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Oral morphine for pain management in paediatric patients after tonsillectomy and adenotonsillectomy

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ABSTRACT

Objectives: The withdrawal of codeine for use in children following tonsillectomy enforced a change in our practice of providing regular paracetamol and ibuprofen, with codeine for breakthrough pain relief. Our objectives were to; examine the effectiveness of paracetamol and ibuprofen; examine the effectiveness of the addition of rescue (PRN) morphine to regular paracetamol and ibuprofen.

Methods: A 2 cycle prospective audit was conducted on our unit. Telephone consultations were conducted with parents of 74 children undergoing tonsillectomy and adenotonsillectomy. Cycle 1 (C1, without morphine) contained 24 consecutive patients and cycle 2 (C2, with morphine) contained 50 consecutive patients. Postoperative health service contact and outcome was recorded: worst pain scores on days 4 and 7 were obtained using validated pain assessment tools scoring 0–10. Cycle 2 results underwent subgroup analysis by method of surgery i.e. coblation (C2C) and cold steel dissection (C2D) groups.

Results: More than half of parents felt simple analgesia was not effective enough in both cycles, this number was significantly higher in both 2nd cycle groups (C1 = 54%, C2C = 74%, $p = 0.003$, C2D = 84%, $p = 0.0001$). Mean worst pain reported at day 4 was similar for all groups, but the morphine groups reported higher pain at day 7 (C1 1.6, C2C 3.59, $p = 0.017$, C2D 3.90, $p = 0.002$). Antibiotic prescribing for children contacting a GP after surgery was significantly lower in the morphine groups (C1 24%, C2C 7%, $p = 0.0014$, C2D 5%, $p = 0.0002$). There was no difference in measured outcomes between the 2nd cycle groups.

Conclusion: This service evaluation found that postoperative morphine on an as-required basis, in addition to regular paracetamol and ibuprofen, did not significantly alter initial pain profile, worst pain scores or rate of health service contact when compared to regular paracetamol and ibuprofen alone. The majority of children in this study felt additional analgesia required. Children in the morphine groups experienced significantly less pharmacological intervention when contacting the GP after surgery.

1. Introduction

In 2012 there were 18,000 tonsillectomy operations performed on children in the National Health Service in England [1]. For an operation so widely performed mortality from tonsillectomy is low. A prospective audit of 33,921 tonsillectomies in England and Northern Ireland reported 1 death [2]. Despite the frequency of its performance, tonsillectomy is associated with significant morbidity. Postoperative complications include pain, bleeding, infection, postoperative nausea and vomiting (PONV) and sleep-disordered breathing [3]. A study in the United States including over 36,000 children looked at 1st and 2nd revisit rates within 14 days amongst children undergoing tonsillectomy or adenotonsillectomy and found acute pain was the primary diagnosis in 18.4% and 11.2% respectively [4]. Acute pain causes fear, anxiety, distress and behavioural changes in children following surgery [5]. Pain following tonsillectomy is associated with decreased oral intake, dehydration, and latency in recovery after surgery [6]. Typically pain surges on postoperative day 4 or 5 before improving on day 6 [7,8].

Gauging analgesic requirements in this age group is problematic as younger age groups are unable to accurately communicate the amount of pain they are feeling. Routine practice in the United Kingdom sees the majority of children undergoing tonsillectomy looked after at home by parents or carers after the procedure and adds a layer of complexity in the management of the child's postoperative pain.

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1.1. Pain management quandary

Kelly et al. [9] documented fatalities in children in North America due to postoperative codeine administration. Following these findings, the United States Federal Drug Agency placed a boxed warning and contraindication on codeine following tonsillectomy and adenotonsillectomy in children in 2013 and the Medicines and Healthcare Products Regulatory Agency (MHRA) closely followed suit [10,11]. A consensus on an alternative is yet to be agreed.

At our hospital, we previously used a combination of paracetamol, ibuprofen and codeine for postoperative take-home analgesia. The prescription of codeine was stopped after the MHRA warning, and parents were advised to continue with regular paracetamol and ibuprofen. We wanted to assess the adequacy of this reduced analgesic regime, and provide an appropriate alternative breakthrough analgesic if it was found not to be adequate.

1.2. Aims

Our aims were to:

1. Assess adequacy of postoperative paracetamol and ibuprofen alone.
2. Assess postoperative pain management following implementation of discharging patients with as-required (PRN) oral morphine.
3. Reduce health service contact attendance due to postoperative pain.

2. Method

We undertook service evaluation by completing a prospective 2 cycle departmental audit on our paediatric tonsillectomy patients. Our Research and Development department deemed ethical approval not necessary for this study.

