International Journal of Medical and Health Sciences Research
2015 Vol.2, No.3, pp.50-54
ISSN(e): 2313-2752
ISSN(p): 2313-7746
DOI: 10.18488/journal.9/2015.2.3/9.3.50.54

XEROSTOMIA IN GERIATRIC POPULATION: AN INSIGHT INTO ETIOPATHOGENESIS, DIAGNOSIS AND MANAGEMENT

Manu Rathee[1†] --- Mohaneesh Bhoria[2]

[1,2]Department of Prosthodontics, Post Graduate Institute of Dental Sciences, Pt. B.D Sharma University of Health Sciences, Rohtak, Haryana, India

ABSTRACT

It is observed in geriatric population that a variety of changes occur with aging that can impact social, physiologic and psychological well being. Most people, however, experience a decrease or complete absence in salivary flow. Salivary dysfunction in old age is a consequence of debilitating systemic diseases and related medications, head and neck radiotherapy and reduced functional reserve that detrimentally impact nutritional status and general health. This article provides an overview on salivary gland hypofunction in geriatric population, etiopathogenesis and management strategies.

Keywords: Cytoprotector, Saliva, Salivary hypofunction, Xerostomia.

Received: 16 October 2014/ **Revised:** 26 November 2014/ **Accepted:** 29 November 2014/ **Published:** 5 December 2014

Contribution/ Originality

This compilation documents the causes and treatment of xerostomia among geriatric population in a comprehensive way.

1. INTRODUCTION

Saliva is essential for the maintenance of oral health. Saliva enables proper and comfortable performance of oral functions, such as speech, swallowing and tasting. Guggenheim and Moore [1] It protects the oral structures from mechanical, microbial and chemical insults that continuously threaten the oral integrity. In order to fulfil this role, a normal quantity and composition of saliva need to be secreted by the salivary glands. [2, 3] When salivary function is diminished, there is increased risk of dental caries, denture discomfort and associated diseases such as candidiasis. [4, 5] Many biological causes and medication with antisialogogic effects have been reported to affect the salivary secretion. Psychosocial factors, such as depression, anxiety, and stress also causesxerostomia. [6-8]

† Corresponding author

1.1. Salivary Gland Hypofunction and Geriatric Population

A decrease in salivary flow (hyposalivation), is a leading complaint and common in older people. Salivary function was thought to decline with age, but it is now accepted that the production of saliva and its composition are largely age independent in healthy people. Salivary dysfunction in old age is mainly a consequence of debilitating systemic diseases and related medications, head and neck radiotherapy and reduced functional reserve. In autoimmune disease such as Sjogren syndrome and chronic graft-versus-host disease, seen in bone marrow transplant recipients, a patient's own immune system can damage the salivary glands. Heft and Baum [9]

Absence of saliva in the interface of denture and mucosa can cause denture sores because of the lack of lubrication and denture retention. The denture base foundation may appear dry and red with minimal saliva pooling under the tongue, the saliva may be more mucous, thick, frothy, and sticky, or the tongue may be coated white. Lack of denture stability and retention can cause social embarrassment to a patient if dentures dislodge during the function. Therefore, salivary hypofunction can have a devastating effect on the psychology of the patient. Hence, a meticulous history, clinical examination and investigation are required to diagnose a salivary gland hypofunction in geriatric population. In some cases, a biopsy or blood tests may be required to rule out a case of salivary hypofunction. Ikebe, et al. [10]

2. ETIOPATHOGENESIS

2.1. Medications

One of the most common causes of hyposalivation in geriatric population is those with anticholinergic activity. Although cancer chemotherapy has also been associated with reduced salivary function, these changes appear to be transient in most patients. Radioactive iodine therapy used for thyroid cancer treatment can also affect parotid function in a dose-dependent manner. A selective cytoprotector, such as Aminofostine, acts upon the salivary glands that can be used to limit the undesirable side effect of radiotherapy. [11, 12]

2.2. Head and Neck Radiotherapy

Hyposalivation is a common side effect of fractionated radiation therapy of head and neck. Acute xerostomia is usually due to acute inflammatory reaction, whereas late xerostomia following radiation therapy results from histopathological changes in salivary glands such as fibrosis, loss of acinar cells and reduced blood flow. Within one week of irradiation (after 10 gray(Gy) have been delivered), salivary function declines 60% to 90%, with later recovery only if the total dose to salivary tissue is less than 25 Gy. After a high radiation dose (> 60 Gy), degenerative changes progress to atrophy and glands become fibrotic. Patients often showed thick, sticky saliva, due to loss of serous secretion initially, followed by lack of secretion and xerostomia. Use of a radioprotective agent either in shield or medication form provides cytoprotection to the gland and has been shown to reduce hyposalivation following radiation

therapy. Surgical replacement of submandibular glands can be used to remove them from the path of radiation. Hensley, et al. [13]

