Review Article

MANAGING THE UNMANAGEABLE: CONSCIOUS SEDATION IN PEDIATRIC DENTISTRY

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ABSTRACT:
Conscious sedation in dentistry has been a contentious subject due to concerns about its safety, especially in the dental chair. Because dental pain is so intense, it's not just common in children; it's also substantially more common in adults. The biggest problem still involves the dentist and anesthesiologist sharing the same airway. This review's objective is to examine current developments in conscious sedation in dentistry from perspective of an anesthesiologist. The pharmacodynamics & pharmacokinetics & routes of drugs administration will be outlined in a useful manner.

Keywords: Anaesthetic agents, Conscious sedation, Fear & anxiety

INTRODUCTION

In order to provide safe and efficient dental care, it's crucial to control a child's behaviour during dental procedures. For a paediatric dentist, the biggest challenge is to dispel the child's worry and anxiety.[1] Recent studies indicate that dental anxiety is a frequent issue, with 14% of 12-year-olds & 10% of 15-year-olds extreme dental anxiety, and 63% of 12-year-old & 54% of 15-year-old moderate dental anxiety. Young people who experience dental anxiety may develop behavioural management issues, which could prevent them from receiving successful dental care.[2] Both non-pharmacological and pharmaceutical management strategies have been used to manage such children. General anaesthesia, severe sedation, and conscious sedation are thought to be the most effective pharmacological treatments for children who exhibit highly reluctant behaviour.[3]

The American Dental Society of Anesthesiology states that a patient is conscious, if he or she can rotate in reaction to a command and has all of their defensive reflexes still active, which allows them to maintain airway.[4] The term "conscious sedation" refers to a strategy in which the administration of a drug or combination of pharmaceuticals results in a state of depression of central nervous system that allows for the administration of treatment while keep up with verbal contact with patient during sedation.[5] This method have been found to help patients become less anxious. Additionally, it contributes to higher levels of overall patient satisfaction with dental care.[6]

Hence, this paper discusses most advanced recommendations for conscious sedation in paediatric dentistry.

INDICATIONS [4]

1. Children and people who are highly fear susceptible tend to be phobic patients.
2. For people who have a strong gag reflex.
3. Patients with physical or medical conditions
4. To make it possible to perform the lengthy, painful treatment stress-free.
5. To stay away from general anaesthesia and the risk it entails.
6. Protracted and traumatic dental operations.
7. A young child with autism, cerebral palsy, and down syndrome.

CONTRAINDICATIONS [4]

1. A patient who suffers from obstructive sleep apnea
2. A person who has high intracranial pressure.
3. A neurological condition that causes impaired coordination of the pharynx.
4. A reluctant and uncooperative patient.
5. Insufficient manpower or equipment.

PREPARATION FOR CONSCIOUS SEDATION[7]

In order to prepare for conscious sedation, it is necessary to prepare both the patients and the operating room for any unforeseen difficulties.

Patient Preparation

1. Informed consent: Records of patient must attest the necessary informed consent that was obtained in accordance with laws.
2. Pre - Sedation checkup: A thorough history and physical examination are conducted on the patient in order to categorize the patient using the American Society of Anesthesiologists (ASA) classification. For sedation in dental surgery performed outside of a hospital, only patients who meet requirements of ASA Grade I & II should be taken into consideration.[8]
3. Dietary precautions: If the patient regurgitates and is unable to shield his or her airway, pulmonary aspiration may develop. So, before giving sedation, the doctor should consider the previous meal and liquid intake.

Operating room preparation

This includes using a methodical way to avoid overlooking having a crucial medication, any equipment, or monitor readily available at onset of an emergency. An acronym useful in planning & preparation is SOAPME, stands for:

S = Size-appropriate suction catheters

O = an adequate oxygen supply

A = appropriate airway equipment

P = Pharmacy

M = Monitors: functioning pulse oximeter, end-tidal carbon dioxide monitor, and other monitors (eg- blood pressure, stethoscope)

E = special equipments

ROUTES OF ADMINISTRATION

The method of administration specifies where and how the medication enters the body for the first time. Diverse ways for administering the same pharmacological dose can result in quite different outcomes.

