Original Article

HISTOMORPHOLOGICAL STUDY OF MINOR SALIVARY GLANDS IN ADVANCING AGE

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Objective: To study age related morphological changes in the minor salivary glands.
Material and Methods: Thirty five specimens of minor salivary glands were collected from dead bodies of adults, both male and female, brought to the Forensic Department of KEMU Lahore for autopsy within twenty four hours of unnatural death. Dead bodies with surgical scars on body, lymphadenopathy, enlarge salivary glands were excluded from the study. Autopsy specimens were placed in five groups according to estimated age. Samples were collected, processed and stained with Hematoxylin and Eosin for histomorphometric studies under light microscope for diameter of acini, number of acini, number of intercalated ducts and number of interlobular blood vessels.
Results: Statistically significant changes in diameter of acini and mean number of acini were observed in different study groups as the age advances (p value = 0.000) while no significant change was observed in mean number of intercalated ducts and interlobular blood vessels.
Conclusion: With increasing age mean diameter and number of acini decreases while number of intercalated ducts and interlobular blood vessels remained unchanged in minor salivary glands.
Key words: Minor Salivary Glands, Acini, Intercalated Ducts, Interlobular Blood Vessels.

Introduction

Minor salivary glands (MSG) are located just beneath the mucosal surface of tongue, lips, palate and cheeks and open in the oral cavity by means of short ducts.[1] These glands are not present in gums and anterior hard palate. They are 450-750 in number and classified into four groups depending upon their location.[2,3]

- Lingual (anterior and posterior; von Ebner's glands)
- Palatal,
- Labial and
- Buccal

Anatomically there is no true capsule of glands and connective tissue septa separates glandular masses into lobules. Supporting connective tissue blends with that of adjacent connective tissue. The acini are made up of truncated pyramidal-shaped mucus cells, and some include serous cells component arranged as occasional demilunes. The lingual serous (Von Ebner's) gland are the only exceptions which are located in the posterior part of the tongue.[3-5]

The secretory cells contain basally located, oval nuclei having denser chromatin material & secretory granules lie apically. Rough endoplasmic reticulum is present in the basal cytoplasm and Golgi complexes are apical in location or lateral to the nucleus. Mucin is the main product of these cells, few other macromolecules are also secreted but rate of flow is much lower than serous cells.[4]

Intercalated ducts are the first ducts into which saliva drains from secretory elements. These ducts are lined with cuboidal cells, which have round, centrally located nuclei. Myoepithelial cells may be located at the basal side of the intercalated ducts. These cells are usually fusiform in shape and are oriented lengthwise along ducts.[5] Presumably, they support the acinar and ductal cells and help them in expelling actively the ductal contents.[6] The main excretory ducts are lined with pseudostratified columnar epithelium until their opening into oral cavity.[7]

The people with hyposalivation may have problem in eating dry foods, denture retention and develop denture sores. The patients also complain of tongue sticking to the palate, halitosis, a chronic burning sensation and intolerance to spicy foods.[8]

The incidence of age related diseases increases rapidly throughout the world in elderly individuals. Among the common problems that have a significant impact on their quality of life are xerostomia, salivary gland hypofunction and edentulism.[9,10]

Dry mouth or Xerostomia the subjective feeling of oral dryness, is a major complaint of many elderly individuals, although they seek medical help, it usually provides no adequate relief.[11] Complaints of xerostomia are more common at night because salivary production is at its lowest circadian level ing sleep; the problem may be compounded by mouth breathing.[8]

With regard to salivary gland morphology and composition of saliva, age-related changes have been

reported in healthy individuals. In the salivary glands of the elderly ,regardless of disease or medications, there is a substantial age-related replacement of the functional parenchymal tissue by nonfunctioning adipose and fibrous tissue, while the proportional volume of acini is reduced, accompanied by a reduction in the salivary flow rates and in composition.[12,13]

Age related changes in the salivary glands are under the control of genes which are either up regulated or down regulated. Although sufficient literature is available regarding age related changes in major salivary gland yet meager research work has been performed to identify changes in minor salivary gland with age.

This study is aimed to establish the histo-morphological changes that occur in the parenchyma of minor salivary glands with advancing age in the absence of any factor which predisposes to their atrophy.

Materials and Methods

This descriptive study was conducted in Anatomy & Forensic Departments of King Edward Medical University, Lahore. Thirty five specimens of labial minor salivary gland were collected from dead bodies of adults, both male and female, brought to the Forensic Department of KEMU Lahore for autopsy within twenty four hours of unnatural death. Dead bodies with surgical scars on body, lymphadenopathy, enlarge salivary glands were excluded from the study. Autopsy specimens were placed in five groups A, B, C, D and E according to estimated age. **(Table-1)**

Table-1: Age distribution.

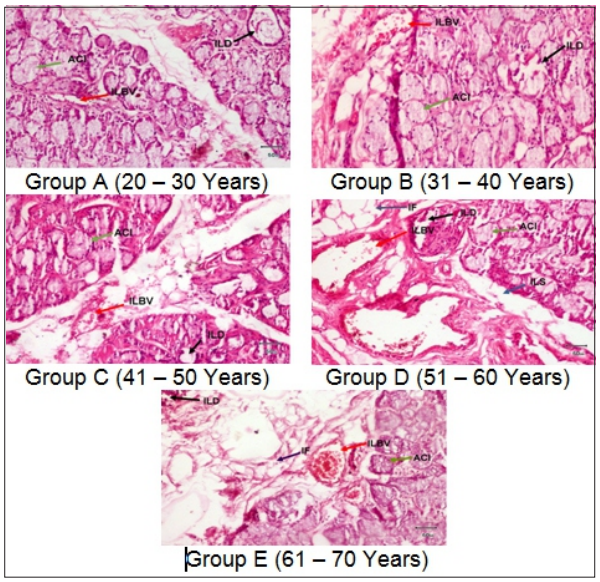
Group	Age Range
A	20- 30
B	31- 40
C	41- 50
D	51 - 60
E	61 - 70

Specimens from Labial glands were collected from mucosal surface of middle of the lower lip by giving horizontal incision parallel to red area of lower lip. Collected Samples were processed and stained with Hematoxylin and Eosin for histomorphometric studies under light microscope and at random non overlapping fields of each slide were studied for diameter of acini, number of acini, number of intercalated ducts and number of interlobular blood vessels.

