

Significance of artificial saliva in patients with dysphagia

Sakarde SB*, Laheji A**, Sabnis R***, Joshi PN****, Gondhalekar R*****

* Dept. of Oral Medicine & Radiology, Rungta College of Dental Sciences & Research, Bhilai

** Dept. of Oral & Maxillofacial Pathology, Rungta College of Dental Sciences & Research, Bhilai

*** Dept. of Oral & Maxillofacial Surgery, Rungta College of Dental Sciences & Research, Bhilai

****Dept. of Oral Medicine & Radiology, SKDS Dental College, Hingna Nagpur

*****Dept. of Oral Pathology, Rungta College of Dental Sciences & Research, Bhilai

ARTICLE INFO

Keywords:

Artificial Saliva, Dysphagia,
Deglutition, Xerostomia.

Corresponding Author:

Dr. S.B. Sakarde

Professor,

Dept. of Oral Medicine & Radiology,

Rungta College of Dental Sciences and Research,

Kohka-Kurud Road, Bhilai, Chhattisgarh, India.

Email: drsbsakarde@gmail.com

ABSTRACT

The exposure to radiation therapy for treating Head & Neck Cancer adversely affects the oral tissues. The side effects of this treatment modality include mucositis, xerostomia, intra-oral burning sensation, dysphagia, radiation caries and osteoradionecrosis. Reduced salivary flow affects swallowing. An attempt has been made to use "artificial saliva" in patients undergoing radiation therapy for Cervicofacial Malignancies with dysphagia to relief discomfort in deglutition. This study concludes that artificial saliva plays a significant role in relieving dysphagia during radiotherapy.

Introduction

The exposure to radiation therapy for treating head & neck malignancies adversely affects the oral tissues.[1] It causes irritation, fibrosis and atrophy of oral mucosa and pharynx, thus making swallowing difficult. Moreover difficulty in swallowing is encountered because the reduction in salivary flow impairs lubrication of food.[2] During radiotherapy as the natural salivary flow is significantly diminished [1], it was thought that artificial saliva may act as a substitute and may allay dysphagia. Thus this study was conducted to evaluate the effectiveness of artificial saliva in dysphagia during radiotherapy.

Materials & Methods

In this study, total 80 patients (65 males & 15 females) receiving Co-60 radiation for Cervico-facial Malignancies, were included. Subjects were divided into Control group (40) and Study group (40). Artificial saliva (Table-1) was given among the study group subjects by the start of 2nd week of radiation therapy. Patients were instructed to swish the artificial saliva in mouth for 1-2 minutes and then swallow it slowly. They were also instructed to repeat it frequently throughout the day.

The subjects were reviewed at the end of every week and subjective response regarding effectiveness of artificial saliva was recorded in relation to Dysphagia.

Observation

In control group, it was observed that by the end of 2nd week there was a progressive increase in the patients with dysphagia and by the end of 6th week all the patients developed dysphagia, out of which 13 patients were with mild, 16 patients with moderate and 11 patients were with severe stage of dysphagia.

While in the study group with artificial saliva, by the end of 2nd week out of 40 patients, 11 did not develop dysphagia at any stage of therapy, 17 patients showed mild dysphagia, 19 moderate and only 3 patients were with severe dysphagia.

It was also observed that by the end of 6th week post radiotherapy, 35 patients had no dysphagia and only 5 patients with mild dysphagia were reported. No patient with moderate or severe dysphagia was observed.

Discussion

Human saliva is a complex fluid secreted by the major and minor salivary glands and the secretion is under the control of the autonomic nervous system. The three major salivary glands are parotid, sublingual and submandibular. Daily secretion of saliva in human is about 1.5 liters and its normal pH is slightly alkaline.[3] Saliva has several distinct functions namely cleansing, lubrication, mucosal integrity, buffering, remineralisation, digestion and antimicrobial action.[4]

In pathological conditions such as Sjogren's syndrome or after radiotherapeutic treatment of tumors in the head and neck region, functional disturbances of salivary glands may be observed.[5] The resulting hyposalivation may cause many complaints, such as dryness of the mouth, difficulties in chewing, swallowing, and speech, and nocturnal oral discomfort.[3]

To relieve these patients' problems, saliva substitutes have been developed by Matzker and Schreiberin 1972 and modified by Gravenmade et al. in 1974. These substitutes are based on carboxymethylcellulose (CMC), or mucins [pig gastric mucin (PGM), and/or bovine submandibular mucin (BSM)], and they contain, as the main components, sorbitol or xylitol and salts at concentrations equivalent to those in human whole saliva as shown in table 1.[3]

Human saliva consists of water, glycoproteins, enzymes, antimicrobial substances and electrolytes. From biophysical point of view, saliva is a viscoelastic fluid with distinct surface activity. Commercial artificial saliva used in salivary gland disorders should resemble normal saliva in biophysical properties.[6]

On comparison of Control and Study groups, it was observed that in both the groups dysphagia started to increase from the end of 2nd week of radiotherapy. In control group at the end of 2nd week of radiotherapy, 35 patients developed mild dysphagia whereas in study group, only 5 patients developed mild dysphagia.

Table-1. Composition of Artificial Saliva:

Methyl-p-hydroxybenzoate	2.00g/l
Na carboxymethylcellulose	10.0g/l
MgCl ₂ .6H ₂ O	0.29mM
CaCl ₂ .2H ₂ O	1.13mM
K ₂ HPO ₄	2.40mM
KCl	8.38mM
F	0.05ppm
pH	7.2

This shows that the use of artificial saliva helped in delaying the development of dysphagia.

Findings in the present study are similar to Nakamotos study,[5] who also reported improvement in dysphagia with the use of artificial saliva.

Conclusion

Comparison of both the groups at the end of 6 weeks of post radiotherapy showed that in control group all 40 patients had mild dysphagia whereas in study group maximum patients recovered with no or only mild dysphagia. Further it was observed that in control group the patients with moderate or severe dysphagia were nil at the end of 6th and 5th week respectively and in study group, they were reduced to nil at the end of 4th and 2nd week after completion of radiotherapy.

These observations made us conclude that during post radiotherapy, use of artificial saliva not only helped in prevention of developing dysphagia but also helped in reducing the severity and fast recovery.

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Source of Support: Nil. **Conflict of Interest:** None