SHORT REPORT

Effects of medical and mental status on treatment modalities in patients treated under general anaesthesia at the KTU Faculty of Dentistry in Trabzon, Turkey: A comparative retrospective study

Ozgul Baygin, Tamer Tuzuner, Adem Kusgoz, Gorkem Yahyaoglu, Nagehan Yilmaz, Simge Aksoy

Abstract

This study evaluated the differences in dental conditions and treatment modalities between disabled and non-cooperative healthy children under general anaesthesia. The data were collected from paediatric patients between 3 and 15 years of age who received dental treatment under general anaesthesia. Patients with at least one mental/physical disturbance (group 1) and other healthy non-cooperative patients (group 2) were compared with regard to gender, age, weight, and treatment time-type. The statistical analyses were performed using Fisher's exact and Mann-Whitney U tests. No significant differences were observed between the groups with regard to gender, weight and treatment-time ($p>0.05$). The numbers of treated teeth ($p<0.01$) and extractions ($p<0.001$) were higher in group 1 than in group 2, whereas the frequency of advanced restorative procedures for group 1 was lower than that for group 2, including preventive-resin-restoration ($p<0.001$), glass-ionomer-cement ($p<0.05$), root-canal ($p<0.001$) and stainless-steel-crowns ($p<0.001$). This study supports the hypothesis that the general condition of the patients may alter the type of treatment provided and confirms the necessity of performing preventive procedures.

Keywords: Disabled children, general anesthesia, teeth extracted

Introduction

The oral health status of medically and/or mentally compromised children and non-cooperative healthy children is poor because the provision of effective preventive therapies, access to dental general anaesthesia (GA) centers and acceptable dental treatment procedures are difficult in paediatric dentistry.[1,2] Given the increased incidence of poor cooperation, younger age, impaired cognitive development and the need for extensive treatments in one session, non-cooperative healthy children require GA more frequently than children who have medical and behavioural problems.[2] However, the requirement of GA for children with multiple medical problems and mental disabilities continues to increase.[1] Furthermore, providing effective and frequent preventive procedures and educating parents, caregivers and medical professionals regarding oral quality improvements for children with medical/cognitive disabilities and/or behavioural problems may also decrease the comprehensive treatment needs of these populations.[1,3] Given that GA procedures allow total oral management in a single session, the range of treatment procedures under GA may differ in medically/mentally disabled children compared with non-cooperative younger children with behavioural problems.[1-5] Tooth extraction appears to be the predominant treatment for medically and mentally disabled children because of poor prognoses, whereas full mouth prophylactic, preventive, restorative, endodontic and stainless-steel-crown procedures are common for non-cooperative children.[1,6,7] The aim of this retrospective study was to compare the differences in treatment between medically/mentally compromised and non-cooperative children.

Methods and Results

A total of 180 patients aged 3 to 15 years who were treated under general anaesthesia from 2014 to 2015 were recruited for this retrospective study. Patients were divided into two groups. Those with special health care needs who had at least one type of medical and/or mental/physical disturbances (group 1=90) and with no mental or physical problems were included in the non-cooperative healthy group (group 2=90). Standardized dosages of general anaesthesia were used. To obtain consistent results, we limited the weight range to 20 to 40 kg. All patients required tooth extraction and restorative treatment and lacked appropriate oral hygiene habits, as described by the Department of Paedodontics, Faculty of Dentistry, Karadeniz Technical University (KTU). Ethical approval was obtained from the Ethics Committee of KTU. The patient data were retrospectively recorded, including general and dental history, reasons for general anaesthesia and treatment modalities, such as the number of restorative primary teeth and restorative permanent teeth, the total number of teeth undergoing operative restoration, root-

Faculty of Dentistry, Department of Pediatric Dentistry, Karadeniz Technical University, Trabzon, Turkey.
Correspondence: Ozgul Baygin. Email: dtozgul@gmail.com

Table-1: Dental Treatment Profiles in Group 1 and Group 2.

