

# Perioperative dexamethasone administration in tonsillectomy patients: A three-cycle audit showing improvement using printed theatre lists

Summy Bola, Annie Bartlett, Richard Williams  
Royal Devon and Exeter Trust, Devon

## Abstract

Dexamethasone administration prior to tonsillectomy has been shown to reduce morbidity and is part of SIGN guideline 117. We conducted a three-cycle audit of 149 patients to ascertain how well guidelines were being met and introduce a sustainable method to improve compliance. A 3-month audit was conducted to ascertain how many tonsillectomy patients didn't receive pre-operative dexamethasone. ENT secretaries were requested to add 'Dex Please' to tonsillectomy theatre lists. A 3-month re-audit was conducted; the intervention was only implemented in half of cases and so a reminding tool for the secretarial staff was administered before a third cycle. Initially, there was 73% compliance to SIGN guidelines, this improved to 87% in the second cycle. After the second intervention, all tonsillectomy theatre lists had the 'Dex Please' note and compliance to SIGN guidelines was 100%. There were five readmissions in the first cycle, three in the second and two in the third cycle. All readmissions were underdosed according to guidelines. Understanding there are regular staff rotations throughout many U.K. hospitals, we implemented a reliable method to increase compliance to guidelines which helped reduce post-operative readmission after tonsillectomy. This can be easily introduced to other institutions and for other perioperative requirements.

## Problem

Dexamethasone provides a low cost and relatively safe method to reduce post-operative complications in tonsillectomy patients [1]. Despite this evidence, failure to administer dexamethasone still results in unplanned admissions [2], causing unnecessary costs to the National Health Service. We conducted a three-cycle audit of perioperative dexamethasone use in patients undergoing tonsillectomy at our hospital, a Trust that performs approximately 300 elective tonsillectomies per year, the majority being paediatric cases. This was done directly after identifying two unplanned admissions in tonsillectomy patients that did not receive perioperative dexamethasone.

## Background

Dexamethasone is a systemic corticosteroid that is commonly administered as prophylaxis for post-operative nausea and vomiting (PONV) during surgical procedures due to its anti-inflammatory properties. Perioperative dexamethasone has been shown to reduce post-operative morbidity in tonsillectomy patients by shortening the time to return to a normal diet [3] and after more than thirty years of data supporting its use [4], the administration of dexamethasone during anaesthetic induction prior to starting a tonsillectomy has become the standard of care in many institutions. SIGN Guideline 117 state that:

1. A single intraoperative dose of dexamethasone (dose range 0.15 to 1.0 mg/kg; maximum dose range 8 to 25mg) is recommended to prevent postoperative vomiting in children undergoing tonsillectomy or adenotonsillectomy.
2. A single dose of 10 mg dexamethasone at induction of anaesthesia may be considered to prevent PONV in adults

undergoing tonsillectomy or adenotonsillectomy.

## Baseline measurement

To quantify the problem, a retrospective audit of compliance with SIGN Guideline 117 was conducted between 1st July and 1st September 2013. A review of 48 anaesthetic charts revealed that perioperative dexamethasone was not given in 27% of patients (n=13). Of these, 75% (n=36) were paediatric patients (defined as patients under the age of 18 years that had undergone a paediatric perioperative assessment). Results were presented to the anaesthetic and ENT departments who agreed that a sustainable intervention should be implemented.

See supplementary file: ds4996.docx - "Tables 1-3"

## Design

With regular staff rotation and temporary doctors throughout most UK hospitals, we acknowledged that a sustainable intervention had to be implemented to ensure lasting improvement in perioperative dexamethasone administration.

For the second cycle, data was collected prospectively between 1st February 2014 and 1st April 2014. Anaesthetic charts were used to ascertain whether dexamethasone was given perioperatively in adult and paediatric patients undergoing tonsillectomy.

Tonsillectomy for recurrent tonsillitis, sleep apnoea, and diagnostic biopsy were included. Postoperative complications were also recorded. Bleeding events that occurred within the first 24 hours were considered as primary bleeds, episodes after this were considered secondary bleeding episodes.

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After further intervention, a third audit cycle was prospectively conducted between 1st July 2014 and 1st September 2014.

### Strategy

Study aims:

1. Measure compliance with SIGN Guideline 177, specifically perioperative administration of dexamethasone.
2. Create a sustainable intervention to improve compliance with this guideline.
3. Ascertain whether this translates to an improvement in clinical outcome.

