Pneumonia is a complication of primary varicella infection that occurs most commonly in adults and may lead to life-threatening respiratory failure. We report a case of varicella pneumonia with impending respiratory failure in which endotracheal intubation was averted by the use of CPAP mask ventilation with a favorable outcome.

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Varicella (chickenpox) is generally a benign infection of childhood. In adults, however, the disease may have several complications, of which pneumonia is the most common and has the highest mortality.1

Continuous positive airway pressure (CPAP) ventilation using a face mask has been used in selected groups of patients to avoid endotracheal intubation and assisted mechanical ventilation.2-4

To our knowledge, the use of CPAP mask ventilation in the management of respiratory failure related to varicella pneumonia has not previously been described. We report a case of varicella pneumonia with progressive respiratory failure that was managed with a CPAP mask with a favorable outcome.

CASE REPORT

A previously healthy 29-year-old man was admitted to our hospital because of rash, fever, cough, and shortness of breath. He was well until 5 days prior to hospital admission, when he developed fever (38.5°C) and a truncal vesicular rash, which over 24 h progressed to involve the extremities and head as well. Productive cough, dyspnea on exertion, abdominal discomfort, and vomiting were present at that time. He sought medical attention at an outlying clinic and was treated with diclofenac and amoxicillin, but his symptoms failed to improve. Because of worsening dyspnea, he was referred to our hospital for admission. He related an absence of previous varicella infection and was aware of having been exposed to children who were ill with chickenpox 2 weeks earlier. He had smoked a pack of cigarettes a day for 10 years. There was no history of alcohol, drug abuse, or human immunodeficiency virus (HIV) risk factors.

On examination, the patient’s temperature was 38.4°C, pulse was 88/min, blood pressure was 95/50 mm Hg, and respiratory rate was 32/min. There were several skin lesions in various stages of development throughout the trunk and extremities, with involvement of the oral mucosa. Auscultation of the lungs revealed scattered rhonchi bilaterally, but no crackles or wheezes were appreciated.

**Figure 1.** Portable chest radiograph revealing extensive bilateral interstitial infiltrates.

The rest of his physical examination was unremarkable. Initial laboratory data showed hemoglobin of 16.6 g/dl, hematocrit of 46.1 percent, and WBC count of 6.6 × 10^9/mm^3 with left shift. Blood chemistry studies revealed sodium level of 129 mmol/L, potassium level of 3.7 mmol/L, chloride level of 98 mmol/L, total CO2 of 26 mmol/L, glucose level of 118 mg/dl, urea nitrogen of 17 mg/dl, and creatinine concentration of 1.3 mg/dl. Arterial blood gas (ABG) analysis while on supplemental oxygen by nasal cannula (4 L/min) revealed a pH of 7.51, PaCO2 of 31 mm Hg, PaO2 of 52 mm Hg, and calculated SaO2 of 90 percent. Liver function tests revealed mild elevation of transaminase values. Enzyme-linked immunosorbent assay for HIV antibody was negative. A portable chest radiograph revealed extensive diffuse bilateral reticulonodular interstitial infiltrates (Fig 1).

The patient was admitted to the medical ICU where acyclovir therapy, 750 mg every 8 h, was initiated intravenously. Supplemental oxygen by nonbreather mask was given with resultant ABG pH of 7.51, PaCO2 of 33 mm Hg, and PaO2 of 150 mm Hg. Over the ensuing 16 h, his SaO2 gradually declined. On the morning of the second hospital day, the patient was complaining of worsening dyspnea and appeared in severe distress. The ABG pH was 7.51, PaCO2 was 33 mm Hg, PaO2 was 50 mm Hg, and SaO2 was 90 percent. In light of the impending respiratory failure, consideration was given to endotracheal intubation and mechanical ventilation. It was decided instead to attempt ventilatory support via constant positive airway pressure (CPAP) mask. The snugly fitting CPAP mask (Downs CPAP Mask, Product 9000, Vital Signs, Inc, Totowa, NJ) with a 5 cm H2O CPAP valve (PEEP Valve, Vital Signs, Inc, Totowa, NJ) was placed and connected to the CPAP flow generator (Downs Adjustable Flow Generator, Product 9250, Vital Signs, Inc, Totowa, NJ) and set at a FIO2 of 1.0. The patient noted rapid symptomatic improvement, and repeat ABG analysis revealed PaO2 of 158 mm Hg. FIO2 was reduced to 0.8 with a resultant PaO2 of 113 mm Hg. Over the next 24 h, he continued to tolerate the CPAP mask well with improvement of his gas exchange. After 24 h of CPAP mask ventilation, the FIO2 had been reduced to 0.5 with a resultant PaO2 of 159 mm Hg. After 48 h of CPAP, it was possible to discontinue the CPAP mask as adequate oxygenation was obtained with nasal cannula alone. The patient’s condition continued to improve rapidly and he was discharged home on the fifth hospital day. Three months after hospital discharge he is asymptomatic.

**DISCUSSION**

Varicella usually presents as a benign, self-limited, primarily dermatologic disease in the pediatric population. In adults, however, life-threatening involvement of the lungs,
False Pulmonary Artery Catheter Measurements Due to the Scimitar (Hyogenic Lung) Syndrome*

Potential for Iatrogenic Pulmonary Edema

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In an acute trauma patient with unrecognized scimitar syndrome, physiologic measurements used in patient management decisions were misleading due to the anatomic and physiologic anomalies of the syndrome. Pulmonary artery catheter measurements believed to reflect left atrial pressures were actually measuring central venous pressures because the catheter was terminating in the scimitar vein. These erroneous measurements led to overly aggressive fluid resuscitation and iatrogenic pulmonary edema. The pathologic features of scimitar syndrome are reviewed, and the mechanism for potential mismanagement of patient volume status created by aberrant pulmonary hemodynamics is discussed.

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| CT = computed tomography; CVP = central venous pressure; IVC = inferior vena cava; PA = pulmonary artery; PCWP = pulmonary capillary wedge pressure |

The scimitar syndrome, also referred to as hypogenetic lung syndrome or congenital venolobar syndrome, represents a rare, variable, and complex congenital anomaly classically consisting of a hypoplastic right lung with partial or complete systemic arterial supply and anomalous pulmonary return to the inferior vena cava (IVC). The syndrome may also include anomalies of the tracheobronchial architecture, cardiovascular abnormalities, and diaphragmatic abnormalities. The abnormal pulmonary venous pattern drainage typically produces a curvilinear shadow seen at the right lung base on chest radiography that resembles a sickle-shaped sword or scimitar.

Herein we describe a patient with acute blunt trauma with initially unrecognized scimitar syndrome in whom a pulmonary artery (PA) catheter terminating in the abnormally draining vein indicated central venous pressure (CVP) rather than left atrial end-diastolic pressure. Management of the patient utilizing this misleading information resulted in development of iatrogenic pulmonary edema during fluid resuscitation.

**Case Report**

A 49-year-old unrestrained driver involved in a motor vehicle accident was admitted to the Shock Trauma Center of the University of Maryland Medical Center for evaluation and treatment of multiple thoracic, pelvic, facial, and extremity injuries. An early chest radiograph (Fig 1) revealed multiple right-sided rib fractures, opacification of a significant portion of the right hemithorax, and apparent shift of the mediastinum to the right. The overall appearance of the hemithorax initially suggested a combination of pleural

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