RAD-57

THIS POLICY APPLIES TO: Patients suspected of having carbon monoxide and cyanide poisoning.

EXCLUSION CRITERIA: Patients without a finger on which either the adult or pediatric sensor can be securely placed. Generally, the pediatric sensor will not fit patients weighing less than 10 kg.

AUTHORIZATION: All levels

GUIDELINES

In the AEMS System, this device is used to monitor arterial blood in patients who may have inhaled carbon monoxide and/or smoke from a fire in a closed space to determine:

- Oxygen saturation of hemoglobin (SpO2), and
- Carbon monoxide saturation (carboxyhemoglobin, SpCO)

SpO2 is the percent value of arterial oxygen saturation, while SpCO is the percent value indicating the level of carbon monoxide bound to hemoglobin. The RAD-57 is a handheld oximeter carried on all aerial apparatus, used for blood monitoring. If high levels of carbon monoxide are present, pulse oximeters like the LifePak 15 or Nonin capnometer may produce inaccurate results. For patients with potential carbon monoxide poisoning, use the RAD-57 to determine %SpO2 and %SpCO levels.

The RAD-57 can be used continuously on a single patient or to spot-check multiple patients. The %SpCO reading, alongside clinical signs and symptoms, assists in treatment decisions. Definitive measurements should be obtained via laboratory blood tests.

Documentation

Record the initial %SpCO and the time it was measured in the Patient Care Report, as well as any changes in %SpCO and their respective times. If there are no changes in %SpCO, document this along with the start and end times of monitoring. During mass casualty incidents (MCIs), record the %SpCO and the time on the triage tag.

Special Considerations

- Carboxyhemoglobin levels may not correlate well with symptoms of carbon monoxide poisoning and do not predict patient outcomes. Assess all patients with known or suspected exposure, even if asymptomatic.
- SpO2 values less than 90% can interfere with SpCO readings and may prevent a reading from being displayed.
- Dyes that alter blood pigmentation, such as Cyanokit, can cause erroneous readings. During and after Cyanokit administration, the RAD-57 should not be used to determine %SpCO.

Special Considerations for Specific Populations

Smokers: Cigarette smoke produces carbon monoxide, and heavy smokers may have a baseline carboxyhemoglobin level up to 10%. Smokers may be more susceptible to toxic effects from accidental exposure to carbon monoxide. Consider smoking history along with elevated Rad-57 readings, symptoms, and possible exposure.

Pregnant Women: The fetus is at higher risk from carbon monoxide exposure, with fetal %SpCO potentially 10% to 15% higher than the mother's level. Transport all pregnant women with potential carbon monoxide exposure to a hospital, even if they show no symptoms.

Multiple Patient Incidents: The RAD-57 is useful as an early screening tool for multiple patients, such as firefighters in rehabilitation areas or civilians exposed to carbon monoxide. Use %SpCO readings to assess exposure, prioritize transport, and determine hospital destinations. When using the RAD-57 to check multiple patients with a reusable sensor, ensure the sensor clip is closed for at least five seconds between uses to reset monitoring.

OPERATION

Sensor Placement

1. Place the sensor on a warm, clean, and dry finger with good perfusion. The fourth finger of the non-dominant hand is preferred. If unavailable, use the third or second finger. Avoid callused fingers if possible. Do not place the sensor on the same limb as a blood pressure cuff or across a child's hand or foot. Remove nail polish containing metallic flakes.
2. Before turning on the RAD-57, insert the finger into the sensor with the cable attachment on top. Ensure the fingertip reaches the stop block so the red light passes through the midnail. The fit should be secure.
3. Strong sunlight or strobe lights may interfere with readings. If this occurs, use the provided light shield or cover the sensor.
4. Confirm abnormal readings by testing different fingers.

Powering Up

1. Press the power button to turn on the device; press and hold to turn it off.
2. The device takes up to 25 seconds to fully start up, during which all LEDs will light up, and a tone will sound. Do not move the sensor during startup.

Patient Monitoring

After startup, the RAD-57 defaults to monitor oxygen saturation (SpO2), displaying the percent value for arterial oxygen saturation and the pulse rate. To obtain the carboxyhemoglobin (%SpCO) reading, press the DISPLAY button once. The reading will appear as a number, and CO will be shown on the lower display.

To Confirm High %SpCO Readings

1. If the %SpCO reading is high, take additional readings on two other fingers.
2. If the readings are within ±3%, use the average as the %SpCO value. If they differ by more than 3%, check the sensor placement and repeat the reading.

Additional Controls

- The SIQ bar graph indicates signal quality. Green bars indicate good quality, yellow bars indicate moderate quality, and red bars indicate poor quality.
- To cycle through readings (SpO2, SpCO, Perfusion Index), press the DISPLAY button repeatedly.
- The Perfusion Index measures blood flow quality, with a desired value greater than 1.00%.

Items of Note

- If the heart rate exceeds 180 beats per minute, the alarm will sound, and the device will not display %SpCO.
- If venous pressure exceeds arterial pressure (e.g., after extreme physical exertion), the display will show dashes until the patient rests and venous pressure normalizes.

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