#### PDSA Cycle 1

We aimed to place the reminder for dexamethasone on all tonsillectomy listings. A request was made to the ENT secretaries to add a reminder to the online and printed theatre list by inserting "Dex Pls" in the general comments section (Table 1). On review of the theatre lists, we found that our intervention had not been implemented in 50% of tonsillectomy cases. Where it was implemented, administration of dexamethasone was discussed in the Team Brief at the start of the operating list. It was only by prompting this discussion that the ENT surgeons first realised the concerns of some anaesthetist for the potential side effects of steroids.

#### PDSA Cycle 2

Understanding that new practices such as additions to theatre lists are difficult to establish, a reminding poster was created for the ENT secretaries' office. This resulted in the intervention being implemented on 100% of theatre lists for the third cycle. The reminder prompted discussion between all members of the theatre team in case any staff member felt that perioperative dexamethasone was inappropriate for a particular case. The ENT surgeons no longer took for granted that SIGN Guideline 117 was known to other staff members.

### Results

#### Dexamethasone administration

In the second cycle, 59 anaesthetic charts were audited, of which 54 were adequately completed for analysis. Paediatric patients account for 59% of audited charts (n=32). We found that perioperative dexamethasone use had increased to 87%. In the third cycle, 52 anaesthetic charts were audited of which 48 were adequately complete for analysis. One patient was excluded as they were on long term steroid treatment therefore a reason for dexamethasone omission had been documented. The intervention was now implemented for all tonsillectomy cases and dexamethasone was given perioperatively in 100% of patients (Table 2).

#### Dexamethasone dosing

In the second cycle, we found legible doses for 24 paediatric patients of which the average dexamethasone dose was 0.08mg/kg. Only one paediatric patient received the recommended 0.15mg/kg-1.0mg/kg (Figure 1). All other paediatric patients were under-dosed according to the guideline. For adult tonsillectomies, no patient received the recommended single dose of 10mg, the average being 4.6mg (range 3.3-8mg).

There was a small improvement in dexamethasone dosing for the third cycle, with the average paediatric dosing being 0.10mg/kg. Again no adult patient received the recommended 10mg single dose but the average dose was higher at 5.2mg (range 3.3-8mg).

#### Post-operative complications

There were 6 post-tonsillectomy readmissions in the first cycle, three in the second, and two in the third. Most of the re-admissions were given lower doses of dexamethasone (Figure 1). The reasons for readmission were post-operative pain, vomiting, and secondary bleeding episode (Table 3). The mainstay of treatment for the unplanned admission was opioid analgesia and intravenous antibiotics. There were no primary bleeds in the audited study periods and all tonsillectomies were conducted with variations of cold steel, ties, and bipolar haemostasis.

See supplementary file: ds4997.png - "Figure 1. Perioperative dexamethasone doses in paediatric patients (readmissions circled)."

### Lessons and limitations

SIGN Guideline 117 is based on several meta-analyses and Cochrane reviews, however the assumption that these guidelines are known and accepted by the Anaesthetic department was incorrect as highlighted by this audit. A UK survey of anaesthetists reported that only 61% routinely used dexamethasone during tonsillectomy procedures [5], highlighting that this problem is not limited to our Trust. Whilst the risks of steroid therapy include immune system suppression and avascular joint necrosis, a single dose has been shown to be virtually without harmful effects [6], although the potential risks and benefits can be discussed with the patient or the parents. The audit interventions prompted case based discussion and learning within the team.

Despite the promising results, most patients who received pre-operative dexamethasone were under-dosed which may still influence post-operative morbidity. There is evidence to support giving the lower end of the recommended dexamethasone range [7], however the results of this audit show that guidelines are not being met in reference to dosing. A follow on from this study would be an intervention to address anaesthetic pre-conceptions on dosing of perioperative steroids. This would ideally be a multi-departmental quality improvement project.

### Conclusion

This three cycle audit against SIGN Guideline 117 demonstrated a

sustained improvement in practice, with two successful interventions resulting in 100% of tonsillectomy patients receiving perioperative dexamethasone. This also led to a reduction in the post-operative readmission rate, with no patients being readmitted with pain and/or nausea. Appreciating that trainees rotate regularly between hospital trusts, it was important to recruit assistance from the staff members that do not rotate between hospitals to help introduce a sustainable intervention.

Exeter Audit Department. It did not involve human subjects.

We recommend the use of the 'general comments' section on theatre lists as a maintainable way to improve patient care and reduce unnecessary costs to the hospital. Although not specifically targeted by our audit, we discovered a widespread practice of dexamethasone underdosing, which was only mildly improved and still needs to be addressed.

## References

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## Declaration of interests

Nothing to declare.

## Acknowledgements

Many thanks to Dana Rogojan for her help with data collection.

## Ethical approval

This project was registered and approved by the Royal Devon and