Pediatric dental procedures under general anesthesia at the Amiri hospital in Kuwait

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Ninety-six patients, fifty-eight healthy patients and thirty-eight special needs patients, ranging in age from 3 to 31yr (average age 6.9yr) had received dental treatments under general anesthesia (GA) at Amiri Hospital. The mean number of dental procedures per child was 13.6 (SD±5.4) with a mean number of 15.6 procedures for healthy patients and 10.5 special needs patients. There was a statistically significantly higher number of dental procedures for healthy patients than for special needs patients ($p<0.001$). The number of pulpotomies and stainless steel crowns placed for healthy patients was significantly higher (3.5) than for special needs patients (1.3) with ($p<0.001$) The average number of extractions was similar for the two groups of patients, 2.8 for normal and 2.2 for handicapped. On the basis of these results, it was concluded that dental treatment under GA in hospital environment is beneficial for certain group of patients, such as very young children and those with special needs. Underlying medical conditions influenced the treatment provided.
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INTRODUCTION

Childhood is recognized in psychiatry as a period of vulnerability and progressive development toward adult personality and character. The brain of a child is in an early stage of cognitive development and a complex matter like a dental procedure can not be fully comprehended.[1]

From this point of view, sedation or general anesthesia (GA) is a solution for extensive dental treatment for those who are unable to adapt their coping skills to the dental treatment, such as young or mentally handicapped children.[2]

Hospital Guidelines for Pediatric Dentistry (AAPD)[3] states that, changing demographics of caries has allowed the profession to focus more energy on other areas such as growth and development, sedation and anesthesia, infant and adolescent care, and special patient and hospital dentistry. Pediatric dentistry activity in hospital affairs has increased over the years considerably, in certain countries. It seems from Harrison[4] that facilities dedicated to GA are becoming increasingly available in the UK within the general community and hospital dental services. This facility has become available in Kuwait within the last ten years.

The aim of this study was to determine characteristics of dental procedures in-patients done with intubation GA in Al-Amiri Hospital during 3 years performed by one operator (1997-2000). The specific aim was to compare the pattern of treatment received for dentally anxious and otherwise healthy children and those with special needs conditions.

MATERIALS AND METHODS

The study group consisted of 96 patients. Fifty-eight were normal and assigned as Group I and thirty-six with special needs conditions, (medically compromised, physically and mentally handicapped) forming Group II. All of them were treated under GA by one senior pedodontist.

The average age at the time of the procedure was 6.9 years and ranged from 3 to 31years (Figure 1). In Group I, the mean age was 4.6 years (Figure 2). In Group II, the mean age was 10.6 years (Figure 3). There were 46 males and 50 females. All of them were admitted in Al-Amiri Hospital for comprehensive dental treatment of primary and permanent teeth utilizing intubating general anesthesia (GA).

Patients were evaluated and diagnosed with multiple carious lesions before admission to the hospital by

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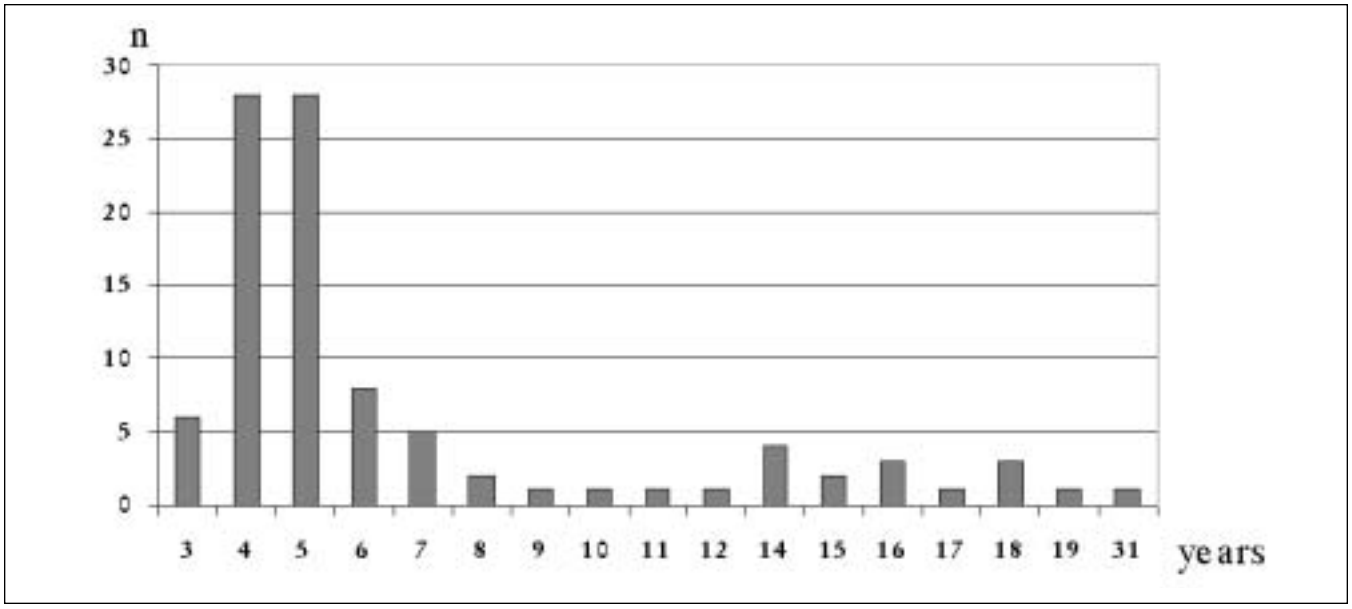

