

Medical Mythology

Myth: Ibuprofen is superior to acetaminophen for the treatment of benign headaches in children and adults

Sergio Manzano, MD;* Evelyne Doyon-Trottier, MD;† Benoît Bailey, MD, MSc†

INTRODUCTION

Clinicians often consider ibuprofen to be more effective than acetaminophen for the treatment of headaches. This impression is reinforced by practice parameters or guidelines that either consider acetaminophen to be less effective or attribute less evidence to its efficacy when compared with ibuprofen.¹⁻⁴ When these medications are compared head-to-head in a randomized controlled trial (RCT), little evidence exists that demonstrates the superiority of one over the other.

The objective of this article was to review the evidence supporting the concept that ibuprofen is superior to acetaminophen for the treatment of benign headaches, by reviewing the RCTs offering a direct comparison.

METHODS

Study selection

We performed a literature search of articles that

- included children, adolescents and/or adults with headaches,
- compared acetaminophen with ibuprofen, and
- used pain reduction as a primary outcome measure, irrespective of the type of pain scale used.

Study identification

To find all relevant articles, we searched in Ovid MEDLINE (1950 to May 1, 2007, and updated Mar. 9, 2009) and Ovid Embase (1980 to May 1, 2007, and updated Mar. 9, 2009) for RCTs, meta-analyses and reviews. Citations of all selected articles were also reviewed. The

search strategies were based on the work of Haynes and coauthors⁵ and Dickersin and colleagues.⁶ They are available on request.

Study inclusion

Two reviewers independently examined the titles and abstracts of articles generated by the search to identify potentially relevant trials. With the full text of these articles, each study was assessed for inclusion, using eligibility criteria established a priori. Disagreements were resolved by consensus.

RESULTS

Based on the title and abstract, we identified 415 articles by Embase and MEDLINE, of which 44 were reviewed in their entirety. Only 5 were RCTs,⁷⁻¹¹ the others were case reports, editorials or narrative reviews.

Migraine in adults

In 1983, Pearce and coworkers⁷ studied adults with any severity of migraine, defined using the Prensky and Sommer criteria in a 2-way crossover RCT. Recruited patients attended a headache clinic as outpatients. Patients received either 400 mg of ibuprofen or 900 mg of acetaminophen. Primary outcome was any pain reduction. After scoring each attack as mild, moderate or severe, 17/23 (74%) and 17/26 (65%) found that the average severity of headaches decreased equally from baseline with ibuprofen or acetaminophen, respectively. The difference between the two was not reported in the article but was not significant ($p = 0.52$).

From the *Department of Pediatrics, Children's Hospital HUG, Geneva, Switzerland, and the †Department of Pediatrics and the Division of Emergency Medicine, CHU Sainte-Justine, Montréal, Que.

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Secondary outcomes, such as duration of effect, favoured ibuprofen. This is not surprising, given its recognized longer half-life.

Migraine in children

In a multicentre double-blind 3-way crossover RCT, conducted in an ambulatory neurology clinic involving children aged 4–18 years with moderate to severe migraine defined using the International Headache Society criteria, 10 mg/kg of ibuprofen was compared with 15 mg/kg of acetaminophen, and with placebo.⁸ The primary outcome was the percentage of patients with a reduction in moderate or severe pain intensity (\geq grade 3) by at least 2 grades at 2 hours, evaluated using a 5-faces scale or a 100-mm visual analog scale (VAS). For the primary outcome, 27/40 (68%) patients had a reduction in headache intensity by at least 2 grades with ibuprofen, versus 22/41 (54%) with acetaminophen ($p > 0.05$). Secondary outcomes favoured ibuprofen.

Tension headache in adults and children

Packman and coauthors⁹ conducted an RCT among inpatients, adults and children older than 12, with moderate to severe undifferentiated benign headache, who received ibuprofen 400 mg, acetaminophen 1000 mg or placebo. The primary outcomes were time to first perceptible relief and time to meaningful relief. A total of 154 patients were enrolled. Patients reported a faster first perceptible relief (39 v. 47 min, $p < 0.02$) and a faster subjective meaningful relief (39 v. 53 min, $p < 0.001$) with ibuprofen compared with acetaminophen or placebo.

Tension headache in adults

Schachtel and colleagues¹⁰ published an RCT involving adults. Patients with a moderate to severe tension headache in an unidentified setting received either 400 mg of ibuprofen, 1000 mg of acetaminophen or a placebo. The primary outcome was not specified. Among the 613 patients enrolled, 455 were analyzed. Using a 100-mm visual analog Headache Pain Intensity Scale, pain intensity scores were significantly lower at 0.5, 1, 2, 3 and 4 hours with ibuprofen than with acetaminophen ($p < 0.01$). Complete pain-free status was obtained for 63% of the patients in the ibuprofen group compared with 34% in those treated with acetaminophen ($p < 0.01$).

High altitude headache in adults

In an RCT conducted at the base camp established in Pheriche, Nepal (4243 m), the study included any hiker with headaches but excluded all patients with a history of a chronic headache disorder or migraine headaches.¹¹ Patients were randomly assigned to receive either 400 mg of ibuprofen or 1000 mg of acetaminophen. Pain was self-evaluated with the help of a VAS at 0, 30, 60 and 120 minutes.¹¹ Seventy-five adults were included. There were no differences in mean VAS scores between the groups at any of the evaluation points.

DISCUSSION

Our literature review demonstrates that only a few relatively small studies exist supporting the concept that ibuprofen is superior to acetaminophen for the treatment of migraine or other benign headaches.

Only 2 studies addressing the relief of migraine headaches have been published, one in adults and the other in children. They both concluded ibuprofen was slightly superior, primarily based on secondary outcome results.^{7,8} However, neither showed any difference with respect to the stated primary outcomes of the studies.

Two studies focused on tension headaches. In a study involving both adults and children, Packman and coworkers⁹ demonstrated that patients treated with ibuprofen had a faster first perceptible relief and time to meaningful relief than those who received acetaminophen. However, the difference was small and of doubtful clinical significance. Unlike this previous study, Schachtel and coauthors¹⁰ demonstrated a clear advantage of ibuprofen over acetaminophen for tension headaches, with greater pain reduction at all time points evaluated. More patients also achieved complete relief of headache.

Finally, Harris and colleagues¹¹ found no difference between ibuprofen and acetaminophen in headaches occurring at altitude. This study did not attempt to identify or restrict the patients studied to only those with altitude-induced cerebral edema-type headaches, so it is unclear what the study population had as the etiology of their headaches.

CONCLUSION

Even though ibuprofen is often considered more effective than acetaminophen for the treatment of benign headache, there is minimal evidence in the literature to

support this belief. To date, only 2 studies evaluating tension headaches have demonstrated a superiority of ibuprofen.

Competing interests: None declared.

Keywords: acetaminophen, ibuprofen, headache, migraine

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Correspondence to: Dr. Benoit Bailey, CHU Sainte-Justine, 3175 Ch. de la Cote Ste-Catherine, Montréal QC H3T 1C5; benoit.bailey@umontreal.ca

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