There are numerous ways to sedate patients.[9]

1. Oral Sedation

- Patients often tolerate it well, and it is quite safe and affordable. [7]
- Oral premedication is frequently used in paediatric dentistry for mild to moderate sedation.

2. Topical

- Although there is very poor drug absorption through intact skin, topically applied local anaesthetics can be used to produce anaesthesia in tissues lacking a layer of keratinized skin, including the mucous membranes of the mouth, nose, throat, oesophagus, stomach, urethra, bladder, vagina, and rectum.[1]

3. Sublingual

- One benefit of sublingual drug delivery is that the medication bypasses the enterohepatic circulation and enters directly into the systemic circulation.[9]

4. Intranasal

- It is infrequently used in paediatric dentistry, especially for young children who may have difficulties consuming bad tasting medication. The drug is sprayed or drip-applied into the nostrils in this instance.[10]

5. Transdermal route

- It is a method of delivering medication that avoids the GIT and does not require injection.
- The development of diminished drug responsiveness and unfavourable skin responses at the application site are potential drawbacks to transdermal medication administration.[8]

6. Subcutaneous

- Pediatric dentistry occasionally uses the subcutaneous route of administration for sedation.[10]
- A medication is injected into the subcutaneous tissues via the subcutaneous route just beneath the skin.

7. Inhalation sedation

- It has a good analgesic effect and is comparatively well tolerated as long as patients can deal with the mask.
- This is recommended for procedures that are painful or cause dental anxiety, needle phobia, or gag reflex suppression.[7]

8. Intravenous

- It is more frequently prescribed for patients who are extremely worried because it is the most effective treatment option thanks to its early onset, quick titration, and long-lasting amnesic effects. [7]

DRUGS USED FOR CONSCIOUS SEDATION

MIDAZOLAM

Midazolam is a short-acting, hydrophilic benzodiazepine metabolised in liver and eliminated in the urine & faeces. It recovers more quickly than other benzodiazepines, which is a crucial quality to lower the likelihood of complications by allowing dentist to watch child in office until sedative effect wears off. [7]

DIAZEPAM

The first benzodiazepine used for juvenile dentistry sedation was diazepam; but, due to midazolam's faster and more strong effect and variety of delivery methods, it was swiftly superseded.[7]

MORPHINE

For preoperative sedation, children often get doses of 0.05 to 0.1 mg/lb. Analgesia can happen even when there is no loss of consciousness, but very high doses might cause coma or even obtundation. Morphine can cause respiratory depression, extended postoperative sleepiness, nausea, vomiting, and itching.[11]

FENTANYL

Pharmacologically, fentanyl has quicker onset, quicker recovery, and lack of histamine production & hence preferred to other opioids. Stiff chest syndrome, an often-reported side effect of fentanyl, is actually uncommon in practice since the amount is much larger than that required for sedation.[12]

SUFENTANIL

One of the first medications to garner attention for intranasal preoperative sedation was the opioid analgesic sufentanil. It has a potency that is 500 times more than morphine and 5–10 times greater than its parent substance, fentanyl.[13]

CHLORAL HYDRATE

Chloral hydrate, a chlorinated derivative of ethyl alcohol, has anaesthetic properties when used in large dosages. The recommended oral dosage ranges from 40 to 60 mg/kg of body weight, with the average being 50 mg/kg. Its elimination half-life is around 8 hours, making it a poor analgesic. Children with kidney or liver damage, as well as those who have cardiac illness, should not take chloral hydrate.[11]

PROPOFOL

Propofol (2,6-disiopropylphenol) combines the effectiveness and safety of inhalation medication with quick metabolism of IV medication that can be administered in metered manner to allow for titration. It has many beneficial properties that make it a good choice for procedural sedation and analgesia, including: an incredibly quick onset, significant potency that consistently creates effective conditions for sedation, an incredibly quick recovery & high patient satisfaction due to its antiemetic and euphoric effects. Propofol is typically administered in conjunction with sevoflurane at a dose of 1 mg/kg body weight.[12]

