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The frequency of repeat general anaesthesia for teeth extractions in children

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Summary. *Aim.* The purpose of this study was to determine the frequency of repeat extractions under general anaesthesia (GA) in children.

Methods. The dental hospital records of patients attending for outpatient GA extractions at Liverpool University Dental Hospital, Liverpool, UK, between January and March 2003 were examined retrospectively. A data collection form was used to record the relevant information.

Results. A total of 278 patients with a mean age of 6·5 years (SD = 2·2 years) were seen for GA extractions. Of those, 33 patients (11·9%) with a mean age of 4·9 years (SD = 2 years) at the time of their initial GA had had a previous or would undergo a subsequent episode of GA extraction. The mean interval between repeat GA was 2·3 years (SD = 1·6 years). Fifteen cases (45·5%) had the repeat GA within 2 years. Radiographs were available as part of the assessment process for 84 (34·3%) of the 245 patients who had had a single episode of GA. However, of the 33 patients who had had a repeat GA, only seven (21·2%) had radiographs available at the time of the initial GA. Regarding the number of teeth extracted, a significant difference ($P < 0·01$) was found between the number of teeth extracted in patients who had had a single GA (mean = 4·6, SD = 2·5), compared with those extracted at the initial GA for the repeat GA group (mean = 3·2, SD = 2).

Conclusion. The frequency of repeat GA is relatively low, but there is a need for appropriate treatment planning incorporating the use of radiographs to reduce this even further.

Introduction

In 1990, the Poswillo Report concluded that 'the use of general anaesthesia should be avoided when possible' [1], and the UK General Dental Council guidelines state, 'General anaesthesia is a procedure which is never without a risk' [2]. Inhalation sedation supplemented with local anaesthesia has been used to try to avoid the use of general anaesthesia (GA) [3]. However, extraction under GA is still a very valuable procedure, especially for children who are extremely anxious, those who are very young and ones with extensively carious teeth which need urgent treatment [4,5].

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The use of GA for extractions has been shown to be influenced by factors other than clinical need. Parental demand, and the availability and convenience of GA, have been recognized as reasons for the use of GA for dental extractions [6]. However, studies have shown that the referral to a specialist paediatric dentistry unit and the use of a separate assessment appointment can reduce the use of GA [5,7].

The attendance for repeat GA in children has been shown to be an area of concern [8,9]. A contributory factor to repeat GA is poor treatment planning [9]. More aggressive prescribing of extractions has been advised to reduce the need for repeat GA [10,11]. In 1998, a study in Sheffield, UK, demonstrated a significant reduction in the need for repeat GA within 18 months following the introduction of a pre-GA screening service [5]. The aim of this study was to investigate the frequency of repeat GA for extraction of teeth in children at a UK dental hospital.

Subjects and methods

The dental hospital records of all patients who were under 16 years of age and had had dental extractions under GA at Liverpool University Dental Hospital, Liverpool, UK, between January and March 2003 were examined. A data collection form was used to record the relevant information (Fig. 1). The data recorded were the date of the initial GA, the date of birth, the clinician grade, the medical history, the availability of radiographs, the diagnosis, the reason for GA and the teeth extracted. The children's medical histories were categorized into those who were fit and healthy, and those who had a cardiovascular system problem (e.g. heart murmur), a respiratory system problem (e.g. asthma), special needs or other (e.g. allergy or eczema). Any available radiographs were examined by one of the authors. The reasons for the extractions were classified as: caries in the primary, mixed or permanent dentition; dental trauma; or orthodontic extractions. The reasons for referral for treatment under GA were classified into three categories: (1) patients who, because of problems related to age/maturity or physical/learning disability, were unlikely to allow safe completion of treatment without GA; (2) patients who were under 4 years of age; and (3) those where the use of local anaesthesia (LA) was not possible because of an established allergy to LA or the presence of an acute soft-tissue swelling. Teeth extracted were recorded using World Dental Federation (FDI) notation.

Repeat GA data collection form

1. Date of Birth:

2. Date of initial GA:

3. Clinician grade: □ SHO □ SpR □ Consultant □ Others

4. RMH: □ Fit & Healthy □ CVS □ RS □ Special needs □ Others

5. Radiographs available: □ Yes □ No

6. Diagnosis: □ Caries primary □ Caries secondary □ Caries mixed
□ Trauma □ Orthodontic □ Others

7. Reason for GA: □ Un-cooperative □ Under 4 □ LA contraindicated

8. Teeth extracted: □ Primary □ Permanent □ Mixed

9. Number of teeth extracted:

10. Number of Quadrants:

11. Repeat GA: □ Yes □ No

If Yes 2 to 10 were repeated

Fig. 1. Data collection form.

