Neonatal/ Pediatric Arterial Puncture

Purpose

To standardize arterial blood gas sampling by Respiratory Care Practitioners in Neonatal and Pediatric areas.

Policy

- Respiratory Care Services provide equipment and practitioners according to physician's orders to safely and promptly obtain arterial blood samples for the purpose of monitoring ventilation.
- The therapist shall perform an arterial puncture on infants with conditions that prolong clotting time in the presence of a physician.
- A therapist/technician shall not make more than three attempts to obtain the blood gas.
- Arterial punctures are not indicated for routine blood drawing.
- In the neonate, arterial punctures done by the department of Respiratory Care Services should generally be limited to the radial artery.

Accountability/Training

- This policy applies to all personnel functioning in a clinical capacity in Respiratory Care Services.
- A Respiratory Care Service staff member, under conditions described by the policy authorizing arterial puncture, may do arterial punctures.

Physician's Order

The arterial puncture will be done at the request of the physician.

Indications

When the need to assess the patient's respiratory/metabolic status exists.

Contrain-dications

- Negative modified Allen 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.

Precautions

- The radial artery is the preferred site for arterial punctures. The brachial, dorsalis, pedis and posterior tibial arteries are more difficult to puncture and should be used by advanced practitioners (i.e. MD, NNP, Transport nurse only) when the radial site is contraindicated.
- Punctures to the ulnar artery should be avoided; such punctures can result in impaired collateral circulation to the hand and damage to the ulnar nerve and the median nerve that lie in close proximity to the ulnar artery.
- Careful attention must be paid to the technique used to perform the arterial puncture to prevent:
  - Arterial spasm

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Precautions Continued

- Bleeding
- Infection
- Hematoma
- Trauma to adjacent structures (nerves, bones)
- Sloughing of skin

Goals

To obtain a sample of blood for analysis via the radial artery by puncture using aseptic technique.

Equipment

- 23 or 25 gauge butterfly with long needle
- Pre-heparinized blood gas syringe
- Iodine swab
- Dry cotton ball/gauze
- EPIC generated blood gas lab request slip

Procedure

General:

Step	Action
1	Gather required equipment
2	Select an appropriate site for the arterial puncture. Site selection should be based on: • Availability of collateral circulation • Accessibility • Presence of other surrounding anatomical structures such as nerves, • Accompanying veins or bone. • Condition of the site. The sites to be used in order of preference are: • Radial artery **(RCS only)** • Brachial artery • Dorsalis pedis • Posterior tibial
3	Check the FIO_2 prior to initiation of the puncture.
4	Scrub the site with iodine solution on cotton swab.

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Procedure Continued

5	Palpate the artery for the site of the strongest arterial impulse.
6	Insert the needle gently but firmly in the area where maximum impulse is felt.
7	Advance the needle slowly until arterial blood is obtained or resistance is felt. If resistance is felt while advancing the needle deeper, the needle is slowly withdrawn without advancement is changed slightly to one side and then to the other. If the artery has not been punctured after redirecting the needle several times, withdraw the needle and obtain a new setup if puncture is to be attempted again.
9	When the artery has been punctured, attach pre-heparinized tuberculin syringe to the hub of the butterfly. Aspirate slowly and gently. Collect a minimum of 0.2 ml in the tuberculin syringe.
10	After obtaining the sample, withdraw the needle and apply direct constant pressure for a minimum of five (5) minutes by the clock using a dry cotton ball or gauze. Even if an attempt is unsuccessful or results in an inadequate sample, pressure must be applied. If bleeding has not stopped after five (5) minutes of continuous pressure on the site, continue to apply pressure.
11	Check sample for presence of small bubbles. If small bubble gets into sample, point the top of the syringe up and expel the air bubbles immediately and cap syringe. KEY POINT: An air bubble in the sample can change the blood gas values.

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Procedure Continued

General Continued:

Step	Action
12	Label the syringe.
13	Take the sample to the unit based blood gas lab as soon as possible and run immediately.
15	Record the following in EPIC under the Blood Gas Collection portion of 'RCS Assessment': • Date • Time • Site of puncture • Results of Allen's Test • Any complications
Key Point:	Hold pressure over the artery as described in the Procedure: General section. Hematoma formation occurs more often at this site, but adequate pressure held over the artery should make further punctures possible.

Radial Artery Puncture:

Step	Action
1	Locate the radial artery. • Hold the arm supine and slightly extend the wrist. Severe extension of the wrist may obscure the pulse. • Palpate the radial artery pulse in the distal bone notch of the radius below the base of the thumb and lateral to the tendon.
2	Determine that collateral circulation is adequate by using the Modified Allen Test as follows: • Hold patient's hand overhead with fist clenched to drain blood while compressing both radial and ulnar arteries. • Lower the hand and open the fist. • Release pressure over ulnar artery. • Check to see if color returns within six (6) seconds, indicating a patent ulnar artery and intact superficial palmar arch.

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Procedure Continued

Radial Artery Puncture:

Step	Action
3	Enter the skin at 30-to 45° angle. The skin is entered just proximal to the wrist at about the level of the proximal skin crease.

Documen-tation

Document in EPIC and Treatment Card as outlined in RCS Policies # 7.1.1 and # 7.1.2.

Infection Control

Follow procedures as outlined Healthcare Epidemiology Policies and Procedures: #2.24 Respiratory Care Services.
http://www.utmb.edu/policy/hcepidem/search/02-24.pdf

References

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