2.3. Autoimmune Disease

Sjogren's Syndrome (SS) is the most common autoimmune disease in older adults and post menopausal women, characterized by inflammation of the exocrine glands and may occur independently as primary Sjogren's syndrome or Sicca syndrome limited to the eyes and mouth, or in association with other autoimmune diseases such as rheumatoid arthritis, systemic lupus erythematosus or systemic sclerosis. The disease is characterized by lymphocyte infiltration of salivary and lacrimal glands resulting in their hypofunction. Thomas, et al. [14]

2.4. Other Conditions

Dehydration due to reduced fluid intake, frequent emesis and diarrhoea can result in hyposalivation. Dry mouth is also a common complaint in patients with diabetes mellitus. Psychogenic causes, such as fear, stress, depression, anxiety, can also result in xerostomia. In cases of Alzheimer's disease or stroke, patients may complain of dry mouth in the presence of normal salivary secretion due to altered perception. Pijpe, et al. [15]

2.5. Diagnosis

It is important to examine the mouth and oral mucosa when a patient experiences dry mouth. The condition of lips, gums and teeth should be assessed and the amount of saliva noted. Palpating a dry oral mucosa may result in the examiner's fingers adhering to mucosal surfaces. Check for coexisting pathology, such as oral thrush. The observation of patients while they are eating, especially when they are attempting to eat dry foods, such as biscuits or bread, can reveal a prolonged and laboured chewing time. In advanced xerostomia, an erythematous, fissured tongue with atrophy of the filiform papillae can be seen. It is important to examine the ventral surface of tongue, so pathology in this area is not missed. Patients should be asked to remove any dentures, so that all surfaces can be observed. Rhodus and Bereuter [16] Other features, such as halitosis, cracked lips and fissures, may be present in these patients. If the patient is on oxygen therapy, check to see if it is humidified.

For assessing salivary gland secretion, a variety of methods are available:

1. Self–reported questionnaires (e.g. Xerostomia inventory).
2. Visual analogue-scales (VAS).
3. Simple functional methods like observing if a dental mirror adheres to the buccal mucosa.
4. If a patient can chew and swallow dried biscuits without water to contrast sialography.
5. Sialoscintigraphy.
6. Sialoultrasonography.
7. Biopsy.

8. Filter paper and micro-moisture meter to measure the volume of residual saliva on mucosal surfaces.
9. Mucosal Wetness devices e.g. Periotron.
10. Sialometry, an objective method to assess salivary function and determine the quantity of resting and stimulated whole saliva.

Normal daily secretion of saliva is approximately 1L to 1.5 L (i.e. 0.5 ml/min-1 ml/min) though flow rate varies with diurnal variation, hydration, food intake and other factors.

3. MANAGEMENT

All strategies should be first aimed at addressing reversible causes of xerostomia. The patient's medications should be either stopped or reduced after concerned physician consultation. Any underlying infections, such as candidiasis, should be treated with antifungal tablets, suspensions (such as Nystatin) or gels (Miconazole). Symptomatic relief such as sipping water throughout the day may be sufficient, holding ice chips in the mouth to provide some moisture can also alleviate symptoms. Other measures include sucking on pineapple slices, frequent sips of cold orange squash or semi-frozen fruit juice, or the use of sugar-free chewing gum. Patients may find using olive oil useful and some dry mouth products containing olive oil have been shown to be beneficial. Rhodus and Bereuter [16]. Saliva substitutes have been developed for patients with xerostomia. There are a variety of formulations, including rinses, aerosols, chewing gums and dentifrices, and these may also have a role in promoting salivary gland secretions. These formulations help patients when taken before meals. Denture use at night should be discouraged. Denture hygiene should be maintained with brushing and denture cleansers. In case of candidiasis, dentures may be cleaned with 0.2% Chlorhexidine solution overnight or a 1% Chlorhexidine gel twice a day. Oral candidiasis can be treated with topical antifungal agents and, if refractory, systemic therapy with Fluconazole may be provided. Pharmacologic agents such as Pilocarpine and Cevimeline have been approved for use in xerostomic patients. Pilocarpine with dosage as 5–10 mg, 3 times a day in patients suffering from irradiation-induced xerostomia. The recommended initial dose is a 5-mg tablet 3 or 4 times a day; the usual dose range is 3–6 tablets (15–30 mg) a day, not exceeding 2 tablets (10 mg) per dose. Slow-release preparations of Pilocarpine are also available to minimize side effects and prolong the drug's duration of action. Pilocarpine loaded nanoparticles are investigated as a new drug delivery system. [11-14]

