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Clinicopathological cognizance of benign salivary gland tumors of minor glands of oral cavity

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Aim: The aim of our study is to investigate the prevalence of benign minor salivary gland tumors in reported in a private institution, Chennai regarding the percentage of each tumor type, the clinicopathological relationship, outlining the clinical manifestations, demographic traits, and histological characteristics of each tumor type

Materials and methods: All histopathologically verified cases of minor salivary gland tumors that occurred throughout a ten-year period, from January 2014 to April 2024, were obtained from the institution's archival software. The histopathological analysis of the biopsied specimen was verified and their clinico-demographic data such as age, gender, location, and treatment were collected.

Results: Most common site of occurrence was palate (55%) followed by floor of the mouth (20%), buccal mucosa (15%) and upper lip (10%). 80% of the cases were provisionally identified to be benign but 10% of the cases were clinically diagnosed as malignant lesions, and another 10% as cystic lesions which turned out to be benign after histopathological analysis. 65% of the cases were histopathologically confirmed to be Pleomorphic adenoma, 15% of the cases were myoepithelioma, 10% of the cases were basal cell adenoma, 5% were Canalicular adenoma and 5% were cystadenoma.

Conclusion: Benign minor salivary gland tumors have heterogeneous sites and types. The clinical features and histopathological diagnosis are essential for refining their diagnostic approaches.

Keywords: canalicular adenoma; minor salivary gland; pleomorphic adenoma

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Introduction

The physiology and pathological states of saliva and salivary glands are considered to be strongly associated with oral and systemic health.[1,2] The major and minor salivary glands in the oral cavity can give rise to a variety of neoplasms, including salivary gland tumors.[3] Benign lesions account for a sizable fraction of these tumors and present diagnostic and therapeutic problems because of their diverse histological characteristics and clinical manifestations.[4,5] These benign tumors are frequently found in the oral cavity due to its intricate structure and extensive network of salivary glands. Therefore, a comprehensive study of their clinicopathological features is essential for an accurate diagnosis and the best possible course of therapy.[6] There is Insufficient literature on the salivary gland tumors that originate from minor salivary glands, as they are rare and heterogeneous. Minor salivary gland neoplasms account for less than 25% of intraoral salivary neoplasms. There are some differences amongst them, mainly with regard to distribution, frequency, and clinical characteristics.[7] Previous studies have documented these tumors either inside an anatomical subsite or by histological type, where major and minor tumors are reported simultaneously.[8]

Minor salivary gland neoplasms account for less than 25% of intraoral salivary neoplasms. 80% of the minor salivary gland tumors are malignant with very less number of benign cases. The majority of these benign neoplasms are heterogeneous in their ability to recur and/or transform into malignant lesions.[9] Therefore, correct diagnosis is essential in dictating the proper treatment. The World Health Organization (WHO) in 2017 recognized 11 different benign epithelial salivary gland tumors. The most common benign subtypes identified include pleomorphic adenoma (PA), Warthin's tumor (WT), and myoepithelioma (MYO), followed by rarer histologies including lymphadenoma (LA), sebaceous adenoma (SA), oncocytoma (OC), cystadenoma, sialadenoma papilliferum (SP), ductal papilloma (intraductal and inverted), canalicular adenoma (CA), and basal cell adenoma (BCA).[10] Among these, pleomorphic adenoma, cystadenoma, and canalicular adenoma are the most frequently encountered benign neoplasm in the minor salivary gland.[11]

Even though these tumors are benign, they can exhibit a wide range of clinical symptoms, including pain, swelling, facial asymmetry, and mucosal ulceration. These symptoms frequently resemble malignant lesions, therefore a thorough diagnostic process is required.[12] A key factor in accurately diagnosing and predicting benign salivary gland tumors is clinicopathological correlation and clinical characteristics, such as patient demographics, the nature of the presenting symptoms, the length of the symptoms, and radiographic findings, offer important hints for preliminary evaluation.[13,14] Nevertheless, histological evaluation which comprises a thorough assessment of tissue architecture, cytological features, stromal characteristics, and immunohistochemistry profiles is necessary for a conclusive diagnosis.[15,16] Combining clinical, radiographic, and histological data makes it easier to formulate a precise differential diagnosis and choose the best course of action.[17] Despite recent advancements in the identification and treatment of oral tumors, more clinical data is needed to identify their practical clinical pattern. Improving our knowledge on the prevalence of these tumors would help in early diagnosis, patient care and prompt treatment. In this regard, the aim of our study is to investigate the benign minor salivary gland tumors in a private institution, Chennai and their clinicopathological relationship, outlining the clinical manifestations, demographic traits, and histological characteristics of each tumor type.

