Acute Treatments for Episodic Migraine: Surveillance Report 3

Literature Update Period: December 31, 2021, through March 21, 2022

Background and Purpose

This report is the third and final surveillance report for the Agency for Healthcare Research and Quality (AHRQ) 2020 report *Acute Treatments for Episodic Migraine*[1] (available at https://effectivehealthcare.ahrq.gov/products/migraine-treatments/research) and covers the time period from December 31, 2021, through March 21, 2022. The original 2020 report examined the evidence on the comparative effectiveness and harms of opioids as well as nonopioid pharmacologic and nonpharmacologic treatments to provide the full range of evidence to inform clinical decision making about the acute treatment of migraine. The objectives of this surveillance report are to identify the latest evidence published since the last surveillance report as of December 30, 2021 (Surveillance Report 2), and to determine how the new evidence impacts the findings of the 2020 report and surveillance reports. This is the final surveillance report planned for this systematic review.

Scope

The Key Questions (KQs; available at https://www.ncbi.nlm.nih.gov/books/n/cer239/ch3/#ch3.s2), PICOTS (population, interventions, comparisons, outcomes, timing, and setting; available at https://www.ncbi.nlm.nih.gov/books/NBK566240/table/ch3.tab1/?report=objectonly), and inclusion and exclusion criteria adopted in the original report[1] were used in this surveillance report and are listed in Appendixes A and B. Briefly, the report evaluated acute treatments in adult patients with episodic migraine and addressed the following:

- The comparative effectiveness and harms of opioid therapy versus nonopioid pharmacologic therapy and nonpharmacologic therapy for outcomes related to pain, function, pain relief satisfaction, and quality of life up to 4 weeks after treatments (KQ 1).
- The comparative effectiveness and harms of nonopioid pharmacologic therapy versus other nonopioid pharmacologic treatments and nonpharmacologic therapy for outcomes related to pain, function, pain relief satisfaction, and quality of life up to 4 weeks after treatments (KQ 2).
- The comparative effectiveness and harms of nonpharmacologic therapy versus sham treatment, waitlist, usual care, attention control, and no treatment up to 4 weeks after treatments (KQ 3).

The original study protocol was developed with input from a six-member Technical Expert Panel and is available on the AHRQ website (https://effectivehealthcare.ahrq.gov/products/migraine-treatments/protocol). The protocol of the report was registered in the International Prospective Register of Systematic Reviews (PROSPERO: CRD42020163262).

Methods

For this surveillance report, we searched bibliographic databases, including Embase®, MEDLINE® Daily, MEDLINE, Cochrane Central Register of Controlled Trials, Ovid® Cochrane Database of Systematic Reviews, PsycINFO®, and Scopus from December 31, 2021, to March 21, 2022. We also searched Food and Drug Administration, ClinicalTrials.gov, Health Canada, the United Kingdom's Medicines and Healthcare Products Regulatory Agency, and AHRQ's Horizon Scanning System. We used Google to search patient advocate group websites and medical society websites. We also performed reference mining of existing systematic reviews/meta-analyses, completed trials identified from clinical trial registries, and relevant primary studies (i.e., randomized clinical trials [RCTs] and observational studies). The same search strategy used in the 2020 report was used for this update (Appendix C); we included RCTs and comparative observational studies published in English on adult patients (18 years and older).

Independent reviewers, working in pairs, screened the titles and abstracts for all citations using prespecified inclusion and exclusion criteria. Studies included by either reviewer were retrieved for full-text screening. Independent reviewers, again working in pairs, screened the full-text version of eligible references. Discrepancies between the reviewers were resolved through discussions and consensus. When consensus could not be reached, a third reviewer resolved the discrepancy.

The same standardized data extraction form used in the 2020 report was adopted to extract study characteristics. A second reviewer confirmed data extraction and resolved conflicts. We contacted authors when important information (e.g., methods and outcomes) was missing. The Cochrane Collaboration's Risk of Bias 2 tool[2] and the Newcastle-Ottawa Scale[3] were used to evaluate risk of bias of the included studies.