Statistical analysis was carried out using the SPSS for Windows, Version 11, computer program.

Results

A total of 279 patients had extractions in the Outpatient GA Department at Liverpool University Dental Hospital between January and March 2003. One patient had an elective repeat GA because the high number of teeth which required extractions needed to be divided between two separate sessions; this case was excluded from the results. The mean age of the 278 patients was 6·5 years (SD = 2·2 years; range = 2·8–14·7 years). Of those, 33 subjects (11·9%) had an entry in their records of at least one other dental GA. Thirty-one patients (11·2%) had had a previous anaesthetic and two patients (0·7%) had a repeat GA after the study date.

Where children had had two GAs, the mean interval between them was 2·3 years (SD = 1·6 years; (range = 7 months–6·7 years). Of the 33 patients who had had a repeat GA, 15 (45·5%) had had the repeat GA within 2 years. The mean age of those patients who had had a repeat GA was 4·9 years (SD = 2 years) compared with 6·5 years for those who had undergone only a single episode of dental GA.

From the total of 278 children, 209 (75·2%) were referred by their general dental practitioner, 64 (23%) were self-referred and five patients (1·8%) were referred by other specialists (e.g. orthodontists). The patients who had received a repeat GA had a similar referral pattern to those who had had only a single GA.

Radiographs were available as part of the assessment process for 84 (34·3%) of the 245 patients who had had a single episode of GA. However, out of the 33 patients who had had repeat GA, only seven (21·2%) had radiographs available at the time of the initial GA. There was no statistical difference between the two groups.

The majority the children, 199 (72%), were fit and healthy with no medical problems; one patient had a cardiovascular system problem, 33 (12%) had a respiratory system problem (e.g. asthma) and 41 (15%) had other problems (e.g. allergy or eczema). Four patients (1%) had special needs and none of these had had a repeat GA.

For those children who had had a single GA, the main diagnosis was caries in the primary dentition in 221 patients (79·5%), followed by caries in

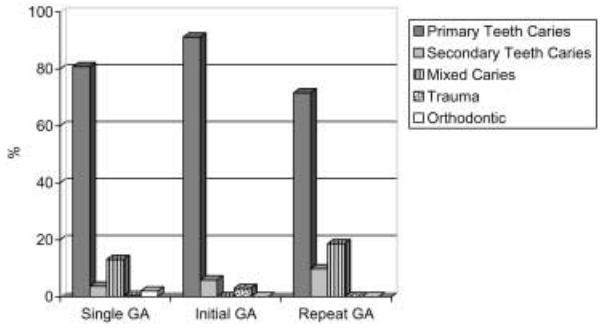

Fig. 2. Diagnoses in patients who had had a single GA and those who had undergone a repeat GA.

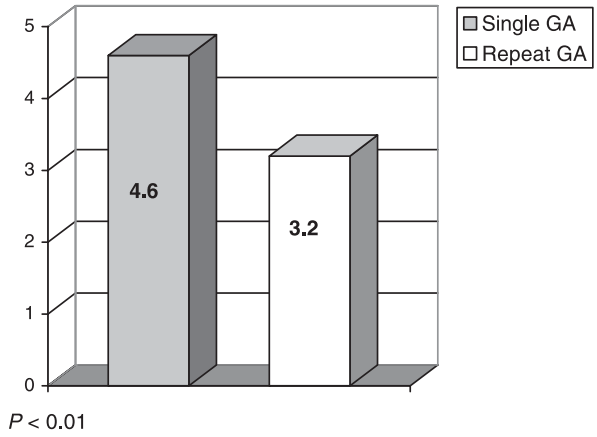

Fig. 3. Mean number of teeth extracted for the patients who had had a single GA and those who had undergone a repeat GA.

mixed dentition in 38 patients (13·7%). Five (1·8%) patients had orthodontic extractions of permanent teeth and one patient (0·4%) had extraction of primary teeth as a result of dental trauma. A similar pattern was found for the children who had had repeat GA; however, none of those had orthodontic extractions (Fig. 2).

Lack of patient cooperation was the main reason for the extractions under GA for 245 (88·1%) of the 278 patients. Twenty-seven patients (11·5%) were under 4 years of age and required multiple extractions. Local anaesthesia was contraindicated in one case because of the presence of soft-tissue swelling.

