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Acute Pain (MAP)

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Modalities for management of acute pain in the ED

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Nitrous Oxide

Overview

- Nitrous oxide (NO) produces analgesia and anxiolysis with a rapid onset of action (<60 sec) and rapid elimination.
- It is administered in combination with oxygen (O_2) via mask or nasal hood.
- It can be administered at the bedside using approved mobile devices.
- It is especially useful in fast-track areas when analgesia with anxiolysis is indicated but cardiac monitoring is not available.

Indications

Any painful procedure in a patient older than 1 year.

Contraindications

- Altered level of consciousness
- Any active pathology involving confined spaces that can be affected by pressure changes (eg, otitis media, sinusitis, bowel obstruction, pneumothorax, pneumocephaly)
- Chronic severe vitamin B12 deficiency
- COPD or severe active asthma
- First- and second-trimester pregnancy
- NO is associated with increased risk of spontaneous abortion in dental hygienists who administer gas more than 3 hours/week without proper scavenging equipment.

Equipment & Dosing

- NO and O_2 tanks or delivery systems.
- Nasal hood or full-face mask.
- If available, an approved mobile unit that can transport the equipment to any part of the ED.
  - Some hold only NO tanks and must be plugged in to wall oxygen.
  - Some require a hose plugged into wall suction for scavenging, a safety feature that prevents NO exposure to clinicians.

Procedure & Administration

- Start pulse oximetry monitoring.
  - No NPO requirements, cardiac monitoring, or peripheral IV is necessary.
  - NO administered as a sole agent is not considered procedural sedation. Its use should not require a nurse at the bedside, but institutional guidelines vary and should prevail.
- Apply the mask or nasal hood to the patient's face. Either the patient or a staff member can hold the mask in place.
- Turn on the unit and allow the patient to breathe O_2 for 15 to 30 seconds, then start NO administration. NO and O_2 are administered simultaneously.10
- Titrate NO by 10% to 20% every 30 to 60 seconds to desired effect.
- Adjust the amount of NO to a maximum of 70% concentration, always allowing for 30% O_2.
- Adjust the flow of O_2 depending on the patient's tidal volume requirements, but the percentage of NO will not change with adjustments in O_2.
- Engage the patient in conversation. If the patient is unable to converse, turn off or titrate down the gas.
- Begin the procedure once a desired level of anxiolysis and analgesia is achieved.
- When the procedure is finished, discontinue the NO and allow the patient to breathe 100% O_2 for 1 minute.
- Remove the breathing circuit. Have the patient stay seated and breathe room air for 1 to 2 minutes.
- Discharge the patient. No additional monitoring is necessary.

Complications

- Claustrophobia due to full face mask
- Dizziness
- Nausea/vomiting

Charting & Documentation

- NO as a single agent is considered an analgesic similar to acetaminophen, ibuprofen, or oxycodone. Although no specific consent is needed, discuss the use of gas with the patient prior to administration and document the conversation.
- Order NO as a medication in the EMR and document its use as the analgesic used in the procedure.

Special Considerations

- There is abuse potential for NO by patients and practitioners, so the machine should be monitored and accounted for at all times.
- If using NO in addition to other CNS-depressing medications for pain, full cardiac monitoring is recommended: combination treatment can be considered procedural sedation.

Discharge Procedure

The patient can drive after the procedure and has no restrictions.

Where to Learn More

Occipital Nerve Blocks

Posterior Tibial Nerve Block

Sphenopalatine Ganglion Block

Trigger Point Injection

Transcutaneous Electrical Nerve Stimulation

Trochanteric Bursitis Injection

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References

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