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Materials and methods

This is a retrospective study of minor salivary gland tumors diagnosed in the Department of Oral Pathology and Microbiology from a private tertiary health care centre, Chennai. Prior informed consent was obtained from all the patients included in the study (IHEC/SDC/OPATH-2101/24/179). The principles outlined in the Declaration of Helsinki were followed in the conduct of this retrospective investigation. Criteria for inclusion were benign minor salivary gland tumors diagnosed based on latest WHO criteria. Major salivary gland tumors and malignant salivary gland tumors were not included.

All histopathologically verified cases of minor salivary gland tumors that occurred throughout a ten-year period, from January 2014 to April 2024, were obtained from the institution's archival software. Three independent, experienced oral pathologists blindly reviewed the minor salivary gland tumor diagnosis. The histopathological analysis of the biopsied specimen was conducted in conjunction with the collection of clinic-demographic data such as age, gender, location, treatment and follow-up. The outcomes were totaled and displayed in a 2021 Microsoft Excel spreadsheet. For the clinical and demographic data, descriptive analysis was performed.

Results

The demographic characteristics namely gender, age, size, site and laterality are summarized in Table 1. A total of 20 cases of benign salivary gland tumors were retrieved from the database. Benign minor salivary gland tumors demonstrated a gender predilection for women (n=13) (62%) in this study.

Table 1: Clinicodemographic profile of minor salivary gland tumors of the oral cavity

Parameter	Number
Age	Mean - 34.81 years
Gender	Male (38%) Female (62%)
Site	Palate (n=11; 55%) Buccal mucosa (n=3; 15%) Upper lip (n= 2; 10%) Floor of the mouth (n=4; 20%)
Size	2.95x 2.6 cm
Histological subtypes	Pleomorphic adenoma (65%) Myoepithelioma (15%) Basal cell adenoma (10%) Cystadenoma (5%) Canalicular adenoma (5%)

The benign minor salivary gland tumors were mostly diagnosed in the third decades of life, with the mean age of 34.81. (median of 29.5 and standard deviation of 12.05), ranging from 7 to 67 years. The mean size of the tumors were 2.95x2.6 cm (Median-2.75x2.5, standard deviation 0.88x1.316) with 75% (n=15) of the tumors measuring less than 4 cm. The site of occurrence of the majority of the tumors were palate (55%), followed by buccal mucosa (15%), upper lip (10%) and floor of the mouth (20%) (Figure 1).

Figure 1: Clinical appearance of palatal swelling of pleomorphic adenoma (a); palatal myoepithelioma (b) and (c) canalicular adenoma of upper lip.

80% (n=16) of the cases had painless swelling and 20% (n=4) of the cases had a

painful swelling which was tender on palpation. 80% of the cases were provisionally diagnosed as benign palatal adenoma. Only 10% of the cases were diagnosed as cystic lesions and malignant salivary gland lesions respectively. 65% of the cases were histopathologically confirmed to be pleomorphic adenoma (n=13), 15% of the cases were myoepithelioma (n=3), 10% of the cases were basal cell adenoma (n=2) and one case each of canalicular adenoma and cystadenoma (5% each) (Figure 2 and 3).
Treatment and follow-up.

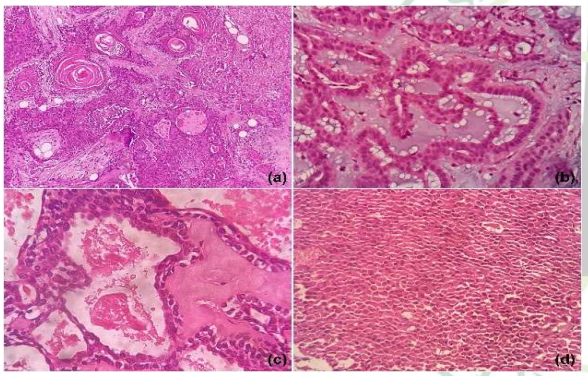

Figure 2: Photomicrographs of H&E stained sections showing (a) pleomorphic adenoma with extensive squamous metaplasia, (b) tall columnar cells arranged in tubular arrangement in a loose vascular stroma; (c) cystadenoma and (d) myoepithelioma containing sheets of plasmacytoid cells.

