Dermatologic Lesions Submitted to an Oral and Maxillofacial Pathology Biopsy Service: An Analysis of 2487 Cases

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Abstract

Skin lesions are often submitted to oral and maxillofacial pathology practices. The purpose of this study is to evaluate the frequency, distribution, variability, and composition of dermatologic lesions within a large oral and maxillofacial pathology biopsy service. An IRB-approved retrospective search of skin lesions diagnosed at University of Florida oral and maxillofacial pathology biopsy service between 1994 and 2015 was performed. 2487 cases were included in the study. Gender was reported in 2466 cases, of which 59% were male and 41% female. Age was provided in 2367 cases and ranged from 2 weeks to 96 years with an average of 55 years. Location was indicated in 2473 cases. Lips were the most common (41.7%), followed by face (25.3%), neck (7.4%), nose (6.5%), periorbital (5.3%), ear (4.1%), and scalp (3.8%). Of the 2487 cases, five diagnoses (actinic keratosis/cheilitis, intradermal nevus, epidermal inclusion cyst, seborrheic keratosis, and basal cell carcinoma) constituted 84.4% of the cases. 69 of 2487 cases (2.8%) resulted in dermatopathologic consultation prior to final reporting. Skin lesions accounted for ~ 1.0% of all lesions submitted to an oral and maxillofacial pathology biopsy service. This study found a large variation in the dermatologic lesions submitted to an oral pathology biopsy service. Although most were routine in complexity, dermatopathology consultation was an important tool in the diagnosis of the more challenging cases. This study may help pathologists gain a better understanding of the frequency and variability of dermatologic lesions submitted to an oral and maxillofacial pathology biopsy service and promote more interdisciplinary consultation within the field. This study evaluated the incidence and scope of dermatologic lesions submitted to a large oral and maxillofacial pathology biopsy service over a long time period. A wide scope of lesions was found, and dermatopathology consultation was important to quality assurance.

Keywords Head and neck neoplasms · Dermatology · Pathology, Oral · Histology

Introduction

Skin biopsies from the head and neck region are often submitted to oral and maxillofacial pathology practices for evaluation and diagnosis. However, the range of dermatologic lesions seen within an oral and maxillofacial pathology biopsy service is not well studied. The purpose of this study is to evaluate the variability and composition of dermatologic lesions within a large oral and maxillofacial pathology

biopsy service and assess the need for consultation with dermatopathology.

Methods

An IRB-approved retrospective search of skin lesions diagnosed at University of Florida (UF) oral and maxillofacial pathology biopsy service between 1994 and 2015 was performed. Exclusion criteria included lesions not occurring on the skin, insufficient clinical information, or inconclusive diagnosis. For lesions occurring on the lip, intraoral lesions, or those found to be on the lip mucosa, were excluded. Lesions occurring on the vermillion were considered to be extraoral and were included in this study. The clinical data, including age, gender, location, and the original diagnosis,

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were extracted and the biopsy reports of all cases were reviewed. A database was created consisting of the age of the patient, gender, location of the lesion on skin, histologic diagnosis, whether a dermatopathology consult was obtained, and in what year the lesion was diagnosed. The data was analyzed qualitatively and descriptively.

Results

A total of 2487 cases were included in the study. Gender was reported in 2466 cases (99.2%). Of these, 1456 (59%) occurred in males and 1010 (41%) in females.

The age at presentation was provided by clinicians in 2372 out of 2487 cases (95.4%) and ranged from 2 weeks to 96 years, with a mean age of 55 years (Fig. 1).

Location was indicated in 2473 out of 2487 cases (99.4%). Lips were the most common location represented with $n = 1032$ (41.7%), followed by face $n = 625$ (25.3%), neck $n = 183$ (7.4%), nose $n = 160$ (6.5%), other $n = 147$ (5.9%), periorbital $n = 130$ (5.3%), ear $n = 101$ (4.1%), and scalp $n = 95$ (3.8%) (Fig. 2).

Of the 2487 cases included in this study, the majority were premalignant/malignant epidermal lesions (Fig. 3). The five most common diagnoses overall were actinic keratosis/cheilitis, intradermal nevus, epidermal inclusion cyst, seborrheic keratosis, and basal cell carcinoma (Fig. 4, Table 1). These lesions constituted 84.4% of all cases included in this study.

