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REPEATED EPISODES OF RESPIRATORY FAILURE DUE TO BILATERAL VOCAL CORD PARALYSIS

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☐ **Abstract—Background: Bilateral vocal cord paralysis can produce severe airway obstruction, leading to acute respiratory failure. Discriminating the pathology of the upper airway from chronic obstructive diseases of the lower airways often presents a challenge for clinicians in the Emergency Department. Objectives: To underlie the value of clinical examination and flow-volume loops in the establishment of diagnosis of upper airway obstruction. Case Report: We describe the case of a 55-year-old female ex-smoker who presented with a long history of hoarseness and progressive exertional dyspnea. The patient developed repeated episodes of acute respiratory failure and was supported with noninvasive ventilation. The diagnosis of bilateral vocal cord paralysis was finally established by patient's symptoms and flow-volume loops demonstrating variable extrathoracic obstruction. Conclusion: Vocal cord paralysis is a rare and often neglected condition, contributing to repeated episodes of acute respiratory failure. Flow-volume loop is a useful tool when symptoms are suggestive of upper airway obstruction.** © **2013 Elsevier Inc.**

☐ **Keywords—vocal cord paralysis; respiratory failure; noninvasive ventilation; flow-volume loop**

INTRODUCTION

Bilateral vocal cord paralysis causes variable extrathoracic obstruction (1). Accurate and prompt diagnosis followed by appropriate treatment is essential because this pathology may progress to acute respiratory failure (2,3). Chronic obstructive pulmonary disease is a common cause of respiratory failure in the Emergency Department (ED) and sometimes coexists with upper airway obstruction. In such cases, differential diagnosis, but also definition of the relative contribution of each pathological component to the overall impaired respiratory function, may present important difficulties for the clinicians (2). In this report we describe the case of a 55-year-old woman with a history of hoarseness and dyspnea who developed repeated episodes of acute respiratory failure due to bilateral cord paralysis.

CASE REPORT

A 55-year-old woman (weight 61 kg, height 158 cm, body mass index 24) presented to the ED with dyspnea on exertion that had become significantly worse following a recent episode of respiratory infection with fever and purulent sputum. During the last year she was also complaining of morning headaches and daytime somnolence. Her medical history included a long history of hoarseness and minor depression treated with paroxetine. She was an ex-smoker with a history of smoking 15–20 cigarettes/day for 25 years.

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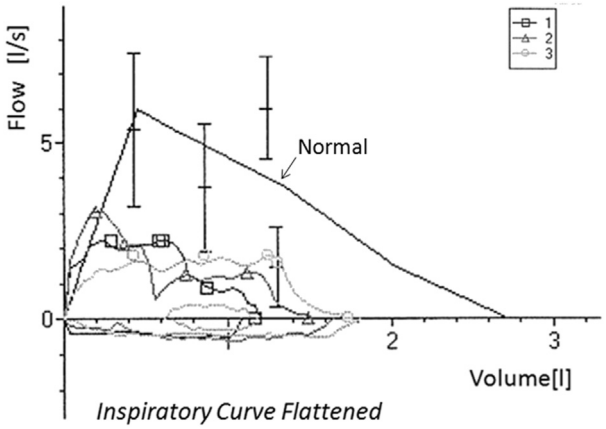

Figure 1. Flow-volume loop demonstrating a severely reduced flow throughout inspiration (variable extrathoracic obstruction) with a markedly decreased peak expiratory flow.

On examination, she was tachypneic with central cyanosis and use of the inspiratory accessory muscles. Bilateral wheezing and slight inspiratory stridor were noted on chest auscultation. Blood gas analysis on room air was indicative of hypoxemia with respiratory acidosis (pH 7.26), partial pressure of oxygen (PO_2) 56 mm Hg, and partial pressure of carbon dioxide (PCO_2) 64 mm Hg. The chest X-ray study was normal. Laboratory investigations revealed leukocytosis (white blood cell count, 12.6 $\times$ 10^9/L; 88% neutrophils). The rest of the hematological and biochemical tests were in normal range.

