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Treatment of dental caries under general anaesthetic in children

Knapp, R, Marshman, Z and Rodd, H.

Introduction

Despite being largely preventable, dental caries in permanent teeth is the most common chronic disease globally, and the 10th most common in the primary dentition, affecting 621 million children worldwide¹. In the UK, it affects approximately one third of 5-year-olds, rising to nearly half of children surveyed by age 8². Although the number of children affected is declining each year in the UK, there are growing inequalities, with those from lower socioeconomic groups disproportionately affected by dental caries, both in terms of prevalence and severity³.

Dental caries has a significant impact on children, and is associated with pain, impaired function and difficulty sleeping⁴⁻⁶. Oral health-related quality of life measures have been increasingly used to assess the impact of caries on the everyday lives of children and their families, and aim to take account of functional, psychological and social impacts⁷.

Sometimes, children require treatment for dental caries to be carried out under general anaesthetic (GA) in a hospital setting. This may be for a variety of reasons, but the most common scenario is the need for multiple extractions in a young child or the presence of high levels of dental anxiety or learning disabilities. Although dental treatment under GA may be carried out for other reasons, for example removal of impacted teeth or acute trauma management, treatment for dental caries is the primary reason for a dental general anaesthetic (DGA). In the UK, dental caries remains the most common reason for a child to be admitted to hospital for a GA. In 2015-16, in England alone, approximately 43,700 children aged 16-years and under were admitted to hospital with a primary diagnosis of dental caries, and most of these admissions were for the extraction of multiple teeth⁸. Not only does this procedure carry risks of morbidity and, albeit very rarely, mortality to the child, it also places a considerable financial burden on the National Health Service (NHS).

The number of children receiving DGA has been rising since 1997, and although the reasons for this are not entirely clear, some studies have noted a reluctance or lack of confidence of

dental professionals to treat children in general practice which may contribute to the high numbers of children being referred^{9,10}. The costs to the NHS of DGA are estimated at £30 million annually¹¹. In this article, we consider DGA in more detail, with a particular focus on the impact of caries-related treatment under GA on children and their families.

Treatment approaches under GA

Treatment approaches under GA fall into two main categories, namely exodontia (extraction only) and comprehensive care (where restorations as well as extractions are carried out). The treatment approach is influenced by parental wishes and clinical-related factors, which include the restorability of the carious teeth, the caries risk of the child, the availability of comprehensive care services and any co-existing medical conditions.

In the UK, the majority of centres provide exodontia services under GA, and so DGA is mostly used for extractions only¹². This is presumably because exodontia services require less time and equipment, and therefore represent a less expensive option than provision of comprehensive care under GA. However, while treatment under GA has been compared to other management techniques (such as sedation), there is a paucity of research on these different treatment approaches under GA. The main gaps in knowledge include the relative costs of the different treatment approaches and which approach gives the best results, either from a clinical point of view or based on patient-reported outcome measures. This is therefore an area of caries management which requires further research.

Benefits of DGA

Many parents view DGA as an acceptable, and often convenient, method of treatment to address their child's oral health needs. Often children who require a DGA have severe caries affecting multiple teeth and a DGA allows all these teeth to be treated in a single session. Parents generally rate high levels of satisfaction with the treatment their child has received for this reason^{10,13}. Children also report positive outcomes following treatment under GA,

including being pleased that all their dental problems are treated and feeling proud at having had the treatment done¹⁴.

Disadvantages and limitations of DGA

There is a perception amongst some dental professionals and parents that treatment under GA may prevent children becoming more anxious about dental treatment, and potentially prevent avoidance of regular attendance in the future. This perception is based on the notion that DGA “keeps the regular dentists separate from treatment”¹⁵. However, studies have shown that where children are already anxious about dental treatment, DGA does nothing to alleviate this anxiety^{10,16}, with one study by Cantekin and co-workers¹⁷ reporting that, according to the Children’s Fear Survey Schedule-Dental Subscale (CFSS-DS), there was an increase in dental anxiety following treatment under GA.

Demand for DGA services is high, and subsequently waiting times for treatment can be long. One study found that average waiting times for treatment across six hospitals in the North East of England was 8-months¹⁰, with a companion study revealing parental concern and frustration over the negative effects on their children because of these waiting times, including ongoing or increased pain, difficulty sleeping and subsequent impact on school attendance¹⁵.

While the risk of mortality associated with DGA is low, approximately 1 in 250,000¹⁸, the morbidities associated with DGA are significantly more common. The most common associated morbidities include nausea, pain and bleeding, and are experienced by 40-90% of children following DGA¹⁴.

Impact of dental treatment for caries under GA on children

Studies have revealed that parental reports of impacts on children for oral health conditions do not always match the findings of studies which have used child-reported measures of impact. For example, Rodd and co-workers conducted a video-diary study which found that pain was not commonly discussed by children, and instead the most commonly described negative outcomes associated with the DGA were hunger and difficulty sleeping. This study

also revealed impacts which had not been reported by parents, such as negative feelings of being worried or scared and the discomfort following placement of the intravenous cannula¹⁴. It has been shown that, in general, parents/caregivers have a low to moderate overall agreement with their child's ratings of health-related quality of life (HRQoL)^{19,20}. A systematic review of parent and child reports of HRQoL by Eiser and Morse revealed agreement between proxy and child ratings was worse in relation to less-observable aspects, such as emotional or social HRQoL, than in those which were more observable, such as physical symptoms²¹.

Measures of oral health related quality of life (OHRQoL) have been used to describe the impacts of oral health conditions and their treatment on the everyday lives of individuals, and have been used to assess the impact of dental caries and treatment under GA in children. A systematic review of the literature found twenty studies reporting on changes in OHRQoL following DGA for dental caries in children, although significant heterogeneity between the studies limited the conclusions that could be drawn²². The findings showed that only half the included studies used instruments which had been validated in the study population, and all but one of the studies relied on proxy reports of child OHRQoL. Overall, all the included studies reported improvements in OHRQoL following treatment. However, it was interesting to note that some individual subscales within the measures showed changes which implied worsened OHRQoL. Only one study to date has examined the impact of exodontia only versus comprehensive care in children, and while no significant difference between the two approaches was found, the sample size was small and no assessment was made as to whether there was a clinically significant difference between the approaches²³. Further research is needed to examine the impact of dental caries and different treatment approaches under GA from the point of view of children themselves.

Conclusion

Treatment for dental caries under GA is sometimes necessary where other techniques to deliver care to children fail or are not appropriate. However, treatment under GA is not without risk and there is a need to ensure this treatment approach is conducted only when necessary. There is also a need for further research to assess the relative effectiveness of

treatment approaches under GA, both to assess which approach gives the best outcomes and to justify the risks and costs associated with each. Future enquiries should also be directed towards assessing the impact of different treatment approaches under GA on the daily life of children, from their own perspective.

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