Propofol Use for Migraine Headache

Critical Bottom Line

There is evidence that supports the use of propofol for treating migraine headache in the emergency department setting. Using this therapy however would require the staff and setup of a moderate sedation, making it difficult to use on anything but an infrequent basis. Potentially this intervention would be helpful in those patients that have tried all other routes of treatment and are pending admission otherwise.

PICO Question

P= ED patients with acute migraine
I=Propofol
C=Standard migraine therapy
O=Improvement of migraine leading to discharge from the ED

Background

Migraine headache is a frequent chief complaint of the emergency department patient. Symptoms of this condition can be debilitating and can be difficult to treat. Multiple different medication classes have been used for treatment, with no clear consensus on which is most effective. In an attempt to add another potential treatment option, propofol has been studied in the treatment of acute migraine. Potential benefits of propofol use are compared against its tendency to be taxing on ED staff and its risk of adverse outcomes, including sedation and hypotension.

Trial 1

Piatka C, Beckett RD. Propofol for Treatment of Acute Migraine in the emergency Department: A systematic Review. Academic Emergency Medicine. 2020; 27:148-160
Pubmed link: https://pubmed.ncbi.nlm.nih.gov/31621134/

Validity Rating: small risk of bias

The Basics

A systematic review of the available literature up until 2019 when it was initially submitted. They included 9 different studies which were a mix of case reports, a retrospective cohort study, and randomized controlled trials. Aim was to evaluate the efficacy and safety of propofol for treatment of acute migraines in the emergency department.

Methods

PubMed, Google Scholar, and clinical trials and research registries were searched from 2000 to May 2019. Used search terms such as headache, migraine, propofol, propofol and headache, propofol and migraine disorders. After the search was completed by one author, it was verified by the second author.

Exclusion Criteria

- Propofol used for sedation, nausea and vomiting, status epileptics, sedation.
- Nonhuman studies
- Not in ED setting

Results

- Nine studies were identified: five case reports/series, one retrospective cohort study, three randomized controlled trials. Total number of patients was 290.

- Results not pooled into meta analysis due to small number of studies and heterogeneity between studies
- All patients reported improvement in their headache
- Adverse events were limited. Some patients experienced transient oxygen desaturation which improved either with nasal cannula oxygen or without intervention, temporary drowsiness, but there were on patients with hypotension or bradycardia requiring intervention in both adults or pediatrics.

Limitations/Biases
- Small number of patients/studies
- Some studies were not of high methodological quality
- Dosing of propofol was different in each study
- Other abortive medications (dexamethasone, compazine, etc) given was different in each study
- Some patients reported recurrence, but this was not adequately followed up or measured

Trial 2

Mitra B, Roman C, Mercier E, et al. Propofol for migraine in the emergency department: A randomised controlled trial. Emergency Medicine Australas. 2020;32:542-547
Pubmed link: https://pubmed.ncbi.nlm.nih.gov/32705801/

Validity Rating: moderate risk of bias

The Basics
Open-label, single center, randomized control study of 29 patients with a migraine receiving either sedation-dose propofol or standard therapy

Exclusion Criteria
-Fever
-Altered mental status or impairment of conscious state
-Allergy to potential medications, eggs, or soy products
-Presence of abnormal neurological signs
-Suspicion of alternate diagnosis
-History of head trauma
-Failure to provide informed consent
-Inability to mark a visual analogue pain scale
-Nursing home residents
-Pregnant patients

Primary Outcome
I. Time to discharge from the emergency department
Secondary Outcomes
I. Lowest Richmond-Agitation-Sedation Scale score
II. Lowest systolic blood pressure
III. Lowest oxygen saturation
IV. Qualitative recording of maneuvers to maintain airway
V. Favorable outcome: 50% reduction in VAS score or discharge from ED

Results
I. Decreased time to discharge in the Propofol study group (290min vs 554.5 min, p=0.021)
II. Hazard ratio of favorable outcome of reduction of pain scores 1.54 (95% CI 0.69-3.41)

III. No detection of significant safety concerns

Limitations/ Biasis
This was an open label study, therefore clinicians and patients were aware of the treatment being used. This could allow for increased haste in their disposition and bias the results. Also 6 of the 15 patients in the intervention group received additional analgesia, including 4 receiving Thorazine, a medication used in the standard therapy group.

Conclusion
Propofol could potentially be a good rescue agent for patient with acute migraines refractory to standard therapies. However, both safety and efficacy of propofol for headaches has limited evidence, and would require further evaluation. This could be considered in severe refractory cases with the appropriate safeguards, but routine use should still be limited.