

A survey on dental treatments provided under general anesthesia for pediatric patients: A hospital-based retrospective audit

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Highlights

General anesthesia is commonly used to facilitate dental treatment in children with anxiety or challenging behavior, many of whom are children.

This study highlights a great need to develop the healthcare system regarding the appropriate management of caries among children with primary dentition.

Restorative procedures were given priority over the extractions in dental treatment under general anesthesia in the present study.

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Abstract

Aim: To evaluate the dental procedures carried out under general anesthesia (GA) on children with primary dentition in a pediatric hospital. **Methods:** The study comprised all children with primary dentition treated under GA at a private pediatric hospital from January 2014 to December 2017. The data was tabulated based on the dental records include reasons for dental treatment under general anesthesia (DGA), dental status, and treatment provided. Descriptive statistics were used for statistical analysis and chi-square test used for the comparison. **Results:** Forty-eight children with primary dentition were utilized the service of general anesthesia for dental treatment. Dental caries (78%) was the most common reason for DGA ($p < 0.05$). More than 80% of children required treatment for more than ten teeth ($p > 0.05$). Overall restorative procedures (60%), extractions (26%), and preventive procedures (14%) were performed under GA ($p < 0.05$). Among, restorative procedures stainless steel crowns (54.2%) were given more priority than other restorative materials. **Conclusions:** Dental caries was found to be a common reason for DGA. Restorative procedures were given priority over surgical and preventive procedures. Stainless steel crowns were extensively used compared to other materials.

Keywords: Children; Dental Care; General Anesthesia; Retrospective Study

INTRODUCTION

General anesthesia (GA) is indicated in patients with anxiety and fear associated with dental treatments.¹ To facilitate dental treatment under GA for patients of motor dysfunction and/or cognitive impairment that precludes adequate treatment, provide treatment for these patients with a low age of reason, or extensive dental treatment procedures or traumatic injuries.¹⁻³ Dental treatment under general anesthesia (DGA) is an effective way of treating pediatric dental patients who are uncooperative.^{1,2} It has the advantage of providing treatment under GA for children if they require multiple procedures at a time.^{4,5} Interest in delivering treatment under GA in children has increased over the recent years.⁶⁻⁸

The provision of dental treatment under GA for pediatric dental patients establishes and maintains the state of co-operation where the patient can receive assessment and treatment safely and successfully.^{8,9} The dental assessments involve attaining adequate evidence regarding dental problems to rationalize comprehensive oral rehabilitation under GA if the patient is not manageable for the treatment under local anesthesia (LA) in the clinical setting. The additional care beyond the LA may be necessary for pediatric patients to obtain dental treatment.⁷ Prior published studies reported that poor oral health might result in poor diet and nutrition, affecting systemic health. Nevertheless, the essential goal for DGA for children is providing comprehensive treatment for children.^{7,10} This type of management should be employed with a preventive program, behavioral remodeling, and a follow-up appointment to avoid further treatment and reduce multiple appointments. Even though many studies reported in the literature DGA for children, it is necessary to check the trends in dental treatment under GA in recent days in the Indian scenario. Therefore this study aimed to perform a retrospective audit on the

characteristics and treatment provided under GA for children with primary dentition.

METHODS

This study followed the ethical standards specified in the 1975 Declaration of Helsinki (revised in 2000) and its subsequent amendments. Written informed consent was obtained from participants.

Sample

This retrospective audit of children with primary dentition underwent dental treatment under general anesthesia at Udbhava Children Hospital, Hyderabad, Telangana, India. A single pediatric dentist referred all the patients from three different private clinics for DGA from January 2014 to December 2017. The healthy children with primary dentition, and with complete records were included in the study. The children without complete records, and children with mixed and permanent dentition were excluded from the study. The hospital authority approved the study, and the study details were collected retrospectively. All children received dental assessments and pre-anesthetic evaluation prior to DGA. The dental assessment included medical and dental history and clinical and radiographic examination. The complete data were collected based on the dental records (case sheet), dental status, management, and reasons for DGA were incorporated.

