Acute Respiratory Failure

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Acute Respiratory Failure is considered a critical condition that may be fatal if not appropriately managed. Acute Respiratory Failure is based on a significant alteration in Arterial Blood Gas Composition. Acute Respiratory Failure is diagnosed when the respiratory system fails in one or both of its gas exchange functions. Composition levels for acute respiratory failure are attributed to a partial pressure of oxygen **less than 60 mmHg**, carbon dioxide levels **greater than 50 mmHg**, and apparent objective signs and symptoms (Murray at el., 1977). Upon histologic examination studies and analysis of secretions collected from the respiratory tract, it has been revealed that a fundamental cause of acute respiratory failure can be pointed toward marked inflammation in the lung parenchyma, which disrupts the alveolar-capillary permeability (Swenson et al., 2021).

This paper aims to discuss the patient's optimal treatment regimen and proper nursing practices based on the patient's presentation. In addition, this paper will discuss proper oxygen supplementation, mechanical ventilation, communication, weaning protocol, prevention of complications, and maintaining adequate nutrition.

The patient discussed in this paper is a thirty-year-old male who presented to the emergency department two weeks prior to admission, complaining of a dry productive cough. After being seen by a physician, the patient was sent home with medications to relieve his dry productive cough. On February 6th at midnight, the patient returned to the emergency room with a cough, chest pain, signs of hypercapnia, and respiratory failure. The patient has a past medical history of Childhood Asthma but denies any exacerbation or episodes within the last six months. The patient was described as restless and agitated due to insufficient breathing and was intubated on the spot. Upon intubation, the patient was sedated with Propofol running at 80 micrograms

per kg per hour. On February 7th, the Propofol was titrated to 40 micrograms per kg per hour. The ventilation settings were: FiO2: 50%, Ti: 12.00, PEEP: 8.0, VT: 450, and a RR of 18. A urine specimen was collected on the 7th for a urine toxicology screening to assess underlying causes, and all categories came back negative. The patient was assessed for Pneumonia, but the chest x-ray came back negative. At 12:05 pm, a Pulmonologist performed a bronchoscopy to visualize the patient's lungs. Upon examination, the bronchoscopy revealed lesions, erythema, and blood in the left bronchioles. The patient was later transferred to Bellevue Hospital for continuous monitoring and potential resection of the area.

In recent years, high-flow nasal oxygen has gained popularity in many intensive care settings due to its simplicity of application, comfort of the patient, and efficiency in improving oxygenation status (Frat et al., 2022). Although further studies are imperative to help grow this practice, during the pandemic, noninvasive oxygenation in patients with Acute Respiratory failure has proved to be an alternative strategy in oxygen management for acute respiratory failure (Frat et al., 2022).

In addition, an imperative plan of action to include in caring for a patient suffering from Acute Respiratory Failure is Intubation and proper mechanical ventilation (Matthay et al., 2019). Due to the significant amount of lung inflammation, positive pressure ventilation is necessary for the patient to promote effective gas exchange (Matthay et al., 2019). The main focus of mechanical ventilation is to maintain adequate oxygenation and promote carbon dioxide elimination (Matthay et al., 2019). In addition to mechanical ventilation, studies have discovered that prone positioning a patient with Acute respiratory failure can be attributed to improving the survival rate and shortening the duration of mechanical ventilation (Matthay et al., 2019). For

patients with severe ARDs, long sessions of prone positioning are highly recommended to improve patient outcomes (Matthay et al., 2019).

During ventilation, verbal communication between the patient and nurse may be impaired due to a lack of apparent manifestations. As nurses, observing any obvious intentions made by a lightly sedated patient to promote communication is essential. Due to a lack of communication between the nurse and the patient, it can be challenging to catch signs of complications or deterioration. Early observations are vital in mechanically ventilated patient care because they may be a warning sign for complications that may be occurring. A meaningful way to promote patient communication is by implementing one-minute patient close observations during assessments (Noguchi et al., 2019). During these observations, nurses can closely assess the patient for any movement or indications that may be warning signs regarding complications. In addition, the patient should be monitored for any intention to communicate with the nurse regarding any physical needs. According to research done in 2019, when nurses began to include one-minute observations in patient care, they were able to see more subtle intentions by the patient in hopes of communication (Noguchi et al., 2019). When implemented in nursing practice, an increase in the patient's level of satisfaction was apparent (Noguchi et al., 2019).

