Laughing at Histrelin Implants: Use of Nitrous Oxide for Procedural Sedation

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Introduction
The placement or removal of histrelin implants in children who have precocious puberty involves a minor surgical procedure. Often, this procedure is performed with local anesthesia, increasing anxiety for the child, or under general anesthesia, increasing cost, time, and risk to the patient. Nitrous oxide (N2O) is a form of procedural sedation often used for dental, emergent or diagnostic procedures, instead of general anesthesia or other forms of sedation. Our organization is the only known facility where nurse practitioners (NP) provide N2O as a single agent in procedural sedation for the placement or removal of histrelin implants in pediatric patients. The benefits of this procedural sedation method include increased patient satisfaction, decreased perception of pain, decreased risk, and decreased cost of the procedure. Our results demonstrate its efficacy and safety without the need for fasting or post-operative monitoring.

Purpose
To discuss the benefits of using N2O for procedural sedation consideration when placing or removing histrelin implants in children.

Data was extrapolated from a previous retrospective review of pediatric patients who had minor surgical procedures using N2O. Only patients who had histrelin implants placed or removed were included in our data. Nitrous oxide was used as procedural sedation for the placement or removal of histrelin implants in patients ages 4 to 12 years old (n=42) from April 2000 to March 2012. Children were referred from the pediatric surgical office once the surgeon determined that local anesthesia alone for placement and/or removal of the histrelin implant would not be adequate to control anxiety and emotions.

Children not meeting criteria for N2O sedation included:
- Patients with nasal obstructions where inhalation was compromised
- Chronic obstructive pulmonary, cardiac or cerebral vascular disease
- Emotional disturbance or drug related dependency
- Pregnancy
- Previous treatment with bupivacaine sulfate, and/or abnormal gaseous collections including bowel obstructions, pneumothorax
- Eustachian tube compromise, or recent ocular or cranial surgery
- Patients refrained to wear a mask due to young age, psychological or cognitive impairments

Method/Design
For any child with an American Society of Anesthesiologists (ASA) physical status score of III, indicating severe systemic disease, a consult with an anesthesiologist was requested. Once patient criteria were established, the procedure was scheduled as outpatient in our minor procedure suite. Children were instructed to eat a light meal 2 hours prior to procedure and local anesthetic was used (EMLA, AstraZeneca, Wilmington, DE) and liberally applied to the skin site. No additional sedatives or narcotics were given prior to procedure. The NP or physician assistant (PA) performed a preoperative assessment and children were classified according to the ASA physical status classification. The NP/PA administered the N2O while monitoring heart rate, respiratory rate, and oxygen saturations. Oxygen was administered for five minutes after completion of the procedure to wash out all N2O. Children were shown the Wong-Baker Faces Pain Scale or pain score from 0 to 10 and pain score was obtained before starting procedure. Pain score for procedure and post procedure was determined using the same pain scale. Injection recall was ascertained, for those that had an injection recall, pain score was obtained. Children were discharged post-operatively without any monitoring.

Results
Of all the patients (n=42), none reported pain prior to their procedure and 12 (28.5%) reported pain during the procedure. One patient (2.3%) complained of severe pain during the procedure. Following the procedure only one patient (2.3%) recalled having received an injection. Additionally, only one patient complained of mild pain post procedure. In total, only 15 of the 42 patients (35%) reported pain at any point during the procedure. During the administration of nitrous oxide, no patients had a decrease in their oxygen saturations below 92%. All patients were able to follow commands throughout the procedure. None of the patients were NPO prior to the procedure and following the 5 minutes of oxygen administration only 1 patient complained of nausea, all others had no complications. All procedures were completed within 30 minutes.

Conclusion
Administering N2O for histrelin implant placement and removal is a safe and effective alternative to moderate sedation, local or general anesthesia. Overall, the length of the procedure remained low as well as the complication. The benefits of using N2O for procedural sedation when placing or removing histrelin implants include short procedure times, quick recovery, low pain scores, no need to remain NPO, and theoretically it may more cost effective based on the decrease in time and resources. Overall, in the case of healthy patients who are able to follow commands and have a low ASA score, N2O is an appropriate for of sedation for a minor procedure such as histrelin implantation or removal.

References
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