

The Role of Ear, Body Acupuncture and Electroacupuncture in Xerostomia of Post Chemoradiation Tongue Cancer Patients

Rahmania Kannesia Dahuri* and Yoshua Viventius

Medical doctor specializing in acupuncture at Bunda Hospital Jakarta, University of Indonesia, Indonesia

*Corresponding author

Rahmania Kannesia Dahuri, Medical doctor specializing in acupuncture at Bunda Hospital Jakarta, University of Indonesia, Indonesia.

Received: February 02, 2026; Accepted: February 09, 2026; Published: February 14, 2026

ABSTRACT

Background: Xerostomia is a condition described as a subjective dryness of the mouth. This condition is a common side effect in patients undergoing chemoradiation for head and neck cancer. Chemoradiation therapy is one of the modalities for cancer therapy. Until now, there is no reliable method to treat xerostomia induced by chemoradiation or commonly known as Radiation Induced Xerostomia (RIX). Therefore, after treatments such as acupuncture are needed.

Case: A 56-year-old woman with chief complaint of dry mouth after chemoradiation. Patient was diagnosed with stage 4 tongue SCC and xerostomia. The patient underwent acupuncture therapy with body acupuncture at points LI2, LI4, CV24, ST6, PC6 bilaterally. Ear acupuncture MA-TF1 Shenmen, MA-AT Parotid Gland, MA-HX1 Point zero, MA-TG1 Laryngeal pharynx bilateral. Electroacupuncture ST5 to ST7, ST36 to SP6 bilateral.

Results: Since the first acupuncture therapy until the 12th acupuncture therapy, the patients experienced an improvement in weight gain. The patient also felt an increase in appetite since the acupuncture therapy. The XI score was improving after 12th treatment (42 vs 13). Based on the WHOQOL-BREF score, there were improvements in physical, psychological, social relationships, and environmental aspects in patients after acupuncture (56 vs 88, 38 vs. 69, 75 vs 81, 63 vs 81)

Conclusion: Acupuncture improving production of saliva and quality of life in tongue cancer patient with xerostomia of post chemoradiation

Keywords: Xerostomia, Xerostomia Inventory Score, Acupuncture, Electroacupuncture, Chemoradiation

Introduction

Xerostomia is defined as a subjective dry mouth complaint that correlates poorly with objective findings of salivary gland dysfunction. Dry mouth may be a symptom of systemic diseases such as Sjögren's syndrome and sarcoidosis), a side effect of anticholinergic, antiadrenergic or cytotoxic drugs, and radiation therapy to the head and neck region [1]. Radiation-induced xerostomia occurs because the oral cavity, lymph nodes, and salivary glands are still within radiation range when head and neck cancer patients receive treatment [2].

Sequelae of oral radiotherapy in the head and neck region is the result of adverse effects of irradiation on the salivary

glands, oral mucosa, bones, teeth, masticatory muscle, and temporomandibular joints. The occurrence and extent of these side effects depend on the total irradiation dose, volume of irradiated tissue, dose fractionation and type of ionizing irradiation. Some of the sequelae of hyposalivation include changes in the soft tissues of the oral cavity, changes in the oral microflora, dental caries associated with hyposalivation, and periodontal disease [3,4]. Mucosal changes such as inflammation, atrophy and ulceration are also common. Patients may also experience impaired swallowing because of the slowing of the movement of the bolus from the mouth to the pharynx. Over time, salivary dysfunction can affect general health because disorders of the mouth affect food choices of the patient and may lead to nutritional compromise. Recently, chronic esophagitis was identified in a patient with radiation induced xerostomia. Loss of blood flow to the salivary glands

Citation: Rahmania Kannesia Dahuri, Yoshua Viventius. The Role of Ear, Body Acupuncture and Electroacupuncture in Xerostomia of Post Chemoradiation Tongue Cancer Patients. *J Metab Diabet Res.* 2026. 3(1): 1-3. DOI: doi.org/10.61440/JMDR.2026.v3.19

and a decrease in esophageal pH can lead to the development of gastroesophageal reflux disease [4].

Xerostomia is symptomatic so the main goal of management is symptom relief. The underlying cause must be treated. To date, there is no reliable method for treating radiotherapy-induced xerostomia (RIX). A study states that drugs such as amifostine show cytoprotective efficacy against xerostomia, but the use of amifostine is controversial given the high level of toxicity. Therefore, safer treatments such as acupuncture are needed [5]. In a study conducted by Deng et al, it was found that acupuncture at the LI-2 point activates the olfactory, visual, and gustatory stimulus pathways thereby increasing saliva production [6].

