

Pulse Oximetry

THIS PROCEDURE APPLIES TO: Using a pulse oximeter to determine:

- Blood oxygen saturation.
- Carboxyhemoglobin concentrations for patients who may have inhaled smoke from a fire in a closed space and/or carbon monoxide.
- Methemoglobin concentration.

EXCLUSION CRITERIA: Do not use in the presence of flammable anesthetics, magnetic resonance imaging (MRI) equipment, or computed tomograph (CT) equipment. **MAY NOT BE RELIABLE IN CARDIAC ARREST.**

AUTHORIZATION: All Levels

GUIDELINES

1. Two general types of pulse oximeter sensors are carried on Arlington ambulances:
 - Sensors that measure only blood oxygen saturation (non-disposable and disposable).
 - A combination probe that measures blood oxygen saturation, carboxyhemoglobin (SpCO), and methemoglobin (SpMet) concentrations.
2. The combination sensor should be used on patients who may have inhaled smoke or carbon monoxide. Use a sensor that measures only SpO₂ for other patients.
3. The combination SpCO/SpMet sensor will measure and continuously monitor:
 - **Carboxyhemoglobin concentration (SpCO):** A percent value indicating the level of carbon monoxide bound to hemoglobin. Normal values are typically less than 9%. The LifePak 15 measures and displays SpCO levels from 0 - 40%.
 - **Methemoglobin concentration (SpMet):** A percent value indicating methemoglobin, which impedes oxygen delivery. Normal values are typically less than 2%. Higher values assist in identifying methemoglobinemia. The LifePak 15 measures and displays SpMet levels from 0 - 15%.
 - **Oxygen saturation (SpO₂):** A percent value for oxygen saturation of hemoglobin. Normal values are typically 95% to 100%. The LifePak 15 measures and displays SpO₂ levels from 50 - 100%.
4. The combination SpCO/SpMet sensor looks similar to the non-disposable sensor that measures only SpO₂. However, the end of the cable that connects the combination sensor to the LifePak 15 is labeled rainbow and specifies the three measurements, SpCO, SpMet and SpO₂, it provides.

Special Considerations

- Patients exposed to carbon monoxide may not exhibit symptoms, so assess all patients with known or suspected exposure.
- Dyes such as Cyanokit may cause erroneous readings. Pulse oximetry cannot determine accurate SpCO% or SpO2% during or after Cyanokit administration.
- Refer to Poisoning: Carbon Monoxide & Hydrogen Cyanide Combined Medical Control section for assessment parameters.
- Refer to **RAD-57 Monitor** for considerations of carbon monoxide exposure in smokers, pregnant women, and multiple patient incidents.

PROCEDURE

1. Observe body substance isolation precautions.
2. Choose a well-perfused, warm, and dry site for sensor application. The preferred site is the ring finger of the non-dominant hand. For SpO2 monitoring, a toe may be used, but a finger is preferable.
3. Remove fingernail polish or false nails to avoid inaccurate readings, or use an alternate site.
4. Turn on the LifePak 15 if it is not already on. It performs a self-test for approximately 20 seconds before displaying readings.
5. Select the appropriate sensor:
 - For SpO2 monitoring only, use the non-disposable or disposable SpO2 sensor.
 - For SpCO monitoring, use the SpCO/SpMet sensor.
6. Choose the monitoring site, avoiding the same extremity as a blood pressure cuff:
 1. For patients who fit the non-disposable SpO2 or SpCO/SpMet sensor:
 - The preferred site is the ring finger of the non-dominant hand. Alternatively, use the great toe.
 - Ensure the fleshy part covers the detector completely. Do not use tape to hold the sensor in place.
 2. For patients too small for non-disposable sensors, use a disposable SpO2 sensor and wrap it securely but not too tightly.
7. Cover the sensor with opaque material if exposed to bright ambient light.
8. Document the percent of oxygen saturation every time vital signs are recorded.

Patient Monitoring

When the combination SpCO/SpMet sensor is placed on the patient's finger and connected to the LifePak 15, it defaults to monitoring SpO2 percent. The SpO2 reading appears on the left side of the screen with a matching waveform color.

To Quickly Obtain SpCO or SpMet Values

1. Press PRINT on the LifePak 15 to display the values at the top of the printout. If dashes appear instead of values, allow a few more seconds for measurements.

To Display SpCO or SpMet Values

1. Verify the combination SpCO/SpMet sensor is in use.
2. Use the LifePak 15 SPEED DIAL to select the SpO2 area on the HOME screen.
3. Select PARAMETER from the menu, then choose SPCO or SPMET.
4. The selected value will display for 10 seconds before returning to the default SpO2 reading.
5. The sensor measures SpCO in the range of 0 - 40% and SpMet in the range of 0 - 15%.

Documentation

If the combination sensor is used, the measurements (SpO2, SpCO, SpMet) will be recorded on the LifePak 15 code summary.

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