4. CONCLUSION

Based on proper diagnosis, a confirmed etiology of xerostomia can be established. Salivary assessment is an important component of a dental evaluation. Various treatment options are available with goals to reduce the suffering from the disease and to perform comfortable normal oral functions. At the same time priority should be given to optimize the retention and stability of the prosthesis, especially in geriatric population. Measuring stimulated/unstimulated salivary

flow rates could be incorporated into an oral hygiene appointment as routine care for geriatric population.

Funding: This study received no specific financial support.
Competing Interests: The authors declare that they have no competing interests.
Contributors/Acknowledgement: Both authors contributed equally to the conception and design of the study.

REFERENCES

[1] J. Guggenheim and P. Moore, "Xerostomia: Etiology, recognition and treatment," *J Am Dent Assoc.*, vol. 134, pp. 61-9, 2003.

[2] C. Scully and D. Felix, "Oral medicine-update for the dental practitioner. Dry mouth and disorders of salivation," *Br Dent J.*, vol. 199, pp. 423-427, 2005.

[3] J. Ship, P. Fox, and B. Baum, "How much saliva is enough? 'Normal' function defined," *J Am Dent Assoc.*, vol. 122, pp. 63-9, 1991.

[4] I. Valdez and P. Fox, "Diagnosis and management of salivary dysfunction," *Crit Rev Oral Biol Med.*, vol. 4, pp. 271-277, 1993.

[5] M. Turner, L. Jahangiri, and J. Ship, "Hyposalivation, xerostomia and the complete denture. A systematic review," *JADA*, vol. 139, pp. 146–150, 2008.

[6] N. Navazesh and K. K. Satish, "Measuring salivary flow challenges and opportunities," *JADA*, vol. 139, pp. 35S–40S, 2008.

[7] P. Fox, "Differentiation of dry mouth etiology," *Adv Dent Res.*, vol. 10, pp. 13–16, 1996.

[8] T. Narhi, "Prevalence of subjective feelings of dry mouth in the elderly," *J Dent Res.*, vol. 73, pp. 20–25, 1994.

[9] M. Heft and B. Baum, "Unstimulated and stimulated parotid salivary flow rate in individuals of different ages," *J Dent Res.*, vol. 63, pp. 1182–5, 1984.

[10] K. Ikebe, K. Morii, K. Matsuda, and T. Nokubi, "Discrepancy between satisfaction with mastication, food acceptability and masticatory performance in older adults," *Int J Prosthodont.*, vol. 20, pp. 161-67, 2007.

[11] L. Sreebny and S. Schwartz, "A reference guide to drugs and dry mouth-2nd edition," *Gerodontology*, vol. 14, pp. 33–47, 1997.

[12] E. Chrischilles, D. Foley, and R. Wallace, "Use of medications by persons 65 and over: Data from the established populations for epidemiologic studies of the elderly," *J Gerontol.*, vol. 47, pp. M137–44, 1992.

[13] M. Hensley, L. Schuchter, and y. C. Lindle, "American society of clinical oncology clinical practice guidelines for the use of chemotherapy and radiotherapy protectants," *J Clin Oncol.*, vol. 17, pp. 3333–55, 1999.

[14] B. Thomas, J. Brown, and M. McGurk, "Salivary gland disease," *Front Oral Biol.*, pp. 129-46, 2010.

[15] J. Pijpe, W. Kalk, and H. Bootsma, "Progression of salivary gland dysfunction in patients with Sjogren's syndrome," *Ann Rheum Dis.*, vol. 66, pp. 107-12, 2007.

[16] N. Rhodus and J. Bereuter, "Clinical evaluation of a commercially available oral moisturizer in relieving signs and symptoms of xerostomia in postirradiation head and neck cancer patients and patients with Sjogren's syndrome," *J Otolaryngol.*, vol. 29, pp. 28-34, 2000.