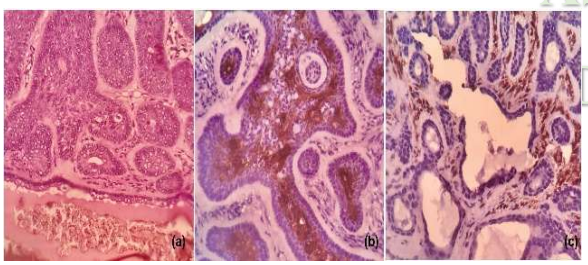

Figure 3: Photomicrographs of a case of basal cell adenoma showing jig-saw puzzle arrangement of tumor cells (a), cytokeratin positivity in the luminal cells (b) and S100 positivity in the stromal cells (c).

All cases were managed conservative surgical excision with no subsequent recurrence during a mean follow-up period of 18.6 months.

Discussion

Minor salivary gland tumors are uncommon, accounting for less than 20% of all salivary neoplasms.[18-20] Our retrospective study's results shed important light on the clinicopathological relationship between benign minor salivary gland tumors. Our research showed that women were more likely than men to get these tumors, which is in line with earlier research showing that women are more likely than men to have minor salivary gland tumors.[21,22] The growth of these salivary gland tumors in women may be influenced by hormonal changes that occur during puberty, pregnancy, or the menstrual cycle.[23]

Our study population's mean age of occurrence was 34.81 years, and the tumors peaked in the third decade of life, which is consistent with the findings that younger people are more likely to get salivary gland tumors.[24] The palate was the most common site of occurrence in our study, followed by the upper lip and buccal mucosa. The anatomical distribution of minor salivary glands, which are numerous throughout the oral cavity and especially in the palate, is consistent with this distribution.[25] Interestingly, most of the cases had no discomfort at all, which is in line with the indolent nature of most benign minor salivary gland tumors.[26] A small percentage of cases, meanwhile, showed uncomfortable swelling, highlighting the significance of taking clinical symptomatology into account when making a differential diagnosis for these lesions.[21] It is imperative to acknowledge that a considerable number of benign minor salivary gland tumors go undiagnosed, especially when they manifest as small, asymptomatic lesions.[5] In clinical practice, these tumors could be monitored over time, if they do not show symptoms of concern such as ulceration, pain, or rapid growth.[27] However, a significant number of these lesions may go unreported or undetected and the actual prevalence of

benign minor salivary gland tumors may be underestimated. Furthermore, though benign, these tumors can occasionally present clinically like malignant lesions, which could result in misdiagnosis and overtreatment if histopathological assessment is not done.[28] This is in accordance with our study results where 10% of the benign tumors were provisionally diagnosed as malignant tumors. Therefore, a thorough diagnostic approach including imaging and histopathological evaluation is crucial.

Histopathological examination remains the most reliable technique for the diagnosis of minor salivary gland tumors. Pleomorphic adenoma was the most often occurring histological subtype in our investigation, which is in line with its well-established status as the most common benign minor salivary gland tumor.[29,30] The additional histological entities found included myoepithelioma, basal cell adenoma, and cystadenoma, illustrating the wide range of benign lesions that can develop from minor salivary glands.

Understanding the prevalence of benign minor salivary gland tumors is essential for both surgeons and pathologists in refining their diagnostic approaches. This would help in early identification, education, and treatment of salivary gland tumors, which will lower patient morbidity from needless medical interventions.[31-33] Furthermore, more detailed and higher sample size prevalence studies are needed to advance our knowledge of the demographic and geographic differences in tumor incidence that may be attributed to lifestyle, environmental, or genetic variables. For example, finding higher frequency in a particular region may lead to research into protective factors or risk factors exclusive to those groups, which may open up new directions for early intervention or prevention. This would also improve patient care, and maximize the utilization of healthcare resources by understanding a clearer epidemiological picture.

Limitations

Although our study offers useful pathological information on benign minor salivary gland tumors, there are several limitations that should be taken into account. The study's retrospective design may introduce selection bias, and the accuracy and completeness of the clinical and histopathological data may be impacted by the dependence on archive data. Furthermore, it's possible that the single-center design will restrict how far our findings can be applied.

Conclusion

Within the limitations of the current study, benign minor salivary gland tumors have heterogeneous sites and types, with the majority in the palate and the commonest type was Pleomorphic adenoma. We conclude that, in the identification and treatment of benign minor salivary gland tumors, a multidisciplinary approach involving clinical, radiographic, and histological examination is crucial. More prospective studies are needed using advanced imaging modalities and molecular profiling to improve our knowledge of the pathophysiology and best practices for treating these interesting neoplasms.

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Data availability: Available on request

Conflicts of Interest:

Financial interests: The authors declare they have no financial interests.

