

## A Retrospective Evaluation of Requirements and Causes of Dental General Anesthesia in Pediatric Dentistry

Ahmet ARAS<sup>1\*</sup>, M. Sinan DOGAN<sup>1</sup>

1. Department of Pediatric Dentistry, Faculty of Dentistry, Harran University, Sanliurfa, 63300.

### Abstract

Although most of the dental treatments can be performed under local anesthesia in pediatric dentistry, there is a need for sedation and general anesthesia as a result of cooperation difficulties, anxiety or systemic disorders. This study aimed to evaluate the requirement and reasons of the dental treatment under general anesthesia.

The patients who applied to Harran University, Faculty of Dentistry, Department of Pediatric Dentistry between 23.05.2017 and 23.05.2019 were included in our study. Retrospective data of the patients such as age, gender, and reason for admission were evaluated. The patients who had to be treated with general anesthesia due to cooperation difficulties or any systemic disease were identified, and their statistical analyses were performed.

The number of patients admitted to the pediatric clinic during the two years was 5796. A total of 620 patients had to be treated under general anesthesia, of which 488 were due to cooperation difficulties and 132 were due to systemic disease. The mean age of the patients who were planned to be treated with Dental General Anesthesia (DGA) was 4.56; the mean age of patients with the systemic disease is 6.45. The rate of general anesthesia requirement was 10.7%.

As a result, general anesthesia is needed in one of every ten patients who admit to the pediatric clinic. We think that this situation stems from the fact that we are the only institution providing this service in our province. The number of centers that provide dental treatment with DGA, which is a great need in children with common caries and patients with special needs, should be increased.

**Clinical article (J Int Dent Med Res 2020; 13(1): 290-294)**

**Keywords:** Tooth decay, general anesthesia, mental retardation, cooperation.

**Received date:** 27 July 2019

**Accept date:** 24 December 2019

### Introduction

Pediatric Dentists provide oral care service and treat the dental problems of toddlers, children, adolescents, and young people with special needs. In the majority of this patient group, non-pharmacological behavioral guidance methods such as tell-show-do can be sufficient.<sup>1</sup>

Although many of the treatments in dentistry can be applied with local anesthesia; there is a requirement for sedation and general anesthesia (GA) due to inability to cooperate, incompatibility with the surgery, and anxiety or systemic disorders. It may also be needed to implement pharmacological behavioral guidance methods such as conscious sedation-general

anesthesia in some children with widespread dental problems, who have not reached psychological and emotional maturity, or who are mentally/physically handicapped.<sup>2,3</sup>

Comprehensive treatments such as endodontic treatment, crown implementations and resin restorations in pediatric patients require the patient to be cooperative during long-lasting procedures.<sup>4</sup> The primary purpose of dentists is to complete oral rehabilitation without having a negative impact on the psychology of the child with complicated and long-term treatment sessions and in the course of any complications during the procedure. In such cases, although behavioral guidance techniques are the preferred way, in some cases it may fail or may be inadequate because of its limited effects in eliminating the anxiety of overly fearful children. In addition, these techniques can take a lot of time, leading to an uncomfortable working and time loss for both the dentist and the patient. When the behavior guidance techniques are not sufficient alone, the pharmacological techniques

#### \*Corresponding author:

Ahmet ARAS,  
Harran University, Faculty of Dentistry,  
Department of Pediatric Dentistry  
Sanliurfa / TURKEY  
E-mail: ahmetaras@harran.edu.tr

are also included in the treatment process.<sup>5</sup>

The American Academy of Pediatric Dentistry (AAPD) classified the patients, on whom the Dental General Anesthesia (DGA) can be administered, as follows: a) patients who have not reached psychological or emotional maturity and/or who have mental, physical, or medical disabilities, b) patients on whom local anesthesia is not efficient, due to acute infection, anatomic variations, or allergies, c) overly anxious, fearful, non-cooperative patients, who are unable to communicate and cannot be contacted, d) patients in need of significant surgical procedures or requiring urgent, comprehensive oral/dental care, e) patients on whom DGA use can maintain the developing psychic and/or reduce medical risk.<sup>6,7</sup>

DGA is often applied to provide a safe and comprehensive treatment under ideal conditions for both the patient and the dentist. It was determined, in a survey<sup>1</sup>, that many of the dentists thought that DGA was a comfortable application for both the dentist and the patient, facilitating the job of the dentist. It is also difficult, even impossible, to perform dental procedures in patients with the severe gag reflex. It was reported that this reflex could be suppressed by intravenous anesthesia, and thus, the dental treatments can be applied.<sup>8</sup> In other studies, it was demonstrated that DGA, which facilitates the work of the dentists, increases the success of treatment and improves patient satisfaction and quality of life in different patient groups.<sup>9,10</sup>

The aim of this study is to evaluate the rate and the causes of GA administered in the treatments of patients admitted to the Pediatric Dentistry Clinic of Harran University Faculty of Dentistry in Sanliurfa city of Turkey.

