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Arterial Puncture		Formulated: 10/78	Effective: 10/31/94 Revised: 09/14/22 Reviewed: 08/15/23

Arterial Puncture

Purpose	Arterial blood gas sampling by puncture is accomplished by aseptic technique with a needle and heparinized syringe to obtain a specimen for analysis.
Scope	Respiratory Care Services obtains arterial blood samples for the purpose of physiologic monitoring.
Audience	This policy applies to all personnel functioning in a clinical capacity in the department of Respiratory Care Services.
Physician's Orders	Arterial puncture will be done at the order of the provider.
Indications	When the need to assess the patient's respiratory/metabolic status exists.
Contra-indications	<ul style="list-style-type: none"> Negative modified Allen's Test denotes presence of ulnar artery occlusion. Any inflammation, infection, or poor integrity at selected puncture site. There is relative contraindication for arterial puncture in the patient with diagnosed Raynaud's Phenomena.
Goals	To obtain a sampling of blood for analysis via the radial artery by puncture using aseptic technique.
Guidelines	<ul style="list-style-type: none"> The femoral and brachial arteries shall not be used for arterial puncture unless the physician is obtaining sample. RT is not allowed to obtain a blood gas from the femoral or brachial artery. When the radial artery site is chosen, an Allen's Test will be used to determine if collateral circulation by the ulnar artery is adequate. The results of the Allen's Test will be documented in Epic. After blood sampling is obtained, apply pressure for a <u>minimum of five minutes</u>. If the patient continues to bleed after five minutes, has a blood dyscrasia, is anti-coagulated, or if the physician has drawn femoral gases apply pressure for a <u>minimum of ten minutes</u>. Suctioning and/or changes in oxygen concentration or ventilator changes will precede arterial blood gas samplings by 20 to 30 minutes. For adult patients, the request MUST include FIO₂, time specimen was drawn, and patients temperature.

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Procedure

Step	Action
1	Verify physician's order.
2	Print the test label.
3	Check patient's record for precautions to be taken, such as in anticoagulant therapy, surgery or trauma to hand.
4	Identify patient using two identifiers.
5	Introduce yourself to patient and explain what you are about to do.
6	Staff are expected to use the appropriate PPE while performing this procedure.
7	Palpate right and left radial pulses. Select the vessel with the most prominent pulse for puncture.
8	<p>Perform the modified Allen's Test on hand with best radial pulse to ensure adequate collateral circulation.</p> <p>Modified Allen's Test:</p> <p>In the conscious, cooperative patient:</p> <ul style="list-style-type: none"> Compress both ulnar and radial arteries at the wrist to obliterate pulses. Have patient clench and release a fist until blanching of the hand occurs. With radial artery still compressed, release pressure on ulnar artery. Watch for normal color to return to the hand. <p>In the unconscious patient or patient unable to cooperate:</p> <ul style="list-style-type: none"> Compress both ulnar and radial arteries at the wrist to obliterate pulses. Elevate patient's hand above level of his heart. Lower patient's hand below the level of his heart.

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	<ul style="list-style-type: none"> • With radial artery still compressed, release pressure on ulnar artery. • If normal color fails to appear, collateral circulation may be assumed to be inadequate. Inform physician that you are unable to obtain ABG. • A positive modified Allen's Test denotes the presence of ulnar collateral flow.
9	Open ABG collection set; remove pre-heparinized syringe, needles, and syringe cap.
10	Assemble the syringe, keeping the chamber and tip sterile.
11	Attach needle to syringe, keeping needle in sterile protective cap.
12	Palpate the chosen radial artery as before, noting the point of maximal pulse. This will be the puncture site.
13	Stabilize the wrist in the position that presents the maximal pulse.
14	Clean the puncture site with approved disinfectant.
15	Remove the needle cap, and at a 35-40 degree angle with bevel in upward position, pierce the skin at the puncture site and slowly advance the needle in one plane. Once the artery is punctured, blood will enter the syringe. If the needle goes through the artery, slowly withdraw the needle until blood again appears in the syringe.
16	After enough blood has been obtained for testing, withdraw the needle and immediately apply pressure directly on the puncture site with sterile gauze.
17	Cap the needle using the provided safety device.
18	After applying pressure pad at the puncture site for a sufficient period of time, remove pressure pad and again palpate a pulse distal to puncture site
19	Remove the needle and cap the syringe. Dispose of the needle in the sharps container.
20	Hold syringe vertically, gently tap the barrel and advance the

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	plunger until it forces air bubbles out of the syringe and blood into the cap.
21	Gently roll the syringe between the palms of your hands to mix heparin
22	Scan the test label then scan the patient's hospital band. Enter the collection information into EPIC.
23	Label the syringe with the test label in the presence of the patient.
24	Place the syringe in a specimen bag and seal it closed.
25	Remove gloves. Perform hand hygiene and transport the specimen bag to the testing area,
26	Analyze the blood and call results to the physician if there are critical values or significant changes.
27	Document the notification of panic values in beaker. Click comm log, then type .crit to fill in the information. Use F2 button to scroll through each prompt. After filling in appropriate information, click accept and verify. (<i>This will clear the blood gas from the outstanding list.</i>) It is the RT's responsibility to report critical values to the physician.
28	Document the results of Allen Test, adverse reactions and which radial artery was used to perform puncture in Epic.

Undesirable Side Effects	<ul style="list-style-type: none"> • Infection - Sterile technique must be used so that no pathogens will be passed directly into the patient's blood stream. • Hematoma - Bleeding from the artery into the surrounding tissue can occur if insufficient time or pressure is applied to the puncture site. Patients on anti-coagulant therapy will be especially susceptible to the complication. • Thrombus - When an artery is punctured there is always a danger of a thrombus forming and blocking the arterial blood flow. For this reason it is necessary to check for collateral circulation (Allen's Test) before the puncture and check for a pulse distal to the site of the puncture following the procedure. • Peripheral Nerve Damage-the radial and brachial nerves run adjacent to
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	the artery and passing a needle through them can do permanent damage.
Undesirable Side Effects Continued	<ul style="list-style-type: none"> • Pain - Since arteries have a nerve supply and major nerves pass close to them, this procedure can prove very painful. It is always necessary to prepare the patient for this possibility to avoid unnecessary movement.
Assessment of Outcome	This procedure shall be deemed effective if the following criteria are met: <ul style="list-style-type: none"> • The procedure is performed with minimal pain to the patient and without permanent damage. • The results of analysis are interpreted by qualified medical personnel and appropriate adjustments in the patient's care are made as needed.
Patient Teaching	Instruct the patient as follows: <ul style="list-style-type: none"> • Explain to the patient why an arterial puncture is done. Relate it to injury or disease state. • Tell the patient that the procedure will be uncomfortable but that everything will be done to alleviate the discomfort. • Explain the importance of normal breathing to prevent altering the analysis.
References	<ul style="list-style-type: none"> • HCE 1.32(Exposure Control) Universal Precautions • HCE 1.32(Exposure Control) Blood Pathogens • Davis, M. D. et.al. AARC Clinical practice guidelines: Blood Gas Analysis...-respiratory care. Retrieved September 14, 2022, from https://rc.rcjournal.com/content/respcare/58/10/1694.full.pdf