adenovirus pneumonia.9 Although immunocompromised patients are more prone to develop unusual presentations of adenovirus,10-12 our case suggests that ARDS may complicate immunocompetent persons. Because bronchiectasis and restrictive lung disease have been seen in some children after infection, the recovery to near normal pulmonary function was gratifying.

The cause of COPD exacerbations often remains elusive. Adenoviruses are good candidates to consider in infectious exacerbations of COPD because of the frequent association with wheezing,13 hyperinflation on chest radiography,2 and a high incidence of bronchiolitis in childhood disease.13,14

In summary, these patients present a spectrum of common clinical presentations from an etiology not often considered in pathogenesis. In vitro studies have demonstrated strong activity of ribavirin toward adenovirus.15 Case reports have supported this finding although no clinical trials have yet been performed. Because viral cultures are not routinely performed for ARDS or COPD exacerbations, an alternation in clinical practice will be achieved only after specific therapies for adenoviruses are defined.16

Plasmacytoma as a Cause of Obstructive Sleep Apnea*

Ryland P. Byrd, Jr., MD, FCCP; Thomas M. Roy, MD, FCCP; William Bentz, MD; and Jay B. Mehta, MD, FCCP

Solitary extramedullary plasmacytomas are uncommon neoplasms. They occur most frequently in the upper aerodigestive tract and account for 4% of the nonepithelial tumors in this site. The evolution of a plasmacytoma is unsteady and symptoms at presentation have included dystonia, dysphagia, oral pain, cough, and dyspnea on exertion. Plasmacytoma of the upper aerodigestive tract has not been previously reported as a cause of obstructive sleep apnea.

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*From the Pulmonary Division, James H. Quillen College of Medicine, East Tennessee State University, Mountain Home VAMC, Mountain Home, Tenn.

Reprint requests: Dr. Byrd, Veterans Affairs Medical Center 111-B, Johnson City, Box 4000, Mountain Home, TN 37684-4000
Key words: plasmacytoma; sleep apnea syndrome; upper airway obstruction

Abbreviations: BUN = blood urea nitrogen; OSA = obstructive sleep apnea

Obstructive sleep apnea (OSA) is uncommonly caused by discrete anatomic lesions of the upper aerodigestive tract. Anatomic abnormalities located anywhere from the nasal vestibule to the larynx may produce sleep-disordered breathing. These abnormalities include both benign and malignant tumors.1-6 Solitary extramedullary plasmacytomas occur in the upper airway and involve lymphoid (Waldeyer's throat) ring, the nose and paranasal sinuses, and less commonly the larynx and upper part of the trachea.7-10 OSA as a complication of an upper aerodigestive tract plasmacytoma, however, has not been previously reported. We present two patients with plasmacytomas of the oral pharynx whose OSA reversed with treatment of the plasmacytoma.

CASE REPORTS

CASE 1

This 61-year-old man presented for evaluation of a restless sleep pattern at night and morning headaches. He snored and snorted loudly while asleep. The patient would fall asleep while engaged in conversation at virtually any time of the day. These symptoms had been present for perhaps 2 years and had become much worse recently. Family members reported apneic episodes of 30 to 40 s. He denied any shortness of breath or other respiratory complaints. He had never smoked cigarettes. He also denied night sweats, fevers, chills, and weight loss. His past medical history was significant only for long-standing hypertension. There was no family history of sleep disorders. His mother died of throat cancer at the age of 41 years.

The patient appeared healthy and led a vigorous life as a farmer. His vital signs were normal except for a BP reading of 162/104 mm Hg. He measured 190 cm in height and weighed 78 kg. Examination of the oral pharynx revealed a 2-cm mass posterior to and extending superiorly to the uvula. There was no lymphadenopathy in his neck. The remainder of the physical examination was normal.

A biopsy specimen of the oral pharyngeal mass confirmed that it was a plasmacytoma. A CBC, serum electrolyte levels, BUN value, creatinine level, and biochemical profile were within normal limits. Serum and urine immunoelectrophoresis and quantitative immunoglobulin values were within normal limits. A bone survey failed to reveal any evidence of an osseous plasmacytoma. Bone marrow biopsy of the left posterior superior iliac process was normal. A CT scan of the patient’s head and neck documented a large soft tissue mass in the oral pharynx (Fig 1). The mass appeared to involve the lymphoid’s ring centrally and laterally on the left and extended across the midline toward the right side.

Pulmonary function tests with the flow volume loops were normal. Nocturnal polysomnography confirmed OSA with oxygen desaturation to as low as 57%. Apnea index was 20 per hour. He responded well to a ventilatory support system (BiPAP; Respironics; Murrysville, Pa).

The patient underwent local radiation therapy for a total of 4,660 rads. He did well with this treatment except for xerostomia due to parotid irradiation. The tumor was no longer detectable physically or radiographically. His symptoms of OSA completely resolved and therapy with the airway management system (BiPAP) was discontinued. Nocturnal polysomnography after completion of radiation therapy was normal.

