



**Radiation Induced Xerostomia and Pain**  
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**Case:** Mr. Smith, an 81-year-old gentleman, with a history of squamous cell carcinoma of the vocal cords, is referred to the ambulatory palliative care clinic for management of symptoms. He was treated with external beam radiation therapy at the time of initial diagnosis eight years ago. Unfortunately, a recent biopsy revealed recurrent disease and, with the goal of preserving his vocal cords, Mr. Smith chose stereotactic radiosurgery as opposed to surgical resection. He completed this therapy approximately eight months prior to presenting in the palliative clinic. Since completing therapy, he has been suffering from severe throat pain. PET CT scans have demonstrated resolution of the cancer. Recent bedside laryngoscopy has not revealed other treatable sources of his discomfort. There was no improvement of his pain with the use of antifungal agents and the introduction of a proton pump inhibitor to treat possible laryngotracheal reflux.

The pain is aggravated by dryness in his mouth and throat, swallowing, talking and temperature changes. In addition to the pain and xerostomia, he complains of thick mucus which he continually attempts to clear and further aggravates his pain. He has had little success managing the xerostomia with the usual measures of frequent use of water, sucking hard candy, and the use of artificial saliva substitutes. He has had an incomplete response to opiate medication thus far (fentanyl patch 25mcg/hr. q72h and Vicodin 5/500 q4h prn). Mucolytic agents have been unsuccessful in clearing the thick phlegm he produces. The pain and xerostomia are so severe and overwhelming that he admits to passive thoughts of suicidal ideation. Examination of the oral cavity demonstrates dry mucosa, but no oral candida or mucosal lesions. Medications to stimulate saliva production are discussed, but Mr. Smith declines as he is concerned by their side effect profiles. Ultimately, a decision is made to titrate his fentanyl patch to 37mcg/hr. q72h.

He is instructed to utilize his breakthrough medication more liberally, and especially in anticipation of painful activity. As an experiment to improve his clearance of mucous and moisten his mucosa we decide to try a trial of nebulized normal saline.

**Discussion:** Xerostomia, or dry mouth, is a common complaint of patients who have been treated for head and neck cancers. In addition, a systematic review of 3000 patients showed that 36% of patients still had orofacial pain six months after completing treatment (1). Non-pharmacologic means to promote saliva production, such as sucking on hard candy, chewing sugarless gum, and using maltose tablets often are of limited success. Many formulations of saliva substitutes exist but often offer no more relief than frequent sips of water.

The most frequently used pharmacologic interventions for xerostomia are pilocarpine and cevimeline (2). Pilocarpine is a muscarinic agonist that can increase aqueous secretions and is typically prescribed 2.5-5mg po tid. Common side effects include sweating, headaches, flushing, hypertension, tachycardia, abdominal pain, diarrhea and urinary frequency. Cevimeline, a derivative of acetylcholine, has a lower affinity for muscarinic receptors of the heart and lung, and thus may have a more favorable side effect profile. It is prescribed at a dose of 30-60mg po tid. It can also cause excessive sweating, rhinitis, nausea, diarrhea and visual disturbances. Both drugs are contraindicated in patients with asthma or acute angle glaucoma. Acupuncture, utilizing auricular points, may show promise in the management of xerostomia as a small study of 18 patients demonstrated (3). The decision to try nebulized saline in Mr. Smith's case was not based on evidence in the literature, but a hypothesis that in his case it might stimulate a productive cough, and decrease the viscosity of his mucous thus enabling him to clear these secretions with greater ease.

For palliative care consultations please contact the Palliative Care Program at PUH/MUH, 647-7243, beeper 8511, Shadyside Dept. of Medical Ethics and Palliative Care, beeper 412-647-7243 pager # 8513 or call 412-623-3008, Perioperative/ Trauma Pain 647-7243, beeper 7246, UPCI Cancer Pain Service, beeper 644-1724, Interventional Pain 784-4000, Magee Women's Hospital, beeper 412-647-7243 pager #: 8510, VA Palliative Care Program, 688-6178, beeper 296. Hillman Outpatient: 412-692-4724. For ethics consultations at UPMC Presbyterian-Montefiore, and Children's page 958-3844. With comments about "Case of the Month" call David Barnard at 647-5701.



Inhaled hypertonic saline has been shown to improve the rate of mucous clearance in patients with cystic fibrosis (29). It should be noted however that the administration of saline could decrease lung function in patients with COPD (5).

**Resolution of the case:** Mr. Smith was seen for a follow-up appointment four weeks later and described significant improvement in pain as well as ability to clear mucous. Interestingly, he described utilizing the nebulized saline during episodes of pain flares with excellent results. He was not requiring any breakthrough pain medication and in fact was suffering from some mild sedation and impaired concentration that was felt to be secondary to his opiate medication. The decision was made to decrease his fentanyl dose back to 25mcg/hr. q72hours. In subsequent follow up he described continued excellent pain control with resolution of sedation and confusion. He infrequently required breakthrough pain medication, and his family noted a dramatic improvement in his mood and overall wellbeing.

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#### **References:**

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4. Elkins MR, *et al.* A controlled trial of long-term inhaled hypertonic saline in patients with cystic fibrosis. *N Engl J Med*. 2006; 354(3): 229.