

Ethics in Children’s Dental Treatment under General Anesthesia at the Lebanese University

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ABSTRACT

Background: In pediatric dentistry, general anesthesia is required for dental treatment. The treatment modalities are often linked to the patient’s medical conditions. However, ethical values might influence the decisions of the treatment. **Aims:** To compare the treatment modalities under general anesthesia between healthy children and children with special needs (CSN) and to assess the ethical principles. **Materials and Methods:** An analytical retrospective study, approximately 64 patients including 26 CSN and 38 healthy children from 3 to 12 years of age, who underwent general anesthesia (GA) for dental treatment, was performed. The treatment modalities for each tooth were noted, such as fissure sealant, composite, pulp treatment, stainless steel crowns restorations, and extraction. Statistical analysis was performed to evaluate the implementation of the four principles of ethics. Statistical analyses were performed with the Statistical Package for the Social Sciences (SPSS), version 20, (Los Angeles, California), with 95% confidence interval of the difference. The significance level was set at $P < 0.05$ valued. **Results:** A total of 40.6% of the sample were CSN and 59.4% were healthy with extremely high dental fear and anxiety. Thirty-five children were <6 years old. Only 11.4% of them were CSN; 29 children were ≥ 6 years old and 75.9% were CSN. For 56 of 64 of the patients, the treatment plan has not been respected irrespective of the medical condition. A total of three of the eight treatment plans that have been respected were for the CSN and five for the healthy children. **Conclusion:** Under general anesthesia, the medical condition of the patient did not alter the dental treatment type. The four principles of ethics were respected as well in CSN as in healthy ones.

KEYWORDS: Ethics, general anesthesia, pediatric dental management

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INTRODUCTION

Dental caries are considered as the most common chronic health problem in childhood.^[1,2]

Approximately 60% of children with decayed primary teeth are around 5 years old.^[3] Untreated caries have shown a negative impact on the child’s development, fulfillment, well-being, and self-esteem. Caries can rapidly destroy the primary dentition of toddlers and infants, and if left untreated, can lead to pain, acute infection, nutritional insufficiencies along with learning and speech problems.^[4] The pain resulting from decay

can cause difficulty in eating and sleeping, which can lead to a decrease in the concentration of the child and lack of school achievement. All these can affect the family’s quality of life.^[5]

In pediatric dentistry, behavior management techniques are used during dental treatment of children such as tell-show-do, modeling, voice control, nonverbal communication, positive reinforcement, distraction,

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and/or parental presence/absence. Moreover, nitrous oxide, protective stabilization, sedation, and general anesthesia (GA) are considered successful tools for the child's dental management. The latest approach of dental rehabilitation is viewed as a technique of last resort.^[6-8]

In some circumstances, GA is the only appropriate method to deliver necessary oral health care. Dental treatment procedures under GA are very useful in some clinical situations, especially with severe health impairments and the lack of cooperation from some children.^[9] The children undergo GA when they are extremely uncooperative and anxious.^[10,11] Physical, psychological, or medical disabilities impede children's cooperation. GA is also indicated in fearful or uncommunicative children and for whom local anesthesia is ineffective or may induce allergic reaction.^[12-14]

Few studies, discussed the dominant conceptions of "medical ethics" to dental management of children, especially during GA. The current field has not been debated broadly as it has quite different concerns and priorities.^[15]

Maintaining health is the main task of health professionals. It is related to the famous Hippocratic oath, "*primum non nocere*"—first of all, do no harm—of medical ethics. Ideally, for a medical practice to be considered "ethical," it must respect all four of these principles: autonomy, beneficence, non-maleficence, and justice.^[16] Nowadays, patient-centered care is required. Particular ethical values might influence decisions and choices of treatment.

The aim of this study was to consider the characteristics and the differences of treatment modalities performed under GA between healthy children and children with special needs (CSN). In addition, an assessment of the ethical principles: autonomy, beneficence, non-maleficence, and justice was performed.

MATERIALS AND METHODS

This retrospective study involved a total of 64 patients aged between 3 and 12 years treated under GA (duration <3h) from the Pediatric Dental Department at the Lebanese University, Beirut, Lebanon, during the academic years 2015–2017. Simple stratified sampling method was adopted; 100% of the patients were considered in the study. As the medical center is a governmental establishment, which charges low fees, many children with different medical conditions seek care in this specialized center.

A provisional treatment plan was elaborated after a dental clinical examination, and oral radiographs were taken when possible. An informed consent was signed beforehand by one of the parents and an approval of the ethics committee of the Faculty of Medicine at the Lebanese University was obtained under the number CUMEB/D163/12019.