Ethical approval: Prior informed consent was obtained from all the patients included in the study

References

1. Elshorkoubally EAM, Amin R, Waelabou-Zeid A. The Changes Induced by Tartrazine in Submandibular Salivary Gland of Male Albino rats. Ain Shams Dental Journal (Egypt). 2020; 19: 55-61.

2. Fekry MM, El-Zainy, MA, Amin RM. Investigation of the toxic effect of titanium dioxide nanoparticles and the possible recovery after 4 weeks withdrawal on the submandibular salivary gland of albino rats: An in vivo study. Ain Shams Dental Journal (Egypt). 2020; 20 (4): 70-76.
3. Kessler AT, Bhatt AA. Review of the Major and Minor Salivary Glands, Part 1: Anatomy, Infectious, and Inflammatory Processes. J Clin Imaging Sci. 2018 Nov 15;8:47. doi: 10.4103/jcis.JCIS_45_18.
4. Ahmad NA. Histpathological and immunohistochemical evaluation of the prophylactic effect of camellia sinensis against sumithion -induced toxicity in rat submandibular salivary gland. *Ain Shams Dental Journal*, 2019; 16(4): 269-278. doi: 10.21608/asdj.2019.164536
5. Young A, Okuyemi OT. Benign Salivary Gland Tumors. [Updated 2023 Jan 12]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Available from: https://www.ncbi.nlm.nih.gov/books/NBK564295/
6. Błochowiak K, Farynowska J, Sokalski J, Wyganowska-Świątkowska M, Witmanowski H. Benign tumours and tumour-like lesions in the oral cavity: a retrospective analysis. Postepy Dermatol Alergol. 2019;36(6):744-751. doi: 10.5114/ada.2018.78805.
7. Sarmento DJ, Morais ML, Costa AL, Silveira ÉJ. Minor intraoral salivary gland tumors: a clinical-pathological study. Einstein (Sao Paulo). 2016;14(4):508-512. doi: 10.1590/S1679-45082016AO3749.
8. Ko JJ, Siever JE, Hao D, Simpson R, Lau HY. Adenoid cystic carcinoma of head and neck: clinical predictors of outcome from a Canadian centre. Curr Oncol 2016;23(1):26–33
9. Mishra S, Mishra YC. Minor salivary gland tumors in the Indian population: A series of cases over a ten year period. J Oral Biol Craniofac Res. 2014; 4(3):174-80. doi: 10.1016/j.jobcr.2014.11.002.
10. Israel Y, Rachmiel A, Ziv G, Nagler R. Benign and Malignant Salivary Gland Tumors - Clinical and Demographic Characteristics. Anticancer Res. 2016;36(8):4151-4.
11. Ali NS, Akhtar S, Junaid M, Tariq MU, Kamal A. Pleomorphic adenoma of minor salivary glands. Pak J Med Sci. 2017;33(2):507-510.
12. Bashir A, Khan ZA, Maqsood A, Prabhu N, Saleem MM, Alzarea BK, et al. The Evaluation of Clinical Signs and Symptoms of Malignant Tumors Involving the Maxillary Sinus: Recommendation of an Examination Sieve and Risk Alarm Score. Healthcare (Basel). 2023;11(2):194. doi: 10.3390/healthcare11020194.
13. Zuo H. The Clinical Characteristics and CT Findings of Parotid and Submandibular Gland Tumours. J Oncol. 2021; 2021:8874100. doi: 10.1155/2021/8874100.
14. Elshorkoubally EAM, Amin R, WaelAbou-Zeid A. The Changes Induced by Tartrazine in Submandibular Salivary Gland of Male Albino rats. *Ain Shams Dental Journal*, 2020; 19(3): 55-61. doi: 10.21608/asdj.2020.140026
15. Elsherif, N., Abdelhamid, M., Taha, A. Histopathological Evaluation of Cancer Tendency in the Buccal Mucosa of Aged Albino Rats (Histological and Immunohistochemical Study). *Ain Shams Dental Journal*, 2023; 32(4): 37-48. doi: 10.21608/asdj.2023.202863.1174
16. Hoda RS, Brogi E, Wen HY. Quality Issues in Diagnostic Immunohistochemistry in Breast Pathology. Pathobiology. 2022;89(5):324-333. doi: 10.1159/000522538.
17. Jaula H, Mattila L, Lappi-Blanco E, Salonen J, Vähänikkilä H, Ahvenjärvi L, Moilanen JS, Kuismin O, Harju T, Kaarteenaho R. Clinical, radiological and histopathological features of patients with familial pulmonary fibrosis. Respir Res. 2024;25(1):239. doi: 10.1186/s12931-024-02864-5.
18. Reddy V, Wadhwan V, Aggarwal P, Sharma P, Reddy M. A benign salivary gland tumor of minor salivary gland mimicking an epithelial malignancy. Contemp Clin Dent. 2015;6(2):247-9. doi: 10.4103/0976-237X.156058.
19. Pandiar D, Ramani P, Krishnan M, Krishnan RP. Intraductal carcinoma of right parapharyngeal space presenting as a fluctuant swelling of retromolar region: Case emphasizing on the histological differential diagnosis. J Oral Maxillofac Pathol. 2023;27(Suppl 1):S28-S32. doi: 10.4103/jomfp.jomfp_288_22.
20. Devi A, Narwal A, Kamboj M, Gupta M, Pandiar D, Gupta A. Low Grade Intraductal Carcinoma of Palate: An Extremely Rare Entity with Review of Literature. Indian J Otolaryngol Head Neck Surg. 2022;74(Suppl 2):2222-2227. doi: 10.1007/s12070-020-02092-5.
21. Rivera-Bastidas H, Ocanto RA, Acevedo AM. Intraoral minor salivary gland tumors: a retrospective study of 62 cases in a Venezuelan population. J Oral Pathol Med. 1996;25(1):1-4. doi:10.1111/j.1600-0714.1996.tb01214.x
22. Li B, Cai W, Yin J, et al. Clinicopathological characteristics and treatment outcomes of minor salivary gland tumors: a single-institution retrospective study of 234 patients. Oral Surg Oral Med Oral Pathol Oral Radiol. 2020;129(2):145-151.
23. Horn-Ross PL, Morrow M, Ljung BM. Menstrual and reproductive factors for salivary gland cancer risk in women. Epidemiology. 1999;10(5):528-530.
24. Loyola AM, de Araújo VC, de Sousa SO, de Araújo NS. Minor salivary gland tumours. A retrospective study of 164 cases in a Brazilian population. Eur J

