Improving pain management for children having dental extractions under general anaesthesia

S Marshall, A Ondhia, C Mearns, T Kandiah

Surrey and Sussex Healthcare NHS Trust, UK

ABSTRACT

Children provided with general anaesthesia for dental extractions at East Surrey Hospital were audited to determine the percentage of children who were prescribed adequate pain management in accordance with guidance published by the Association of Paediatric Anaesthetists of Great Britain and Ireland. Three audit cycles were completed. Data were collected retrospectively through case note review. The results from the first cycle showed that only 47% of children were prescribed with a recommended analgesic regimen. Implementation of change included the development of a protocol for analgesic delivery, which was disseminated to the anaesthetic and dental teams. Full compliance with the audit standards was then demonstrated in the second and third cycles.

This audit demonstrates the importance of multidisciplinary collaboration in order to provide high standards of care for children undergoing dental extractions under general anaesthesia. The protocol developed could be applied to other surgical day case procedures for children to improve the patient experience.

KEYWORDS

Paediatrics – Postoperative analgesia – Pain management – Extraction

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CORRESPONDENCE TO

Amrisha Ondhia, E: amrisha.ondhia@nhs.net

Introduction

In England, 42,755 children and young people under 19 years of age were admitted to hospital for a primary diagnosis of dental caries in 2018–2019, and most of these patients were aged 5–9 years.¹ Tooth decay remains the most common reason why a child aged between five and nine years is admitted to hospital, with more than double the number being admitted for tooth decay than for tonsillitis. General anaesthesia (GA) is often needed to address the dental needs of children, making dental extractions under GA commonplace nationally.

Children provided with dental extractions should be subject to the same principles of pain management as for any other surgical procedure. National guidance published by the Association of Paediatric Anaesthetists of Great Britain and Ireland (APA) recommends the prescription of non-steroidal anti-inflammatory drugs and paracetamol for analgesia for dental extractions in children.² An audit was carried out at our hospital to ensure that the prescription of analgesics for dental extractions under GA complies with these standards with the objective to improve pain management for children.

The agreed audit standard required that one of the analgesic regimens recommended by the APA (Table 1)² was prescribed for every child provided with dental extractions under GA. Option 2 was not considered as the

children admitted for dental surgery come to theatre in their own clothes and inserting rectal medication was not practical.

Methods

This audit project was registered and approved by the audit department at Surrey and Sussex Healthcare NHS Trust. The audit was fully compliant with the trust's local information governance and data protection requirements. Data were collected retrospectively following completion of treatment for every child provided with planned dental extractions under GA at East Surrey Hospital between December 2014 and February 2015. Children with contraindications for the use of non-steroidal anti-inflammatory drugs or paracetamol were excluded from the audit.

A data collection questionnaire was used to record information of analgesic prescription from the patients' drug charts in their notes. Data collection also included postoperative pain scores from each child's day case care plan, which was included as standard. The Wong-Baker FACES[®] pain rating scale (Wong-Baker FACES Foundation, Oklahoma City, OK, US) was employed to grade postoperative pain scores and this was completed by the nurse on the ward for each child's admission.

Each data collection sheet was given an alias number using a random number table that corresponded to the patients' hospital numbers to anonymise data collection. The data were then transferred to Excel® (Microsoft, Redmond, WA, US) for analysis. Data were collected by one of two surgeons in the paediatric dentistry department. Ten notes were reviewed at random by a dental surgeon who was not involved in data collection to ensure accuracy.

Subsequent audit cycles were carried out using the same methodology between January and March 2016, and between October and December 2016, following dissemination of results and implementation of change after each cycle. Each audit cycle comprised 34 patients.

Results

During the first cycle of the audit, 47% of children were prescribed analgesics in accordance with the audit standards. When looking at the postoperative pain scores, children were divided into two groups: those prescribed analgesics in accordance with the audit standards and those who were not. The latter group had higher postoperative pain scores (Fig 1).

Implementation of change

The results of the first audit cycle were discussed with the paediatric dentistry and anaesthetic teams at a local audit meeting. The following reasons for poor compliance with standards were identified:

- > The perceived necessity for analgesics by the anaesthetist/surgeon (depending on the number of teeth being extracted).
- > Different teams worked on paediatric dentistry GA lists and may not have been familiar with regularly prescribing analgesics for teeth extractions for children.

- > Anaesthetists and dental surgeons were not available on the ward to prescribe postoperative medicines.
- > There was poor familiarity of anaesthetists and dental surgeons with the national guidance.