The patients' files were classified into two groups. The first one included 26 CSN (21 male and 5 female) outlining the type of handicap. The second one included 38 children (21 male and 17 female) designated healthy and normal but noncooperative. All patients were categorized as <6 years and ≥6 years. The reason for GA was noted (e.g., noncooperative patient or type of the handicap distributed as follows: cerebral palsy 6, autism 6, hyperactivity 3, Down's syndrome 4, cyanosis 1, epilepsy 3, Leigh's syndrome 1, growth delay 1, and mitochondrion 1.

The treatment modalities under GA for each tooth (primary and permanent) such as preventive procedure (fissure sealant), operative restoration (composite), pulp treatments (pulpotomy and pulpectomy), prosthetic restoration (stainless steel crown [SSC]), and extraction were noted.

The study followed the four principles of ethics. Autonomy evaluation was established on the respecting the treatment plan drafted before GA. Justice was based on fairness in distribution of management between CSN and healthy children. Beneficence (do good) and non-maleficence (do not harm) were assessed by analyzing the risk/benefit for each dental procedure (sealant, composite, pulpotomy, SSC, and extraction).

Statistical analyses were performed with the Statistical Package for the Social Sciences (SPSS), version 20, (IBM, Los Angeles, California, USA), with 95% confidence interval of the difference. The significance level was set at $P < 0.05$ valued.

The Kolmogorov–Smirnov, the independent samples, the Mann–Whitney, and the chi-square tests were used.

RESULTS

Table 1 shows distribution of children in the study; 64 children underwent GA and were divided into two groups: 40.6% of them were CSN and 59.4% were healthy with extremely high dental fear and anxiety. Thirty-five children were younger than 6 years old. Only 11.4% of them were CSN and the rest 88.6% were healthy. Twenty-nine of 64 children were aged more than 6 years. Approximately 24.1% of them were healthy and 75.9% were CSN.

Table 2 shows that for the majority of patients (56 of 64), the treatment plan has not been respected irrespective of the medical condition. Three of the eight treatment plans that have been respected were for the CSN and five for the healthy children.

Table 3 indicates the comparison established between the CSN and healthy children in all treatment modalities (treatment plan, fissure sealant, composite, pulpotomy, SSC, and extraction). The chi-square test was used to determine whether the treatment plan has been respected or not. On comparing the two groups, the Mann-Whitney tests showed *P* value of 0.02 for fissure sealant, which means that CSN have undergone more sealant interventions (37) than healthy ones (16). Sixty-six and 107 teeth were extracted for CSN and healthy ones, respectively.

The independent samples test used to analyze the differences between the two groups indicated *P* values of 0.851, 0.305, and 0.152 for composite, pulpotomy, and SSC, respectively. The means of the three mentioned interventions were approximately equal among both CSN and healthy ones.

DISCUSSION

Ethical issues come up in pediatric dentistry when treating noncooperative children or CSN. The ethical dilemma arises if the patient refuses care or has to be restrained. Varelius^[17] (2006) stated that personal autonomy is free from controlling interferences by others.

According to Camoin *et al.*^[15] (2018), practitioners reported sacrificing ethical values, such as patient autonomy, beneficence, and non-maleficence, when making a clinical decision. Most of the dentists adopt a “utilitarianist” viewpoint.^[15]

In the last decades, there has been a shift from a paternalistic view of medicine to the autonomy of the patient. Information must be shared with a proxy and the problems should be discussed together to be resolved without any harm.^[18]

For each child, the practitioners should provide all the treatment modalities to promote patient-centered care. They also should offer guidance for the treatment, recommend a quality improvement, and protect the vulnerable patients from the violation of their autonomy and rights. Moreover, their role is to help the parents understand reasonable options that could lead to the most appropriate shared decision-making.

To improve the quality of life of anxious children and CSN, parents were forced to accept GA as no other alternative was accessible. Consequently, autonomy is considered to be constrained, particularly, when dental treatment modalities implement aggressive solutions to avoid re-interventions.

In this study, the treatment plan was not respected in 88.5% and 86.8% of CSN and healthy children, respectively [Table 2].