The patient was transferred to the Respiratory Failure Unit with the diagnosis of acute exacerbation of chronic bronchitis and was supported with noninvasive ventilation. She was treated with bronchodilators, antibiotics, and corticosteroids. Three days later, the patient achieved clinical stability; she was afebrile with a marked improvement in symptoms and oxygenation. She was gradually weaned from noninvasive ventilation and maintained satisfactory blood gases (PO_2 62 mm Hg, PCO_2 45 mm Hg, with a pH of 7.42) on 3 L/min oxygen via nasal cannula. The patient was discharged to a medical ward. The next day, however, she became cyanotic and hypoxia developed, and she was transferred again to the intensive care unit for ventilatory support.

Physical examination of the chest revealed marked inspiratory stridor. After clinical stabilization via noninvasive ventilation, a flow volume loop was obtained with reproducible results (Figure 1). The flow volume revealed a repeatable marked impairment on inspiratory curve, with severely reduced flows throughout the maneuver, indicating a variable extrathoracic obstruction. Expiratory curve was also abnormal, but less impaired, with a markedly decreased peak expiratory flow (1.74 L/min, 29% of predicted), an expiratory plateau with reduced end-expiratory flows, consistent with lower airways obstruction from chronic bronchitis. Maximum voluntary ventilation was also found severely impaired (16.44 L/min, 18% of predicted).

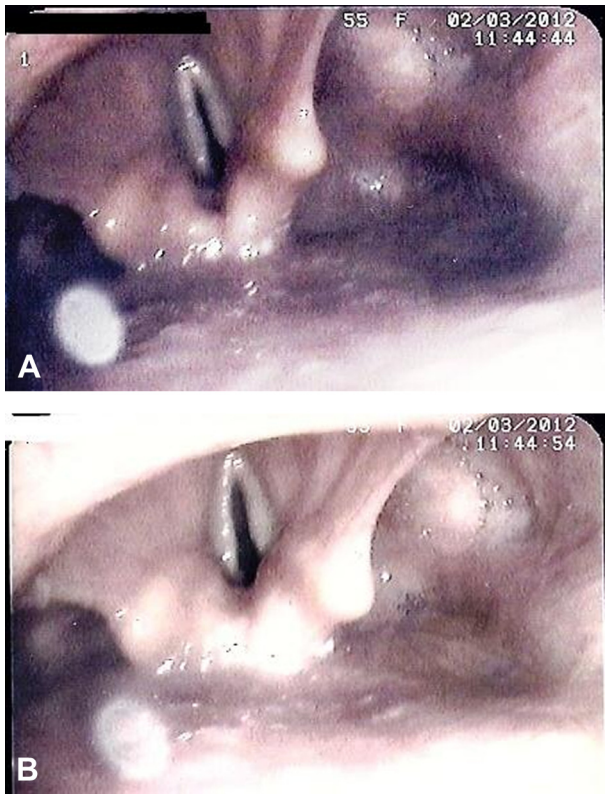

Figure 2. Vocal cords in midline position (A) with poor movement on phonation (B).

Bronchoscopy was performed to evaluate the upper and lower airway. Endoscopy of the larynx and trachea showed the vocal cords to be midline, with poor movement on phonation (Figure 2A, B). No endobronchial lesions were detected. Computed tomography of thorax and neck was negative for lymphadenopathy or tumor.

A tracheostomy was finally performed in our patient to secure the airway and to prevent further episodes of respiratory failure. After recovery, the woman was referred to the otorhinolaryngology unit for evaluation for the possibility of surgical treatment of bilateral vocal cord paralysis.

DISCUSSION

We report on a patient who presented with repeated episodes of acute respiratory failure due to unrecognized bilateral vocal fold paralysis. The diagnosis of upper airway obstruction in the ED may be difficult, especially because functional causes are usually far more likely than anatomical causes. In any case, upper airway obstruction is a medical emergency that requires rapid evaluation of the patient (4). Inspiratory stridor indicates lesions at or above glottis and always commands attention. Securing