During ventilation, the patient is at high risk for many complications. Ventilator-Associated Pneumonia is a significant complication for many patients using ventilation to promote oxygenation. According to the CDC, Ventilator-Associated Pneumonia can be described as a lung infection that develops in people are use ventilators. This form of Pneumonia usually occurs in patients who have been on a mechanically ventilated machine for **more than 48 hours**. Nurses are responsible for implementing interventions to prevent this form of Pneumonia. One important intervention to include in nursing practice to prevent Ventilator-Associated Pneumonia

is elevating the head of the bed between 30 to 45 degrees, also known as Semi-Fowlers Position. Elevation of the bed is considered an evidence-based recommendation for preventing Pneumonia in mechanically ventilated patients due to the decreased risk for aspiration (Güner et al., 2021). In a study done in 2021, semi-fowler positioning was reaffirmed as a crucial role in preventing Pneumonia due to the decreased risk of aspirations during continuous feedings (Güner et al., 2021).

An additional complication that may occur in mechanically ventilated patients is malnourishment. Due to intubation, the patient is unable to consume the proper caloric intake to maintain weight and supply the body with the nutrients needed. As nurses, ensuring that the patient meets the proper caloric intake needed during ventilation is crucial. One nursing practice that should be implemented into the patient's care during intubation is enteral nutrition (Koontalay et al., 2020). Malnutrition in critically ill patients is a significant complication, with 70% of patients suffering from this during prolonged hospitalization (Koontalay et al., 2020). Nutritional support is considered a necessary intervention when managing critically ill patients. According to the ***American Society of Parenteral and Enteral Nutrition (ASPEN)***, it is recommended that nutritional support therapy is started within 24 to 48 hours of hospital admission in an intensive care unit or when the patient is hemodynamically stable after resuscitation or the functional integrity of the gut is improved (Koontalay et al., 2020). In a hospital setting, these patients must receive their targeted caloric intake during the first seven days as it may affect the process of weaning off the ventilator (Koontalay et al., 2020). As nurses, it is vital to ensure that the patient receives the proper enteral nutrition to maintain their weight to prevent malnourishment.

The main goal at the end of patient care is to ensure that the patient is able to wean off the mechanical ventilator and promote oxygenation on their own. In a clinical trial conducted from January 2007 to January 2009, mechanically ventilated patients were assessed to determine if a weaning protocol implemented mainly by nurses could decrease the duration time of the weaning process (Hying Roh et al., 2012). After analyzing two groups, a baseline result revealed that a weaning protocol controlled by nurses was safe and reduced the weaning time from mechanical ventilation in patients recovering from respiratory failure (Hying Roh et al., 2012). As a nurse, it is essential to implement Arterial Blood Gas Analysis with multiple pulse oximetry measures to determine the safety of the weaning process.

Acute Respiratory Failure is a condition that interferes with the ability of the lungs to deliver oxygen and remove carbon dioxide. In many cases, Acute respiratory failure can be fatal if not appropriately managed. In the early stages of patient care, the main priority is the promotion of oxygenation. High Flow Nasal oxygenation has proven to be essential to patient care in the early stages to promote oxygenation. Throughout the patient's hospitalization, the main priority for this patient is oxygenation management. Mechanical ventilation has proven to play a crucial role in maintaining gas exchange and oxygenation. As nurses, during the use of a mechanically ventilated machine, it is important to implement safety measures to prevent any complications that may deteriorate the patient's condition. To avoid complications, nurses must implement one-minute observations to help promote patient-nurse communication. During ventilation, the elevation of the head of the bed at a 35-to-45-degree angle has been proven to decrease the risk of aspiration and Ventilator-Associated Pneumonia. In addition to preventing Pneumonia, nurses need to monitor the patient's nutritional status to prevent malnutrition-related complications. Toward the end of patient care, nurses need to promote proper weaning protocol

to decrease the duration of the weaning process and prevent any form of complications related to the operation.

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