CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES
http://doi.org/10.5281/zenodo.3830599

Available online at: http://www.iajps.com *Research Article*

PROTEINS REGULATING SALIVARY AND LACRIMAL FLOW IN XEROSTOMIA

Dr Hamda Khurram[1], Dr Ramsha Khalid[1], Dr Mahnoor Ali[1]
[1]House Officer at Punjab Dental Hospital, Lahore

Article Received: March 2020 **Accepted:** April 2020 **Published:** May 2020

Abstract:
Lacrimal and salivary glands are exocrine tissues that have the main function of secreting tears and saliva, respectively. The main objective of the study is to analyse the proteins regulating salivary and lacrimal flow in xerostomia. This descriptive study was conducted in Punjab Dental Hospital, Lahore during March 2019 to December 2019. In this review analysis we explain the protein regulation salivary flow in xerostomia condition. Xerostomia and hyposalivation have been reported as common oral manifestations of diabetes mellitus (DM). Xerostomia in DM patients can be due to a number of reasons, such as damage to the salivary gland parenchyma, alteration in the microcirculation of gland, dehydration and disturbed glycemic control, but the exact cause is still unknown. It is concluded that Xerostomia occur due to defects in salivary and lacrimal fluid secretion can result in a multifacet degradation of patients' quality of life.

Corresponding author:
Dr. Hamda Khurram,
House Officer at Punjab Dental Hospital, Lahore

QR code

Please cite this article in press Hamda Khurram et al, ***Proteins Regulating Salivary And Lacrimal Flow In Xerostomia.,*** *Indo Am. J. P. Sci, 2020; 07(05).*

INTRODUCTION:

Lacrimal and salivary glands are exocrine tissues that have the main function of secreting tears and saliva, respectively. These glands consist of acini, ducts, nerves, myoepithelial cells, mast cells, and plasma cells. Approximately 80% of each gland is acini, which secrete electrolytes, water, and proteins [1]. It is well established that lacrimal and salivary gland fluid secretion is under neural control. For example, reflexes from the ocular surface and optic nerve, as well as from higher centers of the brain, stimulate lacrimal gland secretion using parasympathetic and sympathetic efferent pathways [2].

Parasympathetic and sympathetic nerves innervate the acinar cells, duct cells, and blood vessels of the lacrimal and salivary glands. The parasympathetic nerves contain the neurotransmitter acetylcholine, which acts through cholinergic muscarinic receptors, and vasoactive intestinal peptide [3]. Sympathetic nerves contain norepinephrine, which acts through adrenergic receptors.

Saliva is a complex fluid, secreted by salivary glands, plays an important role in health and maintenance of oral cavity through its vast array of functions including, lubrication, protection, buffering action, antimicrobial function, facilitates swallowing and taste, helps in digestion and tissue repair. Saliva has important diagnostic implications as it contains various biomarkers that can be helpful in detection and monitoring of various oral and systemic diseases [4]. The lacrimal fluid, secreted by lacrimal glands, is essential for the maintenance of healthy eyes. It performs important functions such as protection of the eye by producing IgA and various antibacterial and fungicidal substances and molecules, the aqueous component keeps the ocular surface moist and helps in maintaining normal visual acuity [5]. It is also important for the normal growth and maintenance of ocular tissue by producing various growth factors, for example, Epidermal growth factor, Fibroblast growth factor, Transforming growth factor-beta [6].

Objectives of the study

The main objective of the study is to analyse the proteins regulating salivary and lacrimal flow in xerostomia.

MATERIAL AND METHODS:

This descriptive study was conducted in Punjab Dental Hospital, Lahore during March 2019 to December 2019. In this review analysis we explain the protein regulation salivary flow in xerostomia condition.

Local cause of Xerostomia

Xerostomia and hyposalivation have been reported as common oral manifestations of diabetes mellitus (DM). Xerostomia in DM patients can be due to a number of reasons, such as damage to the salivary gland parenchyma, alteration in the microcirculation of gland, dehydration and disturbed glycemic control, but the exact cause is still unknown. The salivary glands of head and neck are highly sensitive to radiation, and radiotherapy can cause temporary or permanent damage to the glands [7]. Xerostomia is the most common presentation of glandular dysfunction in the head and neck region. Sjogren's syndrome is an autoimmune disease of salivary and lacrimal glands, resulting in dry mouth and dry eyes. Xerostomia is common in the geriatric population. The main causes for xerostomia are attributed to different medications, long-term systemic diseases and head and neck radiotherapy [8].

The most frequent cause of hyposalivation is use of certain medications. According to the Surgeon General's Report on Oral Health in America, more than 400 over-the-counter (OTC) and prescription medications can contribute to or exacerbate oral dryness, including antihistamines (for allergy or asthma), antihypertensive medications, decongestants, pain medications, diuretics, muscle relaxants, and antidepressants. The most common types of medications causing salivary dysfunction have anticholinergic effects, e.g., tricyclic antidepressants, antihistamines, antihypertensive medications, and antiseizure/antispasmodic drugs. Patients who are taking multiple medications may also be at a higher risk of dry mouth as an adverse effect of therapy [9].

Salivary flow in Xerostomia

The oral health of patients with diabetes has been widely studied over decades. The studies are primarily focused on the relationship between diabetes and periodontal disease. Initially, the studies have assessed the effects of diabetes on gingivitis and periodontitis; then, the studies sought a bidirectional relationship in which periodontal diseases could hinder glycemic control which confirms the importance of dental care for patients with diabetes [10].

