



## CONSCIOUS SEDATION AFTER ADMINISTRATION OF DRUGS IN DENTISTRY

**VIJAY EBENEZER<sup>2</sup>, R. BALAKRISHNAN<sup>2</sup>,  
ANANTHA PADMANABHAN<sup>2</sup> AND M. ELUMALAI<sup>1\*</sup>**

*<sup>1</sup>Department of Pharmacology, SreeBalaji Dental College &  
Hospital, Bharath University, Chennai.*

*<sup>2</sup>Department of oral and maxillofacial surgery, Sree Balaji Dental College &  
Hospital, Bharath University, Chennai.*

### ABSTRACT

Pain and phobia are the major criteria for patients entering the dental clinics. Pain is well controlled by local anaesthetics but still there is always fear of seeing the complicated dental instruments. Sedation, where the patient is allowed to almost sleep but still verbal contact is made and since there is amnesia patient has no phobia for any instruments. Various drugs has been used to bring about sedation , most common is propofol , midazolam and diazepam, this review discusses about the latest techniques and drugs preferred in sedative dentistry.

**KEY WORDS:** Diazepam, Propofol, Midazolam, Sedation, Dentistry



**PROF DR.M. ELUMALAI**

Department of Pharmacology, SreeBalaji Dental College &  
Hospital, Bharath University, Chennai.

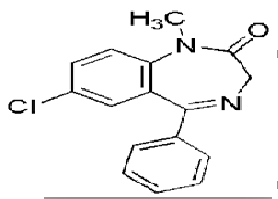
*\*Corresponding author*

## INTRODUCTION

Fear and anxiety towards dental procedures varies from a suppressed fear of pain to phobia. Local anesthetics and new advances in technology have made the dental treatment expedient and often painless. But in certain situations pain and anxiety control becomes unattainable by local anesthetics and the administration of local anesthesia is considered to be a traumatic procedure by patients. General anesthesia is also not practical for many ambulatory patients undergoing minor surgical procedures and hence the alternative approach is the use of anxiolytic and sedative agents alternative to general anesthesia.

Intravenous sedative hypnotics are commonly used during day care oral surgical procedures to enhance patient comfort, improve operating environment and prevent the recall of unpleasant events during surgery<sup>1</sup>. Among various drugs used for sedation, such as Benzodiazepines, Diazepam in particular have been well established. In comparison propofol (2,6 di-isopropyl phenol, an alkyl phenol), is currently in use as a better alternative to Diazepam. Rapid induction, short duration of action, rapid elimination and low incidence of excitatory effects.

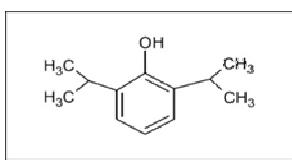
### Structure of Diazepam



Diazepam is considered as a drug that could be easily titrated over a wide spectrum ranging from light sedation to hypnosis and had beneficial effects like fast onset of drowsiness, smooth sedation, better amnesia and faster mean recovery time<sup>2</sup>. Diazepam also has minimal effects on cardiovascular system and

does not depress the respiratory response, except in high doses. Its main disadvantages are pain on injection in 30 to 80% of cases<sup>3</sup>, post injection thrombophlebitis<sup>4</sup>, longer elimination half life<sup>5</sup> and poor analgesic effect<sup>6</sup>.

### Structure of Propofol



Propofol an alkyl phenol, is a fast acting sedative hypnotic agent with a short duration of action, rapid recovery profile and low incidence of excitatory effects. Its side effects include

pain on injection, hypotension and transient respiratory depression<sup>7,8,9</sup>. Joseph et al has been described the wide usage and the safety of propofol in 2005 and 2006<sup>10,11</sup>. While

Davis B<sup>12</sup> highlighted the pharmacological effect of using this drug .

