Avicenna J Dent Res. 2016 March; 8(1):e25614. doi: 10.17795/ajdr-25614.

Published online 2016 February 27. **Research Article**

Prevalence of Pathological Entities in Neck Masses: A Study of 1208 Consecutive Cases

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Received 2014 December 14; **Revised** 2015 October 18; **Accepted** 2015 October 25.

Abstract

Background: Many head and neck diseases manifest as neck masses with a wide range of pathologies from developmental lesions to malignancies. However, there is a lack of large-scale studies about the relative prevalence of these lesions in the neck region.
Objectives: This retrospective study was conducted to assess the distribution of neck masses related to gender, age, pathology, and anatomical location.
Patients and Methods: During a 13-year period (1996–2009), the medical records of 1,208 patients with neck masses were collected from the department of pathology at Loghman educational hospital in Tehran, Iran. The cases were reviewed for data on gender, age, the type of origin tissue, the type of lesion, and the anatomical location. Comparisons between genders, age groups, and tissue origins were performed using the Chi-square test. The significance level was set at $P < 0.05$. All statistical tests were performed with SPSS 20 software.
Results: Over a period of 13 years, a total of 1,208 patients (617 men and 591 women) had neck masses resected for pathological assessments. The median age of presentation was 42.1 (ranging from 6 to 83 years). Among the 1,208 cases, 33 cases (2.7%) developed in the pediatric group ($\leq$ 15 years old), 466 cases (38.6 %) developed in the young adult group (16 to 40 years of age), and 709 cases (58.7%) developed in the adult group ($\geq$ 40 years old). Both the inflammatory/infectious and neoplastic lesions were more common in the older adult group with 129 and 433 cases, respectively. The Chi-square test showed significant differences between the genders and the different types of lesions ($P = 0.000$) and between the different age groups and the different types of lesions ($P = 0.000$). The anterior triangle (n = 654; 54.1%) was the most common anatomical site for the neck masses, followed by the midline and anterior neck (n = 548; 45.4%), and the posterior triangle (n = 6; 0.5%).
Conclusions: The age and location of neck masses are the most important variables. The data in this study showed that the neoplastic lesions (including metastatic lesions) were the most common neck masses and the anterior triangle was the most common anatomical location. In addition, age can play an important role in differential diagnosis. Therefore, any mass in the neck, especially in older patients, located in the anterior triangle must be considered neoplastic until proven otherwise.

Keywords: Prevalence, Neck, Massdifferential Diagnosis

1. Background

Many head and neck diseases manifest as neck masses with a wide range of pathologies from developmental lesions to malignancies (1, 2). Thus, knowledge of the prevalence of the different pathologies in this region is important for the management of patients with neck masses. However, there is a lack of large-scale studies about the relative prevalence of these lesions in the neck region.

2. Objectives

This retrospective study was conducted to assess the distribution of neck masses related to gender, age, pathology, and anatomical location within a large cohort of neck masses in an Iranian population in a pathological setting.

3. Patients and Methods

During a 13-year period (1996 - 2009), the medical records of 1,208 patients with neck masses were collected from the department of pathology at Loghman educational hospital in Tehran, Iran. The cases were reviewed for data on patient gender, age, type of origin tissue, type of lesion, and anatomical location. With regard to age, the neck masses were classified into three groups: pediatric ($\leq$ 15 years old), young adults (16 - 40 years of age), and older adults ($\geq$ 40 years old) (1). The tissue origins of the lesions were classified into five categories, (a) thyroid gland, (b) parathyroid glands, (c) salivary glands, (d) lymph nodes, and (e) miscellaneous, and then the lesions were classified according to the type of origin tissue. In

addition, the anatomical regions of the neck were divided into three parts midline and anterior neck, anterior triangle, and posterior triangle. Comparisons between all variables were performed using the Chi-square test. The significance level was set at $P < 0.05$. All statistical tests were performed with the SPSS software ,version 20 (Chicago, IL, USA).