### Materials and methods

In this study, the archives of all 1-17 age group patients were retrospectively examined who were admitted to the Pediatric Dentistry Clinic of Harran University Faculty of Dentistry between 23 May 2017 and 23 May 2019 and who were treated or planned to be treated with general anesthesia. Retrospective data of the patients such as age, gender, and reason for admission were evaluated. The patients who had to be treated with general anesthesia due to cooperation difficulties or any systemic disease were identified, and their statistical analyses

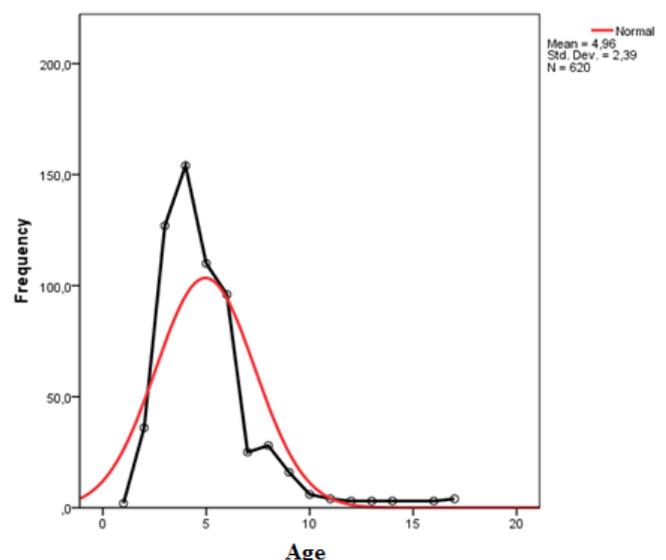
were performed.

Statistical analysis: Following the recording of the data, complementary statistical analyses and independent t-test ( $p < 0,05$ ) were applied. The SPSS software (version 23.0; IBM Corp., Armonk, NY, USA) (IBM, Chicago, USA) program was used for the statistical analysis.

### Results

In our study, the total number of patients who applied to the Pediatric Dentistry clinic in the two-year period was determined as 5796. Among these patients, 620 were treated or planned to be treated under general anesthesia, 488 of whom (78,7%) due to the difficulty in cooperation, and 132 of whom (21,3%) due to systemic disease. Of these patients, 59% were male and 41% were female.

The mean age of all patients admitted to our clinic was determined as  $7.66 \pm 3.56$ , while the mean age of patients, who were planned to be treated under general anesthesia was determined as  $4.96 \pm 2.39$  (Figure 1). The mean age of the patients planned to be treated under DGA was  $4.56 \pm 1.83$  who has no systemic disease, but difficulty in cooperation; the mean age of the patients with systemic disease was  $6.45 \pm 3.42$  (Table 1). It was statistically significant that the mean age was high in patients with systemic disease ( $p < 0.05$ ).



**Figure 1.** The mean age histogram of all patients admitted to the clinic (red) and the patients planned to be treated with DGA (black).

	N	Mean ± SD	Test statistics	P value
With systemic disease	132	6.45 ± 3.42	t= -6.139	<0.001
Without systemic disease	488	4.56 ± 1.83		

t: Independent samples t test statistics

**Table 1.** Comparison of mean ages in groups.

Mental retardation (42.4 %) and epilepsy (35.6 %) were mostly observed diseases in the patients, who were planned to be treated under general anesthesia due to systemic diseases. Apart from these, other diseases observed in the patients admitted were growth retardation (9.1 %), cerebral palsy (5.3%), and drug allergy (4.5%).

In our study, it was determined that, among all patients admitted to our clinic, the rate of the general anesthesia requirement was determined as (10.7%).

### Discussion

In the hospital environment, it is very effective and very safe to perform dental treatments under GA for the child patients (especially between 2-6 years of age) or for the patients with disabilities.<sup>1</sup> In previous studies, it was reported that the proportion of pediatric patients with fear of dentists and anxiety in society is reported to be approximately 3-43%.<sup>11</sup> It was demonstrated that this rate decreases with the increasing age and it was around 30% in children aged 2-6 years. It was reported that dental anxiety decreases at the age of seven and children can cope with fears.<sup>12</sup>

In another study<sup>1</sup> 62% of the patients with DGA were healthy children, who could not cooperate, and 38% of them consisted of children with special needs. The mean age of healthy children was 3.7, whereas children with special needs were reported as 7.2. Malden et al. reported that 3% of the children had to be treated with DGA, and the mean age was 5 years.<sup>13</sup> In our study, it was observed that there was a need for DGA in 10.7% of the patients admitted to our clinic. We evaluate this situation to be emerging from the fact that we are the only institution that conducts dental treatments with DGA in our province, and this type of patients are being sent

to our clinic. However, the mean age of the patients, who were planned for treatment with DGA in our clinic due to lack of cooperation, was identified as 4.56. This figure is compatible with previous studies.

