inflammatory neck masses can be of viral, bacterial, fungal and parasitic aetiology leading to reactive cervical lymphadenopathies, as well as non-infectious inflammatory disorders, such as Kimura's and Castleman's diseases. Developmental and congenital masses in the neck include vascular malformations, hemangiomas and neck cysts. Some of the cystic lesions encountered in the neck are; thyroglossal duct cyst, brachial cleft cyst and dermoid cyst^{5,6}. Congenital neck masses usually reflect abnormal embryogenesis in the development of the head and neck, a good knowledge of embryogenesis will be handy in their management as well⁸. Neoplastic conditions have been observed more commonly in adults, with malignancies

accounting for greater percentage of these neoplasms within the adult population^{1,4}, thereby making it extremely important to make prompt diagnosis.

The importance of a thorough knowledge of the anatomy of the neck cannot be overemphasized in drawing differentials and arriving at a provisional diagnosis. The major muscles of the neck fan out to create the triangles of the neck which are important in the description of location of normal neck structures and pathologies ^{7,9}. The hyoid bone, thyroid gland and cartilage and cricoid cartilage are located in the midline of the neck, the parotid glands are located in the pre-auricular area on each side in the lateral neck with their tails extending below the angle of the mandible. The submandibular glands are located above, within a triangle bounded by the sternocleidomastoid muscle, posterior belly of the digastric muscle and the body of the mandible. Lymph nodes are scattered bilaterally within the neck and are major foci of neck pathologies ^{7,9}.

Not many studies have looked into the differentials of neck masses, and the few available studies are fragmented into the different aetiologies and age groups^{10,11}. There is therefore a need to review cervical masses as a whole. This will give an idea of the relative prevalence of various entities in our environment.

METHODOLOGY

This is an institution based retrospective study of all neck biopsies diagnosed at the Oral Pathology Laboratory of the Department of Oral pathology and Oral medicine, Lagos State University College of Medicine between January 2013 and June 2019. The study evaluated biopsy records and histopathology forms of neck biopsies. All cases of neck pathology with adequate clinical information were included, while cases with normal tissue, inconclusive histopathology result and cases with deficient clinical information were excluded. Lesions were grouped into 6 broad categories, namely; Lymphomas, Salivary gland neoplasms, Developmental lesions, Chronic granulomatous infections, Non-specific lymphadenitis and Reactive lesions. Information regarding age, gender, site and histopathological type of neck pathology were retrieved and entered using alphanumeric codes. Analysis was done using Statistical Package for Social Sciences version 21 (SPSS v 21.0; SPSS, Chicago, USA). Absolute and relative frequencies were expressed in percentages, continuous variables were expressed in mean, minimum, maximum and standard deviation, while categorical variables were expressed as proportions. Comparison was done, statistical significance was inferred at $p < 0.05$. Archival tissue was used in all cases and there was no contact between patient and investigator. All ethical issues were taken into consideration and abided by.

RESULTS

FREQUENCY DISTRIBUTION OF NECK MASSES

Of the 873 lesions diagnosed in the Head and Neck region during the study period, Neck masses constituted 5.6% (49 cases). These neck masses were put into 6 categories, namely: Lymphomas, Salivary gland neoplasms, Developmental lesions, Chronic granulomatous infections, Non-specific lymphadenitis and Reactive lesions. Lymphoma group presented with the highest frequency at 55.1% (27 cases), followed by Salivary gland neoplasms and Developmental lesions, each with 12.2% (6 cases). Least seen were reactive lesions with just 2.0% (1 case). NHLs were the most predominant histologic diagnosis with 26 cases, constituting 96.3% of all lymphomas and 53.1% of all neck pathologies (Table 1).

AGE GROUP DISTRIBUTION OF CATEGORIES OF NECK MASSES

Neck masses were seen within the age range of 2-82 years with a mean age of 39.9 ± 21.2 years. The highest number of neck pathologies were observed in the 11-20-year, 21-30 -year and 51-60-year age groups each with 18.4% (9 cases). NHL was found to affect age groups 11-20years, 21-30years and 51-60years most (Table 2). There was a statistically significant relationship in the age distribution of neck masses ($p=0.03$).

GENDER DISTRIBUTION OF NECK MASSES

Neck masses were slightly more prevalent in males, with 53.1% (26) of cases, giving a male to female ratio of 1.1:1. Also, NHL and developmental lesions were commoner in males at ratios of 1.3:1 and 2:1 respectively (Table 3). However, chronic granulomatous infections were more

predominant in females at a ratio of 3:1. SGNs showed no gender predilection in this study (Table 3).