4. Results

Over a period of 13 years, a total of 1,208 patients (617 men and 591 women) had neck masses resected for pathological assessments. The median age of presentation was 42.1 (ranging from 6 to 83 years). Among the 1,208 cases, 33 cases (2.7%) developed in the pediatric group, 466 cases (38.6 %) developed in the young adult group, and 709 cases (58.7%) developed in the adult group. Both the inflammatory/infectious and neoplastic lesions were more common in the older adult group with 129 and 433 cases, respectively. Thyroid gland, lymphatic, and salivary gland masses were also mostly found in the adult group with 306, 242, and 84 cases, respectively (Table 1). In addition, neoplasms were more common in men with 378 cases. While thyroid gland lesions were more frequent in women (253 cases), lymph node masses were mostly noticed in men (247 cases) (Table 2). In total, 156 cases of lymphatic lesions were lymphomas (71 Hodgkin lymphomas and 85 non-Hodgkin lymphomas) and 121 were metastatic tumors (68 cases in the older adult group). In thyroid glands, most of the tumors were carcinomas (171 cases vs. 39 cases for benign tumors). Among the 147 malignant thyroid gland tumors, papillary thyroid carcinoma was the most common (n = 113; 9.4%). The thyroid gland was the most frequent primary site for metastases with 85 cases, and papillary thyroid carcinoma was the most frequent metastatic tumor with 84 cases. There was only a single case of follicular carcinoma. The second most frequent primary site for metastasis was the oral cavity with 19 cases; among them, 16 cases were from the tongue. Among the 132 salivary gland lesions, 77 cases were neoplastic tumors (44 benign tumors and 33 malignant tumors). Pleomorphic adenoma, with 30 cases, was the most common benign tumor, and adenoid cystic carcinoma, with 13 cases, was the most common malignant tumor, followed by mucoepidermoid carcinoma with 12 cases. The parotid glands were the most commonly involved salivary glands (n = 58). More details are summarized in Tables 3 and 4.

The Chi-square test showed significant differences between the genders and different tissue types ($P = 0.000$), between age groups and different tissue types ($P = 0.000$), between the genders and the different type of lesions ($P = 0.000$), and between the different age groups and the different type of lesions ($P = 0.000$).

The anterior triangle (n = 654; 54.1%) was the most common anatomical site for the neck masses, followed by the midline and anterior neck (n = 548; 45.4%). All the differences between the genders and the anatomical site, and also between the different age groups and the anatomical site, were statistically significant ($P = 0.000$) and ($P = 0.000$), respectively.

5. Discussion

The evaluation of neck masses is often challenging for health care providers. The etiologies range from inflammation/infection to malignancy. Patient history and a physical examination are fundamental to making an early and correct diagnosis. Having an accurate picture of the demographic and epidemiological profile of neck masses is fundamental for diagnosis. For example, in the present retrospective analysis each age group showed a frequency for certain diseases, and this can be a guide for ranking differential diagnosis.

In a previous series, neoplastic lesions were more common in the older adult groups, but inflammatory/infectious lesions were more frequent in the pediatric and young adult group (1). This finding is in contrast to our analysis that showed a higher prevalence of both inflammatory/infectious and neoplastic lesions in the older adult group. Therefore, neck masses in the older adult group need careful assessment.

The neck masses in the pediatric group are broad and included congenital, inflammatory, and neoplastic lesions (3). In the current review, similar to other reports, most of the lesions in the pediatric group were benign conditions (4). In addition, like a previous study, developmental cystic lesions were the most common masses in the pediatric group, and neoplastic lesions were the third most common masses (5). As radiation exposure is a common cause of pediatric head and neck cancers, it is important to ask about the history of radiation exposure (6). The risk of developing a second malignancy, especially thyroid cancer in cases who received radiotherapy in the head and neck area due to a primary cancer, should be evaluated (6, 7). The most common congenital lesions found in the pediatric population were thyroglossal duct cysts and branchial cleft cysts (3). In a previous report, 56.4% of children had congenital neck masses, among them 24% had branchial cysts and 7% had thyroglossal duct cysts (8). These findings are similar to the present review, which showed 24.2% of children had branchial cysts and 9% had thyroglossal duct cysts. As branchial cleft cysts are typically located in the submandibular region, and thyroglos-

Table 1. Summary of the Distribution of Neck Masses According to Age and Tissue Origin[a]

Age/Tissue Origin	Thyroid Gland	Lymph Nodes	Salivary Glands	Parathyroid Glands	Miscellaneous	Total
≤ 15	0	13 (39.4)	3 (9.1)	0	17 (51.5)	33
< 40	125 (26.8)	162 (34.8)	44 (9.4)	15 (3.2)	119 (25.5)	466
≥ 40	306 (43.2)	242 (34.1)	84 (11.8)	22 (3.1)	55 (7.8)	709
Total	431 (35.7)	417 (34.6)	131 (10.8)	37 (3.1)	191 (15.8)	1,208

[a] Data are presented as No. (%).

Table 2. Details of the Distribution of Neck Masses According to Gender and Tissue Origin[a]

Gender/Tissue Origin	Thyroid Gland	Lymph Nodes	Salivary Glands	Parathyroid Glands	Miscellaneous
Male	178 (28.8)	246 (39.9)	71 (11.5)	3 (0.5)	118 (19.1)
Female	253 (42.8)	171 (28.9)	60 (10.2)	34 (5.8)	73 (12.4)
Total	431 (35.7)	417 (34.6)	131 (10.8)	37 (3.1)	191 (15.8)

[a] Data are presented as No. (%).

