3I – OXYGEN ADMINISTRATION ADULT & PEDIATRIC

EMERGENCY MEDICAL RESPONDER

EMT

EMT-INTERMEDIATE 85

ADVANCED EMT

PARAMEDIC

Indications:

Use in chronic conditions to include:

COPD – chronic bronchitis or emphysema
Chronic lung disease – lung cancer, sarcoidosis, pulmonary fibrosis, pulmonary hypertension.

EMS administration of O_2 may be at usual concentrations (e.g. nasal cannula flow at 2-3 liters per minute) or at higher concentrations than usual during acute dyspnea episodes (e.g. non-rebreather mask flow at 12 liters per minute) if the chronic pulmonary disease patient exhibits more than typical dyspnea or more than typical hypoxemia.

Use in acute conditions to include:

Respiratory arrest
Dyspnea – uncertain etiology, asthma, COPD, CHF, BRUE, acute allergic reaction
Cardiac arrest
Acute coronary syndrome (if associated with dyspnea or pulse oximetry< 94%)
Stroke (if associated with dyspnea or pulse oximetry< 94%)
Multi-systems trauma

EMS administration of O_2 should be goal-directed to achieve oxygen saturation levels, based on pulse oximetry, with a target level of 94–98% in most patients, or 88–92% in COPD patients.

Precautions:

Excessive oxygen levels can impair the respiratory drive in chronic pulmonary disease patients and paradoxically contribute to as much tissue disease as hypoxemia. Multiple studies show that **hyper**oxemia in certain ischemic tissue disease events (e.g. cardiac arrest, stroke) can lead to worse outcomes than normal oxygen levels. Treat hypoxemia, but avoid excessive oxygen levels that are unneeded in addressing patient symptoms of dyspnea or signs of respiratory failure (e.g. low pulse oximetry readings).

PROTOCOL 3I: Oxygen Administration – Adult & Pediatric, cont.

Supplemental oxygen concentration capabilities of different devices:

Via nasal cannula (NC) at 1 – 6 liters per minute (lpm), yields 24-44% concentration of inhaled oxygen (FiO_2 of 0.24 – 0.40). Typically, each additional liter flow will increase the concentration of inhaled oxygen by 4%. With higher lpm flows (5-6 lpm) via NC, nasal irritation and drying of mucosa can occur without use of humidified O_2.

There are a number of face mask options, such as the simple face mask, often used between 6 and 12 lpm, resulting in a concentration of oxygen to the patient between 40% and 50%. This is closely related to the more controlled air-entrainment masks, also known as Venturi masks, which can accurately deliver a predetermined oxygen concentration in a range of 24 - 50%.

In some instances, a partial rebreathing mask can be used, which is based on a non-rebreather mask, but with the valves over the exhalation ports removed. The partial rebreathing mask can provide oxygen concentration in the 40 – 70% using up to 15 lpm flow.

Non-rebreather masks draw oxygen from an attached reservoir bag, with one-way valves that direct exhaled air out of the mask. When properly fitted and used at flow rates of 10-15 LPM or higher, they deliver 60 - 80% oxygen concentrations and occasionally higher, depending upon mask/face interface and valve function. Minimum lpm flow through a non-rebreather (even when using for presumed psychogenic hyperventilation) should be 10 lpm.