Nitrous Oxide Use in Labor and Immediate Postpartum

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*Cone Health*
Purpose/Goal(s) of this Education Activity
The purpose of this activity is to enable the learner to expand their knowledge with new information on the use of nitrous oxide in the LDR setting.

1.0 Contact Hour
This continuing nursing education activity was approved by the Northeast Multistate Division, an accredited approver by the American Nurses Credentialing Center’s Commission on Accreditation.
Disclosures & Successful Completion

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• There will be no discussion of off-label usage of any products.

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CME credit is provided for select programs through a partnership with Women & Infants Hospital of Rhode Island (WIHRI).

This activity fulfills core competencies for Continuing Medical Education credit.

Accreditation: Women & Infants Hospital is accredited by the Rhode Island Medical Society to sponsor intrastate continuing education for physicians. Women & Infants Hospital designates this online educational activity for a maximum of 1.0 AMA PRA Category 1 Credit™. Physicians should only claim credit commensurate with the extent of their participation in the activity.
Nitrous Oxide In Labor & Immediate Postpartum

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Objectives

- Identify key strategies for successful nitrous oxide ($\text{N}_2\text{O}$) implementation
- Describe nitrous oxide ($\text{N}_2\text{O}$) and its use for the management of labor and immediate postpartum pain
- Describe the historical perspective of nitrous oxide ($\text{N}_2\text{O}$) and the impact of its use in the U.S.
Objectives

- Describe the maternal and fetal effects associated with nitrous oxide (N₂O)
- Explain how nitrous oxide (N₂O) is used by the patient
- Differentiate which patients are best suited for nitrous oxide (N₂O) use
- Explain occupational exposure and how risk is minimized
Cone Health Journey

- Established a working interest group – Alamance Regional (1700 births/annually) Medical Center and Women’s Hospital (6000 births/annually)
- Reviewed available evidence and consulted other hospitals
- Unique concerns brought to OB Triad
- Policy met unique needs of each hospital
- Designed method of staff education and proof of competency

***Successful implementation required commitment and support of key figures from all involved departments working together toward this common goal***

March 20, 2017 Implementation
Nitrous Oxide

- Best known as “laughing gas”
- Clear, almost odorless and tasteless gas, inhaled to provide analgesic and/or anesthetic effects
- Labor – mixture of 50% nitrous oxide gas and 50% oxygen
- Decreases perception of pain and decreases anxiety
Historical Perspective

- Use in obstetrics since late 1800’s - Robert James Minnitt introduced a mechanism for self-administration in 1934 (England).
- Fell out of favor in the 1970’s in the US
- Re-emergence in U.S. market in last 10 years
- Current Use:

<table>
<thead>
<tr>
<th>Nitrous Oxide</th>
<th>US</th>
<th>Canada</th>
<th>Finland</th>
<th>Sweden</th>
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ACNM:
“Research has supported the reasonable efficacy, safety, and unique and beneficial qualities of N₂O as an analgesic for labor and its use as a widely accepted component of quality maternity care” (ACNM, 2011).

AWHONN
Developed Nitrous Oxide as Labor Analgesia: Clinical Implications for Nurses competency exam
ACOG: ACOG has not issued opinion or policy statements on the use of nitrous oxide in labor.

Medications for Pain Relief during Labor and Delivery

“Nitrous oxide is safe for the mother and the baby. Some women feel dizzy or nauseated while inhaling nitrous oxide, but these sensations go away within a few minutes (ACOG, 2017).”
Maternal Pharmacologic Effects

- Mostly unknown: Stimulation of endogenous endorphin release and corticotrophin and dopamine release; opioid like response
- Rapid onset and quick clearance
- Euphoria and/or a feeling of not caring about pain within 30-60 seconds
- Does not alter uterine activity or have any impact on labor progress
- Side effects: nausea and vomiting, dizziness, and drowsiness
Fetal Pharmacologic Effects

- Nitrous Oxide crosses placenta
- Quickly eliminated from newborn
- No statistically significant difference in Apgar or special care admission (Nitrous vs. meperidine w/epidural)
- No Apgar < 7 at 5 min

(Likis, et. al, 2014; Stewart & Collins, 2012)
Nitrous Oxide Delivery

- Two Nitronox units purchased > track missed opportunity
- Demand Flow Analgesia System
- Disposable breathing circuit
- Face mask
- Medical Gases (O₂ and N₂O)
- Gas exhaust and ventilation system
Nitrous Oxide Delivery

https://vimeo.com/204109979
Who can use N₂O???