Data for overall number of biopsies submitted to the service were available for six of the years included in the study (2009–2014). During these years, skin lesions

Fig. 2 Summary of representative percentages of various locations of the lesion

accounted for approximately 1% of all lesions submitted to an oral and maxillofacial pathology biopsy service. Dermatologic lesions comprised 1.7% of total cases in 2009, 1.4% in 2010, 1.1% in 2011, 1.3% in 2012, 1.0% in 2013, and 1.0% in 2014.

Out of 2487 cases, 69 (2.8%) resulted in dermatopathologic consultation prior to final reporting (Fig. 5). Nevi were the lesions most commonly sent to a dermatopathologist for consultation (Table 2).

Fig. 1 Age distribution of cutaneous lesions

Fig. 3 Representation of types of skin lesions submitted to and diagnosed at UF oral and maxillofacial pathology service by percentage

Discussion

Gender distribution was almost equal in our study, with a slightly higher percentage of males (59%) than females (41%). The average age in our study was 55 years old. The mode was 65 years, indicating that the majority of skin biopsies were performed on an older population. This could be explained by the geographic location of our biopsy service. Most biopsies sent to the UF oral and maxillofacial pathology biopsy service are performed on Florida residents and studies have shown that Florida has the greatest proportion of the elderly (65 years or older) in the United States [1].

Premalignant and malignant epidermal lesions comprise almost half of all cutaneous lesions submitted to UFs oral and maxillofacial pathology biopsy service (47.4%). Fuertes et al. carried out a similar study analyzing the composition of dermatologic lesions submitted to the Universidad Autónoma's (UA) Department of Dermatology during a 1-year period [2]. Out of 8579 skin biopsies received, 1436 (16.7%) were premalignant/malignant epidermal lesions. Melanocytic neoplasms comprised 20.3% of their cases, compared to 16.9% of cases at UF. Finally, soft tissue/mesenchymal lesions comprised 5.1% of UAs dermatologic

lesions in contrast to 1.3% lesions at UF. Interestingly, premalignant/malignant epidermal lesions constituted the majority of cutaneous lesions at UF, whereas melanocytic lesions accounted for the majority of cutaneous cases at UA. This comparison highlights the differences seen in skin lesions submitted to an oral and maxillofacial pathology versus a dermatopathology biopsy service.

In our study, actinic cheilitis was overwhelmingly the most common diagnosis. This observation may be explained by the possibility that the dentists and dental specialists who comprise the majority of biopsy submitting clinicians typically focus on the oral/perioral region. For example, a dental patient would likely be referred to another provider for skin lesions in other areas, such as the ears and scalp. Another possible contributing factor may again be due to the study being carried out in Florida, which receives plenty of ambient sunlight and has a very high ultraviolet (UV) light index [3].

The percentage of cases that were sent to a dermatopathologist for consultation was very small (2.8%). This could be attributed to the fact that five diagnoses (actinic keratosis/cheilitis, intradermal nevus, epidermal inclusion cyst, seborrheic keratosis, and basal cell carcinoma) constituted 84.4% of all lesions. Considering the high volume and

Table 1 Diagnosis

<i>Premalignant/malignant epidermal (1179)</i>	
Actinic keratosis/cheilitis	913
Basal cell carcinoma	211
Squamous cell carcinoma	40
Dysplasia or carcinoma in situ	14
Metatypical basosquamous cell carcinoma	1
<i>Benign epidermal (723)</i>	
Epidermal inclusion cyst	331
Seborrheic keratosis	297
Papilloma or verruca	67
Pilar cyst/trichilemmal cyst	22
Inverted follicular keratosis	6
<i>Benign melanocytic (411)</i>	
Nevus	403
Intradermal	347
Compound	46
Blue	3
Combined	2
Cellular blue	1
Junctional	1
Neural	1
Spitz	1
Dysplastic	1
Melanotic macule or melanosis	5
Lentigo simplex	2
Solar lentigo	1
<i>Reactive/granulomatous/histiocytic (66)</i>	
Hyperkeratosis	18
Acrochordon	16
Fibroepithelial polyp or fibrous papules	11
Keloid/scar	7
Xanthelasma	6
Granulation tissue proliferations	4
Chondrodermatitis nodularis helicis	2
Lichen simplex chronicus	1
Solar elastosis	1
<i>Pilar (32)</i>	
Pilomatricoma	10
Trichilemmoma	8
Trichoepithelioma	5
Dilated pore of winer	4
Trichofolliculoma	3
Occluded or inflamed follicle	2
<i>Soft tissue/mesenchymal (31)</i>	
Neural	15
Neurofibroma	10
Palisaded encapsulated neuroma	3
Plexiform neuroma	1
Traumatic neuroma	1
Dermatofibroma	6
Vascular malformations	5

