

BACK TO CAMPUS – ABG

Learning Objectives

- Discuss the role of ABG versus VBG.
- Practice the technique of ABG

OVERVIEW

In this session you have an opportunity revise performing an ABG on the models.

SUGGESTED TUTOR PREPARATION

1. Geeky Medics. How to take an Arterial Blood Gas (ABG) plus video
<https://geekymedics.com/arterial-blood-gas-sampling/>
2. Medmastery: acid-base disorders (video). Life in the Fast Lane
<https://litfl.com/medmastery-acid-base-disorders/>
3. Additional material from Life in the Fast Lane
 - Metabolic alkalosis - <https://litfl.com/metabolic-alkalosis/>
 - Respiratory alkalosis - <https://litfl.com/respiratory-alkalosis/>
 - Metabolic acidosis - <https://litfl.com/metabolic-acidosis/>
 - Respiratory acidosis - <https://litfl.com/respiratory-acidosis/>

MATERIALS AVAILABLE DURING SESSION

1. Gloves, hand wash
2. Pre-heparinised arterial blood gas syringe and bung or cap
3. Arterial blood gas needle (23 G)
4. Alcohol wipe (70% isopropyl)
5. Gauze or cotton wool
6. Tape
7. Lignocaine 1% (1 mL)
8. Subcutaneous needle (25-27 G)
9. Small syringe (1-2 ml)
10. Sharps container
11. (Ice)

LESSON PLAN TUTORIAL – ABG procedure

Task

Introduction – ABG and VBG

What variables are we most interested in?

pH / p_aO₂ / p_aCO₂ / Bicarbonate / Base Excess

ABG vs. VBG – the evidence

Study from Melbourne {Kelly et al, 2013}. Studies ABG-VBG (a-v) mean difference I and found:

- pH +/- 0.04
- pCO₂ 8.02mmHg.

The study concludes that this variation in pH is 'acceptable' – but that means that a VBG pH of 7.30 could in fact lie between – 7.26 to 7.34. One patient is very sick, the other has a low-normal acid base balance in their blood. Is that really acceptable?!

Similarly, VBG pCO₂ of 52mmHg – the 'real' pCO₂ could lie between 44 to 60 mmHg. One scenario has normal gas exchange, the other is in need of urgent assessment of their respiratory compromise.

VBGs are definitely useful as a screening tool – but if parameters are abnormal – need to follow up with an ABG

When to perform an ABG?

- Any critical illness – in severe shock accurate determination of PaCO₂
- Acute respiratory failure – accurately determine PaCO₂ if hypercapnic (ie >45 mmHg)
- Acute renal failure
- LTOT assessment

What are the contraindications to ABG?

- Inadequate circulation,
- Burger's disease,
- Raynaud's syndrome,
- Full-thickness burns
- Cellulitis of the area
- AV fistula

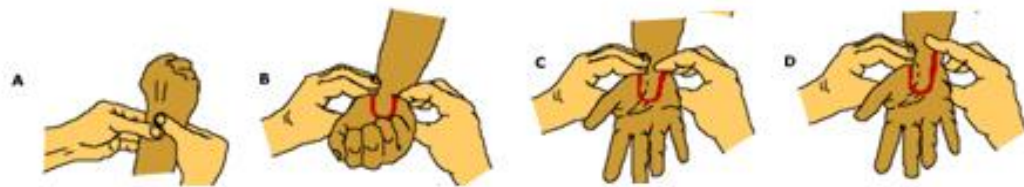
Relative contraindications include:

- Previous surgery in the area,
- Inadequate collateral flow,
- Partial-thickness burns,
- Atherosclerosis,
- Anticoagulation or coagulopathy (can be performed safely but with severe disseminated coagulopathies extreme caution required).

Task

ABG procedure

1. Demonstrate procedure OR watch video Geeky Medics
2. Students perform Allen's test on each other
3. Students perform ABG procedure on models
 - *Explanation & consent (verbal)*
 - *Check allergies*
 - *Check anticoagulants, platelets, h/o clotting disorder*
 - *Allen's test:* *Why? Check circulation to hand*
 Make fist
 Occlude both ulna and radial arteries
 Release ulna
 Normal if hand normal appearance in <15 sec



- *Perform hand hygiene, clear work area and prepare equipment*
- *Alcohol swab to sampling site and allow to dry*
- *Apply gloves and apron*
- *Remove protective cover of ABG needle and flush through heparin from syringe*
- *Rest wrist slightly extended (20-30 degrees)*
- *Palpate radial artery*
- *Infiltrate LA (must aspirate before)*
- *Hold ABG syringe like a dart and insert through skin with ABG needle 30-45° to skin*
- *Advance needle slowly until feel sudden reduction in resistance. When in artery – flashback into syringe and it will self-fill. Only require 1-2 mls*
- *Remove needle – immediate pressure over site*
- *Carefully expel excess air in syringe*
- *Dispose of sharps*
- *Remove gloves, hand hygiene*
- *Label syringe, onto ice*

