Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Original Research

Comparison of intranasal and oral dexmedetomidine for procedural sedation in pediatric dental patients

Asiya Basheer

MDS Pedodontics, Private practitioner, J & K, India

***ABSTRACT*:**

Background: Dexmedetomidine has activity at a variety of locations throughout the central nervous system. The present study was conducted to compare intranasal and oral dexmedetomidine for procedural sedation in pediatric dental patients. **Materials & Methods:** This present study was conducted on 40 pediatrics patients age ranged 4-10 years of age of both genders. Patients were divided into four groups on the basis of route and dose to be used for drug administration. In all groups, onset and depth of sedation, recovery time and drug acceptance was compared. **Results:** The mean onset on time in group I was 8.21 minutes, in group II was 7.47 minutes, in group III was 48.2 minutes and in group IV was 35.1 minutes. Depth of sedation was seen in 4 in group I, 9 in group II, 1 in group III and 0 in group IV. Recovery time was 97.2 minutes in group I, was 146.4 minutes in group II, was 89.2 minutes in group III and was 76.4 minutes in group IV. Drug acceptance was poor in 4 in group I, 3 in group II, 2 in group III, fair in 2 in group I, 1 in group II, 1 in group III, good in 4 in group I, 5 in group II, 2 in group II and 3 in group IV, excellent was 1 in group I, 6 in group III and 7 in group IV. The difference was significant (P< 0.05). **Conclusion:** Nasal administration of Dexmedetomidine is a safe and effective agent for procedural sedation in pediatric dental patients.

Key words: Dexmedetomidine, Pediatric, Sedation

Received: 18 June, 2019 Revised: 15 July, 2019 Accepted: 17 July, 2019

Corresponding Author: Dr. Asiya Basheer, MDS Pedodontics, Private practitioner, J & K, India

This article may be cited as: Basheer A. Comparison of intranasal and oral dexmedetomidine for procedural sedation in pediatric dental patients. J Adv Med Dent Scie Res 2019;7(9):107-110.

INTRODUCTION

Fear and pain are the most powerful influences affecting attitude toward use of dental services. However, over the past few decades, the management of anxiety, fear, and pain in pediatric patients undergoing diagnostic and therapeutic procedures has been developed substantially.[1] In recent times, management of anxiety and unwanted mobility in children during dental treatment has markedly reduced after the introduction of procedural sedation and analgesia (PSA). This has further lead to a decrease in need of general anesthesia in both medical and dental practices.[2] Dexmedetomidine has activity at a variety of locations throughout the central nervous system. The sedative and anxiolytic effects of dexmedetomidine result primarily from its activity in the locus ceruleus of the brainstem. Stimulation of alpha2- adrenergic receptors at this site reduces central sympathetic output, resulting in increased firing of inhibitory neurons. The presence of dexmedetomidine at alpha2-adrenergic receptors in the dorsal horn of the spinal cord modulates release of substance P and produces its analgesic effects.[3]

At the recommended infusion rate of 0.2 to 0.7 mcg/kg/hr, dexmedetomidine provides sedation with minimal effects on respiratory function and may be used prior to, during, and following extubation. In clinical trials of adults, it produced the desired level of sedation in approximately 80% of patients, without the use of additional agents.[4] The present study was conducted to compare intranasal and oral dexmedetomidine for procedural sedation in pediatric dental patients.

MATERIALS & METHODS

This present study was conducted in the department of Pedodontics. It comprised of 40 pediatrics patients age ranged 4-10 years of age of both genders. Ethical clearance was taken from institutional ethical committee. Parents of all children were informed regarding the study and written consent was obtained.