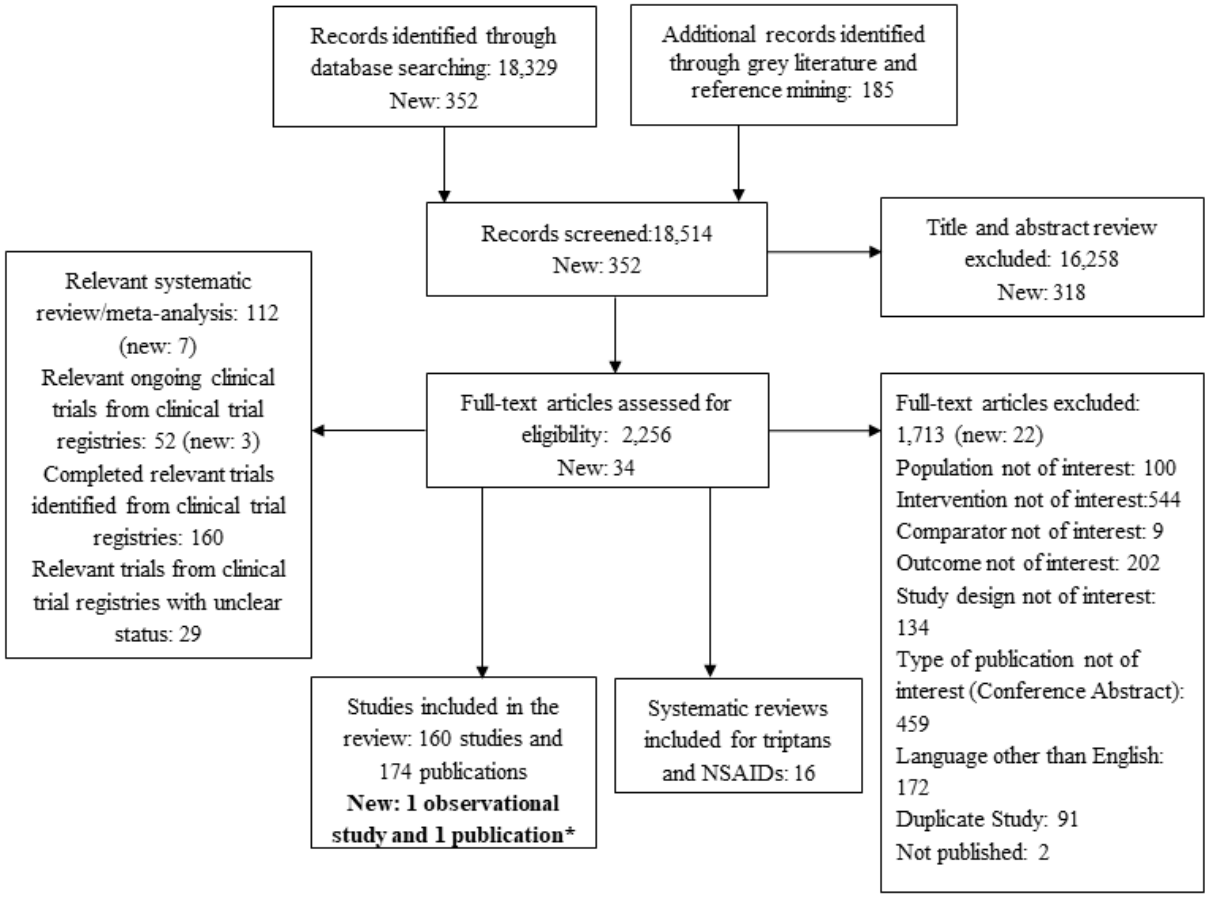
We updated the meta-analysis with new data that were identified in Surveillance Reports 1, 2, and 3, following the statistical approach described in the original report.

We graded the strength of evidence (SOE) using the same methods listed in the original report. Details of the interventions and findings of the included studies for all three surveillance reports can be found in Appendix D and Appendix E. Risk of bias is summarized in Appendix Tables F.1 and F.2. Forest plots for updated meta-analyses are listed in Appendix G. The list of the excluded studies can be found in Appendix H. Appendix I lists the references used in the appendixes.

