

PREMEDICATION AND POST OPERATIVE COMPLICATION IN CONSCIOUS SEDATION

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Running Title: Conscious sedation in pedodontics -Survey

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AIM: Evaluate the dentist knowledge about premedication and post-operative complications in conscious sedation

MATERIALS & METHODS:

questionnaire were framed regarding suggestion of the drug, its usage, preferred route of administration, common complications encountered and circulated among the dentist and postgraduate students.

100 dentist and postgraduate students participated in the questionnaire survey and they gave their opinion regarding the premedication and postoperative complication of conscious sedation based on their clinical experience. The data collected from these 100 dentist and post graduate students of the same department were then statistically analysed to generate appropriate results regarding the questionnaire study.

BACKGROUND:

Dental patients with generalised anxiety were treated with nitrous oxide sedation method to reduce the anxiety level. The use of premedication before proceeding nitrous oxide sedation will fasten the onset of sedation. Dental fear and anxiety is a common problem in pediatric patients. There is considerable variation in techniques used to manage them. Various sedation techniques using many different anesthetic agents have gained considerable popularity over the past few years. Children are not little adults; they differ physically, psychologically, and emotionally. The purpose of this review is to survey recent trends and concerning issues in the rapidly changing field of pediatric sedation. We will study the topic from the perspective of an anesthesiologist. It will also provide information to practitioners on the practice of conscious sedation in dentistry and will also outline the route of administration, pharmacokinetics, and pharmacodynamics of various drugs used. Knowledge about the post-operative care and management of post-operative complications are needed for the post care of the proper procedure.

REASON: Pharmacological agents may be used as a complement to easy the conscious sedation techniques and knowledge about the pre and post-operative care should be known to perform an ethical procedure.

Keywords: Conscious sedation uses, Premedication, Post-op complication, Nitrous oxide and Midazolam.

INTRODUCTION

Current understanding of pediatric oral health includes absence of dental fear and anxiety as well as healthy oral structures with the aim of forming the basis for good oral health throughout life. This implies two main dimensions in pediatric oral care which is to keep the oral environment healthy and to keep the patient capable of, and willing to utilise the dental service.[1] Dental anxiety can be managed either by non-pharmacological methods like behavior therapy, desensitization or by pharmacological means that include conscious sedation techniques using inhalation sedation (nitrous oxide/oxygen mixture), oral or intranasal sedation (midazolam),

intravenous sedation (midazolam) and general anaesthesia. The goal of conscious sedation is to alleviate fear and anxiety in order to facilitate treatment and it serves only as an adjunct to behavioural shaping techniques, and not a replacement.

It is widely recognised that the level of caries in children of various nations has dropped substantially over the last few decades[2]. Unfortunately a significant proportion of these children still have caries which remains untreated. This represents a significant problem, if dentine caries is left it will usually lead to pain and sepsis which can often only be managed by extraction or extensive restoration of the affected teeth[3] Either conscious sedation or pre-medication with pharmacological agents is often recommended to children who are particularly fearful or anxious or for whom a disability prevents their being able to cooperate ,during the dental treatment.[3] The treatment and alleviation of pain is a basic human right that exists regardless of age and demands treatment for this reason alone. Therefore all children should expect painless, high quality dental care.[4].

Sedation is required for some pediatric patients in order for the dentists to be able to deliver high quality, pain-free dental care. Sedation is used for pain control in form of local anesthesia, and for behaviour management [4]. Sedation is the production of a depressed state involving a lack of total consciousness. In sedation, the protective pharyngeal and laryngeal reflexes are not dulled, so the patient can maintain his or her own airway. In this sedated state, the functional activity of the higher centre of the central nervous system is reduced without distortion of the vital functions. The aim of this study is premedication and post-operative complications in conscious sedation.

RESULT:-

1) Premedication is safe for conscious sedation(Table 1)

Agree	After proper history	No	No idea
60%	20%	0.9%	9.1%

2) Choice of drug for premedication (Table 2)

Anti emetics	Sedative	Antibiotic	Anticholinergic
75%	20%	15%	2%

3) Major outcome of premedication (table 3)

Fast onset of sedation	Post operative easiness	Both	None of the above
60%	23%	15%	2%

4) Route of administration for conscious sedation (Table 4)

Inhalation	Intravenous
98%	2%

5) Drug for conscious sedation (Table 5)

Nitrous oxide	Midazolam	Ketamine
95%	3%	2%

6) Post-operative complications (Table 6)

Nausea	Vomiting	Post operative sleepiness	Diffusion hypoxia	Hypersensitivity
55%	25%	15%	3%	2%

DISCUSSION:

The majority of studies involved sedation in children less than 6 years of age, because this age range belongs to a 'pre-cooperative' group. Treatment needs and management of children will vary as they grow and develop[5]. Overall goal of premedication of conscious sedation in pediatric dentistry is to provide a pain free treatment and to relieve the fear and anxiety of the pediatric patients so that the patient feels comfortable in the dental environment and willingly comes back to the clinic for regular checkups without any reluctance[5].The premedication of conscious sedation could increase the success rate of the treatment with ease of operation for the dentist while performing the dental procedure[6].Based on the statistic analysis,60% of the dentist assure that premedication is safe for conscious sedation, whereas 20% of the dentist and post graduates state that only after proper history and other have no awareness about premedication for conscious sedation.(Table 1), A.L. Halosthane survey 95.6% dentist have said that only after proper history of the patient Premedication can be given but in this survey 60% of the dentist agree with premedication is safe for conscious sedation. Drug of choice for premedication is sedation, anti emetics, antibiotic and anticholinergic among this anti emetics is widely preferred drug for premedication which is of 75% , next choice of drug is sedation which is 20% whereas antibiotic and anticholinergic is of 3% and 2% which is less used drug for premedication(Table 2). In Hosey F.G survey most commonly used drug of choice is nitrous oxide with opioids midazolam to increase the concentration.Based on statistic analysis of major outcome for premedication among dentist and post graduate is 60% fast onset of sedation,23% post operative easiness,15% both whereas 2% have no awareness about major outcome of premedication(Table 3). The Most prevalent route of administration of the sedative drug used. 98% of the drug was administered by inhalation method whereas 2% of the drug was administered by intravenous route. The dentist also mentioned that during administration of the drug assistance from specialised anesthetist was also taken so that to increase the efficacy of the sedative drug and to maintain the vital signs of the patient in a safer manner(Table 4). Based on the

statistical analysis, 95% of the dentist and the postgraduate students prefer nitrous oxide for conscious sedation during their dental treatment. It is most commonly used drug and it is preferred by large number of the dentist population. 3% of the dentists prefer Midazolam to control their pediatric patients, whereas 2% of them prefer ketamine for conscious sedation in pediatric patients. (Table 5). Post operative complications in conscious sedation is nausea, vomiting, hypersensitivity, diffusion hypoxia and post operative sleepiness in this 55% nausea is the common post operative complication of conscious sedation next common most complication is vomiting which is 25% and others 15% post-operative sleepiness, 3% hypersensitivity, 2% diffusion hypoxia is less common post-operative complication of conscious sedation (Table 6)

Routes of administration Oral Midazolam is the most commonly used oral agent. It produces earlier sedation, more complete amnesia and improved awakening when compared with diazepam. The onset is 60- 90 seconds and the duration of action for small doses is 10-15 minutes. Oral sedation is easy to administer and monitor, and it costs less. But the level of sedation cannot be easily changed and there is no analgesic effect. Inhalation It is a dependable and simple route of drug administration. As a general rule, the drugs delivered through this route have a very rapid onset and short recovery period [7]. Their effect may be rapidly reversed by lowering the concentration of the agent or discontinuing it entirely and administering only oxygen or room air. Nitrous oxide is the most popular agent used through this route. But it has an inherent disadvantage of being the weakest agent available today. Nitrous oxide administration requires special equipment and training. Although it has a wide safety margin, it could prove dangerous and sometimes even fatal at the hands of an untrained individual. Parenteral administration Intravenous sedation The standard technique is the use of titrated dose of a single benzodiazepine or opioid, like fentanyl, etomidate and propofol. The actions can be reversed by using agents like naloxone, a competitive antagonist of opioid receptors and flumazenil, a pure benzodiazepine antagonist [7]. Other routes include intramuscular and subcutaneous administration. But they are not commonly practiced.

Nitrous oxide is a gas and used as the inhalational anesthetic agent. It has anxiolytic and sedative properties with varying degree of analgesia and muscle relaxation. Recent studies suggest both gamma-aminobutyric acid type A (GABA A) and N-methyl-D-aspartate (NMDA) receptors are affected [8]. It has a long history of safe use providing moderate sedation for minimally moderately painful procedures. Care must be taken when used in addition to other sedatives where deep sedation can easily result. Currently, available nitrous oxide/oxygen delivery systems are manufactured with oxygen fail-safe devices that stop the flow of nitrous when the flow of oxygen is stopped, thus preventing this catastrophe. It should be the first choice for pediatric dental patients who are unable to tolerate local anesthesia alone and have sufficient understanding to accept the procedure [8]. It may be offered with mild to moderate anxiety to better accept the treatment which may require a series of visits. It can also facilitate the provision of more complex time-consuming procedures and dental extractions particularly for young and anxious patients undergoing orthodontic extractions.