Information such as name, age, gender etc. was recorded in case history performa. Patients were divided into four groups on the basis of route and dose to be used for drug administration. Group I received 1 – 2 µg/kg of body weight of intranasal administration of dexmedetomidine, group II received 2 – 2.5 µg/kg of body weight of intranasal administration of dexmedetomidine, group III received 3 – 4 µg/kg of body weight of oral administration of dexmedetomidine and group IV received 4 – 5 µg/kg of body weight of oral administration of dexmedetomidine. In all groups, onset and depth of sedation, recovery time and drug acceptance was compared. Results were tabulated and subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Group I	Group II	Group III	Group IV
1 – 2 µg/kg of body weight of intranasal administration of dexmedetomidine	2 – 2.5 µg/kg of body weight of intranasal administration of dexmedetomidine	3 – 4 µg/kg of body weight of oral administration of dexmedetomidine	4 – 5 µg/kg of body weight of oral administration of dexmedetomidine
10	10	10	10

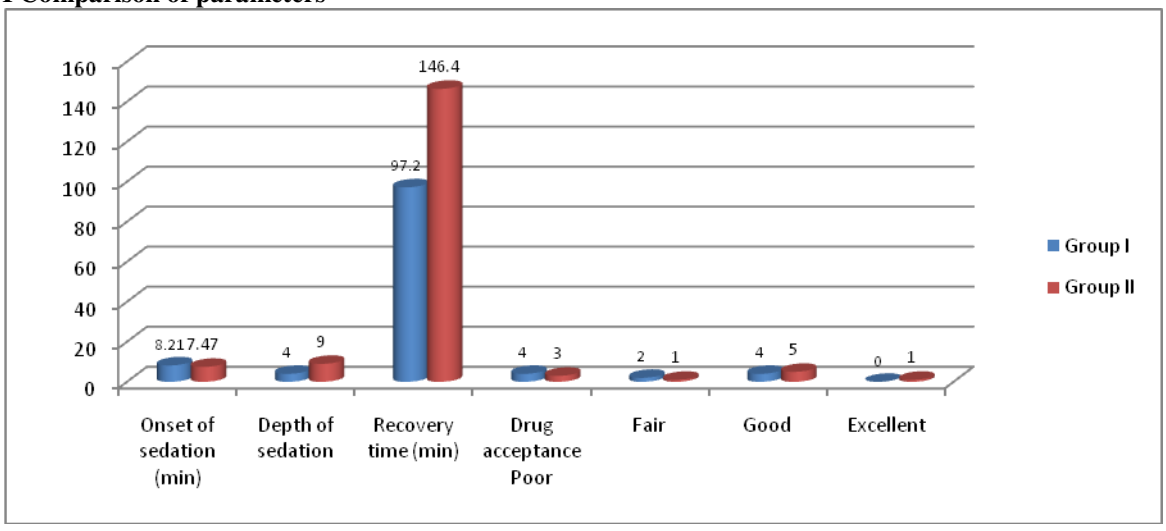
Table I shows distribution of patients on the basis of route of administration of drug.

