



ORIGINAL ARTICLE

Oral Rehabilitation Under General Anesthesia for Pediatric Patients at Bahrain Defense Force Hospital: A Retrospective Study

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Abstract

Objective: To analyze data on full mouth rehabilitation under general anesthesia (GA) performed at the Bahrain defense force (BDF) Military Hospital with focus on patient characteristics, type of procedures, reasons of treatment under general anesthesia and post-operative complications.

Material and Methods: Retrospective review of 281 patients treated under GA at the BDF day case surgery unit. Patient's (sex, age) clinical data (diagnosis, reasons of treatment, number of stainless-steel crowns (SSCs) used, extracted teeth, endodontic treatment, fluoride applications and prophylaxis treatment, postoperative complications were collected.

Results: Two hundred and sixty patients were treated under GA due to their uncooperative behavior, 13 patient were medically compromised, and 7 patients were elective patients. All patients were discharged on the same day, with no complications, excluding 4 patients, who reported within two of months follow-up with pain.

Conclusion: Within the limitations of this study, it is important to educate parents on oral hygiene and caries preventions in order to minimize future failures and the need to repeat the GA, for their children. Oral rehabilitations under GA may be required for the treatment of non-compliant patients. Treatment under GA is safe and effective in providing dental care for non-compliant and medically complex patients.

Keywords: Dental Care; General Anesthesia; Mouth Rehabilitation; Oral Hygiene; Patient Compliance

Introduction

Behavioral management plays an important role in pediatric dentistry, especially when treating younger patients. Most patients treated at the pediatric dental clinic are conscious. Behavioral management can be applied when patients are apprehensive about dental treatment. However, some children cannot receive

comprehensive and conventional dental treatment in the dental chair. Dental treatment under general anesthesia (GA) is used in patients whose behavior cannot be achieved by non-pharmacological approaches ('tell, show, do', positive reinforcement, voice control, distraction) or pharmacological techniques (nitrous oxide sedation oral sedation).¹

This is important for patients with moderate to severe disabilities because these patients have poor oral hygiene and increased treatment requirements versus a general healthy population; GA often is the primary approach for dental treatment in this group.²

Patients with complicated medical conditions, very young children in need of aggressive dental procedures, or patients with full mouth caries, who require complete dental treatment are also candidates for GA as well as otherwise healthy patients with extreme dental phobia or severely uncooperative patients.³

Dental treatment under GA has numerous advantages: it does not require patient cooperation, the patient is unconscious and non-responsive to pain, a certain degree of amnesia is present after the procedure, and drugs can be titrated to an ideal dose. Dental treatment under GA also have disadvantages: the absence of the patient's protective reflexes, depression of vital signs, and a higher rate of intra and postoperative complications versus local anesthesia (LA).⁴

Furthermore, treatment under GA requires specialized equipment, facilities, and a trained team of professionals. This is especially important for the management of intra- and post-operative complications. As per the American Society of Anesthesiologists (ASA) closed claims project, a much higher proportion of fatal postoperative complications were observed when such procedures were performed in dental settings versus hospital settings.⁵

In addition, a greater proportion of complications in dental-based claims were judged to be preventable by using enhanced monitoring compared to hospital settings.⁵ The rationale for GA in dental treatments is to allow complete oral rehabilitation, which includes pulpal treatment, extractions of non-restorable teeth, dental restorations, and/or stainless-steel crowns (SSCs) in a single session.⁵

Lately there has been a trend towards fewer root treatments in primary teeth (pulpotomy/pulpectomy) and more of extractions, SSCs, and fissure sealing of teeth under GA.⁶

Most pediatric dental GA candidates are medically compromised children who are uncooperative but otherwise healthy children and children with early childhood caries.⁶ This study included children aged from birth to 13 years indicated for full mouth rehabilitation who were otherwise healthy as well as medically compromised children. These children were entitled for treatment by the Bahrain Defense Force (BDF) military. Those not entitled but attending as private patients were excluded.

The aim of this retrospective study was to assess the treatment needs of the pediatric dental population and the reasons behind seeking comprehensive dental treatments under general anesthesia for ultimate delivery of care.⁷

Materials and methods

Medical records of 291 children entitled for treatment at the Bahrain defense force (BDF) military hospital who have received dental treatment under GA over a 1-year period (December 2018 – December 2019) were obtained.

The main reason why these included children were treated under general anesthesia was non-compliance to dental treatment under local anesthesia (sedation), medically compromised patients, or extensive procedures that cannot be tolerated on the dental chair. All children had undergone a preoperative assessment during which their clinical details were recorded. However, this was not feasible for many children due to their non-compliance and young age.

A written informed consent was signed by the parents or the child's legal guardian. Verbal and written preoperative instructions were given to the parents regarding eating and drinking both prior to and after the dental procedure. A detailed explanation regarding the treatment procedures to be conducted and the estimated operating time required was discussed with the parents of each child.

