AN ALGORITHM FOR TREATMENT OF CHILDREN UNDER GENERAL ANESTHESIA

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ABSTRACT

INTRODUCTION: Children indicated for general anesthesia are those with early childhood caries; with a high degree of anxiety from dental treatment, and those with special needs.

AIM: The aim of this article is to create an algorithm for the complex treatment of children under general anesthesia.

MATERIALS AND METHODS: The object of observation were 992 teeth in 124 children with primary dentition, treated under general anesthesia. The treated teeth were separated into two groups with 496 teeth each, depending on the way of treatment. Observation units: count and relative share of tooth-related complications in relation to the used treatment methods.

RESULTS AND DISCUSSION: In the first examined group all the teeth diagnosed with periodontitis were extracted. The teeth diagnosed with pulpitis, which had a developed apex and no x-ray data of root resorption, were treated with extirpation and filling of the root canals with metapex, followed by obturation with glass ionomer cement (GIC). Only 1.2% (n=3) of them had complications.

CONCLUSION: In order to prevent retreatment, a more radical therapy approach is mandatory. A basic principle in the treatment of these children is that it is consistent with a more severe differential diagnosis, in order to avoid complications.

Keywords: general anesthesia, retreatment, radical approach

INTRODUCTION

Behavioral management has a main role in pediatric dentistry. A big part of children accept dental treatment with the help of techniques of behavioral management in dental clinics, with or without local anesthesia (1,2,3,4).

However, there are cases, where children do not accept routine dental treatment and the use of gen-
eral anesthesia (GA) is the only alternative to ensure dental treatment for children in a safe and effective way (5,6,7).

Dental treatment in childhood, accompanied by pain and unpleasant psychological and forceful experiences may result in fear, anxiety and evading of treatment, including in adult age. This inevitably leads to seeking new opportunities of behavior and pain control during dental treatment in children. The treatment of children, which includes physical force is unacceptable, especially if there are ways to evade it, using general anesthesia (8,9,10,11).

AIM
The aim of this article is to create an algorithm for the complex treatment of children under general anesthesia.

MATERIALS AND METHODS
The object of observation were 992 teeth in 124 children with primary dentition, treated under general anesthesia. The treated teeth were separated in two groups with 496 teeth each, depending on the way of treatment. Half of them were diagnosed with periodontitis chr. granulomatosa diffusa cum/sine fistule, and the other half - with pulpitis chr. fibrosa (248 each). In the first group the teeth with periodontitis were extracted, and the ones diagnosed with pulpitis were treated with extirpation, for teeth with completed root development and no physiological resorption. In the second group all teeth diagnosed with pulpitis, not depending on the root development or resorption, were treated with amputation using the formalin-resorcin method. Half of the periodontitis teeth, which had underdeveloped roots or were in a stage of root resorption (124) were treated with amputation using the formalin-resorcinol method. The other half (124), which had a completed root development and no root resorption had undergone mechanical and chemical treatment of the root canals, followed by filling.

Table 1. A relative share of the complications after using different materials and methods while conducting a treatment under general anesthesia

| Group              | Diagnosis                                      | Treatment Method                                      | Complications            |
|--------------------|------------------------------------------------|-------------------------------------------------------|--------------------------|
| Research group (1) | Periodontitis chr. granulomatosa diffusa cum/sine fistule | Extraction                                            | n=0                      |
|                    | Pulpitis chr.fibrosa                           | Extirpation (used with developed roots and no root resorption) | Periodontitis n=3 1.2%   |
| Research group (2) | Periodontitis chr. granulomatosa diffusa cum/sine fistule | Amputation - Formalin-resorcinol method               | Exacerbated n=80 64.5%   |
|                    | Pulpitis chr. fibrosa                          | Mechanical-chemical treatment of the root canals and filling (Developed root and no resorption ) | Exacerbated n=32 25.8%   |

RESULTS AND DISCUSSION
In the first examined group, all the teeth diagnosed with periodontitis were extracted. The teeth diagnosed with pulpitis, which had a developed apex and no x-ray data of root resorption were treated with extirpation and filling of the root canals with metapex, followed by obturation with glass ionomer cement (GIC). Only 1.2% (n=3) of them had complications, for example periodontitis (Table 1).

Out of the 124 teeth diagnosed with periodontitis, treated with amputation in the second group, 80 (64.5%) had exacerbated. From the 124 teeth with mechanical and chemical treatment of the root canals, 32 (25.8%) have had complications. A total of 27 (10.9%) from the treated teeth, diagnosed with pul-
pitis chr. fibrosa have had complications as well. The complicated pulpitis teeth have undergone a treatment with amputation following the formalin-resorcin method.

There is a notable difference between the complications, related to using different methods of treatment in the two research groups. In the first research group where the diagnose is periodontitis chr. granulomatosa diffusa, mechanical and chemical treatment of the canals is and filling them with metapex is preferred and when the diagnose is pulpitis chr. fibrosa and the teeth have fully developed roots and no data of root resorption the complications are noticeably less.

Based on the research we have conducted an algorithm for treating children under general anesthesia (Fig. 1).