Figure 1. Age of patients having general anesthesia.

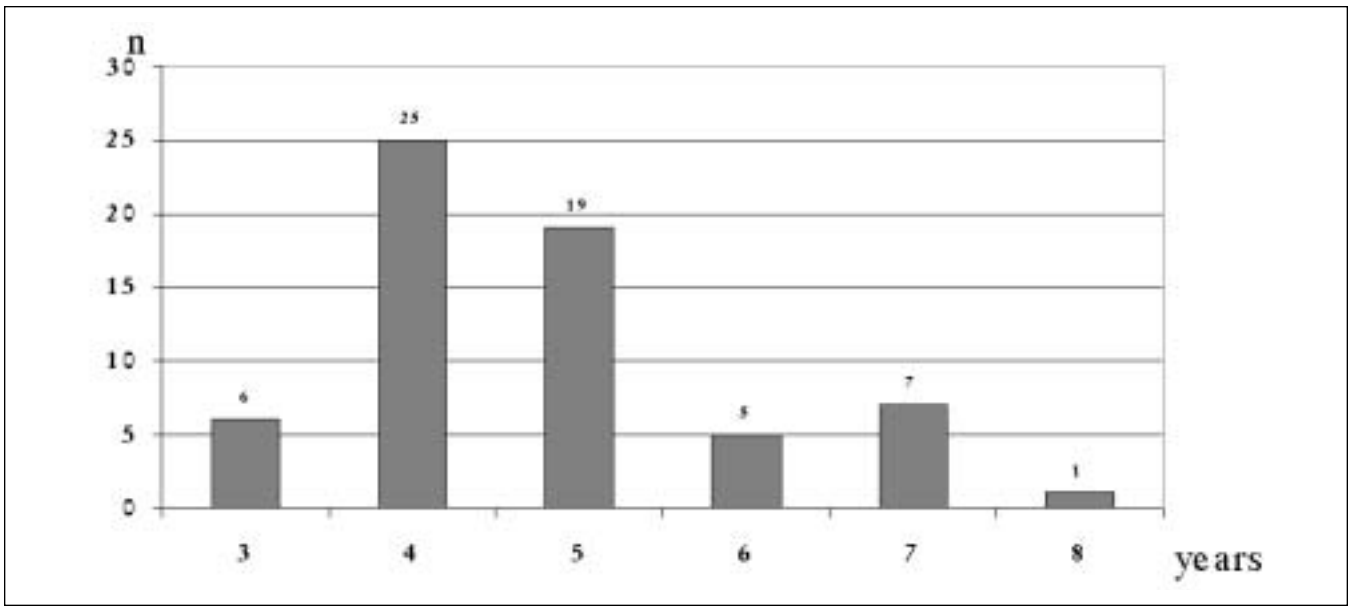

Figure 2. Age of normal patients.

the senior specialist in pediatric dentistry. Parents were given oral hygiene instruction and informed of importance of routine follow-up care. Return visits after surgery were suggested as a requirement every three months for re-evaluation. Medical assessment was made by anesthesiologist at the day of admission, which was one day before the dental procedure.

In the Operation Theatre (OT) two anesthetists were managing patients. When the child was in surgical anesthesia, patients were intubated nasally. An oral pack was placed in order to prevent possible aspiration of debris and pieces of materials during dental procedures.