On the day of the procedure, patients were evaluated by the anesthesiologist regardless of their ASA status. All dental procedures were performed by a consulting pediatric dentist at the BDF hospital and were completed in a single session under GA with

oral intubation. The treatment procedures included placing SSCs, pulpal treatments, extractions, and operative procedures including composite resin, fissure sealants, calculus removal, and prophylaxis treatment followed by fluoride varnish application when possible.

When teeth extractions were performed, the area was anaesthetized using 2% lidocaine 1:100,000 with epinephrine. Analgesics were prescribed postoperatively on a case-by-case basis. All medically fit patients were discharged on the same day. Patients were given follow up appointments after two months for review.

Statistical Analysis

The medical records were reviewed to record the age at the time of dental treatment, gender, and type of dental procedures performed (SSCs, pulpal treatments (pulpotomies), extractions, as well as operative procedures including composite resins and/or fissure sealants, calculus removal, prophylaxis treatment, and fluoride varnish application. Data collected was then sent for statistical analysis to the Research Centre at the BDF hospital. Data was recorded in Microsoft Excel and later imported to SPSS (Statistical Package for Social Science; version 23.0). Continuous data were expressed as mean and standard deviation (SD), and categorical data expressed as frequencies and percentages. Descriptive analysis was done.

Results

The average age of the children at the time of the procedure were 6 years with mean of 5.6 ± 2.21 years. Of these, 260 patients were treated under GA due to their uncooperative behavior. The sample included more males than females. Oral rehabilitation under GA was most often performed for children with uncooperative behavior ($n=260$ (92.86%)) followed by medically compromised children ($n=13$ (4.64%)) and patients assigned for GA as elective cases ($n=7$ (2.50%)) as shown in Table 1.

Table 1: Demographic characteristics

Variable	
Age (years) (Mean± SD)	5.62 ± 2.21
Gender (%)	
Female	109 (38.8%)
Male	172 (61.2%)
Indication	
SN	13 (4.64 %)
UC	260 (92.86 %)
UC/Elective	7 (2.50 %)

Overall, 981 deciduous teeth had SSC placed, 525 teeth were extracted, 94 composite restorations were placed on permanent teeth, and 19 teeth had fissure sealants applied. Pulpotomy was performed on 76 patients and prophylaxis with fluoride application was done for 136 patients as shown in Table 2.

Post-operative analgesics were prescribed for all patients according to their case (Paracetamol 120 mg/5 ml or Ibuprofen 100 mg/5 ml three times a day for 3 days). All patients were discharged uneventfully on the day of procedure. However, only 60 patients came back for their follow up appointment. Postoperative review was done on 95.24 %. Only 8 patients (2.8%) had pain as a complication after surgery within a period of two months.

Table 2: Clinical characteristics

Variables	Mean ± SD
Standard Steel Crown (SSC)/(teeth) Range (min, max)	3.94± 1.80 (1.8)
Extraction / (teeth) Range (min, max)	3.67 ± 2.20 (1.10)
Composite rest (n=8)	1.96 ± 1.30
FS (n=8)	2.13 ± 1.36
Pulp TX (n=57)	1.33 ± 0.61

Discussion

This study showed the primary indications for dental treatment under GA: 260 patients were non-compliant but otherwise healthy with no systemic or neurologic impairment; 13 subjects had intellectual or physical disabilities and were treated under GA because good communication and co-operation was difficult or impossible.

The patients were given dental education/information regarding oral hygiene and importance of follow up visits irrespective of their indication.

The goal of such information was to prevent future GA procedures and risks of repeated GA. The patients treated under GA were chosen regardless of the decayed, missing due to caries, and filled teeth in permanent dentition (DMFT) or decayed, extracted due to caries, filled, teeth in primary dentition (deft) in contrast to prior work.⁸

Children of preschool age diagnosed as having early childhood caries have high treatment needs, i.e., full mouth oral rehabilitation. They sometimes readily accept treatment during initial exam, but compliance usually decreases as the treatment progresses. This can lead to the need for GA for otherwise healthy and young children.⁹ Worthen and Mueller found that dental treatment under GA should be delayed until the primary second molar erupts because this will minimize the need for a second procedure under GA.¹⁰

This finding was confirmed in this study: the mean age group treated was 6 years (5.62 ± 2.21), and the patients could better cope with the treatment. Harrison et al. suggested that parents of chronically sick children are usually acquainted with the need for dental treatment; however, there is a considerable delay in approaching a dentist because seeking medical attention becomes their primary concern.¹¹

This inference can be related to this cohort: 13 cases had chronic disease or disability in the 6-year-old age group. It is well documented that children who undergo dental treatment under GA have a remarkable improvement in their quality of life.¹²

On consultation visits, the parents are informed regarding the treatment plan where a radical treatment approach is recommended. Teeth with

poor prognosis or those with doubtful prognosis must be removed especially in children with special needs.¹³