Results

The literature search for Surveillance Report 3 identified 352 new citations. No additional eligible references were identified through reference mining or grey literature search. One new original observational study of nonpharmacologic therapies (KQ 3) met our inclusion criteria and was included.[4] Additionally, we identified a subsequent publication of eptinezumab versus placebo[5] (KQ 2) derived from the RELIEF (A Study to Evaluate the Efficacy and Safety of Eptinezumab Administered Intravenously in Participants Experiencing Acute Attack of Migraine) trial,[6] previously included in Surveillance Report 1. There were no new studies on opioids for KQ 1 (Figure 1).

Figure 1. Literature flow diagram



Abbreviations: NSAID = nonsteroidal anti-inflammatory drug

*One publication derived from a randomized clinical trial already included in the original report.

Evidence Details

Key Question 1. Opioid Pharmacologic Therapy

No new studies addressed the comparative effectiveness or harms of opioid therapy.

Key Question 2. Nonopioid Pharmacologic Therapy

Calcitonin Gene-Related Peptide Monoclonal Antibodies

In a subsequent publication of the RELIEF trial,[5, 6] eptinezumab was found to clinically and statistically significantly improve quality of life at 4 weeks measured by the 6-item Headache Impact Test (HIT-6) (mean difference: -4.20; 95% CI [confidence interval]: -6.18 to -2.22). In the subgroup analyses of patients who did and did not achieve freedom from pain and most bothersome symptom, a favorable 2-hour response to treatment was associated with a significantly better quality of life at 4 weeks.

Key Question 3. Nonpharmacologic Therapy

One comparative observational study[4] (n=170) compared the combination of remote electrical neuromodulation plus a guided intervention of education and relaxation to remote electrical neuromodulation only. At 2 hours, the combined treatment group reported significantly more patients with improved function (RR [relative risk]: 1.36; 95% CI: 1.05 to 1.76) and restored function (RR: 2.14; 95% CI: 1.23 to 3.75) than the remote electrical neuromodulation only group. There was no significant difference in pain free at 2 hours (RR: 1.65; 95% CI: 0.98 to 2.78) and pain relief at 2 hours (RR: 1.19; 95% CI: 0.90 to 1.57).

Summary of New Evidence

Table 1 summarizes the conclusions from the 2020 report, new evidence from Surveillance Reports 1, 2, and 3, and the changes to the original conclusions in light of new findings. Since this third surveillance report is the last planned update, it includes an updated meta-analysis of lasmiditan versus placebo including trials identified in Surveillance Report 1.

Table 1. Summary of conclusions and assessments informed by new evidence from the 2020 report and all surveillance reports

Key Question	Conclusions From 2020 Report	Findings From Surveillance Reports	Assessment of SOE and Conclusion
KQ 2. NSAIDs: Ibuprofen vs. Placebo	From the original report, NSAIDs as a drug class, compared with placebo, resolved pain at 2 hours and 1 day and increased the risk of mild and transient adverse events (moderate SOE).	One underpowered RCT*[7] (n=44) identified for Surveillance Report 2 found no significant difference in pain free at 2 hours, pain relief at 2 hours, sustained pain free at 24 hours, or adverse events. No serious adverse events were observed.	No change in SOE for NSAIDs as a drug class
KQ 2. NSAIDs: Dexketoprofen trometamol vs. Lidocaine	No study in the original report evaluated this comparison.	One RCT[8] (n=100) identified for Surveillance Report 2 found no significant difference in pain scale at 1.5 hours.	New intervention: SOE insufficient
KQ 2. Triptan: Zolmitriptan vs. Paracetamol (acetaminophen)	No study in the original report evaluated this comparison.	One RCT[9] (n=200) identified for Surveillance Report 2 found no significant difference between zolmitriptan and paracetamol (acetaminophen) in pain scale at 1 hour. No treatment-related adverse events were reported.	New intervention: SOE insufficient

