

Self-Assessment – RSPT 2350: Module F - ABG Analysis

- You are called to the ER to do an ABG on a 40 year old female who is C/O dyspnea but seems confused and disoriented. The ABG on an FiO_2 of .21 show:
pH 7.30 PaO_2 115 torr HCO_3^- 12 mEq/L PaCO_2 20 torr SaO_2 50%

The doctor asks you to further evaluate the patient's clinical condition. You would recommend:

 - Blood Glucose Level
 - Chest x-ray
 - Repeat the ABG
 - Check COHb%/MetHb%
 - Calibration of ABG machine and Co-oximeter
- Does the patient have hypoxemia? **NO**
- Does the patient have hypoxia? **PROBABLY**
- List the four major causes of metabolic acidosis:

 - LACTIC ACIDOSIS**
 - KETOACIDOSIS**
 - ELECTROLYTE IMBALANCE**
 - RENAL FAILURE**
- What is the cause of this patient's metabolic acidosis? **LACTIC ACIDOSIS SECONDARY TO ANEMIC HYPOXIA (HIGH CO LEVEL)**
- You are caring for a patient in the ER of a hospital in Springfield Colorado (PB of 640 torr). The patient, who is currently in Colorado visiting a friend, is C/O dyspnea, is tachypneic and has tachycardia. The ABG results are pH: 7.41; PaO_2 : 60 mm Hg; FiO_2 : .21; PaCO_2 : 40 mm Hg; HCO_3^- : 25 mEq/L. The patient's hypoxemia can best be explained by

 - A decreased PiO_2
 - A decreased PAO_2
 - An abnormal widening of the A-a gradient
 - Presence of atelectasis
 - Presence of hypoventilation
 - I and II ONLY
 - II and III ONLY
 - III and IV ONLY
 - I and V ONLY
 - I, II, and III ONLY
- The patient is how many miles above sea level? **1 MILE (PBARO = 640, LOSE 120 mm Hg FOR EVERY MILE UP YOU GO)**
- What is the A-a gradient? **$[(640-47) \times .21] - (40 \times 1.25) = (593 \times .21) - 50 = 124.53 - 50 = 74.53$. $74.53 - 60 = 14.5$ mm Hg**

9. You have been called for a respiratory consult on a 60-year-old patient C/O dyspnea. The ABG results are pH: 7.20; PaCO₂: 80 torr; HCO₃⁻: 26 mEq/L; P_{Baro}: 760 mm Hg; PaO₂: 60 torr; FiO₂: .21; RQ: 1.0. Based on these results, you would recommend:
- A. Initiating mechanical ventilation
 - B. Initiating CPAP
 - C. Increasing the FiO₂ to 40% via Venturi mask
 - D. Placing the patient on a non-rebreather at 15 L/min
 - E. Giving an updraft treatment with 2.5 mg of Albuterol
10. What is the A-a gradient $[(760-47) \times .21] - (80 \times 1) = (713 \times .21) - 80 = 149.73 - 80 = 69.73$.
69.73 - 60 = 9.7 mm Hg
11. What is the cause of the hypoxemia **HYPOVENTILATION**.
12. You are caring for a patient in ICU on A/C volume ventilation. The V_t is 600 mL, f 12/min, Total rate 12/min, FiO₂ 40%, PEEP 0, Peak flowrate of 60 L/min. ABG results 40 minutes after initiating mechanical ventilation are: pH 7.20; PaCO₂: 80 torr; PaO₂ 60 torr; HCO₃⁻: 26 mEq/L. You would recommend:
- A. Increasing the FiO₂ to 50%
 - B. Adding +5 cm H₂O PEEP
 - C. Increasing the respiratory rate
 - D. Increasing the peak flowrate
 - E. Adding an inflation hold
13. Should oxygenation or ventilation be corrected first? **NO** Why? **CORRECTING THE HYPOVENTILATION WILL CORRECT THE HYPOXEMIA**
14. You are caring for a patient in ICU on A/C volume ventilation. The V_t is 700 mL, f 14/min, FiO₂ 70%, Peak flowrate 50 L/min, PEEP 0 cm H₂O. The ABG results are pH 7.37; PaO₂ 55 torr; BP 140/100; PaCO₂ 43 torr; SaO₂ 83%. You would recommend:
- A. Increasing the f
 - B. Increasing the V_t
 - C. Increasing the peak flowrate
 - D. Increasing the FiO₂ to 80%
 - E. Adding PEEP of +5 cm H₂O
15. Hypoxemia that results in an abnormal A-a gradient on room air but corrects after administration of 100% oxygen is referred to as
- A. Hypoxemia from a decreased PiO₂
 - B. Hypoxemia from hypoventilation
 - C. Relative Shunt
 - D. Absolute Shunt
 - E. True Shunt
16. Differentiate between the relative and true shunt. **TRUE SHUNT HAS A V/Q OF ZERO. RELATIVE HAS A V/Q BETWEEN ZERO AND 0.8.**

