CHAMBERLAIN COLLEGE OF NURSING
NR 341 Complex Adult Health Nursing
CASE STUDY EXERCISE
Ventilatory Assistance & ARF 1

CASE STUDY: Ventilatory Assistance & Acute Respiratory Failure 1
Mr. R is a 66-year-old man who has smoked 1.5 packs of cigarettes a day for 40 years. He is admitted with an acute exacerbation of COPD. His baseline ABGs drawn in the ER showed: pH, 7.36; PaCO2, 55mmHg; PaO2, 69mmHg; Bicarbonate, 30 mEq/L; SaO2, 92% on 4Lvia NC. In the critical care unit, Mr. R has course crackles in his left lower lung base and a mild expiratory wheeze bilaterally. His cough is productive of thick yellow sputum. His skin turgor is poor; he is febrile, tachycardic, and tachypneic requiring 6L via NC to keep Sats >88%.

1. **What is your interpretation of Mr. R's baseline ABGs from the ER? Did his symptoms improve on admission to CCU? What may have caused his exacerbation? What assessment findings lead you to this conclusion? What ventilatory assistance may improve his symptoms? How?**

   According to the patient's report, Mr. R's baseline ABGs shows that his pH is within the normal range, but the rest of his ABG levels reveal compensated respiratory acidosis. Mr. R did not show improvement of symptoms upon admittance to the CCU. Mr. R's history of chronic smoking; being 1.5 packs of cigarettes a day for 40 years has caused extensive damage to his lungs and could be what caused the exacerbation of COPD. Mr. R could benefit from the use of a BiPAP machine, which provides pressurized air to help open up the

lungs and alveoli. Another option would be noninvasive positive-pressure ventilation. Noninvasive positive-pressure ventilation is beneficial for COPD patients, in helping to reduce inspiratory muscle activity in return allows for better gas exchange in the alveoli. It is also the least invasive form of ventilation to start treatment.

2. **Per physician order, Mr. R is placed on NPPV via face mask with PEEP of 15 and FiO2 50% with sats 92%. The doctor also orders blood and sputum cultures and antibiotics IV to be initiated ASAP. What technique is maintained during blood cultures? During sputum cultures? When should nurse administer antibiotics? What organisms are commonly seen in respiratory infections?**

Clean technique should be practiced when receiving a blood culture and the site should be sterilized. The best time to get a sputum sample from the patient would be in the morning right after patient wakes up. It is imperative that both blood and sputum specimens should be sent to the lab immediately following their collection as samples that are a few hours old in various climate conditions could result in positive/negative results. It is also important for the lab to receive the samples right away so antibiotic therapy can be started immediately as needed. Antibiotics should not be taken before obtaining the samples as in doing so could result in skewed results of the samples. Some common organisms found in respiratory

infections include Streptococcus pyogenes, Haemophilus influenza, Streptococcus pneumoniae, and Legionella pneumophila.

3. **One hour post-NPPV ABGs results showed: pH 7.3, PaCO2 67, PaO2 45, HCO3 26, SaO2 85% on PEEP of 20 and FiO2 60% NPPV. What is your interpretation of his current ABG results? What ventilatory assistance does Mr. R require? What lab findings indicate this? What airway is optimal for him and why?**

   Recent ABG levels indicate uncompensated respiratory acidosis. Mr. R. requires endotracheal intubation. The patient's lab results show a decrease in pH,PaCO2, and SaO2 which supports the decision for endotracheal intubation. These results suggest that improvements are not being made from the BiPAP machine and an alternative is needed. The upper airway is most optimal and comfortable for Mr. R.

4. **The physician is preparing for endotracheal intubation. What equipment is needed for this procedure? What is the nurse's role during intubation? What is the procedure for intubation? As a patient advocate, what may the nurse suggest the patient receive prior to intubation?**