	Group 1 n=90 (mean±SD) (min/max)	Group 2 n=90 (mean±SD) (min/max)	P
Amalgam	1.66±1.63	1.19±1.28	0.06
	0/8	0/4	
Composites	1.57±2.04	1.32±1.57	0.81
	0/7	0/6	
Preventive resin restoration	2.36±2.65	3.63±2.39	<0.001***
	0/10	0/9	
Fissuresealant	0.69±1.05	0.98±1.46	0.3
	0/4	0/4	
Glassionomercement	0.31±0.74	0.52±0.83	<0.05*
	0/4	0/4	
Amputation	0.19±0.55	1.01±1.16	<0.001***
	0/3	0/4	
Root canal treatment	0.02±0.14	0.24±0.50	<0.001***
	0/1	0/2	
Stainless steel crowns	0.11±0.35	0.64±0.90	<0.001***
	0/2	0/2	
Supra gingival scaling	1.00±0.00	1.00±0.00	1
	0/1	0/1	
Topical fluor application	1.00±0.00	1.00±0.00	1
	0/1	0/1	
Total number of teeth treated	13.79±3.03	12.52±3.67	<0.01**
	21-Aug	24-Jun	
Primary teeth	7.50±4.03	7.99±3.45	0.57
	0/18	0/18	
Permanent teeth	4.21±3.71	2.60±4.01	<0.001***
	0/16	0/18	
Total number of teeth extracted	4.89±2.33	1.00±1.34	<0.001***
	0/12	0/4	
Primary teeth	4.23±2.29	0.78±1.16	<0.001***
	0/12	0/4	
Permanent teeth	0.69±1.09	0.20±0.72	<0.001***
	0/4	0/4	

*p<0.05
**p<0.01
***p<0.001.

canal treatment, amputation, stainless-steel-crowns, tooth extraction, glass-ionomer-cement, preventive-resin-restoration, supragingival scaling, full-mouth prophylaxis and fissure-sealant procedures. Statistical analyses were performed with the statistical package SPSS 17.0 for Windows (SPSS; Chicago, IL, USA). Normality of data was tested with the Kolmogorov-Smirnov test for continuous variables. Fisher's exact test was used for gender comparison, and the Mann-Whitney U test was used to analyze the differences between groups 1 and 2 with respect to age, weight, and treatment time and type. The association between the type/total number of dental treatment (independent factors) and the total number of teeth treated (dependent factor) was tested with a multivariate linear regression model. The significance level was set at p<0.05.

Table-2. Multivariate linear regression outcomes of variables (association with the total number of treated teeth).

Type and numbers of treatment	B	p
Restorative treatment	1.002	p<0.001
Preventive resin restoration	0.969	p<0.001
Endodontic treatment	0.974	p<0.001
Stainless steel crowns	1.002	p<0.001
Total number of teeth extracted	1.022	p<0.001

*Significant associatons were found between retsorative treatment preventive resin restoration,endodontic treatment,stainless steel crowns,total number of teeth extracted to total number of teeth treated)
**Adjusted R-square=0.985
***Goodness-of-fit statistics: F (5,174) = 2419,102; p < 0.001.

According to the statistical analysis, no significant differences were observed when gender, weight and treatment time were compared between the groups (p>0.05). However, the patients in group 1 were significantly older than those in group 2 (p=0.028, p<0.05). All treatments performed in this study are shown in Table-1, of which the most frequent was extraction followed by restorative procedures. No differences were observed in composite restorations (p=0.81) or fissure-sealant applications (p=0.30) between the groups. Group 1 exhibited a significantly higher total number of teeth treated than group 2 (p<0.01). Permanent teeth were treated more frequently in group 1 than in group 2 (p<0.001), whereas no differences were noted for primary teeth (p=0.57). Supra-gingival scaling and topical fluoride application procedures showed no differences between the groups (p>0.05 for both procedure types). The total number of extractions was higher in group 1 than in group 2 (p<0.001). Additionally, the extraction numbers for both permanent (p<0.001) and primary teeth (p<0.001) were significantly higher in group 1 than in group 2. Regarding other treatment type comparisons, group 1 exhibited a lower frequency of preventive-resin-restoration (p<0.001), glass-ionomer-cement (p<0.05), root-canal-treatment (p<0.001) and stainless-steel-crowns (p<0.001) than group 2. The total number of teeth treated was significantly influenced by restorative treatment (p<0.001), preventive-resin-restoration (p<0.001), endodontic treatment (p<0.001), stainless-steel-crowns (p<0.001), and the total number of teeth extracted (p<0.001) (Table-2).

Discussion

General anaesthesia is generally used in the dental treatment of disabled and non-cooperative children if medically

suitable.[1,2,7,8] This study retrospectively compared the dental treatment profiles of medically/mentally compromised children with those of non-cooperative healthy children. Previous findings revealed that younger age groups generally require more restorations/extractions than older patients during GA procedures.[1] Additionally, we found that patients in group 1 were significantly older than group 2.