**Clinical cases, treated following the steps of the algorithm:**

**CLINICAL CASE 1**

Boy at the age of 2 years and 1 month, diagnosed with early childhood caries (Fig. 2). Uncooperative due to his young age, treated using the algorithm for treatment under general anesthesia.

1. Professional oral hygiene
2. Treatment of teeth 51, 52 and 61, diagnosed with pulpitis chronica fibrosa, using extirpation (Fig. 3), mechanical and chemical treatment with so-
dium hypochloride 2.5% (Fig. 4) and filling the canals with metapex (Fig. 5a and 5b)
3. Tooth 62 had a D3 caries lesion, treated with amputation. Obturated with composite (Fig. 6).
4. Teeth 53 and 63 – D1 caries lesions, treated with fluoride varnish.
5. The parents received a written individual prophylactic program, with recommendations for a balanced food regime and strict oral hygiene with a toothpaste, containing F- 500 ppm.
6. A routine checkup was scheduled after 1 week.

**CLINICAL CASE 2**

Girl at the age of 3 years and 1 month, diagnosed with ECC (Fig. 7). Uncooperative due to her young age, treated using the algorithm for treatment under GA.
1. Professional oral hygiene
2. Teeth 51, 61, 52, 62 have D2 caries lesions, which were treated and obturated with composite.
3. Teeth 84 and 85 were diagnosed with pulpitis chronic fibrosa and were treated using extirpation (Fig. 8). Tooth 85 was restored using a zirconium crown (Fig. 9 and Fig. 10).
4. The parents received a written individual prophylactic program, with recommendations for a balanced food regimen and strict oral hygiene with a toothpaste, containing F- 500 ppm.
5. A routine checkup was scheduled after 1 week.

**CLINICAL CASE 3**

Boy at the age of 8 with multiple carious lesions and a delayed eruption of tooth 21 (Fig. 11 and Fig. 12) treated, using the algorithm of treatment under general anesthesia.

After a tomography, a supernumerary tooth was discovered, located orally, which was the reason for the delayed eruption (Fig. 13). The area was disinfected, after which the tooth was extracted surgically (Fig. 14 and Fig. 15).

**CONCLUSION**

Based on the four-year experience in treating children under general anesthesia and their follow-up, we analyzed the different methods of treatment and we came to the conclusion that after di-
agnosing pulpitis chr. fibrosa the treatment with ex-
tirpation and filling of the root canals with metapex 
when they are fully developed and have no root re-
orption is preferable over amputation and using the 
formalin-resorcinol method. The need for retreat-
ment is higher in teeth, diagnosed with periodonti-
tis chr. granulomatosa diffusa cum/sine fistule and 
treated using amputation or mechanical and chem-
ical treatment of the root canals, followed by filling. 
This proves that it is better to use the more radical 
method of extraction and using space maintainers 
where they are needed.

REFERENCES
1. AAPD. Guideline on use of anesthesia personnel in 
the administration of office-based deep sedation/
general anesthesia to the pediatric dental patient. 
Pediatr Dent. 2012;34(5):170-2.
2. AAPD. Policy on the use of deep sedation and gen-
eral anesthesia in the pediatric dental office. Pedi-
atr Dent. 2010; 30:64–5.
3. Wilson S. Pharmacologic behavior management 
for pediatric dental treatment. Pediatr Clinic North 
Am. 2000;47(5): 1159-73.
4. Nick D, Thompson L, Anderson D, Trapp L. The use of general anesthesia to facilitate dental treatment. Gen Dent. 2003;51(5):464–8.

5. Attari N, Roberts JF. Restoration of primary teeth with crowns: a systematic review of the literature. Eur Arch Paediatr Dent. 2006; 7(2):58–62.

6. Almeida AG, Roseman MM, Sheff M, Huntington N, Hughes CV. Future caries susceptibility in children with early childhood caries following treatment under general anesthesia. Pediatr Dent. 2000; 22(4):302–6.

7. Eshghi A, Samani MJ, Najafi NF, Hajiahmadi M. Evaluation of efficacy of restorative dental treatment provided under general anesthesia at hospitalized pediatric dental patients of Isfahan. Dent Res J. 2012;9(4):478–82.

8. Bergenholtz G, Axelsson S, Davidson T, Frisk F, Hakeberg M, Kvist T, et al. Treatment of pulps in teeth affected by deep caries: a systematic review of the literature. Singapore Dent J. 2013; 34(1):1-12. doi: 10.1016/j.sdj.2013.11.001.

9. Vinckier F, Gizani S, Declerck D. Comprehensive dental care for children with rampant caries under general anaesthesia. Int J Paediatr Dent. 2001; 11(1):25–32.

10. Davis P, Cladis F, editors. Smith’s anesthesia for infants and children. 8th ed. Mosby; 2011.pp. 43-5.

11. Da Fonseca MA, Nelson T. The use of general anesthesia in behavior management. In: Wright GZ, Kupietzky A, editors. Behavior management in dentistry for children. Wiley Blackwell; 2009. p 185.