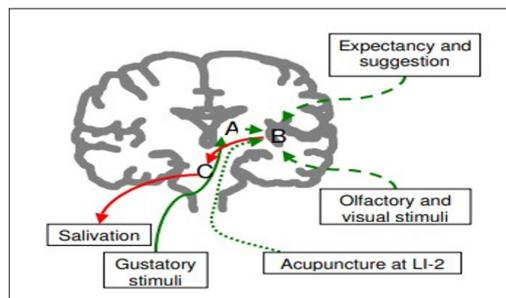


Figure 1: Mechanism of acupuncture at LI-2 for xerostomia

Ear acupuncture is the stimulation of acupuncture points in the outer ear and affects the target organs according to the innervation of certain points in each ear. A point located in the triangular fossa and innervated by the third branch of the trigeminal nerve. Likewise, the ear point which is located at the apex of the antitragus and is innervated by the glossopharyngeal nerve, which plays a role in the ability to feel, sensation of the mucosa of the tongue and oropharynx as well as the eustachian tube, and acts on the pharyngeal and palate muscles that play a role in the salivation process [7].

Case Report

A female patient, 56 years old, came with complaints of dry mouth after undergoing radiation therapy for her 25th squamous cell carcinoma (SCC) of the tongue in the last month. The complaints are accompanied by pain, canker sores, and numbness in the tongue area. The patient also felt a reduced taste for sweet and sour and could not stand spicy foods. One year earlier, the patient was diagnosed with squamous cell carcinoma of the tongue. At first, there were complaints of canker sores and pain in the tongue that were increasing and did not go away. The patient was then treated at the RSCM and was said to have T4N0M0 tongue squamous cell carcinoma. Then the patient started the first chemotherapy on May 11, 2021, for six cycles with Curacil, Brexel, and Cisplatin over five days at RSCM Kencana. After that, the patient underwent radiation therapy with a total dose of 70 Gy administered 35 times, which was carried out until December 6, 2021. Her previous histories of hypertension, diabetes mellitus, allergies, and malignancy were denied. On physical examination, the patient was under weight and had fissures and stomatitis on the tongue; other examinations were within normal limits. The last MRI examination on March 2, 2022, showed left posterolateral enhancement of the tongue; no tumoral lesions were seen in the area; suspected post-radiation fibrosis was smaller and less expensive than before. The

patient was diagnosed with post-chemoradiation xerostomia and squamous cell carcinoma of the tongue. Then, the patient underwent body acupuncture therapy at points LI2, LI4, CV24, ST6, bilateral PC6, Shenmen MA-TF1 ear acupuncture, Parotid Gland MAAT, MA-HX1 Point Zero, MA-TG1 Laryngeal Pharyngeal Bilateral, and ST5 electroacupuncture to ST7, ST36 to SP6 bilateral 4Hz, continuous, with the intensity adjusted to the patient's comfort. Therapy was carried out using a Huanqiu filiform needle with a size of 0.25x25mm or 0.16x20mm. Acupuncture therapy is administered three times per week, with each session lasting 45 minutes. Acupressure is also performed on CV24, LI2, LI4, ST6, and ST36.

Results

After 12 sessions of acupuncture therapy, there was an improvement in weight in patients, going from 37 kg at the start of acupuncture therapy to 38 kg. In addition, the patient feels that the dry mouth is decreasing, there is no numbness on the tongue, and there is an increase in appetite. In terms of quality of life, the WHOQOLBREF score before acupuncture was 56/100 for physical health, 38/100 for psychological health, 75/100 for social relations, and 63/100 for environment.

After acupuncture therapy, there was an increase in all aspects of the WHOQOLBREF score, with 88/100 for physical health, 69/100 for psychological health, and 81/100 for environmental health. There was a decrease in xerostomia in terms of the Xerostomia Index score, with a decrease from 42 to 13. On the MRI examination on October 3, 2022, after acupuncture therapy, compared to MRI oropharynx contrast before acupuncture therapy (2 March 2022), the tongue mass is now on the left posterolateral side, signal intensity is high. The lesion of the tongue appears to be decreasing; the tumor thickness is around 20 mm (previously 23 mm), and the depth of invasion is around 20 mm (previously 23mm).

Discussion

The patient underwent body acupuncture therapy at points LI2, LI4, CV24, ST6, and PC6 bilaterally. Ear acupuncture MA-TF1 Shenmen, MA-AT Parotid Gland, MAHX1 Point Zero, MA-TG1 Laryngeal Pharynx, bilateral electroacupuncture with continuous waves, frequency 4 Hz, at points ST5 to ST7 and ST36 to SP6 bilaterally. The choice of this point was made because that point is located in the triangular fossa and is innervated by the third branch of the trigeminal nerves, which supplies the muscles that play a role in the chewing process. In addition, the selected point is the antitragus peak and is innervated by the glossopharyngeal nerve, which plays a role in the ability to feel, sensation of the mucosa of the tongue, oropharynx, eustachian tube, and salivation function [6,8,9].