Table II Comparison of parameters

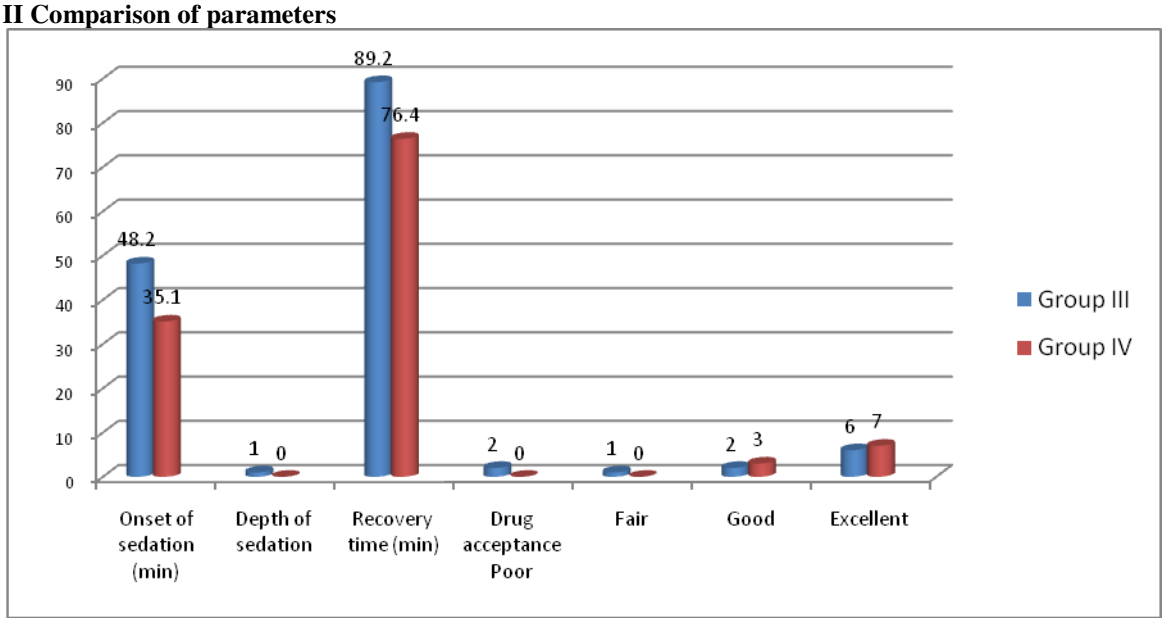
Parameters	Group I	Group II	Group III	Group IV	P value
Onset of sedation (min)	8.21	7.47	48.2	35.1	0.01
Depth of sedation	4	9	1	0	0.04
Recovery time (min)	97.2	146.4	89.2	76.4	0.02
Drug acceptance Poor	4	3	2	0	0.01
Fair	2	1	1	0	0.03
Good	4	5	2	3	0.04
Excellent	0	1	6	7	0.05

Table II, graph I, II shows that mean onset on time in group I was 8.21 minutes, in group II was 7.47 minutes, in group III was 48.2 minutes and in group IV was 35.1 minutes. Depth of sedation was seen in 4 in group I, 9 in group II, 1 in group III and 0 in group IV. Recovery time was 97.2 minutes in group I, was 146.4 minutes in group II, was 89.2 minutes in group III and was 76.4 minutes in group IV. Drug acceptance was poor in 4 in group I, 3 in group II, 2 in group III, fair in 2 in group I, 1 in group II, 1 in group III, good in 4 in group I, 5 in group II, 2 in group II and 3 in group IV, excellent was 1 in group I, 6 in group III and 7 in group IV. The difference was significant (P< 0.05).

Graph I Comparison of parameters



Graph II Comparison of parameters



DISCUSSION

Procedural sedation and analgesia outside of the operating room have become common and widespread.[5] A diverse group of pediatric subspecialists such as pediatric anesthesiologists, pediatric intensivists, pediatric emergency medicine physicians, and pediatric hospitalists provide pediatric procedural sedation (PPS).[6] Dexmedetomidine (DEX) a highly selective a-2 receptor agonist, has gained popularity in pediatrics as an adjunct to traditional sedation or as a sole agent for imaging studies.[7] DEX offers the advantage of having both sedative and anxiolytic effects, as well as relatively mild analgesic properties with minimal respiratory effects and a relatively short elimination half-life of 2 h. Because of its safety profile and success; DEX has now become widely used as a sedation agent in pediatric procedural sedation by a variety of provider.[8]

In present study, Group I received 1 – 2 µg/kg of body weight of intranasal administration of dexmedetomidine, group II received 2 – 2.5 µg/kg of body weight of intranasal administration of dexmedetomidine, group III received 3 – 4 µg/kg of body weight of oral administration of dexmedetomidine and group IV received 4 – 5 µg/kg of body weight of oral administration of dexmedetomidine.

A et al[9] in their study forty-four uncooperative American Society of Anesthesiologists Grade-I children, requiring dental treatment were randomly divided into four groups who received different doses of dexmedetomidine through intranasal and oral routes. The vital signs were monitored continuously during each visit. In this study, significant ($P < 0.05$) differences were found in the onset of sedation, duration, and recovery time between intranasal and oral groups. All vital signs were within normal physiological limits with no significant adverse effects in either of the groups.