Dry eye syndrome (DES) or keratoconjunctivitis sicca is a multifactorial disease, it is a common sequel of inadequate lacrimal fluid production, resulting in blurred vision, foreign body sensation, stinging sensation, photophobia or pain. There are many causes of keratoconjunctivitis sicca. Dry eyes are also a distinctive feature of Sjogren's syndrome.

It is characterized by chronic inflammation of salivary and lacrimal glands resulting in dry mouth and dry eyes. Dry eye syndrome is one of the common complications of diabetes mellitus. Hyperglycaemia has an adverse effect on the lacrimal functional unit, leading to decrease tear production, or excessive tear loss, resulting in dry eye syndrome. Dry eye syndrome is common in elderly patients; the exact cause is still unknown. However, it is suggested that DES is related to biochemical, molecular and immune system disturbances [11].

DISCUSSION:

Although findings of Silva et al. revealed that the dental care provided to patients with such diseases is still poor in Brazil, it is important to highlight that the Integrated Center for Diabetes and Hypertension of Ceará (CIHD), where this study was carried out, is highly concerned about the oral health of its patients. Dental care is provided at the CIHD and all patients with diabetes can have regular dental appointments for treatments and prevention [12].

The results of the DMFT index for both genders are in accordance with the latest regional figure reported by the Ministry of Health of Brazil in 2010, which indicated a mean of 27.2 teeth in people aged 65–74 years in the city of Fortaleza. However, this value is slightly below the one found in a study conducted in the same city with people in the same age group– 30.7 teeth [2]. The periodontal conditions of the older people in the present study are better than those of people aged 65–74 years assessed in Project SB Brasil 2010 with regard to the presence of shallow (4 to 5 millimetres) and deep periodontal pockets (6 millimetres or more). The dental care provided at the Center for Diabetes and Hypertension of Ceará (CIHD) may explain the better oral condition of these patients compared to that of the general population of Northeastern Brazil [11].

It is known that the vast majority of older people present physiological salivary reduction, tooth loss, use prostheses, use long-term medications and are affected by chronic degenerative diseases. However, the 65-year-old diabetic patients assessed in the present research showed sialometric values lower than those found in studies with diabetic and non-diabetic individuals aged 60 [13].

CONCLUSION:

It is concluded that Xerostomia occur due to defects in salivary and lacrimal fluid secretion can result in a multifacet degradation of patients' quality of life. Xerostomia is caused by disturbances in regulation of protiens such as aquaporins, tight junction proteins, linker protein and ion channel proteins.

REFERENCES:

1. Schara R, Medvescek M and Skaleric U. Periodontal diseaseand diabetes metaboliccontrol: a full-mouthdisinfection approach. *J Int Acad Periodontol* 2006; 8: 61–6.
2. Koromantzos PA, Makrilakis K, Dereka X, Katsilambros N, Vrotsos IA and Madianos PN. A randomized, controlled trial on the effect of non-surgical periodontal therapy in patients with type 2 diabetes. Part I: effect on periodontal status and glycaemic control. *J Clin Periodontol* 2011; 38: 142–7.
3. Costa KL, Taboza ZA, Angelino GB, Silveira VR, Montenegro R Jr, Haas NA, et al. The Influence of Periodontal Disease on Changes of Glycated Hemoglobin Levels in Type 2 Diabetics: a Retrospective Cohort Study. *J Periodontol* 2016, 26:1–13.
4. Silva AM, Vargas AMD, Ferreira EF and Abreu MHNG. A integralidade da atenção em diabéticos com doença periodontal. *Cienc Saúde Colet* 2010; 15: 2197–206.
5. Barros MBA, Francisco PMSB, Zanchetta LM and Cesar CLG. Tendências das desigualdades sociais e demográficas na prevalência de doenças crônicas no Brasil, PNAD: 2003–2008. *Ciênc Saúde Colet* 2011; 16:3755–68.
6. De Almeida PDV, Gregio A, Machado M, De Lima A, Azevedo LR. Saliva composition and functions: a comprehensive review. J Contemp Dent Pract. 2008;9:72-80.
7. Wang Z, Pradhan-Bhatt S, Farach-Carson MC, Passineau Artificial Induction of Native Aquaporin-1 Expression in Human Salivary Cells. J Dent Res. 2017;96:444-49.
8. Beroukas D, Hiscock J, J Gannon B, Jonsson R, P Gordon T, A Waterman S. Selective down-regulation of aquaporin-1 in salivary glands in primary sjögren's syndrome. Lab 2002;82:1547-52.
9. Wang W, Hart PS, Piesco NP, Lu X, Gorry MC, Hart Aquaporin expression in developing human teeth and selected orofacial tissues. Calcif Tissue Int. 2003;72:222-27.
10. Steinfeld S, Cogan E, King LS, Agre P, Kiss R, Delporte Abnormal distribution of aquaporin-5 water channel protein in salivary glands from Sjögren's syndrome patients. Lab Invest. 2001;81:143- 48.
11. Moore PA, Bounous DI, Kaswan RL, Humphreys-Beher MG. Histologic examination of the NOD-mouse lacrimal glands, a potential model for idiopathic autoimmune dacryoadenitis in Sjögren's syndrome. Lab Anim Sci. 1996; 46:125–128.
12. Ricci P, Blotière PO, Weill A, Simon D, Tuppin P, Ricordeau P, et al. Diabètetraité: quelles évolutions entre 2000 et 2009 en France? *Bull Epidemiol Hebd* 2010; 42–43:425–431.

13. Zhang X, Zhao L, Deng S, Sun X, Wang Dry Eye Syndrome in Patients with Diabetes Mellitus: Prevalence, Etiology, and Clinical Characteristics. J Ophthalmol. 2016; 2016:8201053.