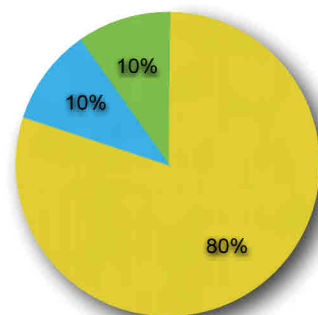


Arterial Blood Gas Procedure

History: This patient requires a arterial blood gas.

Task: Perform an arterial blood test.



● communication ● clinical ● procedure

Marking criteria	Not Completed	Partially Completed	Completed
Washes hands, Introduction, Confirms patient identity			
Discusses procedure with patient / Obtains consent			
Checks concentration of oxygen the patient is breathing, ensure oxygen remains at a constant for 15 minutes prior to sample			
Locates artery of choice by palpation with two fingers (radial, brachial, femoral)			
Allen's test for radial artery: 1. Ensures no surgical shunt or PVD 2. Asks patient to make fist 3. Applies pressure to radial and ulnar arteries 4. Asks patient to open hand (now pale) 5. Releases pressure over ulnar artery Positive test: refill in <4 sec. Negative test: prolonged or no refill			
Cleans area with chlorhexidine solution / allows time to dry / dawns gloves / expresses syringe contents			
Relocate the artery and leave a gap between fingers for insertion of needle into artery (optional)			
Angles needle 30 degrees (60 for femoral) opposite the blood flow and advances needle slowly until flashing pulsation of blood is seen			
If needle advanced to far, withdraws slowly			
If redirection required, withdraws almost to skin surface			
Withdraws 2-3 mls of blood, removes needle quickly and applies pressure with sterile gauze, 5 minutes			
Safely removes and disposes of needle			
Expels air bubbles / caps syringe immediately			
Analysis sample immediately			
Returns to patient to assess puncture site / thanks patient			
Documents procedure in notes, thanks patient			
Overall			

Arterial Blood Gas Procedure Level 1

Understanding (basic sciences)

Describe the advantages / disadvantages and potential contraindications of arterial blood sampling from the radial brachial and femoral arteries.

Artery	Positioning of patient	Angle of needle to skin (°)	Puncture site	Important anatomical structures in proximity to puncture site	Advantages	Disadvantages	Contraindications
Radial	Arm extended and supported on pillow with wrist extended 20°	30	Proximal to proximal transverse crease lateral aspect of wrist		Easily accessible Easily compressible, therefore useful if there is known bleeding tendency	Venous sample may be obtained	Buerger's disease Raynaud's disease Arteriovenous dialysis shunt present or imminent Absent ulnar collateral circulation
Brachial	Arm extended and supported on pillow	30	Medial to biceps tendon in antecubital fossa	Median nerve medial	Easily accessible	End artery, therefore theoretical risk of ischaemia. Venous sample may be obtained	Arteriovenous fistula in arm. Elbow fractures
Femoral	Supine	60	Mid inguinal point 2 cm below inguinal ligament	Femoral nerve lateral Femoral vein medial	May be the only quickly accessible artery in the shocked patient	Venous sample more likely than at other sites	Severe peripheral vascular disease. Aortofemoral bypass surgery

List four complications of ABG sampling and outline measures to prevent them.

Haematoma: Adequate pressure post removal of needle;

Arterial occlusion (thrombus / dissection): avoid repeated attempts;

Infection arteritis / cellulitis: wash hands, prep skin, wear gloves, avoid infected areas;

Embolization: express contents of syringe, avoid repeated attempts, apply direct pressure;

Level 2 Understanding (applied sciences)

What measurements can be obtained from an ABG?

Partial pressures of carbon dioxide (PaCO₂) and oxygen (PaO₂), hydrogen ion activity (pH), total hemoglobin (Hb_{total}), oxyhemoglobin saturation (HbO₂), dyshemoglobins carboxyhemoglobin (COHb) / methemoglobin (MetHb), electrolytes, Lactate

Level 3 Understanding (advanced sciences/management)

What is the calculation for anion gap?

$$(\text{Na} + \text{K}) - (\text{HCO} + \text{Cl}) = (12-16\text{mmol})$$

What are the causes of an increased gap metabolic acidosis?

MUDPILES

Methanol, Metformin, Uraemia, DKA, Paraldehyde, Isoniazid, Lactate, Ethylene glycol, Starvation, Salicylates, Sulfates