

SELF-ASSESSMENT- RSPT 2350 Module B: ABG Technique

1. **What % of the population will have ABG results that fall outside of the normal range?**  
**5%**
2. **Name four factors that affect oxygenation**
  - A. **Age**
  - B. **Barometric Pressure/Altitude**
  - C. **FiO<sub>2</sub>**
  - D. **Body Position**
3. **Which body position results in the highest PaO<sub>2</sub> values?** **Sitting**
4. **Given a patient's age, list two formulas used to calculate the normal PaO<sub>2</sub>**
  - A. **PaO<sub>2</sub> = 110 – ½ age**
  - B. **Assume the PaO<sub>2</sub> is 100 in a 10 year old. PaO<sub>2</sub> drops by 5 mm Hg for every 10 years of age (0.5 mm Hg/year) over 10 up to age 90.**
5. **List the normal range for the following venous blood gas values**
  - A. PO<sub>2</sub> **35-45 mm Hg**
  - B. PCO<sub>2</sub> **41-51 mm Hg**
  - C. pH **7.32 – 7.42**
  - D. SO<sub>2</sub> **70 to 75%**
  - E. CO<sub>2</sub> **12-15 vol%**
6. **Arterial vs. Venous Values - What's the difference?**
  - A. **Arterial values are the same regardless of sampling site. Venous vary depending on local metabolism.**
7. **List four contraindications for ABG's according to CPG's**
  - A. **Abnormal results of a modified Allen's Test.**
  - B. **Do not perform through a lesion, distal to a surgical shunt, or infection.**
  - C. **Femoral punctures should not be performed outside the hospital setting.**
  - D. **A medium-high dose of anticoagulation therapy/thrombolytic may be a relative contraindication.**
8. **List the steps that should be taken PRIOR to drawing an ABG**
  - A. **Check Order**
  - B. **Review Chart**
  - C. **Quick Physical Assessment**
  - D. **Prepare Equipment**

9. **Factors that interfere with blood clotting**

- A. Anticoagulants
  - i. **Heparin**
  - ii. **Coumadin**
- B. Thrombolytics
  - i. **Streptokinase**
  - ii. **TPA**
  - iii. **Urokinase**
  - iv. **Streptolase**
- C. Hemophilia **Reduced clotting times**
- D. Low Platelet Count **Levels less than 150,000**
- E. Increased Bleeding Times **PTT > 36 seconds**

10. **Infection Control**

- A. Contact with blood/body fluids
  - i. **HIV**
  - ii. **Hepatitis A, B, C**
  - iii. **Syphilis or other STD**
  - iv. **Septicemia**
- B. Protection of Patient and Caregiver
  - i. **Diligent Hand Washing**
  - ii. **Use of gloves**
  - iii. **Mask or protective eyewear if splashing could occur**
  - iv. **No recapping, bending, or breaking off of needles by hand**
  - v. **Placement of needles in puncture resistant containers**

11. **Steady State:** Wait 20 – 30 minutes before drawing an ABG if:

- A. **Change in oxygen concentration/liter flow.**
- B. **Change in ventilator settings.**
- C. **An IV was started.**
- D. **Patient removed his/her O2.**
- E. **Recently suctioned.**
- F. **Any procedure which increased patient anxiety or caused pain.**