Dental procedures

One of the goals of oral rehabilitation in OT is to minimize the length of time the patient is under GA, while maximizing the number of dental procedures.[5] This goal we have achieved with appropriate plan of treatment, which was as follows:

- First clean the teeth with a tooth brush and paste,
- Perform all endodontic procedures,
- Place stainless steel crowns (SSC) on endodontically treated primary teeth in each quadrant,
- Do cavity preparation and restore with amalgam, glass- ionomer or composite, according to indication.

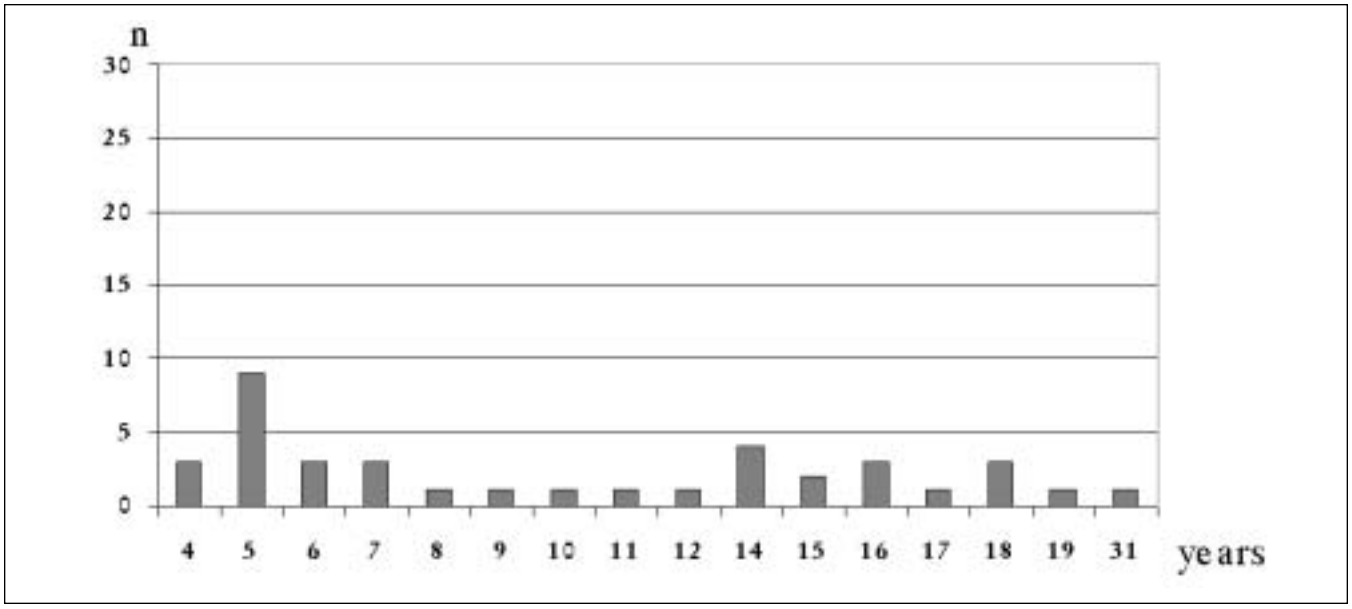

Figure 3. Age of patients with special needs conditions.

- Finally place fissure sealants as the last conservative procedures. Amalgams and other restorations were over-carved into hypo-occlusion to prevent traumatic occlusion as it was difficult to determine the exact occlusion as the patient had muscle relaxants and was in a supine position.

Following the restorative procedures, the oral cavity was rinsed with normal water to remove any debris. Extractions were the last performed dental procedure.

Dental preoperative assessment, which included clinical examination and any necessary special investigations such as radiographs as indicated, were made two days before the OT procedure. Also assessed were the medical and dental histories. On that basis, a provisional treatment plan was made with the knowledge that it will be adjusted as needed during operative procedure. A final treatment plan was made in the operating theatre, after proper intraoral examination, as most of these patients were uncooperative in the dental chair.

The data were saved on computer for statistical analysis using SPSS 9.05 program. An Independent-Samples T-test was used to compare the means.

RESULTS

The total number of dental treatment procedures provided for all patients was 1303 with mean number per person 13.6 (SD±5.4). Mean number for Group I was 15.6 (SD±4.4), and for Group II 10.5 (SD±5.4). Group I (healthy patients) had statistically significantly more performed dental procedures than Group II, special needs patients ($p<0.001$) Table 1.

A total of 794 conservative dental procedures were recorded with an overall mean of 8.3 (SD±3.9). The use of this treatment for the healthy group was 9.3 mean (SD±3.8) being significantly higher than in special needs patients with 6.7 mean (SD±3.6) and $p<0.001$.