GENDER DISTRIBUTION WITHIN AGE GROUP

In this study 26 cases (53.1%) were diagnosed in males, while 23 cases (46.9%) were females (Table 4). 21-30year, 41-50year and 51-60year age groups had highest number of males with neck lesions, each accounting for 10.2% (5 cases) while females within age groups 11-20years and 61-70 years respectively accounted for highest presentation among female gender with 10.2% (5 cases) each (Table 4).

SITE DISTRIBUTION OF NECK MASSES

Lesions were observed in the lateral and central parts of the neck, however sites of 5 lesions were missing. Majority of masses 40 cases (81.6%) were observed in the lateral part of the neck with just 2 cases (4.1%) found in the central neck. There was a strongly significant relationship between site and neck mass at $p=0.00$

DISCUSSION

The 6 categories of masses encountered were, lymphomas, salivary gland neoplasms, developmental, chronic granulomatous infections, non-specific lymphadenitis and reactive lesions, this is similar to the range observed by several other previous studies by Unsal et al¹², Imhof et al¹³, Gleeson et al¹⁴, however larger series by Irani et al¹⁵, Antiquir et al¹⁶ and Balikci et al¹⁷ who collected their data from general histopathology facilities recorded broader range of lesions. Thyroid masses were conspicuously missing in this study, which may be attributable to the fact that data was collected from an oral and maxillofacial pathology laboratory. Lymphomas were the most prevalent category of masses constituting 55.1%, remotely followed by salivary gland neoplasms and developmental lesions each with 12.2%, this contrasts with reports of several previous studies by Unsal et al¹², Imhof et al¹³, Antiquir et al¹⁶ and Balikci et al¹⁷ who reported their highest prevalences with inflammatory/infectious diseases. Karthikeyan et al¹⁸ and Ahmad et al¹⁹ also reported highest prevalence with chronic granulomatous infections. Imhof et al¹³ however also reported that lymphomas were the most predominant malignancies seen in their study. The prevalence of lymphomas observed in our study is due to the high number of cervical lymph node biopsy specimens received at our laboratory.

The high prevalence of Non-Hodgkin's (53.1%, 26 cases) lymphoma observed in this study, is at variance with several previous studies which consistently reported high prevalence of inflammatory/infectious conditions^{16,17,19}. Chronic granulomatous infections (8.2%) and non-specific lymphadenitis (10.2%) in this study both had a combined prevalence of 18.4% which is far from that of non-Hodgkin's lymphoma reported. Muddegowda et al²⁰ in their study, comparing 2 southern Indian populations found no lymphoma in one of the regions while the second region only recorded 1%, salivary gland lesions reported was only 2% and 8% for regions

1 and 2 respectively. The wide variance of prevalences recorded globally for neck masses could be attributed not only to geographic distribution but also the facilities where the data was collected, the trend and pattern observed at oral and maxillofacial facilities differ from that of otorhinolaryngology facilities, same disparity applies between oral and maxillofacial pathology and general pathology laboratories^{4,12,20}.

The age range and median age at diagnosis of neck masses in this study is similar to findings of Soussan et al¹⁵ in their study of 1208 neck masses where lesions were diagnosed between 6-83 years and a median age of 42.1 years was observed. The statistically significant relationship observed between age group and neck lesions ($p=0.003$), agrees with several previous reports which observed affinity of specific lesions for particular age groups^{13,15,16,17}. About 50% of neck masses were diagnosed in patients above 40 years of age, this is at disparity with reports of Soussan et al¹⁵ who observed a higher prevalence of 58.7%, while Karthikeyan et al¹⁸ recorded a lower percentage (30%) at above 40 years. However, the 16% and 21% observed by Karthikeyan et al¹⁸ for 11-20 and 21-30-year age groups are comparable to 18.4% each recorded by this present study. Inflammatory and developmental lesions were majorly seen below 40 years while all salivary gland tumours encountered were seen above 40 years, this is at tandem with most studies which reported prevalence of inflammatory and developmental conditions at younger ages, while neoplastic masses occurred in the older age groups^{1,5,6,18}. Although Osifo et al¹⁰ recorded high prevalence of malignant neoplasms of 57.1% in childhood, this could be due to low presentation of inflammatory cases at their facility.

The slight male predilection observed in the present study is comparable to the large series study of 1208 cases by Soussan et al¹⁵ who reported 51.1% prevalence in males and 48.9% in females, study by Unsal et al¹², however recorded much higher prevalence of 65.3% for males and 34.7%

for female, while, in contrast Ahmad et al¹⁹ found a female gender predilection at 68% female prevalence. The different structures in the neck are found in specific parts of the neck, so also are the lesions that arise from them, which explains the strong statistically significant site distribution of neck masses observed in this study and several previous studies^{15,16,17,18}. The conspicuous absence of thyroid lesions in the present study will explain the very low prevalence of midline neck masses.