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12. List information that should be **documented when performing an ABG:**
- A. **Sample Site**
  - B. **Diagnosis**
  - C. **Initials of person drawing the sample**
  - D. **f/Ventilatory Pattern**
  - E. **FiO2**
  - F. **Temperature**
  - G. **Ventilator Parameters (including Non-Invasive)**
13. **List all materials needed to perform an ABG**
- A. **Lab Slip/Label**
  - B. **Syringe (1- 5 ml)**
  - C. **Glass or Plastic**
  - D. **Needles**
  - E. **20 – 22 gauge (adult)**
  - F. **25 gauge (children)**
  - G. **Longer needle for brachial or femoral**
  - H. **Ice/Bag**
  - I. **Alcohol/Betadine Swab**
  - J. **4 x 4 gauze**
  - K. **Bandage**
  - L. **Towel**
14. **List advantages of glass and plastic syringes**
- A. Glass Syringe
    - i. **Less friction.**
    - ii. **Easier to fill with blood**
  - B. Plastic Syringe
    - i. **Gases diffuse more quickly through plastic.**
    - ii. **Air Bubbles are more difficult to expel.**
15. **Anticoagulants in Syringes**
- A. Liquid Heparin
    - i. Concentration: **1000 units/mL**
    - ii. Amount needed for sample: **0.05 mL needed to anticoagulate 1 mL of blood**
  - B. Dry Heparin
    - i. Advantage of Lithium Heparin: **Will not interfere with electrolyte analysis.**
16. **Cooling the Sample:**
- A. Recommendation for Cooling: **Ice/Water bath**
  - B. Temperature recommended **1-5 °C**
  - C. Analyze within **two** hours (**one hour per AARC CPG**).

17. **Local Anesthetic**

- A. Medication used: **Lidocaine**
- B. Concentration: **0.5 to 1.0%**
- C. Amount of time needed to wait: **2 minutes**
- D. Needle gauge **25 – 26 guage**

18. **Sites for Arterial Draws**

- A. **Radial**
- B. **Brachial**
- C. **Femoral**
- D. **Umbilical Artery**
- E. **Axillary**
- F. **Dorsalis pedis**

19. **Radial Puncture is the preferred site because:**

- A. **Collateral circulation.**
- B. **The artery is not too deep.**
- C. **Less nerve damage.**

20. **Modified Allen's Test:**

- A. How to perform
  - i. **Have patient clench fist to force blood from hand.**
  - ii. **Apply pressure to both the patient's radial and ulnar arteries.**
  - iii. **Relax the hand and look for blanching.**
  - iv. **Release ulnar artery and note flushing within 5 to 15 seconds.**
- B. Positive vs. Negative results: **A normal response is a positive response**

21. **Describe the technique for brachial artery puncture.**

- A. **Place the patient's elbow on a rolled towel for support.**
- B. **Position the forearm in supination, slightly hyperextended, and slightly rotated externally.**
- C. **Extend patient's arm and rotate wrist to obtain the strongest pulse.**
- D. **Palpate the artery slightly above the elbow crease.**
- E. **Cleanse skin with an antiseptic solution.**
- F. **Puncture artery 2-3 centimeters above the bend of the elbow at an angle of 40-60 degrees.**
- G. **Aim along the axis of the artery towards the pulsation.**

22. **Describe the technique for femoral artery puncture.**

- A. **Lie the patient supine with the leg slightly externally rotated.**
- B. **Palpate the artery 1-1 1/2 inches distal (below) to the inguinal ligament.**
- C. **Cleanse skin with an antiseptic solution.**
- D. **Insert the needle 1-1 1/2 inches at an angle of 60-90 degrees.**
- E. **Take care to avoid the femoral nerve which lies lateral to the artery.**

23. **Following an ABG Puncture**

- A. **Hold site for a minimum of 5 minutes & until bleeding stops.**
- B. **Check temperature and pulse downstream from puncture site 2 minutes following release of pressure to site.**
- C. **Remove air bubbles.**
- D. **Mix sample (5 seconds).**
- E. **Room air samples should be analyzed within 10 – 15 minutes.**

24. **List 5 reasons for failure to obtain an ABG sample**

- A. **Not deep enough.**
- B. **Missed the artery.**
- C. **Went through artery.**
- D. **Blood Clot.**
- E. **Arteriospasm.**

25. **Recognizing Venous vs. Arterial Samples**

- A. Arterial
  - i. **Flashing**
  - ii. **Pulsation**
  - iii. **Auto-filling of syringe unless patient is hypotensive or a small needle was used**
  - iv. **Color**
- B. Venous
  - i. **Slow fill – no pulsation**
  - ii. **Dark Blood**
  - iii. **Check pulse ox at time of draw**
  - iv. **PaO<sub>2</sub> 40 mm Hg, SaO<sub>2</sub> 70 – 75%**