Table 1 (continued)

Lipoma/fibrolipoma	2
Vascular leiomyoma	2
Benign fibrous histiocytoma	1
<i>Sebaceous (19)</i>	
Sebaceous hyperplasia	13
Nevus sebaceous	3
Sebaceous carcinoma	2
Sebaceous adenoma	1
<i>Sweat gland (9)</i>	
Chondroid syringoma	3
Eccrine spiradenoma	2
Syringoma	1
Apocrine hidrocystoma	1
Dermal cylindroma	1
Adenoid cystic carcinoma of skin	1
<i>Other/miscellaneous (9)</i>	
Accessory tragus	6
Calcinosis cutis	1
Neuroendocrine carcinoma	1
“Normal” skin	1
<i>Premalignant/malignant melanocytic (8)</i>	
Melanoma	6
Melanoma in situ	2

generally low diagnostic complexity of these five conditions, subspecialty consultation is often not required. This claim can be supported by the fact that less than 2% of these five diagnoses were sent out for consultation in our study.

Of the lesions that were sent to a dermatopathologist for consultation, epidermal lesions comprised the majority (50.7%). This is in stark contrast to a study carried out by Goldenberg et al., where researchers compared the referral patterns amongst dermatologists, pathologists, and dermatopathologists [4]. Not surprising, melanocytic lesions (both benign and malignant) accounted for the majority of cases sent for consultation (55.7%). According to Goldenberg et al., melanocytic neoplasms make up 13% of all medical malpractice claims and misdiagnosis of malignant melanoma is the most common cause of litigation in histopathology practice [4]. Therefore, pathologists have a stronger incentive to request consultations for melanocytic cases. Still, melanocytic lesions in our study constituted a significant 27.5% of dermatopathologist consulted cases, second only to epidermal lesions. There are several potential explanations for this difference. First of all, the vast majority of skin lesions received by UF are related to epidermal changes, which explains why the most common skin lesions sent for consultation by UF are epidermal rather than melanocytic. This is further substantiated by the fact that of the 1902 epidermal lesions included in this study, only 35

Fig. 4 Histologic examples of the most common dermatological lesions within certain categories. **a** Premalignant/malignant epidermal: actinic cheilitis (×10). **b** Premalignant/malignant melanocytic: melanoma (×10). **c** Pilar: pilomatricoma (×2). **d** Sebaceous: Sebaceous hyperplasia (×4). **e** Sweat gland: Chondroid syringoma (×2). **f** Other/miscellaneous: accessory tragus (×4)

(3.8%) were given a dermatopathologic consult, the second lowest percentage ahead of only soft tissue lesions (3.2%). Of the 419 melanocytic lesions, 19 were sent out for consultation (4.5%). The fact that epidermal lesions individually resulted in the second lowest referral rate yet still comprised more than half of the total consults would indicate that this is due to the absolute number of epidermal cases. It is also probable that clinically suspicious pigmented lesions would be less likely to be biopsied by oral surgeons or dentists, but rather referred to a dermatologist. Therefore, the vast majority of melanocytic lesions in a biopsy service such as this

would be non-complex benign proliferations, such as nevi, not requiring additional consultation.