Table 3. Details of the Distribution of Neck Masses According to Gender and Lesion Type[a]

Gender/Lesion Type	Developmental	Inflammatory/Infectious	Neoplasm (benign, malignant)	Goiter	Cyst
Male	15 (2.4)	86 (13.9)	378 (61.3)	86 (13.9)	52 (8.4)
Female	5 (0.8)	166 (28.1)	259 (43.8)	126 (21.3)	35 (5.9)
Total	20 (1.7)	252 (20.9)	637 (52.7)	212 (17.5)	87 (7.2)

[a] Data are presented as No. (%).

Table 4. Summary of Neck Masses According to Age and Lesion Type[a]

Age/Lesion Type	Developmental	Inflammatory/Infectious	Neoplasm (benign, malignant)	Goiter	Cyst
≤ 15	3 (9.1)	11 (33.3)	7 (21.2)	0	12 (36.4)
< 40	15 (3.2)	112 (24)	197 (42.3)	72 (15.5)	70 (15)
≥ 40	2 (0.3)	129 (18.2)	433 (61.1)	140 (1.7)	5 (0.7)
Total	20 (1.7)	252 (20.9)	637 (52.7)	212 (17.5)	87 (7.2)

[a] Data are presented as No. (%).

sal duct cysts are usually located in the infrahyoid region, the correct diagnosis of a congenital pediatric neck mass could be made regarding the location of the mass (3).

In the present study, most of the thyroid tumors were carcinomas. This is in disagreement with other studies that demonstrated a higher frequency of benign tumors in the thyroid (9). It is worthwhile to note that in a previous study in Iran, thyroid cancer accounted for 6.2% of all the cancers in the head and neck area (10). In agreement with other studies (11, 12), the majority of the thyroid carcinomas in the present review were papillary thyroid carcinoma with 113 cases, among them 84 cases metastasized to the lymph nodes. Importantly, prognosis in papillary thyroid carcinoma, especially in patients over age 45, depends on cervical lymph node metastasis. Therefore, it is very important to evaluate the lymph node status regarding the metastasis (11, 12).

In the current series, the lymph node masses were mostly neoplastic (mostly lymphoma). This result is different from previous research indicating inflammatory/infectious lesions were the most frequent lesions in the lymph nodes. However, in agreement with previous reports, our data analysis demonstrated that lymph node metastases were mostly found in the older adult group. As

a result, distinguishing the primary site, metastatic tumor, and age distribution could have an impact on early detection (13).

In a previous study on 500 cases of neck masses in Iran, 232 cases (46.4%.) were malignant lesions. Among those, lymphoma accounted for about 26% of cases and thyroid cancer for 15% of cases (14). Another study on 16,232 cases of head and neck cancer in Iran found 60 cases (0.36%) of cervical lymph node metastasis (15). In another retrospective study on head and neck neoplasms in Iranian children and adolescents, 152 primary tumors were found, among them 136 cases (89.5%) were malignant. Non-Hodgkin lymphoma (35%) and Hodgkin lymphoma (20%) were the two most common neoplasms (16).

According to the results obtained in the current investigation, the thyroid gland and the oral cavity were the most common primary sites. These findings are in agreement with those of a previous research (17). In the current series, 16 cases were from the tongue. As in the oral cavity, the tongue is the most common site for developing a malignancy (18), it was expected to have a higher number of metastasis from the tongue.

In this study, benign tumors in the salivary glands were more common than malignant tumors. This outcome is similar to previous studies (19). An Iranian study on salivary gland tumors found 68.2% benign and 31.8% malignant tumors (20). In addition, in the present review adenoid cystic carcinoma, was the most common malignant tumor (n = 13), followed by mucoepidermoid carcinoma (n = 12). These figures show a higher frequency of adenoid cystic carcinoma in major salivary glands, which is similar to previous reports (18, 21, 22).

Similar to other studies, the parotid glands were the most commonly involved major salivary glands with 61 cases, followed by submandibular glands with 56 cases (22, 23).

In conclusion, the age and location of neck masses are the most important variables. The data in this study showed that neoplastic lesions (including metastatic lesions) were the most common neck masses, and the anterior triangle was the most common anatomical location. In addition, age could play an important role in differential diagnosis. Therefore, any mass in the neck, especially in older patients, located in the anterior triangle must be considered neoplastic until proven otherwise.

Footnotes

Authors' Contribution: Dr. Soussan Irani: all steps; Dr. Bidari and Dr. Sabeti: diagnosis of the masses, as they used the archive of depathology department of Loghman dospital.

Funding/Support: This research was supported only by Hamadan University.

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