Ketamine It is a dissociative agent, which makes a state of catalepsy that gives sedation, control of pain and amnesia. Ketamine has advantages over other drugs in its relative cardiovascular steadiness and restricted effect on the respiratory mechanics. Recovery occurs in 30–120 min, which allows for patient discharge in a reasonable time after the procedure. It is a dose-related cardiovascular stimulant. Even in children with congenital heart disease, it caused clinically only minor increases in heart rate and mean pulmonary artery pressure during catheterization. More than 11,000 reported cases of its use in children with no reported fatalities have been described in the literature by Green. The most frequently cited disadvantage is the emergence phenomenon, seen more commonly in adults (5–50%) than children (0–5%) [9]. Ketamine causes an increase in salivary and tracheobronchial mucus gland secretions, so an anticholinergic is recommended for use with ketamine for GA. Emesis is the third most common side effect of ketamine. In Green's review, he found that the reported incidence of vomiting in children was 10%, and was associated with dental procedures. Ketamine can be given intramuscularly at 3–4 mg/kg or intravenously at 1–2 mg/kg.

Benzodiazepine

They provide anxiolysis, sedation/hypnosis, skeletal muscle relaxation, anterograde amnesia, respiratory depression, and an anticonvulsant effect [10]. but have no analgesic properties. Mechanism of action is through GABA-mediated opening of chloride channels. Benzodiazepines (BZD) have a wide margin of safety between therapeutic and toxic doses. They have high lipid solubility so have a rapid onset of action [11]. They have been widely used in dentistry. They are usually combined with nitrous oxide/oxygen for conscious sedation as additive effect of nitrous oxide to BZD produces analgesic properties. [12] The most common drug used is midazolam, which is having a short duration of action. It is considered as BZD of choice for conscious sedation during treatment in pediatric dentistry. It is given in the form of sweetened syrup given either via a drinking cup or drawn in a needleless syringe and deposited in the retromolar area or oral tablets [13].

Propofol is a water-immiscible oil which is formulated as an emulsion with a soya oil base to facilitate injection [14]. The elimination half-life is between 2 and 24 h. However, its duration of clinical effect is much shorter because Propofol is rapidly distributed into peripheral tissue, and its effects, therefore, wear off considerably within even a half hour of injection. This, together with its rapid effect and the moderate amnesia it induces makes it an ideal drug for IV sedation. Sub-anesthetic doses of propofol used for IV conscious sedation facilitated operative dental treatment in anxious children [15]. IV induction by ketamine or propofol remains a problem because of the difficulty in obtaining vascular access in the awake and frightened child. Potent volatile anesthetic agents are used for induction of anesthesia to avoid the struggle to get IV access before the child is asleep [16]. In a study by Arya and Damle in comparison of propofol with midazolam it was found that propofol exhibit rapid onset while having involuntary movements as side effect while midazolam had an edge over propofol in being good anxiolytic and anticonvulsant.

With sevoflurane, dose of propofol used is an initial loading dose, (usually 1 mg/kg body weight) and the maintenance dosage needed to achieve satisfactory sedation, ranging from 0.3 to 4 mg/kg/h[17].

Complications in conscious sedation

Surgical factors

As airway is shared by the anesthesiologist and dentist, it may be soiled with blood or debris and stimulation of trigeminal nerve increases chances of arrhythmia during surgery.

Pediatric issues

1. They may have enlarged tonsils and adenoids thus increasing chances of respiratory obstruction
2. They are uncooperative and communication may be challenging
3. Many medical conditions can co-exist such as epilepsy, reflux, and cardiac anomalies
4. They are needle phobic and highly anxious
5. High autonomic activity thus increasing chances of arrhythmias and vasovagal response
6. Gastric emptying may be delayed
7. Problems of ambulatory anesthesia.

Keeping all the above factors, one should thoroughly prepare the patient after complete pre-anesthetic check-up and after proper examination of airways, cardiorespiratory system, and any congenital abnormalities. Another one of the most important problems is position in the dental chair[17,18,19]. It becomes very difficult to resuscitate the patient if something unwanted happens suddenly[20]. All types of drugs and resuscitative measures should be there in case of any emergency.

Current Status of Conscious Sedation in Pediatrics

Sedation for dental procedure carries high risks for both patient and anesthesiologists. The sedation techniques offer alternative for patients where the use of general anesthesia (GA) is unavoidable.[21] Oversedation or undersedation is unreasonable or unacceptable in some circumstances.[22] In order to decrease dependency of the patient to sedation other psychological methods can be used, e.g. Cognitive reconstructing, hypnosis, relaxation and distraction techniques, systematic desensitization, and conditioning

CONCLUSION:

Over view of this survey is about the knowledge of premedication and post operative complication towards dentist, since dentist practise in their clinic are aware about the premedication of conscious sedation and the survey shows that dentist have knowledge about the premedication and post-operative complication of conscious sedation.

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