Palliative Care Rounds

The Use of Octreotide to Manage Symptoms of Bronchorrhea: A Case Report

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Abstract
Octreotide, a synthetic analogue of the hormone somatostatin, is primarily used in palliative medicine because of its antisecretory effect and has been shown to be effective in the management of bowel obstruction, nausea, and diarrhea. Octreotide also has been successfully used for the management of bronchorrhea in both inpatient and outpatient settings. We report the case of a 47-year-old female with a history of bronchioloalveolar cell carcinoma whose copious bronchial secretions were controlled with octreotide. Octreotide should be further evaluated as a first-line treatment for bronchorrhea. J Pain Symptom Manage 2014;47:814–818. *Published by Elsevier Inc. on behalf of U.S. Cancer Pain Relief Committee.*

Key Words
Bronchorrhea, octreotide, bronchioloalveolar carcinoma

Introduction

Bronchorrhea is arbitrarily defined as the production of more than 100 mL of watery sputum per day.[1] It is typically associated with malignancy, specifically bronchioloalveolar cell carcinoma (BAC) and pulmonary metastases. The BAC is a subtype of pulmonary adenocarcinoma, which is further subdivided into mucinous, nonmucinous, and an intermediate form. The mucinous form arises from mucinous metaplasia of bronchiolar cells and is associated with mucosecretion. Rates of BAC are increasing and it accounts for 3–9% of new lung cancer diagnoses, of which 20–25% are the mucinous form.[2] Although uncommon, bronchorrhea also is associated with nonmalignant processes such as chronic bronchitis, asthma, tuberculosis, and scorpion stings.

Excess sputum production in patients with BAC is thought to be caused by a few different mechanisms. First, inflammatory stimuli are thought to cause hypersecretion of mucous glycoprotein. Takeyama et al.[3] suggested linkage to an epidermal growth factor receptor (EGFR) pathway in which stimulation of EGFR causes MUC5AC expression in airway epithelial cells *in vivo* and *in vitro*. The MUC5AC is a major component of the mucus matrix forming a family of mucins in the airways.[4] Bronchorrhea also is thought to be caused by increased transepithelial chloride secretion, which in turn is associated with the excretion of water. Finally, it is thought to be related to excessive transudation

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of plasma products into airways.[5] The true incidence of bronchorrhea in patients with BAC is not known; but one review found that it occurs in 6% of the cases.[6]

Despite its rare occurrence, when bronchorrhea does occur, it causes significant morbidity for patients and may lead to excessive coughing, dyspnea, and exhaustion. In addition to the physical symptoms, the profuse sputum production can cause difficulties with social integration. Also, there have been reports of increased sputum production causing electrolyte imbalances, dehydration, and even respiratory failure.[7]

Case Description

We report here the successful treatment of bronchorrhea using octreotide in a 47-year-old female with BAC. The patient presented to pulmonary clinic in July 2011 with a chief complaint of "coughing up too much sputum" for two months and producing about 1 L of sputum per day. She also noted significant dyspnea, chest pressure, and pain associated with the chronic cough. She was diagnosed with BAC in 2004 and initially had a left lung lobectomy. She underwent a right lung wedge resection in 2006, and also received radiation and chemotherapy.

Despite treatment, the cancer progressed and she noted increasing watery sputum production starting in 2009. At presentation to pulmonary clinic, her symptoms had significantly impaired her quality of life. She had been managed with levalbuterol, glycopyrrolate, guaifenesin, orally inhaled tiotropium, salmeterol, opioids, and prednisone, without reduction in sputum quantity. A computed tomography scan of the chest on admission showed marked progression of disease in the parenchyma of both lungs, with increasing left lung consolidations, multiple cavitating pulmonary nodules, and new diffuse consolidations of the right lung.

Case reports suggest that subcutaneous (SC) octreotide has been used successfully to treat bronchorrhea; however, the patient was fearful of SC injections. She was admitted to the inpatient palliative care unit for a trial of intravenous (IV) octreotide at 12.5 μg/hour. After 24 hours, her secretions had decreased to 150 mL/day; and by 72 hours, she had produced a total of 500 mL of sputum. On hospital Day 4, the octreotide was discontinued and her secretions remained minimal. She was discharged with a plan for SC administration of octreotide; however, the patient opted instead to receive daily IV infusions of octreotide in the outpatient clinic.

Five days after discharge, she noted that her sputum production increased to unacceptable levels within 12 hours of the IV infusion. One week after discharge, she was readmitted to the inpatient palliative care unit for the management of bronchorrhea and started again on IV octreotide with reduction in her sputum to 100 mL/day. She was discharged on 200 μg octreotide administered through SC route twice a day.

When the patient was evaluated in the outpatient clinic four weeks later, it was noted that her secretions diminished with SC administration of octreotide, and her symptoms of dyspnea, chest pressure, and cough had improved. Of note, there were no other medications that were adjusted to account for the marked improvement in symptoms.

Comment

This case describes the management of a rare yet very burdensome symptom frequently associated with BAC. Managing the symptoms related to bronchorrhea can be difficult, although there are a few case reports in the literature suggesting the success of various treatments. Macrolide antibiotics and steroids have been shown to reduce sputum volume production in patients with BAC secondary to the anti-inflammatory effect of these drugs, which act as immunomodulators and reduce mucin gene expression. Hiratsuka et al.[8] found that clarithromycin treatment in conjunction with inhaled beclomethasone reduced sputum volume from 900 to 300 mL a day in a patient with bronchorrhea secondary to BAC. Furthermore, they found that after stopping the clarithromycin and continuing inhaled beclomethasone alone, the bronchorrhea was controlled for four more months. There also are case reports of successful treatment of bronchorrhea with corticosteroids alone in patients with BAC. Nakajima et al.[9] described the successful treatment of bronchorrhea in a patient with BAC with high-dose pulse methylprednisolone