CONCLUSION

Neck masses constitute a small proportion of head and neck masses, they however present a wide range of lesions similar to that seen in the head. These different lesions are differentially distributed among the various age groups and occur in specific regions of the neck. Knowledge of the differentials and distribution of these neck masses will go a long way in the prompt and effective management of patients.

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Table 1: Table Showing Frequency Distribution of neck masses

Diagnosis	Frequency	% within category	% within total lesion
Lymphoma	27	100	55.1
NHL	26	96.3	53.1
HL	01	3.7	2.0
Salivary Gland Neoplasm	06	100	12.2
Mucoepidermoid	01	16.7	2.0
Carcinosarcoma	01	16.7	2.0
Acinic cell carcinoma	01	16.7	2.0
Basal cell adenocarcinoma	01	16.7	2.0
Adenocarcinoma Not Otherwise Specified	02	33.3	4.1
Developmental	06	100	12.2
Cystic Hygroma	01	16.7	2.0
Lymphangioma	01	16.7	2.0
Epidermoid cyst	03	50.0	6.1
Cervico-lymphoepithelia cyst	01	16.7	2.0

Chronic granulomatous infection	04	100	8.2
TB lymphadenitis	02	50.0	4.1
Non-specific Chronic Granulomatous Infection	02	50.0	4.1
Non-specific lymphadenitis	05	100.0	10.2
Reactive	01	100.0	2.0
Total	49		100

Table 2: Age group distribution of categories of neck mass

Age group	HL	NHL	Chronic Granulomatous Infections	SGN	Reactive follicular hyperplasia	Developmental	NSL	Total
0-10	----	1(2.0)	----	----	----	2(4.0)	----	3(6.1)
11-20	1(2.0)	5(10.2)	----	----	1(2.0)	1(2.0)	1(2.0)	9(18.4)
21-30	----	5(10.2)	3(6.1)	----	----	----	1(2.0)	9(18.4)
31-40	----	1(2.0)	----	----	----	2(4.1)	1(2.0)	4(8.2)
41-50	----	3(6.1)	----	1(2.0)	----	1(2.0)	1(2.0)	6(12.2)
51-60	----	5(10.2)	1(2.0)	3(6.1)	----	----	----	9(18.4)
61-70	----	4(8.2)	----	1(2.0)	----	----	1(2.0)	6(12.2)
71-80	----	2(4.1)	----	----	----	----	----	2(4.1)
81-90	----	----	---	1(2.0)	----	----	----	1(2.0)
Total	1(2.0)	26(53.1))	4(8.2)	6(12.2))	1(2.0)	6(12.2)	5(10.2))	49(100)

Mean age = 39. 9±21.2. Range =2-82year).

$\chi^2 = 60.82$; p value = 0.03 (significant)

Keys:

HL: Hodgkin's lymphoma

NHL: Non-Hodgkin's lymphoma

SGN: Salivary Gland Neoplasm

NSL: Non-Specific Lymphadenitis

Figure 1: Bar chart showing frequency distribution of age group and neck pathology

