

Dental treatment under sedation versus general anesthesia

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ABSTRACT

Behavioral control of pediatric or developmental delay patients is one of the most important factors to be considered during dental treatment. When it is difficult to obtain patient cooperation by using conventional methods of behavior management, an alternative methods, such as

administration of Conscious Sedation (CS) or General Anesthesia (GA) are implemented. The prevalence of dental caries among Saudi children is greater than 80%. Many of these children attend dental office only if they have dental pain or dental abscess that makes treatment on the dental chair is challenging for the dentist.

Key Words: *Dental abscess; pediatric dentists; dental treatment*

Behavioral control of pediatric or developmental delay patients is one of the most important factors to be considered during dental treatment. When it is difficult to obtain patient cooperation by using conventional methods of behavior management, alternative methods, such as administration of conscious sedation (CS) or General Anesthesia (GA) are implemented. The prevalence of dental caries among Saudi children is greater than 80%. Many of these children attend dental office only if they have dental pain or a dental abscess that makes treatment on the dental chair is challenging for the dentist. Therefore, these children are referred for dental treatment under CS, or GA in a hospital setting. However, sedation in dentistry is a controversial subject as a safe practice in dentistry. Although the diversity of sedation methods in dental treatments are available, the most appropriate CS method and the achievability of sedation methods in dentistry have yet to be determined. In general, very young children and those with developmental/intellectual delay require a deep level of sedation to control their behavior during the procedure (1). Nevertheless, it is not uncommon to shift from the intended level of sedation to a deep sedation. Therefore, all sedation providers must have sufficient skills to recognize the various levels of sedation and able to provide appropriate cardiopulmonary support if

necessary. Usually, in Saudi Arabia, CS in pediatric dentistry is only delivered to healthy children ASA I and occasionally to ASA II in a hospital setting by anesthesiologists whereas patients with underlying medical conditions and those with developmental delay have their treatment completed under GA.

AIM

The aim of the present study was to evaluate the satisfaction of pediatric dentists, anesthesiologists, and parents, Guardians when dental treatment is carried out under sedation versus GA in pediatric patients.

PATIENTS AND METHODS

117 children were not known to have any medical problems (ASA 1) attended the pediatric dental clinic at Prince Sultan Medical Military City (PSMMC) in Riyadh, Saudi Arabia. All patients were uncooperative or very young who refused to receive dental treatment with behavioral management and local anesthesia. Age of patients ranges between 2.5 to 12 (mean age 6) years. Sixty-one of the cases were males and 56 were females. An alternative method such as treatment under CS or GA to control their behavior was offered to the parents/guardians. Once the decision was made to refer the child for dental treatment under CS or GA, the type and action of either

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method was explained carefully to the parents/guardians; this includes indication and contra-indication with possible consequences of each type before getting verbal and written consent.

Assessment of the vital signs, oral examination (and oral radiographs whenever possible) was obtained. Treatment plan was established and discussed with the parents. Blood extraction and physical screening by anesthesia physician were also performed following assessment by the dentists. All patients who need long dental procedures were referred for full dental rehabilitation under GA while those who require short procedures such as few dental fillings or extractions of primary teeth were referred for dental treatment under CS. Obese children treated under GA to avoid overdose or apnea.

All patients were seen in the day case surgery where GA or sedation is administered only by the anesthesiologists. All sedation children had IV line for drug administration (even those who received oral midazolam, an IV cannula was placed for immediate interaction if necessary). Fasting time was the same (6-8hours) for both groups. The reason behind long fasting time before sedation because it is difficult to predict the exact depth of sedation (deep) that may lead to loss of airway reflexes. Most of the sedative drugs were cocktail of midazolam with ketamine or midazolam with propofol. Some children had sevoflurane with oxygen for induction of CS to insert a cannula in needle phobic or screaming children. Papoose was used in sedative patients to stabilize the patient and to prevent sudden movement. Following completion of the treatment (both groups), patients rest in the recovery room with parents and being watched by the recovery nurses until the patient returns to a good level of consciousness. The two groups were evaluated in terms of vital signs, duration of the treatment procedure, patient behavior, recovery time and the treatment comfort experienced by the dentists and anesthesiologists (Figures 1-4).

RESULTS

All patients who need long dental procedures received full dental rehabilitation under GA (68 patients) while patients who required short procedures (few dental fillings or extractions of primary teeth) received dental treatment under moderate sedation (49 patients).

Difficulties during treatment under CS were noted by the dentists and anesthesiologists. Movements and crying were observed in most patients (65%) especially in procedures need more time to be completed (approximately 10 minutes or more). Nevertheless, older children were more difficult to control their behavior during sedation. However, there was no difference in behavior between males and females children.

During dental procedure under sedation, some interruption has been noted in a few cases such as vomiting during the procedure. Those

who vomited, during the procedure, their heads were turned to one side, the procedure was discontinued immediately (to prevent aspiration), and the patients were referred for treatment under GA. Furthermore, suction was in use for both groups, although, there were difficulties or struggling experienced in some patients in the sedation group to keep the airway reflex clear as all patients were treated in the supine position. When dentists experienced such difficulties, they were rushed to complete the procedure. The rubber dam was used whenever possible. Moreover, the oxygen saturation level was slightly lower in the sedation group compared with the GA group.