Using Student's *t*-test, a statistically significant difference ($P < 0{\cdot}01$) was found between the number of teeth extracted in children who had received a single GA (mean = 4·5, SD = 2·5), and the number of teeth extracted at the initial GA for those children who had undergone another (mean = 3·2, SD = 2·0) (Fig. 3). For the 33 subjects who received a repeat

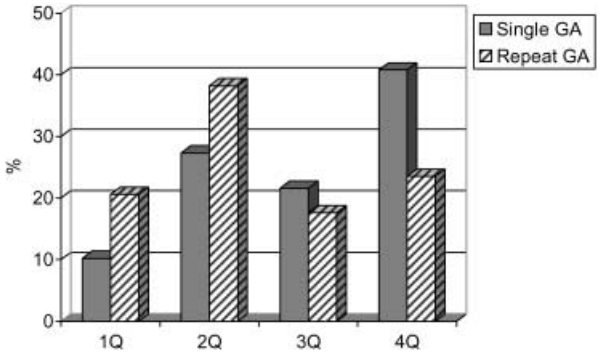

Fig. 4. Number of quadrants in which teeth were extracted for the patients who had had a single GA and those who had undergone a repeat GA.

GA, five (15·1%) had a single tooth extracted at the initial GA, compared to 18 (7·3%) of the 245 patients who had had a single GA.

Of those patients who had had a single GA, 100 (40·8%) had undergone extractions in all four quadrants, followed by 67 patients (27·3%) in two quadrants, 53 (21·6%) in three quadrants and only 25 patients (10·2%) in one quadrant. On the other hand, for patients who had received a repeat GA, 38·2% had had extractions in two quadrants, followed by 23·5% in four quadrants, 20·6% in one quadrant and 17·6% in three quadrants at their initial GA (Fig. 4).

Discussion

The majority of the patients were referred by their general dental practitioner for GA extractions and about one-quarter were self-referred, which may suggest that their parents consider dental GA to be an acceptable treatment option for their children [8]. Caries and its sequelae was the main diagnosis in this study, which agrees with the findings of a previous study [9]. It is a standard procedure in Liverpool University Dental Hospital for all patients to be assessed in the paediatric unit. At assessment, the children and parents are always encouraged to consider having the treatment by alternative pain control methods (i.e. LA or inhalation sedation). Most patients in this study needed GA because of lack of cooperation as a result of age, maturity, or physical or learning disability.

In this study, 33 (11·9%) of the children had had a repeat GA, half of these being within 2 years. Radiographs were available less frequently in patients who had had repeat GA compared to those

who had received single GA. This did not reach a statistically significant level, but knowing the clinical significance and valuable role of radiographs as an important aid in diagnosing dental caries, repeat GAs might have been avoided if carious teeth had been diagnosed radiographically at the initial assessment.

The results of this study show that fewer teeth were extracted at the initial GA in patients who had repeat GA compared to those who had a single GA. The presence of repeat GA in association with the number of teeth extracted and the availability of radiographs support the results of a previous study that found that more radical treatment planning and consistent treatment planning procedures are very important factors in reducing the numbers of repeat dental GA [8]. The short interval between GAs may be caused by a lack of proper assessment and treatment planning. The long intervals would also highlight the important role of preventive dentistry, and the need for dental education for both child and parents.

A repeat GA that is avoidable is a very serious problem, and it is clear that it is the responsibility of the profession to reduce the need for a repeat GA. This responsibility not only demands more radical and appropriate treatment planning, but also identification of those patients who are at high caries risk and have cooperation problems, so that they can be involved in an intensive prevention programme [12]. In conclusion, although the frequency of repeat GA is relatively low, there is a need for appropriate treatment planning incorporating the use of radiographs when indicated to avoid the use of a further unnecessary dental GA.

What this paper adds

- This paper investigates the frequency of repeat GA for extraction of teeth in children.
- This paper highlights the importance of radiographs as an aid to treatment planning of children before GA.
- 11.9% of patients had a previous or subsequent episode of GA extractions.

Why this paper is important for paediatric dentists

- It is the responsibility of the profession to reduce the need for a repeat dental GA.
- The short interval between GA's may be due to lack of proper assessment and treatment planning.
- The long intervals between GA's would also highlight the important role of preventive dentistry and the need for dental education for both child and parents.

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