Key Question	Conclusions From 2020 Report	Findings From Surveillance Reports	Assessment of SOE and Conclusion
KQ 2. NSAIDs: Celecoxib vs. Placebo	No study in the original report evaluated this specific NSAID. From the previous report, NSAIDs as a drug class, compared with placebo, resolved pain at 2 hours and 1 day, and increased the risk of mild and transient adverse events (moderate SOE).	One RCT[10] (n=631) identified for Surveillance Report 1 found no significant difference in pain free at 2 hours. In a subsequent RCT[11] (n=535) of the same group of patients also identified for Surveillance Report 1, celecoxib was found to be superior to placebo for the outcomes of pain free, pain relief, function scale at 2 hours, and sustained pain free and sustained pain relief at 24 hours.	No change in SOE for NSAIDs as a drug class
KQ 2. Antiemetic: Magnesium sulfate vs. Metoclopramide	No study in the original report compared these interventions, but in general, compared to placebo, antiemetics may resolve pain at 2 hours (low SOE).	One RCT[12] (n=105) identified for Surveillance Report 1 found no significant difference on pain scale at 2 hours.	New intervention: Improvement in pain SOE: low
KQ 2. Antiemetic: Magnesium sulfate vs. Prochlorperazine	No study in the original report evaluated this comparison, but compared with placebo, antiemetics including prochlorperazine alone and magnesium sulfate alone may resolve pain at 2 hours (low SOE).	One RCT[12] (n=113) identified for Surveillance Report 1 found no significant difference on pain scale at 2 hours.	New intervention: No change in pain SOE: Low
KQ 2. Antiemetic: Prochlorperazine vs. Metoclopramide	Prochlorperazine was significantly more likely to lead to being pain free and having pain relief at 2 hours compared with metoclopramide (low SOE, based on 2 RCTs). Insufficient evidence for pain scale at 2 hours (based on 2 RCTs).	One small RCT[12] (n=96) identified for Surveillance Report 1 found no significant difference on pain scale at 2 hours.	No change in SOE
KQ 2. Antiemetic: Metoclopramide plus magnesium sulfate vs. Metoclopramide	Metoclopramide alone was superior to Metoclopramide plus magnesium sulfate for pain relief and restored function at 2 hours (low SOE, based on 1 RCT). Insufficient evidence for pain scale at 2 hours (based on 1 RCT).	One small RCT[13] (n=80) identified for Surveillance Report 1 found no statistically significant difference on reduction of pain scale at 2 hours.	No change in SOE
KQ 2. Antiemetic: Chlorpromazine vs. Prochlorperazine	Chlorpromazine alone was superior to placebo for pain free and pain relief at 2 hours and 1 day (low SOE, based on 2 RCTs). Prochlorperazine alone was superior to placebo for pain free, pain relief, and reduction of pain scale at 2 hours (low SOE based on 1 RCT).	One small RCT[14] (n=88) identified for Surveillance Report 1 found no statistically significant difference between chlorpromazine and prochlorperazine on the reduction of pain scale at 2 hours.	No change in SOE

Key Question	Conclusions From 2020 Report	Findings From Surveillance Reports	Assessment of SOE and Conclusion
KQ 2. 5-HT1F: Lasmiditan vs. Placebo, overall	Lasmiditan was superior to placebo for the outcomes of pain free, pain relief, pain scale, restored function, and function scale at 2 hours; pain free, sustained pain free, and pain relief at 1 day; and sustained pain free at 1 week (moderate to high SOE based on 5 RCTs).	Two RCTs[15, 16] (n=2,459) identified for Surveillance Report 1 found lasmiditan was superior to placebo on pain free, pain relief, and restored function at 2 hours, and sustained pain free at 1 day and at 2 days, compared with placebo. Updated meta-analysis: Lasmiditan was superior to placebo for: Pain free at 2 hours: 6 RCTs; RR: 1.96; 95% CI: 1.40 to 2.73; I^2=69.9% Pain relief at 2 hours: 6 RCTs; RR: 1.41; 95% CI=1.28 to 1.55; I^2=24.2% Function free at 2 hours: 3 RCTs; RR: 1.42; 95% CI: 1.27 to 1.59; I^2=0.0% Sustained pain free at 1 day: 4 RCTs; RR: 1.77; 95% CI: 1.47 to 2.12; I^2=79.3% Sustained pain relief at 1 week: 3 RCTs; RR: 1.64; 95% CI: 1.35 to 1.99; I^2=69.6%	No change in SOE
KQ 2. 5-HT1F: Lasmiditan vs. Placebo, subgroup analysis by age	No study in the original report evaluated this subgroup.	Two new articles[17, 18] based on two previous RCTs (SAMURAI and SPARTAN) identified for Surveillance Report 1 found no significant difference between patients under 65 years and 65 years and over on being pain free at 2 hours or adverse events.	SOE is not applicable for subgroup analysis