One of the acupuncture points chosen is the LI2 acupuncture point. The LI2 acupuncture point in this patient was chosen because it can increase the activity of the parietal operculum, rolandi operculum, frontal operculum and insula which are the places of integration of various stimuli in the process of salivation. Points LI4, CV24, ST5, ST6, ST7, ST36, and SP6 are empirical points for facial and head abnormalities and are useful for complaints of xerostomia [7]. This is because manual acupuncture at these points affects the autonomic nervous system by increasing the activation of the parasympathetic nervous

system and limiting sympathetic tone by releasing several neuropeptides between the sinuses, ductus and blood vessels of the salivary glands so that they can increase saliva production and CGRP plays a role in increasing salivary secretion.⁷ In addition, acupuncture can stimulate the sympathetic and parasympathetic nervous system by activating neurons and stimulating the release of neuropeptides such as vasoactive intestinal peptide and calcitonin gene related peptide. This neuropeptide has anti-inflammatory properties and nutritional effects on the salivary glands and can improve blood flow to acini cells. Acupuncture can also directly affect neuronal circuits which can activate the salivary nuclei in the pons and then activate the salivary glands through the cranial nerves [6,7,10].

Electroacupuncture was chosen as a therapeutic modality because it has a synergistic effect on xerostomia. This is because electroacupuncture can objectively provide the amount of stimulation according to the patient's needs. 4Hz low frequency electroacupuncture can release endorphins and cortisol which are important for anti-inflammatory effects. So far there have been no studies that have directly compared electroacupuncture with other modalities in post-chemoradiation xerostomia patients. However, from several studies, electroacupuncture has been shown to have advantages, namely a stimulation effect that is faster than other modalities and can provide intense stimulation compared to manual acupuncture. According to several studies, electroacupuncture can also increase nerve growth factor, reduce edema, suppress demyelination of facial nerve fibers, increase anti-inflammatory effects, and reduce pro-inflammatory cytokines [9,10].

Conclusion

By looking at the improvement in dry mouth symptoms, xerostomia score examination, quality of life score and MRI in patients, it can be concluded that the combination of ear, body acupuncture and electroacupuncture can play a role in improving xerostomia complaints after chemoradiation of squamous cell carcinoma of the tongue. In patients undergoing acupuncture therapy there are no side effects during the therapy and after therapy. The improvement in salivary function also found in patient without any sign of relapse. This shows that ear, body acupuncture combined with electroacupuncture is effective and safe as xerostomia therapy in squamous cell carcinoma patients after chemoradiation.

References

1. Guchelaar HJ, Vermes A, Meerwaldt JH. Radiation-induced xerostomia: pathophysiology, clinical course and supportive treatment. *Support Care Cancer*. 1997. 5: 281-288.
2. Blom M, Lundeberg T. Long-term follow-up of patients treated with acupuncture for xerostomia and the influence of additional treatment. *Oral Dis*. 2008. 6: 15-24.
3. Agarwal JP, Baijal G, Kar R. Radiation-Induced Xerostomia. *Int J Head Neck Surg*. 2012. 3: 82-86.
4. Pinna R, Campus G, Cumbo E, Mura I, Milia E. Xerostomia induced by radiotherapy: an overview of the pathophysiology, clinical evidence, and management of the oral damage. *Ther Clin Risk Manag*. 2015. 171.
5. Jaguar GC, Prado JD, Campanhã D, Alves FA. Clinical features and preventive therapies of radiation induced xerostomia in head and neck cancer patient: a literature review. *Appl Cancer Res*. 2017. 37: 31.
6. Deng G, Hou BL, Holodny AI, Cassileth BR. Functional magnetic resonance imaging (fMRI) changes and saliva production associated with acupuncture at LI-2 acupuncture point: a randomized controlled study. *BMC Complement Altern Med*. 2008. 8: 37.
7. Garcia MK, Meng Z, Rosenthal DI, Shen Y, Chambers M, et al. Effect of True and Sham Acupuncture on Radiation-Induced Xerostomia Among Patients with Head and Neck Cancer: A Randomized Clinical Trial. *JAMA Netw Open*. 2019. 2: e1916910.
8. Ni X, Yu Y, Tian T, Liu L, Li X, Li F, et al. Acupuncture for patients with cancer-induced xerostomia: a systematic review protocol. *BMJ Open*. 2019. 9: e031892.
9. Assy Z, Brand HS. A systematic review of the effects of acupuncture on xerostomia and hyposalivation. *BMC Complement Altern Med*. 2018. 18: 57.
10. Dawidson I, Angmar-Månsson B, Blom M, Theodorsson E, Lundeberg T. Sensory stimulation (acupuncture) increases the release of calcitonin gene-related peptide in the saliva of xerostomia sufferers. *Neuropeptides*. 1999. 33: 244-250.