In many studies in the literature, it is reported that male children have a higher level of dental anxiety in comparison to female children.<sup>12,14</sup> On the other hand, there are studies reporting that higher anxiety levels are more common in female children.<sup>15</sup> In a study, among the patients undergone tooth extraction with sedation, 58% were male, and 42% were female children.<sup>2</sup> In our study, in parallel with this data, it was determined as 59% male and 41% female children. In line with our findings, Al-Eheideb<sup>16</sup> and Tsai<sup>17</sup> also reported that male children were less cooperative compared to female children.

In a study conducted by Lee et al.<sup>1</sup> it was observed that among the patients, who were treated under GA due to systemic diseases, 36.6% had mental retardation, 29.5% had autism, 14.3% had cerebral palsy, 8.9% suffered from developmental strain, and 6.3% had epilepsy. Similarly, in our study, the highest rate was observed in patients with mental retardation (42.4%). However, the second-highest rate was detected as patients with epilepsy (35.6%). We think that the differences in the rates of cerebral palsy (5.3%) and epilepsy (35.6%) are caused by regional differences.

According to the data of the World Health Organization, mental retardation is a disease affecting all races and social classes around the world and influencing about 3% of the world's population. In these patients, tooth problems are often observed due to nutritional disorder, poor oral hygiene and side effects of medications that they continuously use. Due to the inability to cooperate and due to aggressive behaviors, their treatments and even their examinations are

conducted under sedation or GA.<sup>18</sup> In this group of patients undergoing GA due to oral rehabilitation, respiratory problems may also arise due to frequent genetic syndromes and mental retardation. Associated with genetic syndromes, craniofacial anomalies, macroglossia, hypertrophic adenoid and tonsils, obesity, respiratory system diseases, restriction of head and neck movements and lack of its stability may cause dyspnea.<sup>19</sup> The majority of the patients, who were admitted to our clinic due to all these reasons and who had systemic disease, were determined to be the mentally retarded patients.

Epilepsy is a common disease in dentistry. It is thought to affect millions of people around the world and has a prevalence of 0.5%-0.9% in the general population.<sup>20</sup> It was reported that epileptic seizures are the second most common medical event in dental interventions and that each dentist is faced with epileptic seizures at least 1.5 times throughout their professional lives.<sup>21</sup> It is stated that GA is the right choice if it is difficult to control epileptic seizures that can frequently occur in pediatric patients. Moreover, the fact that a stress-induced seizure can be triggered due to the difficulty in cooperation reveals the necessity of GA for such patients.<sup>21,22</sup> In our study, it was determined that the second-highest number of patients admitted to our clinic following the mentally retarded patients were the epilepsy patients (%35.6).

The use of dental general anesthesia is increasing in acute and painful dental treatments of healthy children and mentally disabled children, who have problems in cooperation or anxiety in dental treatment. In the literature, it was reported that dental treatments with DGA implemented in 2014 and 2015 were higher than twofold of those of 2006 and 2007.<sup>2,23</sup> Another study has reported that the rate of treatment performed under sedation and GA has increased in recent years.<sup>24</sup> Based on the developments in the field of medicine, we anticipate that the use of DGA applications has become more effective and safer, and therefore its use will increase.

## Conclusions

The dental treatments under DGA is a vital need for the patients, who have problems in cooperation, such as children younger than 5 years old with widespread decay and patients with special needs. Although it has several risks,

developments in medicine and pharmacology in recent years have made the DGA more reliable. Nevertheless, it is very important that such procedures are conducted in full-fledged hospitals. DGA was needed in 10.7% of the patients admitted to our clinic. This rate is above the average. Therefore, it is necessary to increase the facilities that provide dental health services through DGA.

## Declaration of Interest

The authors declare that there are no conflicts of interest.