Key Question	Conclusions From 2020 Report	Findings From Surveillance Reports	Assessment of SOE and Conclusion
KQ 2. 5-HT1F: Lasmiditan vs. Placebo, subgroup analysis by triptan response	No study in the original report evaluated this subgroup.	One subgroup analysis[19] identified for Surveillance Report 2 that was based on three RCTs[16, 20, 21] (previously included in the 2020 report) found no significant difference in lasmiditan effectiveness between patients based on previous triptan response (poor/none vs. good) when lasmiditan was compared with placebo or lasmiditan 200 mg compared with lasmiditan 100 mg. For triptan insufficient responders (defined as patients who had poor or very poor treatment efficacy), the CENTURION study showed that lasmiditan compared with placebo was associated with significantly better pain free and pain relief at 2 hours, and sustained pain free at 24 hours and 48 hours. There was no significant difference between 200 mg and 100 mg lasmiditan. No death was reported.	SOE is not applicable for subgroup analysis
KQ 2. Other interventions: Propofol vs. Placebo	No study in the original report evaluated this comparison.	One small RCT[22] (n=40) identified for Surveillance Report 1 found propofol significantly increased pain relief at 2 hours.	New intervention: Improvement in pain SOE low
KQ 2. Other interventions: Mesotherapy (thiocolchicoside plus lidocaine plus tenoxicam) vs. Dexketoprofen	No study in the original report evaluated this comparison.	One RCT[23] (n=154) identified for Surveillance Report 1 found mesotherapy significantly improved pain scale and pain relief at 2 hours and at 24 hours.	New intervention: SOE insufficient
KQ 2. CGRP: Eptinezumab vs. Placebo	***No study in the original report evaluated this comparison.***	***One RCT[5, 6] (n=485) identified for Surveillance Reports 1 and 3 found eptinezumab significantly increased pain free at 2 hours and at 1 day, sustained pain free at 1 day and at 2 days, and quality of life at 4 weeks measured by the 6-item Headache Impact Test (HIT-6).***	***New intervention: Improvement in pain and QoL SOE moderate***
KQ 2. Other interventions: Greater occipital nerve block vs. Metoclopramide	No study in the original report evaluated this comparison.	One small RCT[24] (n=99) identified for Surveillance Report 1 reported no significant difference between the two groups on pain scale at 2 hours, sustained pain relief and sustained pain free at 2 days, or adverse events.	New intervention: SOE insufficient

Key Question	Conclusions From 2020 Report	Findings From Surveillance Reports	Assessment of SOE and Conclusion
KQ 2. Other interventions: Greater occipital nerve block vs. Placebo	Insufficient evidence for pain free, pain relief, and pain scale at 2 hours (based on 1 RCT).	One small RCT[25] (n=57) identified for Surveillance Report 1 reported significantly more reduction of pain scale at 2 hours with greater occipital nerve block compared with placebo.	No change in SOE
KQ 2. Other interventions: Greater occipital nerve block vs. Supraorbital nerve block vs. Combination of greater occipital nerve block and supraorbital nerve block vs. Placebo	No study in the original report evaluated this comparison.	One RCT[25] (n=142) identified for Surveillance Report 1 reported greater occipital nerve block, supraorbital nerve block, and the combination of these two significantly improved pain scale at 2 hours compared with placebo; while greater occipital nerve block and the combination of greater occipital nerve block and supraorbital nerve block significantly improved pain scale at 2 hours compared with supraorbital nerve block.	New intervention: Improvement in pain SOE low
KQ 3. Nonpharmacologic therapy: Transcranial alternating current stimulation vs. Sham stimulation	No study in the original report evaluated this comparison.	One small RCT[26] (n=25) identified for Surveillance Report 1 found transcranial stimulation significantly improved pain scale at 2 hours and increased the likelihood of being sustained pain free at 1 day and at 2 days compared with those in the sham group.	New intervention: Improvement in pain SOE low
KQ 3. Nonpharmacologic therapy: External trigeminal nerve stimulation vs. Sham stimulation	External trigeminal nerve stimulation was superior to sham for pain free, pain relief, and pain scale at 2 hours and at 1 day and for sustained pain free and sustained pain relief at 1 day (low to moderate SOE based on 2 RCTs).	One small RCT[27] (n=77) identified for Surveillance Report 1 found external trigeminal nerve stimulation significantly improved pain scale at 2 hours.	No change in SOE