Results

The mean diameter of acini with SD in labial glands in group A, B, C, D and E was 75.00±2.24, 72.14±5.67, 64.28 ±6.87, 36.96±1.89 and 28.46±4.18 respectively. The mean number of acini in labial gland with SD in group A, B, C, D, and E were 30±1.63, 26.43±1.72, 18.29±0.76, 14.29±0.73 and 10.86±0.69 respectively. A statistically significant difference in mean diameter of acini and mean number of acini in labial gland of different groups was observed with advancing age (p-value=0.000).

The mean number of intercalated ducts in labial glands in group A, B, C, D, and E were 3.14±0.89, 3.10±0.57, 2.99±0.53, 3.00±0.53 and 2.89±0.48 respectively. The mean number of interlobular blood vessels with SD in labial gland groups A, B, C, D and E were 3.04±1.00, 3.00±0.53, 2.99±0.69, 3.00±0.95 and 2.98±0.48 respectively. The mean number of intercalated ducts and mean number of blood vessels in labial glands did not show any statistically significant change (p-value=0.074 and 0.062 respectively).



Discussion

Age related morphological changes in parenchymal and stromal components of labial minor salivary glands were examined under the light microscope. A substantial decrease in total mean diameter of acini of labial glands with advancing age was seen in present study which could be due to different and independent behavior of acini with ageing which

can be explained in terms of reduced secretions from the minor salivary glands in old age. Our findings were consistent with the findings of Azevedo et al, who also documented age related decrease in size of acini of MSG whereas Vered et al, studied age related histomorphometric changes in labial salivary glands with special reference to acinar components also showed similar changes in acini with advancing age.Statistically significant variations were noted in mean diameter of acini among different study groups (p-value=0.000) and the trend was decreasing as age was increasing.[14,15]

The mean number of acini in labial gland showed a decreasing pattern with increasing age. It also showed statistically significant decrease in number of acini. (p-value = 0.000). The number of acini showed a general trend of age related decrease which might be due to infiltration of fibrous tissue as well as adipose tissue replacing the acini. Our findings were in accordance with the findings of Dayan, who also noted that the mean number of acini decreased with ageing. He observed that there was 48% decrease in number of acini in minor salivary glands in old age group which was due to replacement of parenchyma by fibrous tissue and lymphocytic infiltrate.[16] Similarly Drummond & Chisholm[17] and Scott in separate studies observed 44% decrease in number of acini in minor salivary glands.[14-17]

Although the adipose tissue increased significantly with age**,** the increase was less than that of connective tissue. Vered et al (2000) stated that there was more increase in adipose tissue in minor salivary glands in aged people than fibrous tissue. In present study the acinar tissue in minor salivary glands in ageing was mainly replaced by fibrous tissue and less by adipose tissue which was in accordance with the findings of De Wilde et al & Syrjanen. Dayan reported an increase in Infiltration of the lymphocytes in the ageing glands. Wilde et al in 1986 found no significant increase in lymphocytic infiltrate in minor salivary glands of elderly people while Drummond & Chisholm, Syrjanen claimed different severity of age related increase of lymphocytic infiltrate. In 1986 Nair and Schroeder, explained this infiltrate as a part of mucosa associated lymphoid tissue in the oral cavity or as an age related autoimmune process.[14-20]

Among the stromal components, no age related change in the intercalated ducts and vessels were observed. Generally, the total of mean numbers of intercalated ducts in different study groups of labial glands were 3.20±0.83. The intercalated ducts in these glands did not show any statistically significant change with advancing age as the p values were > 0.05 (p-value=0.074). In present study results of this parameter were in accordance with Buchner et al who observed no significant increase in mean number of duct with aging while Wilde et al in his research reported that in areas with ageing of minor salivary glands number as well as diameter of the intercalated ducts were increased which was contrary to the findings of this study. Drummond and Chisholm also found out that increase in ductal volume is a result of mild ductal dilatation partly it is due to ductal hyperplasia where as Wilde et al observed that increase ductal volume is not due to ductal dilatation rather it's a result of increased number of ducts and he supported observation by increased length density of interlobular ducts. The presence of duct like structures were visualized in the glands of elderly individuals by Azevedo LR and many research workers who labeled them as apparent or relative ducts. These were labeled as apparent because doubt existed about whether these structures were duct remnants or atrophic acini.[14]

The total mean number of interlobular blood vessels in different study groups showed no statistically significant change with passage of time as the p-values was 0.062. The findings of current study were consistent with the results of Vered et al who observed striking changes in the stromal component of the minor salivary glands with ageing like adipose tissue and lymphocytic infiltrate but no change in the number blood vessels while Azevedo et al noted that congested blood vessels increased with age. Drummond and Chisholm also found no change in number of blood vessels in minor salivary glands with ageing[18-21].

Conclusion

With increasing age mean diameter and number of acini decreases while number of intercalated ducts and interlobular blood vessels remained unchanged in minor salivary glands.

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