We found that mean onset on time in group I was 8.21 minutes, in group II was 7.47 minutes, in group III was 48.2 minutes and in group IV was 35.1 minutes. Depth of sedation was seen in 4 in group I, 9 in group II, 1 in group III and 0 in group IV. Recovery time was 97.2 minutes in group I, was 146.4 minutes in group II, was 89.2 minutes in group III and was 76.4 minutes in group IV. Drug acceptance was poor in 4 in group I, 3 in group II, 2 in group III, fair in 2 in group I, 1 in group II, 1 in group III, good in 4 in group I, 5 in group II, 2 in group II and 3 in group IV, excellent was 1 in group I, 6 in group III and 7 in group IV. The difference was significant ($P< 0.05$).

The nasal mucosa has a rich vascular supply, therefore, immediate absorption of drug takes place directly in the systemic circulation without undergoing first-pass metabolism and resulting in rapid onset of action.[10] Another reason for faster onset can be due to rapid achievement of adequate levels in cerebrospinal fluid through communication with subarachnoid space through the olfactory nerve and its sheath.[11]

Administration of dexmedetomidine with other sedatives and anesthetics typically produces a pharmacodynamic interaction resulting in enhanced sedation. This additive effect often allows for a reduction in the dose of sedative agents with a more significant adverse effect profile, such as benzodiazepines. Although dexmedetomidine undergoes metabolism by cytochrome P450 enzymes, no drug interactions involving this pathway have been identified. Dexmedetomidine does not alter responsiveness to nondepolarizing neuromuscular blocking agents.[12]

CONCLUSION

Authors found nasal administration of Dexmedetomidine is a safe and effective agent for procedural sedation in pediatric dental patients.

REFERENCES

1. Boyle CA, Newton T, Milgrom P. Who is referred for sedation for dentistry and why? Br Dent J 2009;206:E12.
2. Allen EM, Girdler NM. Attitudes to conscious sedation in patients attending an emergency dental clinic. Prim Dent Care 2005;12:27‐32.
3. Kaplan RF, Yang CI. Sedation and analgesia in pediatric patients for procedures outside the operating room. Anesthesiol Clin North America 2002;20:181‐94.
4. Couloures KG, Beach M, Cravero JP, Monroe KK, Hertzog JH. Impact of provider specialty on pediatric procedural sedation complication rates. Pediatrics. 2011;127(5):2-7.
5. Wang J, Bu G. Influence of intranasal medication on the structure of the nasal mucosa. Chin Med J (Engl) 2002;115:617‐9.
6. Abrams R, Morrison JE, Villasenor A, Hencmann D, Da Fonseca M, Mueller W, et al. Safety and effectiveness of intranasal administration of sedative medications (ketamine, midazolam, or sufentanil) for urgent brief pediatric dental procedures. Anesth Prog 1993;40:63‐6.
7. Pitetti RD, Singh S, Pierce MC. Safe and efficacious use of procedural sedation and analgesia by nonanesthesiologists in a pediatric emergency department. Arch Pediatr Adolesc Med 2003;157:1090‐6.
8. Arora S, Sinha S, Kosalai K, Namane A, Pym AS, Cole ST. Intranasal atomized dexmedetomidine for sedation during third molar extraction. Int J Oral Maxillofac Surg 2002;3:470-83.
9. Padmanabhan MY, Pandey RK, Saksena AK, Chandra G. A comparative evaluation of agents producing analgo‐sedation in pediatric dental patients. J Clin Pediatr Dent 2009;34:183‐8.
10. Guideline for monitoring and management of pediatric patients during and after sedation for diagnostic and therapeutic procedures. American Academy of Pediatric Dentistry 2016;37:15-6.
11. Weiner AA, Weinstein P. Dentists' knowledge, attitudes, and assessment practices in relation to fearful dental patients: A pilot study. Gen Dent 1995;43:164‐8.
12. Srinivasan M, Bhaskar S, Carlson DW. Variation in procedural sedation practices among children's hospitals. Hosp Pediatr. 2015;5(3):148–153.