Table 1: Distribution of children according to their medical condition and age

Distribution of the sample			Age category		Total
			<6 years	≥6 years	
Child condition	CSN	Count	4	22	26
		% within age category	11.4%	75.9%	40.6%
	Healthy	Count	31	7	38
		% within age category	88.6%	24.1%	59.4%
Total		Count	35	29	64
		% within age category	100.0%	100.0%	100.0%

Table 2: Distribution and implementation of treatment plans between the two groups expressing the autonomy

Implementation of treatment plan			Child condition		Total
			CSN	Healthy	
Treatment plan	Respected	Count	3	5	8
		Expected count	3.3	4.8	8.0
		% within child condition	11.5%	13.2%	12.5%
	Not respected	Count	23	33	56
		Expected count	22.8	33.3	56.0
		% within child condition	88.5%	86.8%	87.5%
Total		Count	26	38	64
		Expected count	26.0	38.0	64.0
		% within child condition	100.0%	100.0%	100.0%

Table 3: Principles of ethics (justice, beneficence, and non-maleficence) linked to dental treatments performed under general anesthesia between the children with special needs and healthy children

Factor	CSN number	Healthy number	CSN mean	Healthy mean	Comparison test	P value
Treatment plan (justice)	26	38	26	38	Chi-square	0.847
Fissure sealant (beneficence)	37	16	1.42	0.42	Mann–Whitney	0.02
Composite (beneficence)	118	178	4.54	4.68	Independent samples <i>t</i> -test	0.851
Pulpotomy (beneficence)	64	116	2.46	3.05	Independent samples <i>t</i> -test	0.305
SSC (beneficence)	104	189	4	4.97	Independent samples <i>t</i> -test	0.152
Extraction (non-maleficence)	66	107	2.54	2.82	Mann–Whitney	0.529

CSN*: children with special needs

Despite the fact that the treatment plan anticipated was explained to the parents, its implementation could not be respected during GA. It showed that autonomy was approximately not applicable in the two groups due, in one hand, to difficulties during preoperative dental and radiographic examinations, and on the other hand, to the delay in managing the GA. In fact, parents postpone the intervention for many reasons—mainly financial—which can impede the modality of the dental treatments. According to Abou-Mrad and Tarabey^[19] (2013), the problem with the quality of care in Lebanon is economical in nature and the vulnerable elements of the Lebanese population cannot afford medical care. The American Academy of Pediatric Dentistry (AAPD 2015) stated that dental disease usually is not life-threatening and the type and timing of dental treatment can be deferred in certain circumstances.^[7]

In Table 3, no statistical significance was found regarding the treatment plan ($P = 0.847$). It has been either respected or not, equally, when comparison was established between CSN and healthy kids in general.

This finding points to the fact that the principle of justice is respected in the sense of fairness in distribution of management between CSN and healthy ones. The Belmont report (1979) asserted that the way of conceiving the principle of justice is that equals ought to be treated equally.^[20]

A dentist must always try to minimize the risk of failure and maximize the benefit. At first glance, it appears easy, but it requires the dentist's awareness and knowledge in analyzing the risk/benefit for each child. Some decisions are straightforward and easy, others can be very difficult. Ethics are inextricably linked with these following decisions:

- When the risk is low and the profit is low, it results in a futile action, the risk is unnecessary.
- When the risk is low and the profit is high, it results in a mutual agreement and the action is granted.

When the risk is high and the profit is low, it results in an unacceptable situation; it will be dangerous and most likely non-beneficial.

When the risk is high and the profit is high, it results in a bet, which will be hazardous.

It has been shown that GA is the safest way of sedation.^[14] Sometimes, needed integrated methods, especially in CSN and anxious children, must be applied.

Some treatments involve some levels of risk for the patient. The dentist must explain the risks and benefits of dental interventions such as fissure sealant, composite, pulpotomy, SSC, and extractions. Therefore, a treatment plan will be as unique as a fingerprint and should be highly individualized for each patient.

In Table 3, concerning the number of fissure sealants, a statistical significance was observed ($P = 0.02$). CSN have undergone more sealant interventions than healthy ones. This difference could be justified by the fact that CSN are older than the healthy ones. Approximately 75.9% are ≥ 6 years, at this age, the first permanent molars are erupted, whereas 88.65% of the healthy children are < 6 years, the first permanent molars are not yet erupted. Fissure sealant, considered as an early intervention, plays a crucial role in helping to prevent caries and aims to avert an increased risk of developing decay in the dentition. Indeed, the AAPD (2016) encourages clinicians toward an increase in the use of sealants that are considered likely to be effective in preventing carious lesions.^[21]

Implemented strategies were anticipated to minimize the occurrence of potential untoward outcomes. This was realized by risk identification: development of well-targeted procedures for minimizing adverse outcomes that require an awareness of the most frequently occurring negative incidents.

In this study, composite restorations were equal among the two groups ($P = 0.851$). It could be related to the concerns of ensuring good treatment in a systemic way on evidence-based methodology.