Procedure

All the patients were admitted to the hospital one day before the DGA. At the time of admission, a comprehensive treatment plan was discussed, and informed consent was obtained from parents. All the patients were discharged after complete recovery without any adverse conditions to the post-treatment. The anesthesia

procedure involves four stages which include premedication, induction, maintenance, and recovery. The theatre time included the premedication stage to the recovery stage. In the present study, only children with primary dentition were included. All the procedures have been divided into preventive (scaling and fissure sealants), restorative procedures [glass ionomer cement, composite restorations (strip crowns), pulpotomy, pulpectomy, and stainless steel crowns], and surgical procedures (extractions and surgical removal of supernumerary teeth). All the dental procedures were done by one pediatric dentist and the same anesthesiologist involved in the cases. Single examiner collected all the data, and complete data were collected after two weeks washout period.

Statistical analysis

Kappa statistics were used to determine the investigator's intra-examiner reliability involved in the data collection of the study. The data were tabulated and analyzed using descriptive statistics, and the chi-square test was used for comparison with $p < 0.05$. Descriptive statistics carried out using SPSS (Version 17.0, Illinois, Chicago, USA).

RESULTS

Forty-eight children (27 boys and 21 girls) with primary dentition with an average age of 4.4 years ranges from 2.4 to 5.9 years were treated under GA during the study period (Figure 1). Nasal intubation was performed in 91% patient ($n=44$) while 4 ($n=9\%$) patients had oral intubation required (Figure 1). The mean theatre time utilized for all dental procedures was 91 minutes per patient (Figure 1), with a range of 51 to 161 minutes.

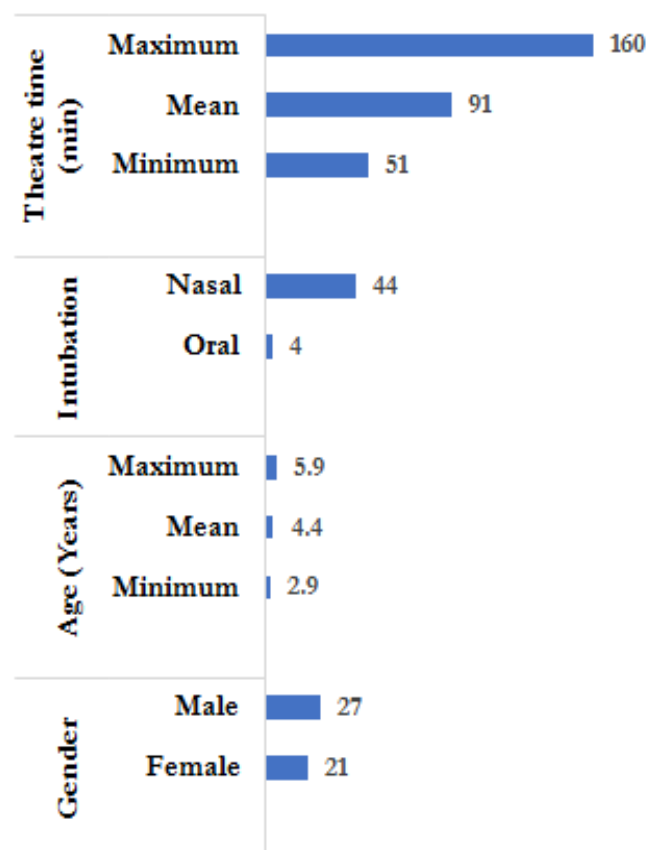


Figure 1. Summary of various characteristics of subjects involved in the retrospective audit

Dental caries (74%) was the most common cause for the DGA, followed by a dental trauma (11%) and other reasons like supernumerary teeth (6%), syndrome (4%), and medically compromised children (5%) ($p < 0.05$) (Table 1). Overall, 56% were restorative procedures, surgical and preventive procedures were 30% and 14%, respectively ($p < 0.05$). Among the restorative procedures, stainless steel crowns were extensively used ($p < 0.05$).

Table 1. Reasons for dental treatment under general anesthesia

Diagnosis	No of patients (%)
Dental caries	74
Dental trauma	11
Supernumerary teeth	6
Syndrome	4
Medical condition	5

The mean for stainless steel crowns, composites, glass ionomer cement, fissure sealants, preventive resin restorations, and strips crowns were 4.5, 1.5, 0.2, 1.1, 0.6, and 0.6, respectively (Table 2). Almost 80% of children required treatment for more than ten teeth ($p > 0.05$), followed by 2% of 20 teeth, 10% of ≥ 15 teeth, and 8% of ≥ 5 teeth. Kappa statistics showed excellent ($K = 1.0$) intra-examiner reliability.