17. You are evaluating a patient on mechanical ventilation with the following ABG results: pH 7.44; PaCO₂: 36 torr; PaO₂: 55 torr; FiO₂: 35%; V_t: 500 mL; f 12/min; Mode: SIMV – VC; Peak Flow 60 L/min. You would recommend:
- A. Increase the V_t
 - B. Increase the f
 - C. Add +5 cm H₂O PEEP
 - D. Increase the FiO₂ to 45%
 - E. Add 100 cc of mechanical deadspace
18. What other supplemental therapy could be done to improve the patient's oxygenation?
BODY POSITION CHANGE, GOOD BRONCHIAL HYGEINE, SUCTION, BRONCHODILATORS
19. You are asked to conduct a respiratory consult on a patient with the following ABG results: pH 7.38, PaCO₂: 42 torr; PaO₂: 87 torr; HCO₃⁻: 26 mEq/L; FiO₂ .21; A-a gradient 10 torr; P_{Baro} 760 torr. The patient is C/O SOB on exertion and during routine activities of daily living. You suspect the patient may have an oxygenation problem due to:
- A. Absolute shunting
 - B. Hypoventilation
 - C. Relative shunting
 - D. Low PiO₂
 - E. Diffusion defect
20. You are asked to evaluate a patient with the following ABG results: pH 7.32; PaCO₂: 48 torr; PaO₂ 200 torr; FiO₂: .30; P_{Baro} 760 torr. You would:
- A. Decrease the FiO₂ to .21
 - B. Administer a bronchodilator
 - C. Initiate mechanical ventilation
 - D. Check the oxygen concentration the patient is wearing
 - E. Order a shunt study
21. Calculate the PAO₂ and the A-a gradient. **[(760-47) x .30] – (48 x 1.25) = (713 x .3) – 60 = 213.9 – 60 = 153. 153 – 200 = -47 mm Hg WHICH IS IMPOSSIBLE.**
22. You are asked to evaluate a patient in ICU with pneumonia of the right lower lobe. The patient is on mechanical ventilation, SIMV- VC, V_t 700 mL, f 12/min, FiO₂ .60, PEEP +5 cm H₂O, Peak flowrate of 65 L/min. The last ABG shows: pH 7.45; PaCO₂ 35 torr; PaO₂ 55 torr; HCO₃⁻ 22 mEq/L. You would recommend:
- A. Positioning the patient on his left side
 - B. Positioning the patient on his right side
 - C. Positioning the patient in the prone position
 - D. Positioning the patient supine
 - E. Increasing the V_t to 900 mL

23. Nursing has called you to evaluate a patient who has become lethargic and unresponsive in the last hour. The patient is on a Venturi mask at 40%. You draw an ABG and the results are: pH 7.30; PaCO₂ 92 torr; PaO₂ 95 torr; HCO₃⁻ 38 mEq/L. You would recommend:
- A. Mechanical ventilation
 - B. Increase the FiO₂ to .50
 - C. Decrease the FiO₂ to .28
 - D. Administer an updraft treatment with albuterol
 - E. Recommend BiPAP
24. What is the maximum PaO₂ value on a FiO₂ of .40 and a normal PaCO₂?
- A. 150 torr
 - B. 200 torr
 - C. 250 torr
 - D. 300 torr
 - E. 350 torr
25. A pH of 7.38, PaCO₂ of 46 torr, PaO₂ of 41 torr are obtained on a patient who appears to be healthy. There is no tachycardia, tachypnea or cyanosis. Which of the following is an appropriate conclusion to draw on the basis of this information?
- A. The blood gas sample has a air bubble
 - B. The blood gas sample was not mixed or warmed prior to analysis
 - C. This is a venous sample
 - D. The patient has chronic lung disease
 - E. Mechanical ventilation should be initiated
26. You are called to evaluate a 25-year-old patient in the ER who was involved in a auto accident. The patient has tachycardia and is tachypneic, has frequent PVC's and appears to be in respiratory distress. No cyanosis is seen. The patient appears to be confused and disorientated. ABG results are: pH 7.35; PaO₂ 92 torr; PaCO₂ 35 torr; SaO₂ 94% measured with co-oximeter HCO₃ 22 mEq/L. Which of the following would you suspect to be the cause of the patients oxygenation problems?
- A. Hb and Hct
 - B. BUN and Creatinine
 - C. Lactic Acid Level
 - D. Blood Glucose Level
 - E. Electrolytes
27. You are working in the NICU and have been asked to place a pulse oximeter on a baby being mechanically ventilated in PCV- assist/control mode: Pressure limit 22 cm H₂O, PEEP + 5 cm H₂O, f 30/min, FiO₂ .50, T_i .6 sec. The doctor is unable to get an arterial blood sample. The SpO₂ reading is 100%. The capillary blood gases are: pH 7.35, PCO₂ 45, PO₂ 93 torr. You would recommend:
- A. Continue to monitor
 - B. Decrease the FiO₂ while monitoring the pulse ox reading
 - C. Raise the pressure limit
 - D. Decrease the f
 - E. Decrease the PEEP to 0 cm H₂O