In order to improve compliance with standards, the following actions were taken:

- > A hospital protocol for analgesic prescription for children undergoing dental extractions under GA was produced and disseminated to the anaesthetic and dental teams. This was to be used by all surgeons/anaesthetists.
- > Analgesics required for every child were specified after the World Health Organization surgical safety checklist briefing prior to surgery.
- > Stickers for use in patients' drug charts were developed to aid efficient prescription of analgesics by clinicians.

A second audit cycle was carried out following implementation of change. The results showed 100%

Table 1 Analgesic regimens recommended by the Association of Paediatric Anaesthetists of Great Britain and Ireland²

Option	Preoperative	Intraoperative	Postoperative
1	Oral paracetamol	–	Oral ibuprofen
2	Oral paracetamol	Rectal diclofenac	–
3	Oral paracetamol and ibuprofen	–	–
4	Oral ibuprofen	–	Oral paracetamol
5	Oral ibuprofen	Intravenous paracetamol	–
6	–	Intravenous paracetamol	Oral ibuprofen

Figure 1 Pain scores at 30 minutes after returning to the ward for children in the first audit cycle

compliance with the audit standards. Postoperative pain scores were lower in the second cycle than in the first audit for all children provided with a recommended analgesic regimen (Fig 2).

No further changes were planned given the improvement of standards between the first and second audit cycles. A third cycle was carried out approximately six months after the second audit owing to the turnover of staff during this period. This was to ensure that high standards of care were being maintained. The results of the third audit cycle also showed 100% compliance with the standards. The postoperative pain scores from the third cycle were the lowest of all three cycles (Fig 2).

Discussion

A collaborative multidisciplinary approach was used to overcome barriers for prescription of analgesics for children provided with extractions under GA. This led to full compliance with national standards at our hospital.

We are aware of the limitations of this audit project, including the fact that emergency dental extractions were not considered in the data collection process. We are unaware of the current prescription of analgesics for these children.

The demonstration of lower postoperative pain scores in the second and third cycle is purely observational, and this project does not assess for a causal relationship between adequate analgesic prescription and postoperative pain scores. This is simply an observation of pain scores recorded and needs to be interpreted with caution given that different nurses were scoring children by proxy. In

addition, a different cohort of children was being graded in each cycle. Although nurses are trained in recording these scores, a subjective assessment of the child would have been made. In order to examine this relationship more closely, further research would be required in this area.

The sample sizes were small in each audit cycle, which reflects the number of children being treated in a small district general hospital. Smaller cohorts of children allow for better control over the implementation of change and fewer staff members are required to manage them. This may explain the improved results in the second and third cycles.

Throughout the audit, the dental and anaesthetic teams reflected on the analgesic regimens that were found to be favoured by parents and nurses on the ward. In general, intraoperative intravenous paracetamol and postoperative ibuprofen were preferred by both parents and nurses for the following reasons:

- > Delivery of preoperative analgesics was poorly tolerated by children, often being refused.
- > Nurses on the ward had insufficient time to clerk all of the children being admitted and deliver analgesics preoperatively.
- > If preoperative analgesics were given (ie ibuprofen preoperatively and paracetamol either preoperatively or intravenously during the procedure), then nurses were unable to deliver any further analgesics on the ward to children who appeared to be in discomfort. This led to complaints from parents.
- > Prescription of intravenous paracetamol intraoperatively and ibuprofen postoperatively could be written in the drug chart in theatre during the procedure and did not require a prescription by a clinician on the ward.

Figure 2 Pain scores at 60 minutes after returning to the ward for children in each audit cycle who were on a recommended analgesic regimen

The dental and anaesthetic teams also noted the importance of discussion of analgesics required for each child after completion of the preoperative World Health Organization surgical safety checklist. This meant that both surgeons and anaesthetists were clearly informed of the analgesics needed.

Conclusions

This audit has resulted in the improvement of pain management for children provided with dental extractions under GA. The protocol developed has now been implemented for other surgical paediatric day case procedures in our hospital to ensure high standards of care for children seen as day cases.

Given how commonly dental extractions for children are performed under GA, we would recommend that dental surgeons carrying out such procedures consider whether the children under their care are being provided with adequate analgesia. By minimising postoperative discomfort, children can be provided with positive experiences of hospital admission and patient reported experience measures

can be improved. This consideration of the patient journey is crucial in managing anxiety related to any further episodes of GA that may be required throughout life.

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