Procedural Sedation Guidelines for Nitrous Oxide Administration

Purpose

- To provide guidelines for the administration of nitrous oxide for procedural sedation outside of the operating room or dental office.
- Nitrous oxide delivery in the dental office must follow the current American Academy of Pediatric Dentistry (AAPD) guidelines.
- Nitrous oxide (N_2O) in a concentration of 50% or less produces a state of minimal sedation[1,2]; therefore, current hospital policy for minimal sedation will apply.
- When N_2O is combined with other sedatives or analgesics (local anesthetics excluded), or when a concentration > 50% is utilized, a state of moderate sedation is more often produced and guidelines for moderate sedation will apply.

General

- Administration of N_2O requires a standing order by an MD/DO/APN.
- Administration of N_2O is limited to providers who have completed the credentialing course, exam, and demonstrated competency.
- Administration of a maximum concentration of 50%/50% Nitrous Oxide/Oxygen mixture when used as a sole agent, without other sedative agents, may be delivered by credentialed LIP, nurses, or respiratory therapists.
- Nitrous oxide use should be limited to no more than two 30 minute exposures in a 24 hour period, and should not exceed a total of 4 hours of exposure in 7 days.

Indications

- N_2O is an analgesic per the Food and Drug Administration Safety and Innovation Act (FDASIA) of July 2012.[3]
- N_2O may be administered to provide procedural sedation/analgesia to patients undergoing brief, mildly painful procedures (≤ 30 minutes) routinely conducted outside of the operating room, such as: [2,4,5,6]
  - Urologic imaging (VCUG, cystogram)
  - Intravenous access
  - Incision and drainage of abscess
  - Foreign body removal from ear, nose, or soft tissue
  - Injection of local anesthetic (suture repair, digital blocks)
  - Brief orthopedic procedures (joint dislocation, casting)

Contraindications [7,8,9]

- ASA Class 4 or above.
- Gross abdominal gas distention, bowel obstruction or ileus.
- Patients presenting with symptoms of pneumothorax, pneumopericardium, gas embolus, bullous emphysema, or severe head trauma.
- Patients with a history of treatment with bleomycin sulfate.
- Consider an alternative pain management option for combative patients who are unwilling or unable to follow instructions for inhalation therapy.
- Patients presenting with a vitamin B12 or folic acid deficiency.
- Pregnant patients. Siblings and/or caregivers who are or may be pregnant will be asked to remain distant from the patient's breathing space.

Most Commonly Experienced Adverse Events [4,6,8,10]

- Dizziness

- Light headedness and euphoria
- Nausea
- Vomiting
- Mild Agitation/Excitability

PROCEDURE:

1.0 Monitoring and Clinical Documentation

- At least two health care providers will be present during the procedure: one to perform the procedure, and one to monitor the patient. The practitioner performing the procedure and the practitioner administering the sedation shall agree on the plan for sedation.
- Document nitrous flow rates with times of initiation and times of changes.
- The administering practitioner will maintain constant attention to the patient's level of consciousness, breathing and airway patency.
- Monitoring will be consistent with the hospital policy.
- Adverse events such as emesis, vasovagal reaction, seizure, anaphylaxis, anaphylactoid reaction, or cardiopulmonary impairment and interventions required will be documented, as well as disclosure performed to the patient and/or guardian(s).
- A complete list of the patient's current medications should be reviewed prior to administration – including prescriptions, over-the-counter (OTC) medications and herbal medications using the hospital medication reconciliation process.
- Universal Protocol for invasive procedures must be followed and documented.

2.0 System Use and Tracking Procedure

- The nitrous oxide delivery system will be stored in a locked area. The system or key that locks the system must be checked out and returned.

3.0 Pre-Procedural Technique [2,4,11,12,13,14,15]

- Breathing circuit supplies used with the Nitrous Delivery System are intended for single-patient use only.
- The System should be tested by the clinician for functionality prior to each administration.
- Obtain consent for the administration of nitrous oxide from the patient or his/her guardian per hospital policy.
- When N2O is combined with other sedatives or analgesics (local anesthetics excluded) follow the applicable NPO guidelines per hospital policy. Patients receiving 30-70% nitrous oxide without additional sedatives or narcotics for procedural sedation outside the operating room do not have fasting requirements prior to procedure.[16,17,18,19]
- The patient or guardian may assist with the administration of N_2O per hospital policy and JCAHO 2012 guidelines. [15]

4.0 Sedation / Recovery Process

- The N_2O/O_2 gas mixture should be administered for at least 2 minutes prior to starting the clinical procedure to permit the gas to have full clinical effect. [11,12]
- The patient's ventilation and cardiovascular functions are expected to remain unaffected. However, the administering practitioner must be ready to protect the patient's airway, manually assist ventilation, and avoid aspiration.

- At the end of the procedure (or if the mask is removed for a period of > 30 seconds) deliver 100% oxygen. [11,12]
- If the patient receives ≤50% nitrous oxide without additional sedatives (minimal sedation), the patient should be observed for a minimum of 10 minutes or until he/she meets discharge criteria: [1,4]
    - Within 20% of pre-procedure vital signs
    - Return to baseline level of consciousness
    - Return to baseline motor function
    - Absence of nausea/vomiting
- If the patient receives N_2O combined with other sedatives or analgesics (local anesthetics excluded) or at a concentration > 50%, the guidelines for patient monitoring during recovery from moderate sedation will apply.
- Clean the nitrous system pursuant to standard disinfection protocol.

5.0 Documentation

- Documentation per hospital policy.
- Nitrous and oxygen flows will also be documented.

References

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