Throat packs were placed in the patient's pharynx before starting the procedure under GA. The pack protects the airways from aspiration of any debris and was removed immediately following extubation to prevent obstruction of the airway.

There was three incidences of vomiting in the recovery area and flumazenil (a benzodiazepine antagonist) was given twice for delay recovery in sedation group.

Dentists in sedation group were strained, uncomfortable and restless during the implementation of dental treatment. They were aware of patient's vital signs, looking at the patient's eyes, face and body movement as well as getting worried about airway while in the GA group, they were concentrating on dental treatment while the anesthesiologists took care of the patients' general vital signs.

Dentists and anesthesiologists did not experience anxiety associated with the duration of the procedure during treatment under GA, and they managed to comfortably conduct the procedure whereas, during CS, they were worried from any complications that may occur during the procedure and rushed to finish the treatment.

Around 30% of the anesthesiologists refused to do administer CS to the pediatric dental patients to avoid any complications in the airway. Children treated under CS or under GA were noted to be agitated on recovery. However, patients who were treated under GA experienced a calmer phase during recovery.



Figure 1) *Papoose was used to stabilizing the patient during treatment in the sedation group*



Figure 2) IV cannula was applied to all sedation patients



Figure 3) Sevoflurane is used for induction of the sedative drugs in a needle phobic, panic or very young children



Figure 4) Rubber dam application was useful during moderate sedation to avoid aspiration of a foreign body

DISCUSSION

Indications for GA or CS in pediatric dentistry include patients with intellectual or developmental delay and children who are uncooperative, anxious and needle phobic. In the present study, the following issues were assessed to choose the method of treatment under CS or under GA such as (1) duration and complexity of the procedures; (2) dentists and anesthesiologists comfort to treat children under sedation and (3) parents/guardians acceptance of either method. Parents prefer oral sedation than GA, as it is reasonably safe, cheap, tolerated by patients and comfy for needle-phobic patients.

Table 1) Outcome of dental treatment under CS vs GA

	CS	GA
Pre-operative assessment	Same	same
Procedure type/length	Short	Medium or long
Fasting time before the procedure	6-8 hours	6-8 hours
Needs for drug antagonists	2 patients	0 patients
Complications	3 patients vomiting during the treatment and 2 postoperatively	None
Dentist and anesthesiologists comfort	Uncomfortable and stressed out	Comfortable
Patient comfort in the recovery	More agitated	Less agitated
Quality of work	Less quality depends on patient behavior	High quality
Post-operative recovery time	2-3 hours	2-3 hours

However, it has been reported that parental acceptance of dental treatment under GA has been increased in comparison to earlier studies (2). It has been reported that most parents that completed a questionnaire regarding their preoperative anxiety and perception and their preference of CS versus GA, they rated that sedation is more accepted and recommended for dental treatment than GA (3). Due to a risk of possibly losing consciousness, respiratory and cardiovascular depression, airway obstruction, and even death, CS should remain controlled and administered by adequately trained staff (1). In PSMCC, CS in pediatric dentistry is only provided and monitored by anesthesiologists for patient's safety. In addition, all dentists who provide dental treatment under CS were certified. The present study has similar results to that reported by Silay et al. (4). Dental cases that require multiple dental procedures, the CS method was not effective and not an alternative way to GA. Patients with pre-existing medical conditions, young children and the elderly are at more risk with sedation as the balance in sedation can be easily shifted from CS to deep sedation that may lead to over-sedation and respiratory depression which may result in death or permanent neurologic damage (5,6). Therefore, sedation protocol for pediatric dental procedures other than nitrous oxide inhalation sedation in Saudi Arabia is similar to the UK guidelines for pediatric dentistry that recommend practicing sedation techniques by an anesthesiologist in a hospital setting (3).

Certainly, the quality of dental restorations has been affected by child behavior during sedation. Dentists were hasty to complete treatment under CS even by choosing less durable restorations when patients' controlling behavior was difficult. Sevoflurane sedation can be useful in dental treatment for pediatric and disabled patients. However, its use can be limited for short procedures as in case of excessive sedation, airway management is required and this making sevoflurane sedation less advantageous for long procedures (7).

On the other hand, administration of nitrous oxide with oxygen as a sedative agent is commonly failed to sedate the patient to a degree required to complete a dental procedure cost of treatment under CS or GA is not a factor to be considered in this study as both types of treatment is provided for free for all military individuals and their families although multiple appointments required for treatment under CS is an important factor to be considered for parental time out of work or children out from school. It has been reported that if a child needed more than three CS appointments, the GA option offered cost savings over the CS treatment option (8).

CONCLUSION

Dental treatment under sedation can be successful with little or no complications if the cases are well selected by a qualified trained dentist. Treatment under GA is favorable than sedation for both dentists and anesthesiologists but it is not an alternative to dental treatment on dental chair with behavior management. CS can be applied in short dental procedures such as tooth extractions or simple fillings. The present study did not look at long-term success rates of dental procedures under GA versus CS.

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