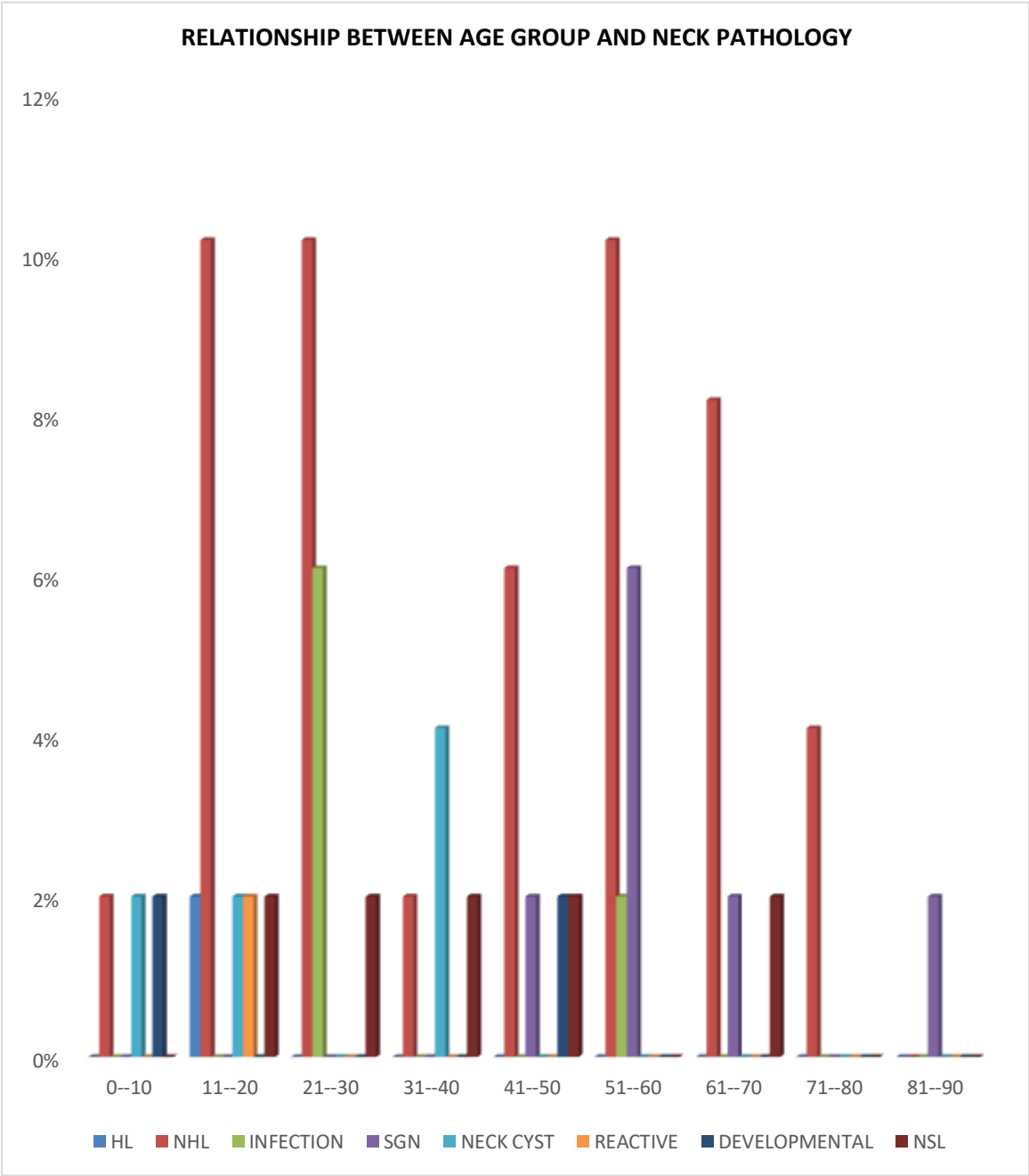


Table 3: Sex distribution of neck masses

Sex	HL	NHL	Chronic Granulomatous	SGN	Reactive	Develop mental	NSL	Total
Male	----	15(30.6)	1(2.0)	3(6.1)	----	4(8.1)	3(6.1)	26(53.1)
Female	1(2.0)	11(22.4)	3(6.1)	3(6.1)	1(2.0)	2(4.0)	2(4.1)	23(46.9)
Total	1(2.0)	26(53.1)	4(8.2)	6(12.2)	1(2.0)	6(12.2)	5(10.2)	49(100)

$X^2 = 4.56$; p value = 0.70 (Not significant)

Keys:

SGN: Salivary Gland Neoplasm

NSL: Non-Specific Lymphadenitis

Table 4: Relationship between age group and sex of patients.

Age-range	SEX		Total
	Male	Female	
0-10	1(2.0)	2(4.2)	3(6.2)
11-20	4(8.2)	5(10.2)	9(18.4)
21-30	5(10.2)	4(8.2)	9(18.4)
31-40	3(6.2)	1(2.0)	4(8.2)
41-50	5(10.2)	1(2.0)	6(12.2)
51-60	5(10.2)	4(8.2)	9(18.4)
61-70	1(2.0)	5(10.2)	6(12.2)
71-80	1(2.0)	1(2.0)	2(4.0)
81-90	1(2.0)	----	1(2.0)
Total	26(53.1)	23(46.9)	49(100.0)

Table 5: Relationship between site and neck mass.

Site	HL	NHL	Chronic Granulo matous	SGN	Reactive	Develo pmental	NSL	Total
Lateral	1(2.0)	26(53.1)	4(8.2)	4(8.2)	1(2.0)	3(6.1)	3(6.1)	42(85.7)
Central	----	---	----	----	----	2(4.1)	---	2(4.1)
Missing	----	---	----	2(4.1)	----	1(2.0)	2(4.1)	5(10.2)
Total	1(2.0)	26(53.1)	4(8.2)	6(12.2)	1(2.0)	6(12.2)	5(10.2)	49(100)

$\chi^2 = 29.302$; p value = 0.00 (significant)

Keys:

SGN” Salivary Gland Neoplasm

NSL: Non-Specific Lymphadenitis $\chi^2 = 7.61$; p value = 0.50