### **Latest Technique for propofol**

Joseph E. Cillo and Richard Finn,<sup>13</sup>2005 introduced Continuous infusion propofol pump which helped to produce sedation and decreased the amount of opioids used. Dexmedetomidine a Central nervous system depressant is also being used as a sedative agent in dentistry. Low-dose midazolam with propofol during patient controlled sedation neither reduced oxygen saturation nor prolonged the time of discharge.<sup>14</sup> . Combination of propofol with ketamine is the latest medication for sedation.<sup>15</sup>

## **DISCUSSION**

In 1874 Pierre-Cyprien Ore Of Bordeaux ,France was the first person to administered a drug intravenously in human beings. He administered chloral hydrate to achieve general anesthesia. Nelis Bjorn Jorgenson in 1945 first employed a technique which he called 'intravenous premedication' at the Loma Linda University School of medicine. He had used pentobarbital administration with meperidine and scopolamine. This technique is known as Jorgenson's technique, the man who is considered by many authors to be the father of intravenous sedation in dentistry. Conscious sedation is a technique in which the use of a drug or drugs produces a state of depression of CNS, which enables an operator to carry out a surgical procedure, but during which verbal contact with the patient is maintained and patient retains protective reflexes. Among the methods used for conscious sedation, intravenous sedation is perhaps the most popular, as it has a rapid onset and enables the dose of the drug to be titrated according to the need of the patient, with maximum safety<sup>16</sup>. Conscious sedation in combination with local anesthesia has been used as a safe alternative to General anesthesia for control of peri-operative pain and anxiety in oral surgery<sup>17,18</sup>. Since the introduction of intravenous sedation by Pierre-

Cyprien Ore Of Bordeaux, France in 1872, various agents have been introduced to provide adequate analgesia, amnesia, anxiolysis and patient co-operation. It has been stated that prolonged recovery and venous complications are the two main problems associated with use of intravenous diazepam<sup>19</sup>. It has also been stated that reports on complications from intravenous diazepam are sparse.<sup>20,21</sup> Prolonged recovery in the immediate postoperative period and for several hours following surgery has been reported, but very little research has been done on its occurrence beyond the day of administration.<sup>22</sup>

This review was undertaken to assess the usefulness of propofol as a sedating agent in day care oral surgery in comparison with diazepam in terms of onset of action, recovery, amnesia and side effects. Slight increase in heart rate was noticed in both the drugs after administration of local anaesthesia, which can be attributed partly to the strength of adrenaline ( 1: 80,000 ) used in local anesthetic solutions,<sup>23</sup>. Through maintenance of hemodynamic stability and faster recovery time, the admixture (10:1 propofol-ketamine ratio) provided the greatest benefit for continuous intravenous general anesthesia in adults undergoing dentoalveolar surgery in an outpatient clinic setting.<sup>15</sup> Propofol has been gaining increased attention as a sole agent in providing procedural sedation due to its predictable pharmacokinetics and favorable amnesic properties. There were no major complications.<sup>12</sup> Low-dose midazolam with propofol during Patient controlled sedation neither reduced oxygen saturation nor prolonged the time of discharge. Low-dose midazolam with propofol also improved the acceptability and comfort for patients and made the operation easier, which makes it preferable to propofol alone. The propofol group exhibited anterograde amnesic properties clearly superior to those of diazepam, which is an important consideration in the choice of a sedating agent for use during oral surgical procedures.<sup>24</sup> .

## CONCLUSION

Based on our review, we conclude propofol as a superior sedating agent compared to diazepam, having rapid onset and predictability of action, profoundness of amnesia and a faster recovery period, offering advantages of

early patients discharge and better patient compliance. Propofol on combining with drugs like ketamine or midazolam helps in still better sedation effect and better analgesic. Continuous infusion technique of propofol is of great advancement to produce sedation to perfect level.