KETAMINE

It causes dissociative anaesthesia and gives an appropriate amount of sedation with a quick recovery & fewer apparent symptom. Despite being completely unconscious, the patient typically doesn't need chin support or tongue retraction to keep their airway open. Ketamine can be administered intravenously or intramuscularly at doses of 1-3 mg/kg & 1-2 mg/kg, respectively. [13]

DEXMEDETOMIDINE

Dexmedetomidine is an intranasal analgesic that is a strong, highly selective, and specific 2 adrenoreceptor agonist. It is administered intranasally at a dose of 1-2 g/kg was effective for producing drowsiness. Children were given the premedication 45–60 minutes before to the onset of general anaesthesia. Compliance with mask application post–premedication was considerably higher among children who received intranasal dexmedetomidine compared to intranasal midazolam.[7]

NITROUS OXIDE

It is a colourless, odourless gas with a subtle, pleasant fragrance. It is a potent analgesic and euphoric with little effect on the respiratory system, generating depression and euphoria in the central nervous system (CNS). The delivery units will not allow over 70% N2O, hence administration of less than 30% oxygen is not allowed. It is absorbed through pulmonary circulation. N_2O should be titrated to effect; the typical dose ranges from 25 to 45 percent for dental sedation. Careful titration enables a quick beginning of effect and a quick recovery. It is helpful for people who have allergies to other medications since it has potent analgesic and calming effects.[7]

CONCLUSION

One of the main elements in building a solid rapport with child patients is the execution of painless dental procedures. Even the most

fearful dental patients can now be treated without the dread of unpleasant treatments thanks to the development of effective analgesic therapies like conscious sedation. It is a secure technique that lessens the requirement for general anaesthesia. There should be more consideration when administering to paediatric patients. Additionally, the route of medication administration plays a significant role in determining the quantity of the drug present at the site of action. Therefore, a pediatric dentist can provide a painless therapy to an aggressive and terrified child by having a complete understanding of the various drug types, dosage, pharmacokinetics, and pharmacodynamics.

REFERENCES

1. Alkandari SA, Almousa F, Abdulwahab M, Boynes SG. Dentists' and parents' attitude toward nitrous oxide use in kuwait. Anesth Prog. 2016;63(1):8-16.
2. Joe Hulin. Development of a decision aid for children faced with the decision to undergo dental treatment with sedation or general anaesthesia. Int. J. Paediatr. Dent. 2016;1-12.
3. Jain P, Pathak P, Goswami M. Sedation with midazolam in pediatric dentistry: a review. Indian J. Appl. Res. 2021;11(5):1-5.
4. Srivastava R, Cherian P R, Brar R, Kalra HS. Conscious sedation: uses in medicine and dental practice. Eur. J. Mol. Clin. Med. 2020;7(10):3278-3288.
5. Deepika K, Bhuvaneswarri J. Conscious sedation in dentistry. Eur. J. Mol. Clin. Med. 2020;7(2):6618-6624.
6. Dr Subhasmitabhol. Evaluation of different sedatives used to achieve conscious sedation during pediatric dental procedures: original research. Ann. Romanian Soc. Cell Biol. 2021;25(6):2043–2047.
7. Coté CJ, Wilson S. American Academy of Pediatric Dentistry, American Academy of Pediatrics. Guidelines for monitoring and management of pediatric patients before, during, and after sedation for diagnostic and therapeutic procedures. Pediatr Dent 2019;41(4): E26-E52.
8. Harbuz D, O'Halloran M. Technique to administer oral, inhalational, and IV sedation in dentistry. AMJ 2016;9(2):25–32.
9. Malamed S F. Sedation a guide to patient management. Elsevier, 6th edition. 2010;207-210.
10. Nowak AJ. Pediatric dentistry infancy through adolescence. Elsevier, 6th edition. 2019;120-121.
11. Marwah N. Textbook of pediatric dentistry. Jaypee, 3rd edition.2013; 251-252.
12. Mittal N. Pediatric Dental Sedation Practice: Evolution and Current State-of-the-Art. J Postgrad Med Edu Res. 2014;48(3):139-147.
13. Kapur A, Kapur V. Conscious sedation in dentistry. Ann Maxillofac Surg. 2018; 8:320-323.

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