Pulpal treatments, which included pulpotomies and pulpectomies, were performed on 255 teeth, with an overall mean 2.7 (SD±2.1) per patient. The healthy group was provided with significantly greater number of pulpal treatments (3.5±1.9) than special needs patients (1.3±1.9) ($P<0.001$).

Two hundred and forty five extractions were done with an overall average of 2.6 per patient (SD±2.5). There were no statistically significant differences regarding extractions among those two treated groups ($p=0.250$). Mean number of extraction in Group I was 2.8 (SD±2.7) and in Group II 2.2 with SD±2.2.

Total number of amalgam restorations was 325 with mean overall 2.4 per person (SD±2.2) No statistically significant differences were found between the two groups ($p=0.502$). Mean in Group I =2.9 (SD±1.7) and Group II 1.7 (SD±2.3).

One hundred and ninety two SSC were placed with an overall average of 2.0 per person (SD±1.9). Number of placed SSC in healthy group was statistically significantly greater than in special needs patients ($p<0.001$) with mean in normal group 2.6 (SD±1.8) and 1.1 in special needs patients (SD±1.6).

It was a similar situation with 261glass ionomer fillings, with mean 2.7 (SD±2.8). In the normal group mean was 3.4 (SD±2.7) and special needs group 1.7(SD±2.6), which was statistically a significant difference ($p<0.001$).

The mean number of all dental procedures in primary teeth in healthy patients was 9.1 (SD±5.4) which was statistically higher than in the special needs

Table 1. Mean numbers and the P-values for different dental procedures during general anesthesia in total sample including all treated teeth

Dental procedures	Total sample		Normal group		Handicap group		
	Mean	SD	Mean	SD	Mean	SD	P-value
All procedures	13.6	5.4	15.6	4.4	10.5	5.4	< 0.001
- intracoronal restorations	8.3	3.9	9.3	3.8	6.7	3.6	0.001
- pulpal treatments	2.7	2.1	3.5	1.9	1.3	1.9	< 0.001
- extractions	2.6	2.5	2.8	2.7	2.2	2.2	0.250

Table 2. Mean numbers and the P-values for different dental procedures during general anesthesia in primary and permanent dentitions in total sample

Dental procedures	Total sample		Normal group		Handicap group		
	Mean	SD	Mean	SD	Mean	SD	P-value
All procedures *in primary teeth*	9.1	5.4	11.6	3.7	5.1	5.3	< 0.001
- intracoronal restorations	6.9	4.7	8.9	3.9	3.8	4.3	< 0.001
- pulp treatments	2.7	2.1	3.5	1.9	1.3	1.9	< 0.001
- extractions	2.2	2.6	2.8	2.7	1.3	2.2	0.008
All procedures *in permanent teeth*	1.8	3.7	0.4	1.0	4.0	5.1	< 0.001
- intracoronal restorations	1.4	2.9	0.3	1.0	2.9	4.0	< 0.001
- extractions	0.3	1.0	1.7E-02	0.1	0.8	1.5	< 0.001
- sealants	9.4E-02	0.7	0	0	0.2	1.0	0.081

patients (P<0.001). This was the opposite for dental procedure on permanent teeth. Mean number was 1.8 (SD±3.7) and comparing this procedure among those two groups, statistically higher number of dental procedures on permanent teeth were performed in special needs group (P<0.001) Table 2.

DISCUSSION

Dental treatments under GA in a hospital environment have great value for a particular group of patients, such as the very young and handicapped.[6] A result of this study has confirmed this statement, where 58 young healthy children (mean age 4.6y) and 38 with a medical diagnosis (mean age 10.6), have received 13.6 dental procedure per person in one visit.

Repeated visits to achieve satisfactory treatment with behavioral management and local anesthesia in a child with limited cooperation where many treatments are needed may be unacceptable.[2] This was the case with all of our patients.

In this study special needs patients, Group II, were older than healthy children from Group I, which was one of the main reasons why they had received statistically significantly a higher number of dental procedures on permanent teeth. As Holt[7] mentioned for the chronically sick child, sepsis associated with failed restorations itself could be life threatening and may involve additional medical interventions. In this study, for the reason of certainty of the outcome of dental treatment, the number of restorative and pulpal therapy procedures were statistically significantly less in children with special needs conditions than in normal group. We did not find any significant differences in term of extraction teeth between two groups. This finding differed from many studies.[6-10]

Harrison[4] found a predominance of extractions over restorations in sick children. The explanation was that extraction is often the treatment of choice when taken in to account the underlying medical conditions. Very poor dental conditions in the healthy group was reason that we had same number of extractions in healthy group, as was in special needs patients group.