Table 2. Details of restorative materials used for dental treatment under general anesthesia

Procedure	n	%	Mean
Fissure sealants	40	13.5	1.1
Composite	55	18.5	1.5
Glass ionomer cement	9	3.0	0.2
Preventive resin restoration	22	7.4	0.61
Stainless steel crowns	161	54.2	4.5
Strip crowns	10	3.4	0.3

DISCUSSION

There are various types of dental complications in pediatric patients that cannot be treated optimally in the clinical setting, and these are managed the better way in a pediatric hospital setting.¹¹ The gender discrepancy was observed in the present study, and it was similar to prior studies.^{11,12} Inversely, few studies reported that females were predominantly treated under GA.¹³ In the present retrospective audit, dental caries (74%) is the most common reason for the DGA, followed by a dental trauma (11%) and other reasons (15%) like dental fear, supernumerary teeth, syndrome, and medically compromised children ($p < 0.05$). These findings were in agreement with prior studies from Hong Kong¹³, Taiwan¹⁴, and Turkey¹⁵.

In the present study, 91 minutes utilized for DGA ranges between 54 and 160 minutes. Tsai and co-workers¹⁴ performed treatments under GA between 2.4 hours to 3.8 hours. In contrast to this study, Turkish study¹⁵ all the dental

procedures are finished at a mean of slightly more than 60 minutes. A recent Korean study¹⁶ reported that the mean duration of treatment was 101 min, almost in agreement with the present study findings. Shin and co-workers¹⁶ opined GA probably requires long treatment, is preferable to multiple sedation procedures in terms of both time and cost, and allows treatment to be completed in one visit without any psychological stress of treatment under restraint.

The mean number of teeth treated under GA was greater than 80% of children who required treatment for more than ten teeth. Nevertheless, a Taiwanese study¹⁴ reported that the mean no treated teeth under GA were slightly higher than the present study (15.2). A recent Turkish study¹⁵ reported that the mean value of teeth treated under GA was 10.4. These findings would explain that pediatric patients who required treatment for multiple teeth planned for DGA. This study opines that DGA recommended for pediatric patients who require treatment for ten or more teeth based on our findings.

Overall, in the present study, 56% were restorative procedures, 30% surgical procedures, and 14% were with preventive procedures were performed under DGA. It seems restorative procedures were given higher priority than surgical procedures. These findings are not in agreement with earlier studies reported by Kwok-Tung et al.⁶ and Shin et al.¹⁶. The present study findings are contrary to some other investigators^{6,12,17} where they have preferred surgical procedures more than restorative procedures under GA. Stainless steel crowns were given more precedence amongst all restorative procedures employed for multi-surface carious lesions. The provision of dental treatment under GA is a very efficient way of treating children with primary dentition because it allows the clinician to perform the entire treatment in one visit for highly uncooperative children and children with disabilities. Nonetheless, more

parents and guardians would select DGA as an option based on the child's psychological state, such as poor co-operation or dental anxiety.¹⁶

In the present study, only forty-eight children with primary dentition have utilized the service of the DGA. The sample involved in the study was significantly less compared with prior reported studies and considered a limitation. The possible reason was only children with primary dentition included in the present study. In the Indian subcontinent, dental treatment under general anesthesia was still confined to the urban areas. Hence, with this data, the study findings are not to be generalized. These findings could be used as a reference for further studies. Moreover, the study performed retrospectively from January 2014 to December 2017; this is another drawback. However, the early intervention of DGA for uncooperative children with more carious lesions improves their quality of life. Overall, the present study trend showed a conservative approach to a surgical approach, and these findings were in agreement with prior studies.^{6,8,16}

CONCLUSIONS

Dental caries was the most common reason for DGA. Overall, restorative procedures were given priority over preventive and surgical procedures in DGA. Among restorative procedures, stainless steel crowns were extensively used. Nevertheless, DGA is also a viable option for pediatric patients if they require treatment for ten or more primary teeth.

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Declarations

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