Southern Illinois Regional EMS System

II-31.1 NITROUS OXIDE – OXYGEN ADMINISTRATION PROTOCOL

ALS:

Preamble:
A patient's self-administration of a nitrous oxide-oxygen mixture can provide relief of acute pain, provided there are no contraindications to its use.

1. Requirements:
   - 1.1. Approval by the EMS Medical Director
   - 1.2. Education in nitrous oxide-oxygen administration
   - 1.3. Availability of pulse oximetry
   - 1.4. Functioning exhaust fan on maximum setting, if used while on board the ambulance

2. Indications:
   - 2.1. Acute pain due to any one of the following conditions:
     - 2.1.1. Orthopedic trauma (Soft tissue injury, suspected fracture)
     - 2.1.2. Renal colic
     - 2.1.3. Burns without airway involvement
     - 2.1.4. Abdominal pain (not due to suspected bowel obstruction)

3. Contraindications
   - 3.1. Patient unable to self administer.
   - 3.2. Head injury with altered level of consciousness.
   - 3.3. Severe chronic obstructive lung disease.
   - 3.4. Inability to follow instructions (children, dementia).
   - 3.5. Recent ingestion of alcohol or illicit drugs.
   - 3.6. Major facial injuries or trauma.
   - 3.7. Thoracic trauma.
   - 3.8. Know or suspected bowel obstruction.
   - 3.9. Known or suspected cardiac ischemic chest pain.
   - 3.10. Patient developing cyanosis or respiratory distress with the use of nitrous oxide-oxygen.
   - 3.11. Pulse oximetry reading indicating oxygen saturation is less than 90% prior to nitrous oxide-oxygen mixture use.

4. Drug Dose and Frequency:
   - 4.1. The concentration of nitrous oxide-oxygen mixture must be 50:50.
     - 4.1.1. No other mixture is permitted.
   - 4.2. Nitrous oxide-oxygen is self administered by the patient with Paramedic assistance.
     - 4.2.1. The negative pressure exerted by the patient's inhalation effort triggers gas flow.
     - 4.2.1. A tight mask-face seal is necessary.
   - 4.3. Cylinders must be positioned and secured in the upright position.
   - 4.4. Cylinders must be stored at a temperature between 32-125 degrees Fahrenheit at all times.
     - 4.4.1. Due to temperature restrictions, do not store cylinders in exterior compartments.
   - 4.5. Pressure readings should be checked and documented at the beginning of each shift and after each use.
   - 4.6. Turn cylinder end over end three times immediately prior to each use. This will ensure proper gas mixing.
   - 4.7. The ambulance exhaust fans must be in operation and at maximum setting for the duration of transport.

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5. Procedure:
   - 5.1. Perform patient assessment and record vital signs, level of consciousness, and oxygen saturation.
     - 5.1.1. Monitor oxygen saturation at all times until nitrous oxide-oxygen mixture is no longer used by the patient.
     - 5.1.2. Ventilation fan may be temporarily turned off while performing patient assessment and measuring vital signs.
   - 5.2. Assess that the patient meets the criteria for this protocol.
   - 5.3. Ensure that there are no contraindications to use of this protocol.
   - 5.4. Provide care based on other protocols related to the patient's presenting complaint.
   - 5.5. Instruct the patient in the method of self-administration.
     - 5.5.1. The patient must self-administer the nitrous oxide-oxygen mixture without assistance.
     - 5.5.2. EMS personnel must not assist the patient in holding the mask or delivering the nitrous oxide-oxygen mixture.
   - 5.6. Monitor the patient closely for evidence of efficacy or adverse effects.
   - 5.7. Repeat assessment, including vital signs, level of consciousness, oxygen saturation, and effect of nitrous oxide-oxygen.
     - 5.7.1. Nitrous oxide-oxygen mixture use must be permanently discontinued if, at any point in time, the patient's oxygen saturation drops by 2% or more from baseline measurement.
     - 5.7.2. If nitrous oxide-oxygen has been discontinued because of a drop in the patient's oxygen saturation, it may not be restarted and the cylinder that was used must be removed from service.
   - 5.8. Clean face mask and equipment, in accordance with service procedures, after each use.

6. Documentation Requirements:
   The following information must be documented on the patient care report form:
   - 6.1. Patient's presenting signs and symptoms, including vital signs, level of consciousness and oxygen saturation.
   - 6.2. Indications for protocol use
   - 6.3. Time and tank regulator reading when nitrous oxide – oxygen use begins.
   - 6.4. Results of treatment, including any complications.
   - 6.5. Repeat assessment and vital signs, as indicated.
   - 6.6. Time and tank regulator reading when nitrous oxide – oxygen use ends.
   - 6.7. Changes from baseline, if any, that occur during treatment and transport.

7. Training Requirements
   - 7.1. Attend in-service on acute pain relief and the role of nitrous oxide-oxygen administration.
   - 7.2. Demonstrate an understanding of the pharmacology, mechanism of action, and potential adverse effects and complications from nitrous oxide-oxygen use.
   - 7.3. Identify indications and contraindications for its use.
   - 7.4. Demonstrate the correct method of instructing and administering nitrous oxide – oxygen.
   - 7.5. Demonstrate the correct method of maintaining the nitrous oxide – oxygen delivery system.
   - 7.6. Pass a written exam.
   - 7.7. Receive the approval of the EMS Medical Director.

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8. Quality Assurance Requirements:
   8.1. Appropriate quality assurance policies must be in place. The Medical Director or his designee must review all instances where this protocol is used. As a minimum, the following must be assessed:
      8.1.1. Appropriateness of implementation
      8.1.2. Adherence to protocol
      8.1.3. Any deviation from protocol
      7.1.4. Patient response to treatment
   8.2. Statistics for the use of this protocol will be compiled and forwarded to the Illinois Department of Public Health.