Acute Treatment of Migraine Pain in the Pediatric Emergency Department: Propofol versus Standard Therapy

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Background

- Headache is a common reason for children to go to the Emergency Department (ED)
- Evidence supports standard intravenous (IV) therapy with analgesics, dopamine receptor antagonists, and anti-emetics for adults with migraine headache
- Lack of pediatric data or guidelines to direct treatment in children
- Considerations for choice of migraine treatment in children:
  - Adverse effects
  - Infusion times
- Intravenous propofol, administered at sub-anesthetic doses, has been identified as a possible alternative.
- Pediatric studies with propofol for migraine have shown inconsistent results

Objectives

- Primary:
  - To compare the difference in ED length of stay (LOS) after initiation of IV abortive therapy between propofol and standard IV therapy
- Secondary:
  - To determine the difference between propofol and standard IV therapy in:
    - Proportion of patients achieving pain scores ≤4 on the Numeric Rating Scale (NRS)
    - Total ED LOS
    - Incidence of rebound migraine headache (proportion of patients returning to the ED for migraine within 24 hours)
    - Patient disposition post-ED migraine treatment
  - To describe adverse drug events

Methods

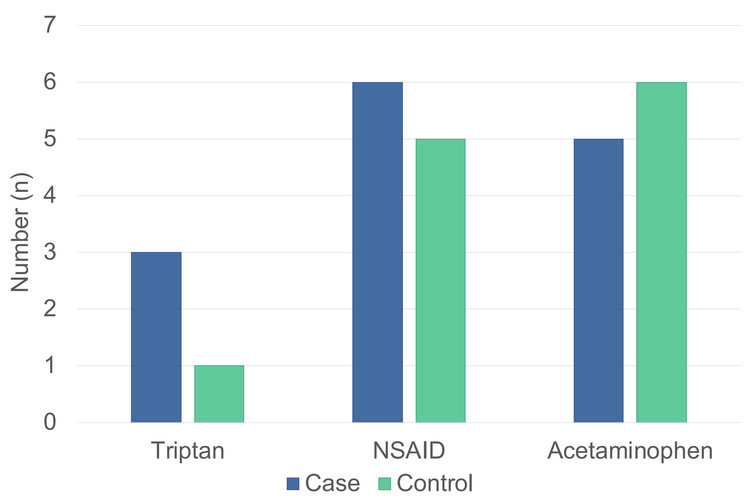
- Design: Retrospective matched 2:1 cohort study
- Inclusion: Patients ≥ 7 years old presenting to the ED for migraine headache
  - Cases: Those who received IV propofol for abortive migraine therapy
  - Controls: Those who received 'standard therapy' (IV metoclopramide, ketorolac, and diphenhydramine)
- Exclusion: Presence of head injury, presence of an intracranial shunt, history of tumor or malignancy, or received propofol for indication other than migraine pain relief
- Matching criteria: Age at the time of presentation ±1 year, sex, and pain score on the NRS ±1 at initiation of IV therapy
- Sample size: Intended sample size of 51 patients (17 cases matched to 34 controls), assuming an effect size of 40% to achieve a power of 80% at an alpha of 0.05, with 2:1 randomization
- Statistical analysis: Descriptive statistics for demographic data, comparison statistics using the Mann-Whitney U test the Fisher exact test

Results

Table 1. Patient Characteristics

	Cases N=11	Controls N=11
Age, yrs – mean (SD)	14.5 (1.8)	14.4 (1.7)
Female, n (%)	8 (73)	8 (73)
Weight, kg – mean (SD)	63.8 (16.6)	56.2 (8.9)
Family history of migraine, n (%)	5 (46)	5 (46)
Prior diagnosis of migraine, n (%)	7 (64)	6 (55)
Daily migraine prophylaxis, n (%)	4 (36)	4 (36)
Nortriptyline, n (%)	1 (9)	1 (9)
Flunarizine, n (%)	0 (0)	1 (9)
Gabapentin, n (%)	1 (9)	0 (0)
Coenzyme Q10, n (%)	2 (18)	1 (9)
Magnesium, n (%)	0 (0)	1 (9)
Riboflavin, n (%)	2 (18)	1 (9)
Headache duration, day – median (IQR)	7 (7-7.8)	0.4 (0.2-0.7)
Abortive medications prior to ED, n (%)	7 (64)	9 (82)
Physical symptoms, n (%)	9 (82)	10 (91)
Photophobia, n (%)	8 (73)	8 (73)
Phonophobia, n (%)	6 (55)	4 (36)
Nausea, n (%)	3 (27)	9 (82)
Vomiting, n (%)	0 (0)	2 (18)
Migraine therapy prior to propofol, n (%)	9 (82)	N/A

Figure 1. Abortive Medications Tried Prior to ED



Results

Figure 2. Post-IV Abortive Therapy ED LOS

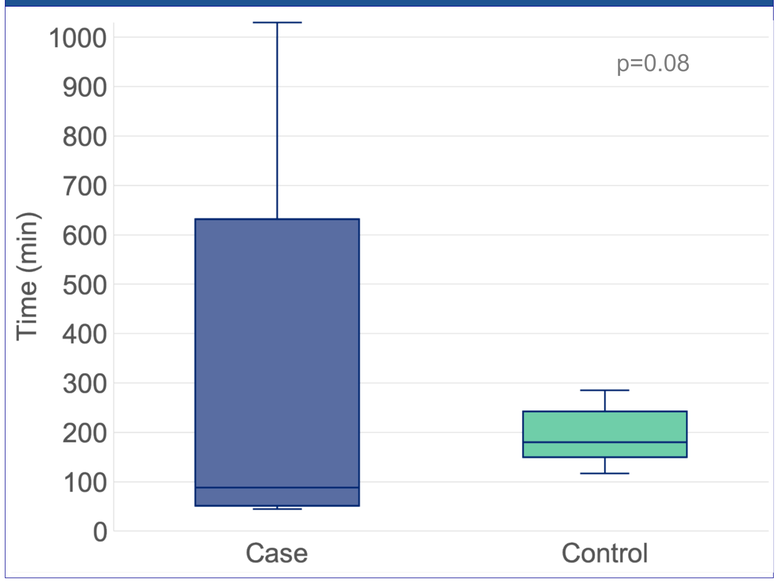


Table 2. Effectiveness and Safety

	Cases N=11	Controls N=11	p value
Post-IV Abortive Therapy NRS Pain Score ≤4, n (%)	7 (64)	9 (82)	0.43
Total ED LOS, min – median (IQR)	644 (411-987)	412 (299-515)	0.08
Rebound Headache, n (%)	2 (18)	1 (9)	--
Admitted to Hospital, n (%)	0 (0)	0 (0)	--
Adverse Drug Events, n (%) CNS Depression (Naranjo = 3)	1 (9)	0 (0)	--

Conclusions

- Wide variation in case cohort post-IV abortive therapy ED LOS and total ED LOS
- Case cohort appeared to have presented to ED with more refractory migraine