In the first cycle, all children undergoing tonsillectomy and adenotonsillectomy were included (ages 1> to <16 years). Children <1 year or undergoing concomitant grommet insertion were excluded. Parents were asked to give their children regular ibuprofen three times daily, with meals, with regular paracetamol between ibuprofen doses. 24 consecutive patients from February 2014 to May 2014 were selected. Patients/carers were contacted on day 4 and day 7 post-operatively. They were asked whether additional analgesia was required (aside from paracetamol and ibuprofen), about worst pain scores and whether healthcare services were contacted, and if so what the outcome was.

The inclusion and exclusion criteria were unchanged for the second cycle. Second cycle patients were provided with four day's supply of oral morphine to be used for breakthrough pain relief. Morphine was dosed according to weight and age–at a reduced dose compared to doses published in the British National Formulary (BNF). This action was based on guidelines provided by Alder Hey Children's Hospital (Appendix A). 50 consecutive patients from September 2014 to February 2015 were selected. Patients/carers were asked whether additional analgesia required (other than paracetamol and ibuprofen), about worst pain scores at day 4 and day 7, what day post-operatively did parents give morphine, whether healthcare services were contacted, and if so what the outcome was.

All patients and their carers were given oral and written information designed at a local level at discharge, including the expected pain profile and safe administration of analgesia. The pain assessment tool used depended on the age and understanding of the child [12–14].

Analysis of the morphine group was subdivided into coblation and cold steel dissection groups to attempt to mitigate method of surgery as a confounding factor. Cold steel dissection tends to be carried out by junior surgical trainees at our hospital and this could possibly skew the results.

Statistical analysis was carried out using SPSS™ Ver. 20.

3. Results

In the 1st cycle the mean age of the children was 7.3 years (median 5.5, range 3–14 years, SD ± 3.86) (Table 1). Coblation tonsillectomy was used in all 24 children. 13/24 (54%) felt that additional analgesia was required. The mean worst pain score reported on day 4 was 4.98, 95% CI 3.35–6.6 (median 6, SD ± 3.86). This dropped to a mean score of 1.6 on day 7, 95% CI 0.79–2.41 (median 1, SD ± 1.92). The GP was contacted in the cases of 9 children (36%) children, 6 (24%) of whom were given antibiotics, 1 given difflam, another given PRN analgesia and the last had no outcome recorded. 1 child was re-admitted to ward on postoperative day 5 and given IV fluids. One of the patients given antibiotics was also given codeine by the GP.

In the 2nd cycle the overall mean age of the children was 6.2 years (median 5, range 2–15 years, SD ± 2.9). Coblation tonsillectomy was used in 28 children, cold steel dissection in 19 and 3 operation methods were unrecorded. GP or walk-in centre contact was made for 9 (36%) children; 5 were given antibiotics and 4 were given advice. 1 child was re-admitted to the wards for intravenous fluid therapy on the second postoperative day.

In the coblation group, the mean age of the children was 6.54 years (median 5, range 2–15 years, SD ± 3.43). 21/28 patients (75%) felt additional analgesia was required and all 21 used the morphine provided. Mean pain score reported after 4 days was 6.30, 95% CI 5.6–7 (range 2–10, SD ± 1.81). By day 7 this had dropped to 3.59, 95% CI 2.52–4.64 (range 0–10, SD ± 2.73). In those that used morphine, it was used on average at 3.33 days (SD ± 1.56) and for 2.52 days (range = 1–4, SD ± 1.17 days). 10/28 (36%) attended or contacted their GP, walk-in centre (WIC) or emergency department. Of these children, 7 were given advice, 2 antibiotics and 1 difflam. 3 children were re-admitted; 2 for intravenous fluids and 1 was returned to theatre due to a postoperative bleed.

The dissection group contained 19 children; their mean age was 6.47 years (median 5, range 2–14, SD ± 3.67). 16/19 (84%) felt additional analgesia was required they all used the provided morphine; those that did not refrained from morphine use. On day 4 the mean pain score reported was 6.82, 95% CI 5.56–8.08 (range 1–10, SD ± 2.62). By day 7 this had dropped to 3.90, 95% CI 2.87–4.93 (range 0–8, SD ± 2.13). 6/19 (32%) attended the GP, WIC or emergency department and 2 further children were re-admitted to the ward. Of the 6, 5 were given advice and 1 given antibiotics. In those children using morphine, the mean timing of first use was 3.56 days, 95% CI 2.84–4.29 (median, 4 range 1–6, SD ± 1.36) and it

Table 1
Comparison of outcomes between Cycle 1 and Cycle 2 coblation groups.

	Cycle 1 (n=24)	Cycle 2 Coblation (n=28)	p-value
Mean age (years)	7.27	6.54	0.328
Needed additional analgesia	54%	75%	0.003
Mean worst pain score day 4	4.98	6.30	0.154
Mean worst pain score day 7	1.60	3.59	0.017
Saw pain score reduce from day 4 to day 7	79%	82%	0.7215
Attended GP or WIC	36%	36%	1.0000
Given antibiotic	24%	7%	0.0014
Re-admitted to ward	4%	11%	0.1046