This perspective reduces the possibility of complications and repeated GA, which should be avoided considering the risks of morbidity and mortality of GA. Most treatment is comprised of restorative treatment using SSCs. SSC restorations have shown the highest success rate among restorative material, and their use in primary teeth is very useful.¹⁴

SSCs were the most common restoration material used in this study as well. This material has a higher success rate than multi-surface complex amalgam restorations. SSCs are very durable and functional restorations and can decrease the need for retreatment in teeth with interproximal caries.¹⁵

Complex treatments such as pulp therapy for teeth with interradicular or periapical lesions or necrotic pulp should be avoided.¹⁶ Vital pulpotomy is more frequently adopted when the pulp treatment option is considered.¹⁵

Najat Farsi et al. reported the postoperative complications of 90 children attending a dental GA procedure in Jeddah, Saudi Arabia. They were observed intraoperatively in the operating room and post-operatively by phone on the first and third days after operation. The results showed that 99% of the children had one or more complaints on the first day in contrast to only 33% on the third day. An inability to eat, sleepiness, and pain were the most common complaints followed by bleeding, drowsiness, sore throat, vomiting, psychological changes, fever, cough, and nausea. Post-operative morbidity was common but was mostly mild and limited to the first day.¹³

The limitations of this study included an extended waiting time (4 to 6 months). This could be due to the scheduled five cases once per week by two alternating pediatric dentists. The admissions were done as day cases, which minimizes the hospital stay and discharges the child when vitally stable and fit. A dental surgeon and a physician were on the panel to cater to any of the patients' complaints (if any). The patients were advised to attend dental clinics for follow-ups after 2 months.

However, they were requested to attend the emergency clinics anytime over the weekdays from 7 AM to 9 PM if there were any complications. This data suggested that pain with a mean of 8 (2.8%) was the most common complication.

Conclusion

Within the limitations of this study, it is important to educate parents about oral hygiene and caries prevention in children to minimize the need for GA. Oral rehabilitation under GA is sometimes required for noncompliant patients. Treatment under GA is a safe and effective way to provide dental care for non-compliant and medically complex patients.

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References

1. Behaviour Management Subcommittee AAofPD. Guideline on behaviour guidance for paediatric dental Patient. *AAPD: American Academy of Pediatric Dentistry*. 2019;:266-279.
2. Anders P, Davis E. Oral health of patients with intellectual disabilities: A systematic review. *Special Care in Dentistry*. 2010;30(3):110-117
3. Chen Y, Hsieh C, Hsu W. et al. A 10-year trend of dental treatments under general anesthesia of children in Taipei Veterans General Hospital. *Journal of the Chinese Medical Association*. 2017;80(4):262-268.
4. Lee L, Posner K, Caplan R. ASA Closed Claims Project: An Analysis of Claims Associated with Regional Anesthesia in the Operative Setting 1980- 1999. *Anesthesiology*. 2002;96 (Sup 2):A1126
5. Tsai CL, Tsai YL, Lin YT, Lin YT. A retrospective study of dental treatment under general anaesthesia of children with or without a chronic illness and/or a disability. *Chang Gung Med J* Vol. 29 No. 4, Jul-Aug 2006
6. Brailo V, Janković B, Lozić M. Dental Treatment Under General Anesthesia in a Day Care Surgery Setting. *Acta Stomatologica Croatica*. 2019;53(1):64-71.
7. Atan S, Ashley P, Gilthorpe M. et al. Morbidity following dental treatment of children under intubation general anaesthesia in a day-stay unit. *Int J Paed Dent*. 2004;14(1):9-16.
8. Alcaino E, Kilpatrick N, Kingsford Smith E. Utilization of day stay general anaesthesia for the provision of dental treatment to children in New South Wales, Australia. *Int J Paed Dent*. 2000;10:206-212
9. Worthen T, Mueller W. Implications of parental compliance on decision making in care provided using general anesthesia in a low-income population. *ASDC J Dent Child*. 2000;67(3):197-9.
10. Harrison MG, Roberts GJ. Comprehensive dental treatment of healthy and chronically sick children under intubation general anaesthesia during a 5-year period. *Br Dent J* 1998;184: 503-6.
11. Baghdadi Z. Children's oral health-related quality of life and associated factors: Mid-term changes after dental treatment under general anesthesia. *Journal of Clinical and Experimental Dentistry*. 2015;:e106-e113.
12. Farsi N, Ba'akdah R, Boker A. Postoperative complications of pediatric dental general anesthesia procedure provided in Jeddah hospitals, Saudi Arabia. *BMC Oral Health*. 2009;9(1).
13. Attari N, Roberts J. Restoration of Primary Teeth with crowns: a systematic review of the literature. *European Archives of Paediatric Dentistry*. 2006;1(2):58-62.
14. Eshghi A, Samani M, Najafi N. et al. Evaluation of efficacy of restorative dental treatment provided under general anesthesia at hospitalized pediatric dental patients of Isfahan. *Ent Res J (Isfahan)*. 2012;9(4):478-482.