Cancer B Oral Oncol. 1995;31B(3):197-201. doi:10.1016/0964-1955(95)00001-x
25. Einstein (São Paulo) 14 (4) • 2016 • https://doi.org/10.1590/S1679-45082016AO3749
26. Lee WH, Tseng TM, Hsu HT, Lee FP, Hung SH, Chen PY. Salivary gland tumors: A 20-year review of clinical diagnostic accuracy at a single center. Oncol Lett. 2014;7(2):583-587. doi: 10.3892/ol.2013.1750.
27. Dongiovanni P, Meroni M, Casati S, Goldoni R, Thomaz DV, Kehr NS, et al. Salivary biomarkers: novel noninvasive tools to diagnose chronic inflammation. Int J Oral Sci. 2023;15(1):27. doi: 10.1038/s41368-023-00231-6
28. Hwang SM, Pan HC, Hwang MK, Kim MW, Lee JS. Malignant Skin Tumor Misdiagnosed as a Benign Skin Lesion. Arch Craniofac Surg. 2016;17(2):86-89. doi: 10.7181/acfs.2016.17.2.86. Epub 2016 Jun 21. PMID: 28913261; PMCID: PMC5556877.
29. Wang YL, Zhu YX, Chen TZ, Wang Y, Sun GH, Zhang L, Huang CP, Wang ZY, Shen Q, Li DS, Wu Y, Ji QH. Clinicopathologic study of 1176 salivary gland tumors in a Chinese population: experience of one cancer center 1997-2007. Acta Otolaryngol. 2012;132(8):879-86. doi: 10.3109/00016489.2012.662715. E
30. Ramesh M, Krishnan R, Paul G. Intraoral minor salivary gland tumours: a retrospective study from a dental and maxillofacial surgery centre in salem, Tamil Nadu. J Maxillofac Oral Surg. 2014;13(2):104-8. doi: 10.1007/s12663-013-0489-4.
31. Karwan A. Moutasim, Gareth J. Thomas, Salivary gland tumours: update on molecular diagnostics, Diagnostic Histopathology, 26(4), 2020,159-164, https://doi.org/10.1016/j.mpdhp.2020.01.002.
32. Pandiar D, Kannan N, Krishnan RP, Ramalingam K. Synchronous palatal polymorphous adenocarcinoma and canalicular adenoma: A rare case presentation and literature review. Oral Oncology Reports. 2024
33. Sivakumar N, Narwal A, Pandiar D, Devi A, Anand R, Bansal D, Kamboj M. Diagnostic utility of p63/p40 in the histologic differentiation of salivary gland tumors: A systematic review. Oral Surg Oral Med Oral Pathol Oral Radiol. 2022;133(2):189-198. doi: 10.1016/j.oooo.2021.07.010.

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