- Any stage of labor in which patient experiences pain
- Forceps-assisted or vacuum-assisted deliveries
- Extensive laceration or episiotomy repair
- Manual removal of placenta, uterine exploration or bedside D&C
- IV start

(Stewart & Collins, 2012; Collins, 2014)
Who shouldn’t use???

- Inability to hold one’s own facemask
- Known pernicious anemia or a B12 deficiency
- Impaired level of consciousness or drug/alcohol intoxication
- Hemodynamic instability or impaired oxygenation (<95% on room air)
- MTHFR gene mutation, pneumothorax, bowel obstruction, increased intracranial pressure, intra-ocular surgery, or any significant cardiac disease, including but not limited to valve abnormalities, CHF, and pulmonary hypertension.
- Physically in water tub

(Stewart & Collins, 2012)
Think Twice

- Narcotic in the past 2 hours (monitor O2 sat; anesthesia notification)
- Category III FHR tracing remote from delivery
- Current methadone, Suboxone, narcotic use for chronic pain management
- Magnesium sulfate use

(Stewart & Collins, 2012)
Nitrous Oxide Process

- Provider completes or reviews patient history for contraindications
- Provider orders nitrous oxide
- RN staff provides education
- IV access or continuous O2 monitoring is not required
- Written consent not required
- Designated staff (RN or RT) sets up Nitronox
- Nurses monitors ongoing patient status

(Likis et al., 2014)
Staff Training

- Education and Competency must be demonstrated
- Components of staff education
  - Risks/benefits
  - Equipment use
  - Self administration
  - Adverse reactions
  - Documentation
- Communication with OB/anesthesiology team
- Follow hospital policies for assessment of mother and fetus
New Orders

Nitrous Oxide 50%
Routine, Continuous PRN starting Today at 1412 Until Specified
CONTRAINDICATIONS
1. Patients who cannot hold their own facemask.
2. Patients who are acutely intoxicated or have impaired consciousness.
3. Patient with known pernicious anemia or history of B12 deficiency (Patient taking B12 as a nutritional supplement without a deficiency is not contraindicated from this therapy).
4. Patients with a known history of MTHFR gene mutation, pneumothorax, bowel obstruction, increased intracranial pressure, intra-ocular surgery, or any significant cardiac disease, including but not limited to valve abnormalities, CHF and pulmonary hypertension.
5. Impaired oxygenation defined as oxygen saturation less than 95% on room air.
6. Patients physically in waterub for labor/birth.
7. Any other indication based on OB provider discretion.
Route: Inhalation
Concentration: 50% Gas
Indication: Labor pain analgesic
Assessment / Plan:
{CHL LABOR ASSESSMENT:21627}

Labor: {CHL LABOR PROGRESS:21622}
Preeclampsia: {CHL PREECLAMPSIA PLAN:21623}
Fetal Wellbeing: {CHL FWB PLAN:21624}
Pain Control: {CHL FWB PLAN:21625}
I/D: {NA AND WILDCARD:21589}
Anticipated MOD: {MOD:21626}
Occupational Exposures

- Exposure to ambient N₂O should be minimized to reduce occupational health hazards.
  - Built in scavenging system reduces risk
  - Proper exhaust and ventilation
  - Minimal effective dose
  - Patient management with a well-fitted mask
- Per OSHA, U.S. exposure limit 25-50 ppm (Europe 100 ppm)
- Badge dosimetry – Every 6 months

(Likis et al., 2014; Stewart & Collins, 2012)
Life After Nitrous

- Average: 1-2 uses per day > Women’s Hospital
- Education, education, education!!!
  - Unrealistic expectations
  - Set-up time
- Side effects not common
- Majority: Use additional method
- When it works, it works!!!
Questions???

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References


- Braimah, Tina (2015), N699 Nitrous Oxide presentation.


References


Questions & Comments

Participants are encouraged to ask questions and share comments.

- Please submit any questions or comments via the chat box in the lower left corner of your screen
- Questions and comments are visible only to presenters
- Questions will be answered in the order they are received
Thank You For Attending

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- Please complete the post-test and evaluation within 24 hours
- Certificates of attendance and completion will be emailed within 14 business days