Conclusion

With the results of this study, oral and maxillofacial pathologists can better understand the magnitude and variability of dermatologic lesions submitted to their service by surgeons, dentists, or other clinicians. This, in turn, may aid in the understanding of the significant challenges

Fig. 5 Distribution of the histologic diagnosis sent out for dermatopathologic consultation

dermatologic lesions may present. A similar large-scale study was conducted by Jones et al. and included skin lesions in an oral and maxillofacial pathology biopsy service, however their study analyzed all lesions submitted and did not focus specifically on dermatologic lesions [5]. Very few articles exist in the literature that analyze the composition of skin lesions in an oral and maxillofacial pathology biopsy service. Future studies conducted by other oral and maxillofacial pathology practices that focus solely on dermatologic lesions may contribute to a better understanding of the composition and variety of skin lesions, especially given that the frequency of dermatologic lesions may vary greatly across different oral and maxillofacial pathology biopsy services for a variety of factors involving the submitting clinicians, oral and maxillofacial pathologist, and institutions. Furthermore, studies showing the composition of dermatopathologic lesions in other oral and maxillofacial pathology practices outside of Florida would be helpful in fully characterizing these submissions, given the potential skewing effect of Florida's high UV light index and higher proportion of older adults

in the population. The fact that 84.4% of the dermatologic lesions from this study were comprised of five diagnoses would indicate that oral and maxillofacial pathologists should be comfortable with diagnosing these lesions. It was also discussed that experience with these lesions could be a reason for the low number of dermatopathologic consults. However, additional information regarding utilization of dermatopathology consultations by oral and maxillofacial pathology practices with special emphasis on whether such consults significantly alter original diagnoses could also be informative in regards to developing patterns of emphasis on training and continuing education for oral and maxillofacial pathologists.

To conclude, oral and maxillofacial pathology biopsy services often effectively handle a diverse mix of skin biopsies from the head and neck region, but this requires them to acquire a good knowledge of common skin lesions. It is also important to develop a good relationship between an oral and maxillofacial pathology biopsy service and a consultant service in dermatopathology, as this is critical to optimal quality of care.

Table 2 Summary of the histologic diagnosis sent out for dermatopathologic consult after initial review by UF Oral and Maxillofacial Pathologists

<i>Premalignant/malignant epidermal (19)</i>	
Basal cell carcinoma	10
Actinic keratosis	4
Squamous cell carcinoma	3
Epithelial dysplasia with hyperkeratosis	1
Metatypical basosquamous cell carcinoma	1
<i>Benign epidermal (16)</i>	
Seborrheic keratosis	12
Epidermal inclusion cyst	2
Verruca vulgaris	2
<i>Benign melanocytic (16)</i>	
Nevus	15
Compound	5
Intradermal	4
Combined	2
Blue	1
Cellular blue	1
Junctional	1
Dysplastic	1
Solar lentigo	1
<i>Reactive/granulomatous/histiocytic (6)</i>	
Acrochordon	1
Callus	1
Chondrodermatitis nodularis helices	1
Fibroepithelial polyp	1
Lichen simplex chronicus	1
Prurigo nodularis	1
<i>Pilar (5)</i>	
Trichilemmoma	2
Trichoepithelioma	2
Dilated pore of Winer	1
<i>Premalignant/malignant melanocytic (3)</i>	
Melanoma	3
<i>Sebaceous (2)</i>	
Sebaceous adenoma	1
Sebaceous carcinoma	1
<i>Sweat gland (1)</i>	
Eccrine spiradenoma	1
<i>Soft tissue/mesenchymal (1)</i>	
Benign fibrous histiocytoma	1

Compliance with Ethical Standards

Conflict of interest The authors report no conflicts of interest.

Research Involving with Human and Animal Participants This article does not contain any studies with human participants or animals performed by any of the authors.

References

1. Zevallos J, Wilcox M, Jean N, Acuña J. Profile of the older population living in Miami-Dade County, Florida: an observational study. *Medicine*. 2016;95(20):e3630.
2. Fuertes L, Santonja C, Kutzner H, Requena L. Immunohistochemistry in dermatopathology: a retrospective study of the most frequently used antibodies. *Am J Dermatopathol*. 2016;38(2):92–104.
3. Fernandez CA, McClure LA, LeBlanc WG, et al. Comparison of Florida skin cancer screening rates with those in different US regions. *South Med J*. 2012;105(10):524–9.
4. Goldenberg G, Camacho F, Gildea J, Golitz LE. Who sends what: a comparison of dermatopathology referrals from dermatologists, pathologists and dermatopathologists. *J Cutan Pathol*. 2008;35:658–61.
5. Jones AV, Franklin CD. An analysis of oral and maxillofacial pathology found in adults over a 30-year period. *J Oral Pathol Med*. 2006;35:392–401.