CASE 2

A 46-year-old man presented with complaints of 2 years of progressive snoring, restless sleep, and daytime somnolence. He also had experienced increasing difficulty with swallowing. He denied shortness of breath, night sweats, fevers, chills, and weight loss. His past medical history included a tonsillectomy and adenoidectomy as a child. He smoked 1 pack of cigarettes per day and consumed 1 to 2 beers per day.

The patient was in no distress. His vital signs were normal. He was 185 cm in height and weighed 94 kg. Examination of his oral pharynx revealed a fleshy lesion extending across the midline from the right. A biopsy specimen of this lesion confirmed that it was a plasmacytoma.

A CBC, serum electrolyte levels, and biochemical profile were normal. Serum and urine electrophoresis and immunoelectrophoresis as well as serum quantitative immunoglobulins were normal. Bone marrow aspiration and a bone survey were normal. A CT scan showed a soft tissue mass in the right oral and nasal pharynx, which displaced the airway to the left of the midline (Fig 2). There was no evidence of metastatic disease. A nocturnal polysomnogram documented OSA with an apnea index of 12 per hour. The patient received nasal-continuous positive airway pressure.

Figure 1. CT scan of head and neck showing a soft tissue mass in the oral pharynx.

Figure 2. CT scan of the head and neck showing a soft tissue mass in the right oral and nasal pharynx.
The patient was treated with a total of 4,410 rads of radiation therapy to his nasal and oral pharynx. The treatment ports were then decreased to encompass just the site of the original tumor, and he was then given an additional 1,440 rads. The patient's sleep apnea resolved with the radiation therapy and he remains free from sleep disturbances. A CT scan obtained after radiation documented resolution of the soft tissue mass. Repeat nocturnal polysomnography following completion of radiation therapy was normal.

**DISCUSSION**

While the mechanism of OSA is multifactorial, anatomic narrowing of the upper airway plays an important pathophysiologic role.\(^1\) Anatomic obstruction resulting in sleep-disordered breathing has been reported due to a variety of causes. All patients with symptoms of obstructive sleep apnea require a thorough examination of the upper airway.

Extramedullary plasmacytomas occur predominately in the upper respiratory tract and oral cavity.\(^5\) Initial symptoms of plasmacytomas of the upper aerodigestive tract have included dysphonia, dysphagia, oral pain, and dyspnea on exertion.\(^12\) Approximately 20% of solitary extramedullary plasmacytomas of the upper aerodigestive tract develop local recurrence or progress to multiple myeloma. In contrast, 80% of solitary osseous myelomas develop disseminated disease within 10 years. Plasmacytomas of the upper respiratory tract occur more frequently in males (3:1) and usually are in patients 50 to 70 years of age.\(^5\)

Since solitary extramedullary plasmacytomas are radiosensitive, surgery was not indicated in our patients. Both patients were initially treated with nasal positive airway pressure which provided temporary relief of their sleep apnea. Subsequently nasal positive airway pressure was discontinued because their tumors responded to radiation therapy.

We are unaware of other reports of OSA due to plasmacytoma. Although our patients did well, physicians should be aware that radiation therapy, when delivered to the upper aerodigestive tract, may worsen airway obstruction due to supraglottic mucosal edema,\(^1,12\) acquired laryngomalacia,\(^14\) and radiation-induced fibrosis.\(^15\)

**REFERENCES**


**Adult Croup**

Michael C. F. Tong, MBChB; Ming Chi Chu, MBBS; Susanna E. J. Leighton BSc; and C. Andrew van Hasselt, MMeds

Adult croup is a distinct disease entity that probably represents a heterogeneous clinical syndrome. Three cases of adult laryngotracheitis characterized by upper airway infection and progression to airway obstruction are illustrated. Close observation and prompt decisions regarding airway intervention are critical in effective management, and complete resolution is expected.

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**Key words:** adult; croup; management; tracheitis

For almost 60 years, laryngotracheobronchitis, or croup, has been recognized as an important cause of upper airway obstruction in children. Adult cases have been rare and it was not until 1990 that Deeb and Einhorn\(^1\) first reported seven cases. “Adult croup syndrome” was used to describe the clinical picture of community-acquired acute upper airway obstruction due to an infectious cause in the subglottic area of the larynx. The condition generally has a good prognosis and is to be distinguished from acute bacterial tracheitis, which is caused by staphylococcal infection,\(^2,3\) and tracheitis associated with immunocompromized patients or chronic debilitation.\(^4,5\)

We report three cases seen in a regional hospital in Hong Kong between June 1992 and March 1994. The reports are followed by a discussion of clinicopathologic features and management.

**Case Reports**

**Case 1**

A 77-year-old Chinese woman presented with prodromal symptoms of sore throat and diarrhea of 2 days’ duration. There was no cough, dyspnea, or hoarseness. On physical examination, she was...

*From the Division of Otorhinolaryngology, Department of Surgery (Dr. Tong, Leighton, and van Hasselt), and the Department of Anaesthesia and Intensive Care (Dr. Chu), Chinese University of Hong Kong, Prince of Wales Hospital, Hong Kong. Reprint requests: Dr. van Hasselt, Dept of Surgery, Prince of Wales Hospital, Shatin, NT, Hong Kong.*