Instructions for home care prevention were given to parents before dental procedure (GA) and at the dis-

charge time from hospital. At the same time, all parents had been asked to bring back child to clinic every three months for follow-up. None returned within one year.

On recall after three years a total of 10 percent of the children returned to our office for recall. Similar findings were found in other studies. Berkowitz *et al*.[9] found two out of three children treated under GA for nursing caries were non-responsive to conventional follow-up care. It is concluded, that most of the parents when once treatment has been completed do not see the need for home care prevention and fail to keep visits to dentists for this purpose.

Vercamp *et al*.[2] observed that when parents of a difficult child seek dental treatment, they are inclined to choose the last invasive treatment strategy possible. Dentists, especially inexperienced, prefer behavioral management techniques.

Podesta[10] has found that parents of children referred for dental treatment under GA in outpatient clinic were highly satisfied. Some were critical for the lack of immediate access to dental treatment for children in pain. We had similar findings. Most of the parents were cooperative before the procedure in terms of coming to appointments on time. However, after the procedure they did not respond to invitation for re-care. We recognized that a large number of parents have approached treatment of children dental caries as "accident" problem, which has to be solved "instantly." Usually those parents are resistant to our advice on practicing home care preventive measures.

In Lands *et al*.[11] study, children treated under GA for nursing caries, have demands for repeated dental treatment under GA within one year. They have suggested that a much more aggressive approach to dental treatment in the children under the age of four, including more extractions, be considered. On the basis our experience our recommendation for this age group is to do more pulpotomies and follow with the placement of SSC, in healthy group, which are the most successful restorations for primary molar teeth when pulp therapy was done. Any doubt in the vitality status of the radicular pulp should be an indication for extraction. Careful assessment of remaining radicular part of the pulp can give high success rate up to 92%.[12]

We agree with Harrison *et al*.[4] that in the case of special needs children, certainty of the outcome for dental treatment is essential. Good quality of treatment can provide certainty. Working under conditions, such as GA, is ideal to accomplish good quality and certainty of dental procedures. It has been recommended that full coverage of primary molars with stainless steel crowns be done even without evidence of extensive lesions particularly for special needs patients.

Scot 1997 in his retrospective study has found trends in dental treatment under GA moving toward conservative restorations and preventive treatments like fissure sealants. In our study the most frequently performed dental procedure, in-group of normal patients, were intracornonal restorations. Numbers of fissure sealants were small, almost ignored. From our data it is obvious that prevalence of caries in Kuwait is high. Available data support this finding.[14] High DMF teeth among children in Kuwait is the reason why our waiting list for treatment under GA is more than one year for special needs patients. At the moment, we have stopped making appointments for normal children with behavioral difficulty because of the lack of space for the operating theatre.

It is an interesting observation by Spencer[8] that in the profession with a generally accepted opinion that prevalence of dental decay is decreasing, at same time there are appearing reports about the increase in the dental rehabilitation under GA.

Thompson[15] is reporting that demands for dental treatment under GA has risen in New Zealand, where waiting time within five years has increased from 3.2 to 28.4% children waiting more than three month. The same author has invited New Zealand Government authorities to take a more realistic approach to purchase such services, so that safe practices are encouraged.

Similar reports from London[6] shows that one third of children attending dental center for extraction under GA were under the age of five. It is concluded that London should re-emphasize the on-going need for GA service at a special center.

We urge our Government to allow more time in OT for the pediatric dental treatment needs under GA for those where other measures of analgesia such as sedation has failed, but there is positive criteria for the use of GA. Many reports around the world have shown demands for dental treatment under GA, particularly for young children as is the case in Kuwait.

Management of fearful children in pediatric dentistry clinic differs from dentist to dentist. Some of them prefer non-pharmacological methods, while others approach these children using more pharmacological behavioral management techniques. Most agreed with Nathan[16] that there are many children for whom non-pharmacological approach may prove inadequate or even inappropriate. From a survey, it is evident that physical restraint in pediatric practice is low, now used only in about 4%, and has tendency to limit the applications to either a handicapped or sedated patients for the purpose preventing potentially harmful movements.

Use of GA has spread all over the world, because very young children and mentally handicapped persons are not able to recognize or understand the feelings of sedation. They are much more suitable for treatment under GA.[2]

CONCLUSION

There will always be groups of children with needs for dental treatment under GA. This method of treatment should be reserved mostly for children with special needs conditions. Extra emphasis should be given to

education in the importance of dental health and prevention of early prevention to all concerned including pregnant women.

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