

Sub-optimal treatment of paediatric migraine in an emergency department: An observational study

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ABSTRACT

Objective: To describe treatment of children presenting to an Australian Emergency Department (ED) with a final ED diagnosis of migraine.

Methods: Planned substudy of a retrospective cohort study of the epidemiology of headache in children. Primary outcome of interest was treatment administered in the ED.

Results: Thirty-five children were studied. The most commonly used medications were nonsteroidal anti-inflammatory drugs, paracetamol and ondansetron. Specific antimigraine therapy was used uncommonly. Fourteen percent of children received an opiate.

Conclusion: Treatment of migraine in children was not consistent with the available evidence regarding agents' relative effectiveness. The use of opiates is concerningly high.

INTRODUCTION

Headache is the chief complaint for about 1% of paediatric emergency department (ED) attendances of whom 8.5%-18.5% are due to migraine.[1,2] A recent systematic review has found limited evidence comparing the effectiveness of therapies.[3] Included studies were largely confined to placebo-controlled rather than comparative trials. It found that ibuprofen (RR 1.87) and triptans (children: RR 1.67; adolescents: RR 1.32) were superior to placebo. Neither paracetamol nor dihydroergotamine was superior to placebo. Dopamine receptor antagonists are little studied in children. One small study compared intravenous prochlorperazine and ketorolac and reported that significantly more children had a pain score reduction of >50% at one hour with prochlorperazine.[4]

Little is known about treatment of paediatric migraine in ED and its concordance with the available evidence-base. Canadian data shows considerable variation in practice.[5] Australasian data reported that the most commonly used agents were non-steroidal anti-inflammatory agents (NSAID, 30%) followed by paracetamol (24%).[6] The use of defined antimigraine medications (chlorpromazine, sumatriptan, prochlorperazine) was low (8%). Eleven percent of children received morphine and a further 25% a codeine-containing medication.

The aim of this study was to describe the treatment provided to children presenting to an Australian ED with a final ED diagnosis of migraine.

METHODS

This was a planned substudy of a retrospective cohort study by medical record review of the epidemiology of headache in children presenting to ED. It was conducted at Sunshine

Hospital, a university-affiliated community hospital with an annual paediatric census of approximately 25,000.

Inclusion criteria were presentation between 1 January and 31 December 2016 with headache as a major symptom and age 2-16 years. Exclusion criteria were a history of head trauma within the previous 48 hours, a ventriculoperitoneal shunt in situ or known intracranial conditions associated with headache. This substudy includes the cohort with an ED discharge diagnosis of migraine as recorded in the treating doctor's clinical notes as free text. The primary outcome of interest for this substudy was the treatment administered in the ED. Data was analysed by descriptive statistics using Analyse-It (Leeds, UK). The project was approved by the Western Health Low Risk Ethics Panel. Patient consent for data collection was not required.

RESULTS

Thirty-five children had a discharge diagnosis of migraine (15.5% of total cohort). Median age was 11 (IQR 8-15); 51% were male. Pain score data is available for 20 children. Median initial pain score was 5 (IQR 2-7). Median pre-discharge pain score was 0.5 (IQR 0-5). Nine children had a reduction in pain score of ≥ 2 points (45%, 95% CI 25.9-65.8%). Seven children had a pain score ≥ 4 at ED discharge (35%, 95% CI 8.1-56.7%).

Medications given are shown in table 1. Note, more than one medication could be prescribed. Fourteen percent of children received an opiate (95% CI 6.3-29.4%). Regarding paracetamol, in 4 cases it was nurse-initiated before medical assessment. In three of these additional medications were prescribed by the assessing doctor.

Three children were admitted to hospital for further investigation and treatment (8.6%, 95% CI 3-22.4%).

DISCUSSION

The available evidence regarding the relative effectiveness of migraine treatments for children is limited, however, what there is suggests that some treatments are more effective than others. It is also probably reasonable to extrapolate from adult data that opiates are relatively ineffective.

Our data suggests that treatment of paediatric migraine is sub-optimal. There is high usage of paracetamol which has been shown to be ineffective in a recent Cochrane review.[3] The high use of paracetamol may be due to it being recommended in local clinical guidelines for the treatment of headache, despite the research findings.[7] Closer review of these guidelines makes age-based recommendations for ibuprofen, chlorpromazine, aspirin or sumatriptan when migraine is the most likely diagnosis.

There is low usage of proven antimigraine treatments (phenothiazines, triptans and metoclopramide, 9% combined). While the use of codeine-containing medications has reduced compared to the PREDICT study,[6], the proportion of patients receiving an opiate is concerning high (14%). There would appear to have been little improvement in the use of evidence-based therapies since the PREDICT audit [6]. The reduction in the use of codeine-containing medications between the PREDICT study and this study may be due to efforts, including by government, to reduce use of these medications.

Reasons for poor compliance with the evidence may include lack of knowledge about recommended migraine treatment for children and concern about adverse effects (including

extrapyramidal effects and sedation) with some medications. There may also have been a preference to avoid parenteral medications, especially in younger children.

In order to improve prescribing of effective antimigraine therapy in children, two main interventions are needed: high-quality comparative research and development and dissemination of evidence-based guidelines specific to migraine treatment for children and adolescents.

This study has some limitations. It is single centre and thus may not be generalizable, although the findings were very similar to those of the PREDICT audit which was multicentre.[6] Migraine was the clinical diagnosis made by the treating clinician so it is possible some cases were miscoded. This is the 'real world' situation in ED. Data was collected from medical records so may be subject to missing data. The study sample was relatively small, resulting in wide confidence intervals around the point estimate

CONCLUSION

Treatment of migraine in children was not consistent with the available evidence regarding agents' relative effectiveness. The rate of use of opiates is concerningly high. More work is needed to increase the evidence-base, develop pathways and educate clinicians about effective therapeutic approaches to paediatric migraine.

Table 1. Treatments administered

Medication	N, %, 95% CI
Nonsteroidal anti-inflammatory agent	23, 66%, 49-79%
Paracetamol	18, 51%, 36-67%
Ondansetron	14, 40%, 26-56%
Oxycodone	4, 11%, 5-26%
Phenothiazine	3, 9%, 3-22%
Triptan	1, 3%, 0.5-15%
Metoclopramide	1, 3%, 0.5-15%
Paracetamol/ codeine	1, 3%, 0.5-15%
Intranasal fentanyl	1, 3%, 0.5-15%
None	5, 14%, 6-29%

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