Consistent with previous findings,[2,8,9] in lieu of preventive measures, comprehensive treatment strategies, including restorative treatments, pulp treatment, extraction and stainless steel crowns, have commonly been used in GA procedures for children.[1,6] Some researchers have indicated that intellectually disabled children were more frequently treated with extractions and restorative treatments than healthy children,[1,10] whereas others have reported that tooth extraction was commonly selected to treat children with chronic medical illnesses and/or disabilities given the poor prognostic profiles of primary and permanent teeth and the inadequate preventive oral hygiene habits and education strategies of this group.[1,7] Our findings were generally consistent with latter claim. In group 1, the total number of extracted teeth was significantly higher than in group 2. In addition, the frequency of preventive, restorative, endodontic and stainless steel crown treatments in group 1 was lower than in group 2. Additionally, according to our regression model, all of the abovementioned treatment sub-types were significantly associated with the total number of treated teeth. The choice of extraction instead of endodontic treatment in group 1 may explain the reductions in complications and the requirement of repeat procedures in disabled patients, consistent with previous reports.[1,7,8] However, previous studies did not identify any difference among healthy and disabled children in terms of dental extractions.[8,9] Therefore, given modern dental innovations, the altered choices of extraction and/or other treatments (restorative and endodontic) must be further investigated to clearly explain the treatment profiles of children treated with GA procedures. Although we identified no significant differences in the number of restored primary teeth between the treated groups, this finding conflicts with previous findings.[1] Additionally, the number of treated permanent teeth was significantly higher in medically/mentally compromised patients than in healthy patients. Therefore, a higher number of permanent teeth needed treatment in the former group. This finding is similar to the findings of previous studies.[1,7,8] All of the above concerns indicate that the children who have medical/mental/physical problems should be considered for comprehensive oral care education and preventive strategies to improve their oral health profiles.[1]

Dental treatment under general anaesthesia for medically/mentally compromised and non-cooperative children is useful, effective and less time consuming. However, the use of more radical treatments in disabled children and more preventive procedures in healthy children has drawn attention. This study supports the hypothesis that the general condition of the patient may alter the treatment type and confirms the necessity of performing preventive procedures and devising oral health education strategies for future patients, particularly medically/mentally compromised patients.

Disclaimer: None.

Conflict of Interest: None.

Funding Sources: None.

References

1. Sari ME, Ozmen B, Koyuturk AE, Tokay U, Kasap P, Guler D. A retrospective evaluation of traumatic dental injury in children who applied to the dental hospital, Turkey. Niger J Clin Pract 2014; 17: 644-8.
2. de Nova García MJ, Gallardo López NE, Martín Sanjuán C, Mourelle Martínez MR, Alonso García Y, Carracedo Cabaleiro E. Criteria for selecting children with special needs for dental treatment under general anaesthesia. Med Oral Patol Oral Cir Bucal 2007; 12: E496-503.
3. Forsyth AR, Seminario AL, Scott J, Berg J, Ivanova I, Lee H. General anesthesia time for pediatric dental cases. Pediatr Dent 2012; 34: 129-35.
4. Enever GR, Nunn JH, Sheehan JK. A comparison of post-operative morbidity following outpatient dental care under general anaesthesia in paediatric patients with and without disabilities. Int J Paediatr Dent 2000; 10: 120-5.
5. Wong FS, Fearne JM, Brook AH. Planning future general anaesthetic services in paediatric dentistry on the basis of evidence: an analysis of children treated in the Day Stay Centre at the Royal Hospitals NHS Trust, London, between 1985-95. Int Dent J 1997; 47: 285-92.
6. Chen CY, Chen YW, Tsai TP, Shih WY. Oral health status of children with special health care needs receiving dental treatment under general anesthesia at the dental clinic of Taipei Veterans General Hospital in Taiwan. J Chin Med Assoc 2014; 77: 198-202.
7. Lee PY, Chou MY, Chen YL, Chen LP, Wang CJ, Huang WH. Comprehensive dental treatment under general anesthesia in healthy and disabled children. Chang Gung Med J 2009; 32: 636-42.
8. Tsai CL, Tsai YL, Lin YT, Lin YT. 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.
9. Ibricevic H, Al-Jame Q, Honkala S. Pediatric dental procedures under general anesthesia at the Amiri Hospital in Kuwait. J Clin Pediatr Dent 2001; 25: 337-42.
10. Nunn JH, Gordon PH, Carmichael CL. Dental disease and current treatment needs in a group of physically handicapped children. Commun Dent Health 1993;10: 389 96.