## REFERENCES

1. Sarasin D. S., Ghoneim N.M., Block R I : Effect of Sedation with Midazolam or propofol on cognition and psychomotor functions. *Journal of Oral and Maxillofacial Surg*; 1996; 1187 - 1193.
2. Keilty S R, Blackwood : Sedation for conservative dentistry. *British Dental Journal of clinical pract*; 1969; 23; 365.
3. Wood N and Sheik A. Midazolam and diazepam for minor oral surgery. *Br Dental Journal*. 160: 9-12. 1986
4. Mitchell Paul.F. Diazepam associated thrombophlebitis. *JADA*. 101:492-95. 1980
5. Aun C, Flynn P.J and Richards J. A comparison of midazolam and diazepam for intravenous sedation in dentistry. *Anaesthesia*, 39 , 589-93, 1984
6. Dixon H R, Tilton B.E, Briggs. .B.D. A Comparison of sedative and cardiopulmonary effects of Diazepam and Pentazocine premedication. *Anaesth; and Analg*; 1970; 49; 546
7. Joseph .E Cillo, Buffalo N.Y. Propofol anesthesia for out patient Oral maxillofacial Surgery. *Oral Surg Oral Med Oral Path*, 1999; 87(5); 530 - 8
8. Sebel Peter S. et al .Propofol a new intravenous anesthetic. *Anesthesiology*. 1989; 71; 260 - 277.
9. White Paul F. Propofol Pharmacokinetic and pharmacodynamics. *Seminar in Anesthesia* . 1988. Vol 7; No 1: 4 - 28.
10. Joseph E. et al. Modern intravenous sedation for office based full face Laser resurfacing using a continuous infusion propofol pump. *J Oral maxillofacial Surg*; 2005: 63; 903 - 907.
11. Joseph E. et al. Haemodynamic in elderly coronary artery disease patient undergoing propofol sedation. *J Oral maxillofacial Surg*; 2006: 64; 1138 - 1342.
12. Davis B. Safety and efficacy of propofol - only sedation in Oral and Maxillofacial Surgery- Pilot Study. *Journal of Oral and Maxillofacial Surg*; 2012; e-35.
13. Joseph E. Cillo and Richard Finn. Moderate Intravenous Sedation for Office-Based Full Face Laser Resurfacing Using a Continuous Infusion Propofol Pump. *J Oral Maxillofac Surg* 63:903-907, 2005
14. Zuhail Küçükyavuz\*, Mine Cambazoğlu. Effects of low-dose midazolam with propofol in patient-controlled sedation (PCS) for apicectomy. *British Journal of Oral and Maxillofacial Surgery* (2004) 42, 215—220
15. Joseph. E et al. Analysis of propofol and low dose ketamine admixture for adult outpatient dentoalveolar surgery. A prospective ,Randomised , Positive controlled clinical trial. *J Oral Maxillofacial Surg*; 2012: 70; 537 - 546.
16. Rodrigo M.R and Jonsson E : Conscious Sedation with Propofol. *Br; Dent. Journal*. 1989. 166; 75 - 79
17. Bennett C R .Conscious Sedation : An alternative to general anesthesia. *J. Dent. Res*; 1984; 63(6); 832- 833
18. Hempenstall P.D. Cardiovascular, biochemical and hormonal responses to intravenous sedation with local analgesia versus general anaesthesia in patients undergoing oral surgery. *Journal of Oral maxillofacial Surgery*. 1986; 44; 289.

19. Thornton JA: The use of intravenous agents for sedation in dental outpatients. S.A.A.D. Dig 3:96. 1977
20. Sara C: Intravenous sedation-a review. Aust Dent J 19:39. 1974
21. Donaldson D, Gibson G: Systemic complications with intravenous diazepam. Oral Surg Oral Med Oral Pathol49: 126,1980
22. N. Bruce litchfield, Prolonged Recovery after Intravenous Diazepam, J Oral Maxillofac Surg 41.566-577. 1963
23. Dionne Raymond A et al. Effects of Diazepam pre medication and epinephrine containing local anesthesia or cardiovascular and plasma catecholamine response to oral surgery. AnesthAnalg; 1984; 63; 640 - 4.
24. Valtonen M, Saloen M, Forssell H. Propofol infusion for sedation in outpatient oral surgery. A comparison with diazepam. Anesthesia 44: 730-734: 1989.