These findings were consistent with a study by Baygin *et al.*,^[22] where no differences were observed in composite restorations between special health-care needs and noncooperative children ($P = 0.81$).

On the contrary, Kumar Mallineni *et al.*^[23] (2018) found that the young children <6 years received more restorative procedures than the ones >6 years and the use of composite restorations was higher ($P < 0.05$).

To minimize the risk or to avoid recurrent caries, an overtreatment such as a composite restoration was preferred without any distinction or difference between the two groups. The purpose of composite utilization was to prevent the clinically visible caries lesions from progressing and consequently infecting the pulp.

Concerning the pulpotomy, both CSN and healthy children have undergone equal number of pulpotomy interventions ($P = 0.305$). This equality could be related to the fact that in the <6 years old group, treatments with SSC were performed on vital teeth. In the CSN's group, for teeth having poor prognosis and deep carious lesions, the tendency to overtreat was preferred (pulpotomy). Despite the inequality in the distribution of the children (26 CSN and 38 healthy), there was almost an equivalence in the treatment's modality.

Our findings run contrary to the findings of Yung-Pan *et al.*,^[14] for them, the >6-year-old group had the lowest mean number of teeth treated by pulp therapy ($P = 0.05$). Another study showed that children who had a disability received fewer pulpal treatments.^[24]

In Table 3, when comparing SSC between the two groups, no statistical significance was noted ($P = 0.152$). This result could be justified by the fact that the target of the treatment was to implement the treatment durability over time. Thus, the principle of beneficence was respected.

In children with high caries, which is the case, whether they were disabled or healthy, absolute management of primary dentition with SSC is indicated over time compared to multi-surface intracoronal restoration.^[25,26] For Chisini *et al.*^[27] (2018), the SSC had the highest success rate (96.1%). Khodadadi *et al.*^[28] (2018) revealed that the failure rate of SSC was 5.26%.

It has been shown that the SSC lasts long in patients with heightened risk of caries such as those distressed by behavior, age, and medical condition.^[25] The advantages of SSCs are a reduction in the cost and a decrease in the risk of re-intervention under GA and its inherent perils.^[26]

Importantly, even after restorations of carious teeth, children remain at high risk for future recurrences;

therefore, we opt for a stronger, forceful, and vigorous treatment, especially in CSN. Therefore, usually under GA, instead of pulp treatments, extractions were preferable. This choice may lead to the decrease of complications and less probability of repeated dental procedures.

According to the AAPD policy (2015), an individual and objective assessment showing the most appropriate oral therapeutic needs in each case will help to decide the best way for dental treatment.^[29]

In this study, no statistical significance was observed between the two groups when comparing the number of extracted teeth ($P = 0.529$) [Table 3]. The choice of extraction in both the groups may explain our determination to reduce the complications and the requirement of repeat procedures in such difficult patients. As conservative dental treatments have a risk of failure, extractions prevailed in certain situations. Contrary to our finding, others revealed that disabled children had more tooth extractions than healthy children.^[22,30]

When evaluating the risk versus beneficence, non-maleficence was esteemed when the pedodontist determined what would be good and bad for the patients without any harm. Indeed, evidence-based methodology was applied in all treatments that were performed in a correct way conferring to the guidelines. The AAPD (2015) recommended the obligation to act for the benefit of the patient in a timely manner.^[29]

According to Thibon *et al.*^[31] (2017), GA considered "the chemical contention" must not be used for the comfort of the practitioner but to protect the patient from possible damages.

AAPD's Policy on the Ethical Responsibilities in the Oral Health Care claimed that the dentist should deal fairly with patients. Moreover, under no circumstance should the business affect the dental treatments.^[29]

Some elements limited our study. A small category of Lebanese population was involved in this study owing to several difficult economical restrictions. Many critical situations were encountered to make decisions and convince the children's guardians about the necessity to undergo GA for dental treatment. Additional studies with larger sample would yield more results.

CONCLUSION

This study results in almost all the treatment modalities: composite, pulpotomy, SSC, and extraction, and indicated that no statistical significance was observed between the two groups. Undeniably, the findings could

be interpreted in a manner that the principles of ethics including autonomy, beneficence, non-maleficence, and justice were respected as well in CSN as in healthy ones.

These findings pointed to the conclusion that under GA, the medical condition of the patient did not alter the dental treatment type.

Nonetheless, the majority of the center's patients showed negligence toward their dental health, especially when GA is involved. This may be due to financial status, where one would argue that financial aid from the government should be implemented for dental care.

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CONFLICTS OF INTEREST

There are no conflicts of interest.

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