Pulse Oximetry, An Accurate Monitor for Detection of Hypoventilation

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**BACKGROUND**

- Arterial hypoxemia is considered to be significant when SpO2 is <90%
- Only three of six classical physiologic causes of arterial hypoxemia are clinically relevant
  - Low V/Q
  - Shunt
  - Hypoventilation (see AGE)
- None explain the rapid desaturation observed with acute hypoventilation and airway obstruction, the most common hypoxic events!

**HYPOTHESES**

- The pulse oximeter is a sensitive monitor for acute hypoventilation
- SpO2 <90% is tolerable (for the patient)
- Supplemental O2 will not prevent hypoventilation induced hypoxemia
- Supplemental O2 is minimally effective for increasing O2 delivery at the cellular level
- The rate of O2 desaturation, once initiated, is directly proportional to FIO2

**DISCUSSION OF FALLACIES**

- Capillary and tissue PO2 levels are dependent variables; saturation is the independent variable for presentation of the oxyhemoglobin dissociation curve
- Dissolved O2 is of minimal significance in determining O2 delivery; therefore, so is supplemental O2
- The sensitivity of pulse oximetry as a monitor of ventilation is inversely proportional to FIO2
- Used appropriately, pulse oximetry is a sensitive monitor for detection of acute hypoventilation and/or airway obstruction

**SUMMARY**

- The O2 Hgb dissociation curve represents a "slippery slope" (It’s flawed)
- Supplemental O2 is appropriate, innocuous and protective
- Pulse oximetry prevents morbidity and mortality
- The respiratory gas exchange quotient R is a constant

**REFERENCES**