## References

1. Lee PY, Chou MY, Chen YL, Chen LP, Wang C-J, Huang W-H. Comprehensive dental treatment under general anesthesia in healthy and disabled children. *Chang Gung Med J* 2009;32:636-42.
2. Çina Aksoy M, Akpınar H. Ağız Diş Çene Cerrahisinde Sedasyon Uygulamaları ve Diş Çekimlerinin Retrospektif Olarak Değerlendirilmesi. *SDÜ Sağlık Bilim Derg* 2018;9:1-5.
3. Coolidge T, Irwin SP, Leyster KA, Milgrom P. Determinants of receiving intravenous sedation in a sample of dentally-fearful patients in the USA. *SAAD Dig* 2012;28:52-60.
4. Edmonds B, Williams T, Carrico C. The Prevalence and Factors Associated with Sibling-Recurrent Dental Treatment Under General Anesthesia at an Academic Institution. *Pediatr Dent* 2019;41:40-6.
5. Özgül Baygın, Berrin Işık. Çocuk Diş Hekimliğinde Nitroz Oksit/Oksijen Sedasyonu Nitrous Oxide. *Hacettepe Diş Hekim Fakültesi Derg* 2010;34:53-61.
6. Savanheimo N, Sundberg SA, Virtanen JI, Vehkalahti MM. Dental care and treatments provided under general anaesthesia in the Helsinki Public Dental Service. *BMC Oral Health* 2012;12:1-8.
7. The American Academy of Pediatric Dentistry. Guideline on behavior guidance for the pediatric dental patient. *Pediatr Dent* 2011;36:179-91.
8. Yoshida H, Ayuse T, Ishizaka S, Ishitobi S, Nogami T, Oi K. Management of exaggerated gag reflex using intravenous sedation in prosthodontic treatment. *Tohoku J Exp Med* 2007;212:373-8.
9. Jankauskiene B, Virtanen JI, Kubilius R, Narbutaite J. Oral health-related quality of life after dental general anaesthesia treatment among children: a follow-up study. *BMC Oral Health* 2014;14:81.
10. Günay Canpolat D, Gönen ZB, Durdu T. Diş Hekimlerinin Klinik Uygulamalarında Genel Anesteziye Yaklaşımlarının Değerlendirilmesi. *Atatürk Üniversitesi Diş Hekim Fakültesi Derg* 2016;26:389-389.
11. Soldani F, Manton S, Stirrups DR, Cumming C, Foley J. A comparison of inhalation sedation agents in the management of children receiving dental treatment: a randomized, controlled, cross-over pilot trial. *Int J Paediatr Dent* 2010;20:65-75.
12. Arpacı AH, Isik B. Pediatric tooth extractions under sedoanalgesia. *Pakistan J Med Sci* 2016;32:1291-5.
13. Malden PE, Thomson WM, Jokovic A, Locker D. Changes in parent-assessed oral health-related quality of life among young children following dental treatment under general anaesthetic. *Community Dent Oral Epidemiol* 2008;36:108-17.
14. Kil HK, Kim WO, Han SW, Kwon Y, Lee A, Hong J-Y. Psychological and behavioral effects of chloral hydrate in day-case pediatric surgery: a randomized, observer-blinded study. *J Pediatr Surg* 2012;47:1592-9.

15. Kumar V, Goud EVSS, Turagam N, Mudrakola DP, Ealla KKR, Bhoopathi PH. Prevalence of Dental Anxiety Level in 6- to 12-Year- Old South Indian Children. *J Pharm Bioallied Sci* 2019;11:321-4.
16. Al-Eheideb AA, Herman NG. Outcomes of dental procedures performed on children under general anesthesia. *J Clin Pediatr Dent* 2003;27:181-3.
17. Tsai C-L, Tsai Y-L, Lin Y-T, Lin Y-T. A retrospective study of dental treatment under general anesthesia of children with or without a chronic illness and/or a disability. *Chang Gung Med J* 2006;29:412-8.
18. Alkan M, Kip G, Sahin S, Atac MS, Kilinc Y. Our Sedation Experience on Mentally Retarded Patients. *J Clin Anal Med* 2015;6:423-7.
19. Ozkan AS, Erdogan MA, Sanli M, Kacmaz O, Durmus M, Colak C. Retrospective Evaluation of Dental Treatment under General Anaesthesia. *Turkish J Anesth Reanim* 2015;43:332-6.
20. Perks A, Cheema S, Mohanraj R. Anaesthesia and epilepsy. *BJA Br J Anaesth* 2012;108:562-71.
21. Mehmet Y, Senem Ö, Sülün T, Hümeýra K. Management of epileptic patients in dentistry. *Surg Sci* 2012;3:47-52.
22. Fiske J, Boyle C. Epilepsy and Oral Care. *Dent Update* 2002;29:180-7.
23. Chen Y-P, Hsieh C-Y, Hsu W-T, Wu F-Y, Shih W-Y. A 10-year trend of dental treatments under general anesthesia of children in Taipei Veterans General Hospital. *J Chin Med Assoc* 2017;80:262-8.
24. Yılmaz MZ, Turer A, Sumer M. Diş Hekimliği Pratiğinde Genel Anestezi: Derleme. *Duzce Med J* 2013;15:68-72.