26. **Complications of ABG sampling**

- A. **Thrombosis**
- B. **Hemorrhage**
- C. **Hematoma**
- D. **Arteriospasm**
- E. **Pain**
- F. **Infection**
- G. **Anaphylaxis from local anesthetic**
- H. **Nerve Damage**
- I. **Vasovagal response**
- J. **Improper handling of sample**
- K. **Contamination of sample with venous blood**
- L. **Trauma to the vessel**

27. **Capillary Sampling**

- A. Sites: **Finger, Heel, Toe**
- B. Contraindications:
  - i. **Posterior curvature of the heel.**
  - ii. **Previous puncture site.**
  - iii. **Inflamed, swollen, edematous tissue.**
  - iv. **Cyanotic or poorly perfused tissues.**
  - v. **Localized areas of infection.**
  - vi. **Peripheral arteries.**
  - vii. **When there is a need for direct analysis of oxygenation and/or Arterial blood.**

28. Limitations

- A. **Inadequate warming of site**
- B. **Undue squeezing of the puncture site**
- C. **A second puncture may be necessary**
- D. **Cannot use to assess oxygenation**
- E. **Air bubbles must be expelled immediately**
- F. **Analyze within 10 – 15 min if left at**
- G. **Clots prevent accurate analysis**
- H. **Room temperature**
- I. **Quantity of sample insufficient**
- J. **Delay in analysis will alter results**

29. Equipment needed

- A. **Lancet**
- B. **Band-Aids**
- C. **Pre-heparinized capillary tube**
- D. **Metal fleas**
- E. **Magnet**
- F. **Sealant or caps**
- G. **Gauze or cotton balls**
- H. **Ice**
- I. **Gloves**
- J. **Skin Antiseptic**
- K. **Warming pads**
- L. **Labels/Lab Slips**
- M. **Sharps container**

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30. Facts to Remember

- A. **Warm site to 42° C for 10 minutes.**
- B. **Results of a capillary blood gas will correlate with PaCO<sub>2</sub> and pH**
- C. **Capillary blood gases should not be used to monitor oxygen therapy**
- D. **PO<sub>2</sub> values from a CBG do not correlate with arterial PO<sub>2</sub>**

31. Procedure for Capillary Blood Sampling

- A. **Select appropriate site and warm to 42° C for 10 minutes.**
- B. **Cleanse skin with an antiseptic solution.**
- C. **Puncture no more than 2.0 mm deep**
- D. **Wipe away first drop of blood.**
- E. **Collect sample in a free flow fashion.**
- F. **Do not squeeze site.**
- G. **Stop blood flow with gentle pressure.**

32. How much pressure is kept in the infusion bag of an A-line set-up? **300 mm Hg**

33. Given a blood pressure of 140/90, calculate the mean blood pressure.

$$MAP = \frac{(2 \times \text{DIASTOLIC}) + \text{SYSTOLIC}}{3} = \frac{(2 \times 90) + 140}{3} = \frac{180 + 140}{3} = \frac{320}{3} = 106.\bar{6}$$

34. Arterial blood pressure measures the \_\_\_\_\_.

- A. Preload of the right ventricle
- B. Preload of the left ventricle
- C. Afterload of the right ventricle
- D. **Afterload of the left ventricle**