28. A patient is receiving 40% oxygen with an aerosol mask at a flowrate of 12 L/min. The patient's peak inspiratory flowrate is 38 L/min. The RCP should recommend?
- A. Increasing the flowrate to 15 L/min
 - B. Maintain current settings **3:1 RATIO; $3+1=4 \times 12 = \text{YOU ARE PROVIDING } 48 \text{ L/min}$**
 - C. Changing to an air-entrainment mask
 - D. Inserting a heating element
 - E. Placing the patient on a non-rebreather at 12 L/min
29. You are taking care of a patient on BiPAP with an IPAP of 12 cm H₂O and an EPAP of 4 cm H₂O. The liter flow is 8 L/min. The pH is 7.42, PaCO₂ 43 mm Hg, PaO₂ 60 mm Hg, HCO₃⁻ 26 mEq/L. You would recommend?
- A. Increase the IPAP
 - B. Increase the EPAP
 - C. **Increase the IPAP and EPAP by the same amount**
 - D. Maintain current settings
 - E. Intubate the patient and place on a T-bar
30. While reviewing an ABG result with a student respiratory therapist, you notice that the PaO₂ is 60 Hg but the SaO₂ is reading 95%. The student asks you to explain these results. You would explain to her that:
- A. This is a normal relationship between PaO₂ and SaO₂.
 - B. The ABG should be repeated because there is a lab error.
 - C. **The patient may be hypothermic and should have the patient's temperature evaluated.**
 - D. The patient may be acidotic.
 - E. The patient may have polycythemia.
31. Low flow oxygen delivery devices are affected by which of the following
- I. Ventilatory pattern
 - II. Liter flow of oxygen device
 - III. Minute ventilation
- A. I ONLY
 - B. II ONLY
 - C. III ONLY
 - D. I and III ONLY
 - E. **I, II, and III**

32. Your patient is receiving 60% oxygen via an aerosol mask set at 10 L/min. The physician has asked you to draw an ABG. The patient's inspiratory flowrate is 40 L/min. The ABG results are as follows: pH 7.50; PaCO₂ 20 torr, PaO₂ 50 mm Hg, SaO₂ 80%, HCO₃⁻ 24 meq/L. The physician suspects the patient is shunting and asks your opinion on further therapy. You would:
- A. Recommend non-invasive BiPAP
 - B. Suggest intubation and mechanical ventilation
 - C. Explain that the patient is not getting 60% oxygen and suggest an oxygen delivery device that can meet the patients flow demand **20 L/min TOTAL FLOW**
 - D. Explain that the patient is getting more than 60% oxygen from the oxygen delivery device and needs mechanical ventilation
 - E. Recommend non-invasive positive pressure ventilation with the PB 840 ventilator
33. You come into a patient room to draw an ABG. The patient is on a heated aerosol mask at 40% at 12 L/min. There is no mist coming out of the reservoir tubing. You notice a large loop in the aerosol tubing and inadequate drainage into the reservoir bag. You would
- A. Proceed with the ABG and document an FiO₂ of 40%
 - B. Drain the water from the tubing and proceed with the ABG; document 40% O₂
 - C. Drain the water from the tubing, wait 30 minutes and proceed with the ABG; document 40% O₂
 - D. Drain the water from the tubing, wait 30 minutes and proceed with the ABG; document 60% O₂
 - E. Proceed with the ABG and document an FiO₂ less than 40%
34. In which clinical situations would you place the patient on 100% non-rebreather mask?
CHF, PULMONARY EDEMA, CO POISONING, TRAUMA, WAITING OR PREPARING FOR INTUBATION