Respiratory – Measurement of Oxygen Saturation Using Pulse Oximetry

SECTION: 9.10

Strength of Evidence Level: 3

PURPOSE:
To monitor arterial oxygen saturation non-invasively.

CONSIDERATIONS:
1. The symbol SpO2 is used to denote non-invasive, electronically measured arterial oxygen saturation. The symbol SaO2 is used to indicate invasively measured arterial oxygen saturation.
2. Oximetry measures the percentage of hemoglobin that is saturated with oxygen. If the patient is anemic (not enough hemoglobin), the SpO2 may be within normal limits but the blood may not be carrying enough oxygen to meet the tissue oxygen needs. In this situation, the patient could appear hypoxic with a “normal” SpO2 value.
3. Oximetry gives NO information about the level of blood carbon dioxide (CO2). Patients can have hypercarbia with normal oxygen saturation.
4. The SpO2 value must always be interpreted in the context of the patient’s complete clinical care.
5. Preferred probe sites for adults and children are fingertips and ear lobes. Acceptable sites for infants include fleshy portion of hand, fleshy portion of foot, or toe. For neonates, the ball of the foot or heel of the hand are the best sites.
6. Results may be inaccurate if the patient has any of the following:
   a. Conditions which cause poor perfusion to probe site:
      (1) Low cardiac output
      (2) Vasoconstriction
      (3) Hypothermia
   b. Elevated carboxyhemoglobin levels.
   c. Elevated methemoglobin levels.
   d. Artificial nails or nail polish.
7. If unable to remove nail polish or artificial nails, place the probe sideways so the light goes through the finger side to side and bypasses the nail.
8. Other causes of inaccurate results include:
   a. Excessive ambient light sensed by the probe sensor.
   b. Patient movement.
   c. Inability of oximeter to accurately sense the patient’s pulse.
9. Patient should be in a “steady state” on correct dose of oxygen (or off oxygen) for at least 15 minutes before obtaining a reading. If initial reading done on oxygen, then with oxygen off, the nurse must wait at least 15 minutes after oxygen removed to obtain accurate room air reading.
10. If the patient shows clinical signs of distress after oxygen removal, immediately replace the oxygen at the appropriate liter flow.
11. For infants and neonates, clarify with physician if oximetry reading needs to be done during a feeding session, during sleep or during awake/active times.
12. Normal SpO2 levels are 95-100% at sea level, lower with higher altitudes (e.g. 90% or greater at 1 mile above sea level).

EQUIPMENT:
Oximeter
Finger or ear probe
Alcohol wipes
Nail polish remover (if needed)

PROCEDURE:
1. Adhere to Standard Precautions.
2. Verify physician’s order for procedure.
3. Explain procedure to patient.
4. Prepare equipment according to manufacturer’s instructions.
5. Ensure patient has been on correct dose of oxygen for at least 15 minutes prior to obtaining reading.
6. Select probe site appropriate for age and condition of patient.
7. Place probe so sensors are opposite of each other. For ear lobe, gently massage site for about 10 seconds prior to probe application.
8. Turn on pulse oximeter. The unit will perform a self-check, then the pulse indicator should flash synchronously with the patients pulse. The pulse rate displayed by the oximeter must be equal to the patient’s apical/radial pulse. If the pulse is not sensed accurately, the SpO2 value will be inaccurate.
9. Read SpO2 value after several minutes when reading stabilized.

AFTER CARE:
1. Remove probe, turn off and unplug unit. Clean the probe gently with alcohol wipe.
2. Document in patient’s record:
   a. Procedure type.
   b. Date and time.
   c. Probe location.
   d. O2 type and concentration, if in use.
   e. Patient activity.
   f. SpO2 reading.
   g. Action taken, if any.
   h. Patient’s response to procedure.