35. Name three thrombolytics that can interfere with normal blood clotting:

- A. **STREPTOKINASE**
- B. **TPA**
- C. **UROKINASE**
- D. **STREPTOLASE**

36. If a local anesthetic were used prior to drawing an ABG, what percent solution is recommended? **0.5 to 1.0%**

37. How long should you wait after administering the anesthetic? **2 MINUTES**



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38. You are preparing to draw a radial ABG and have just finished the Modified Allen's Test on the patient's right side. You observe a positive test. You would
- A. **Attempt the ABG on the right radial.**
  - B. Attempt the ABG on the right ulnar
  - C. Perform a Allen's test on the left hand
  - D. Perform a brachial ABG on the right
39. What is the normal PaO<sub>2</sub> for a patient 80 years old?  
 **$PaO_2 = 110 - 1/2 \text{ age} = 110 - (0.5 \times 80) = 110 - 40 = 70$**
40. Which body position will give you the higher PaO<sub>2</sub>? **SITTING**
41. How much heparin is needed to adequately anticoagulate a 5.0 mL blood sample?  
 **$\frac{0.05 \text{ mL}}{1 \text{ mL sample}} = \frac{x}{5.0 \text{ mL}}$   $x = 5.0 \times 0.05 \text{ mL} = 0.25 \text{ mL}$**
42. Which nerve is closest to the brachial artery and can be damaged by an arterial puncture?  
**MEDIAN**
43. When the stop cock lever on an A-line is turned to a 45 degree angle, which port is closed?
- A. Sample port
  - B. Patient port
  - C. Flush port
  - D. **All ports**
44. Name some hazards or complications associated with a femoral arterial blood draw?
- A. **THROMBOSIS**
  - B. **HEMORRHAGE**
  - C. **HEMATOMA**
  - D. **ARTERIOSPASM**
  - E. **PAIN**
  - F. **INFECTION**
  - G. **ANAPHYLAXIS FROM LOCAL ANESTHETIC**
  - H. **NERVE DAMAGE**
  - I. **VASOVAGAL RESPONSE**
  - J. **IMPROPER HANDLING OF SAMPLE**
  - K. **CONTAMINATION OF SAMPLE WITH VENOUS BLOOD**
  - L. **TRAUMA TO THE VESSEL**
45. If septicemia develops in a patient with an A-line, what should be done? **REMOVE CATHETER AND CULTURE TIP OF A-LINE**
46. ABG samples that are not iced should be analyzed within **IMMEDIATELY OR WITHIN 30 MINUTES**
47. Which of the following capillary values will **NOT** correlate to an arterial sample?

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- A. pH                      B. PCO<sub>2</sub>                      C. PO<sub>2</sub>

48. ABG samples that are iced should be analyzed within **1 HOUR**.
49. Why is the first blood sample drawn from an A-line, discarded? **EXCESS HEPARIN**
50. Which way should the stop cock lever be turned when withdrawing blood from the patient?  
A. Toward the patient  
B. **Toward the transducer**  
C. Toward the sampling port  
D. To a 45 degree angle
51. What type of transducer is usually used for a A-line set-up? **STRAIN GAUGE**
52. What does a properly damped waveform mean? **TRACING IS ACCURATE; PRESENCE OF DICHROTIC NOTCH.**
53. How does an overdamped waveform affect the blood pressure reading? **FALSE LOW SYSTOLIC PRESSURES.**
54. What causes an overdamped waveform?  
A. **LOOSE CONNECTIONS**  
B. **AIR BUBBLES**  
C. **KINKS**  
D. **BLOOD CLOTS IN THE LINE**  
E. **SPASM OF ARTERY**  
F. **TUBING TOO NARROW**
55. When flushing a radial artery A-line, how long should you compress the flush device? **2-3 SECONDS; ENOUGH TO SEE THE PRESSURE GO TO MAXIMUM (300 mm Hg)**
56. List the normal values for venous gases  
A. pH **7.35-7.38**  
B. PCO<sub>2</sub> **45 mm Hg**  
C. PO<sub>2</sub> **40 mm Hg**  
D. SO<sub>2</sub> **70-75%**
57. Blood drawn from a Umbilical Artery Catheter is referred to as  
A. Pre-ductal blood    B. **Post-ductal blood**    C. Variable blood

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58. Draw a picture of an arterial waveform showing a BP or 150/98. Draw a picture of how the waveform will change when you flush the A-line