Key Question	Conclusions From 2020 Report	Findings From Surveillance Reports	Assessment of SOE and Conclusion
KQ 3. Nonpharmacologic therapy: Dry oxygen vs. Dry air vs. Humidified oxygen vs. Humidified air	No study in the original report evaluated this comparison.	One small RCT[28] (n=51) identified for Surveillance Report 1 found that patients with dry oxygen, dry air, or humidified oxygen reported a significant reduction in pain scale at 2 hours compared with those in the humidified air group, while patients with dry air reported significantly more pain relief at 2 hours than those with humidified air. No significant difference between dry oxygen, dry air, and humidified oxygen was reported on pain scale at 2 hours. No significant adverse events were reported.	New intervention: Improvement in pain SOE low
KQ 3. Nonpharmacologic therapy: Remote electrical neuromodulation vs. Remote electrical neuromodulation plus guided intervention of education and relaxation	***No study in the original report evaluated this comparison.***	***One comparative observational study[4] (n=170) identified for Surveillance Report 3 found significantly more patients in the combined group (remote electrical neuromodulation plus guided intervention of education and relaxation) reported restored function and improved function at 2 hours. There was no significant difference in pain relief and pain free at 2 hours.***	***New intervention: SOE insufficient***

Abbreviations: CENTURION = Study of Two Doses of Lasmiditan (100 mg and 200 mg) Compared to either Placebo or Lasmiditan 50 mg in the Acute TReaTment of MigrAiNe attacks; CGRP = calcitonin gene-related peptide; CI = confidence interval; HIT-6 = Headache Impact Test-6; KQ = Key Question; mg = milligram; NSAID = nonsteroidal anti-inflammatory drug; QoL = quality of life; RCT = randomized clinical trial; RR = relative risk; SAMURAI = A Study of Two Doses of LAsMiditan (100 mg and 200 mg) Compared to Placebo in the AcUte Treatment of MigRAIne; SOE = strength of evidence; SPARTAN = A Study of Three Doses of Lasmiditan (50 mg, 100 mg and 200 mg) Compared to Placebo in the Acute TReaTment of MigrAiNe

*Due to slow patient enrollment, the study was unable to recruit the prespecified number of patients (n=150) to have a power of 0.8 with an alpha error of 0.05.

Conclusions

The findings on the comparative effectiveness and harms of opioids and nonpharmacologic treatments for acute treatments of episodic migraine from this update are consistent with those in the original 2020 report, Surveillance Report 1, and Surveillance Report 2. This surveillance update identified two new publications evaluating calcitonin gene-related peptide and remote electrical neuromodulation. Overall, already established effective treatments, such as triptans, nonsteroidal anti-inflammatory drugs, antiemetics, ergot alkaloids, and newer treatments, such as gepants and ditans, are associated with improved pain and functional outcomes and different adverse effect profiles. Opioids have low or insufficient strength of evidence for acute treatment of migraine.

References

1. Halker Singh RB, VanderPluym JH, Morrow AS, et al. Acute Treatments for Episodic Migraine. Comparative Effectiveness Review No. 239. (Prepared by the Mayo Clinic Evidence-based Practice Center under Contract No. 290-2015-00013-I.) AHRQ Publication No. 21-EHC009. Rockville, MD: Agency for Healthcare Research and Quality; December 2020. DOI: https://doi.org/10.23970/AHRQEPCCER239.
2. Sterne JAC, Savović J, Page MJ, et al. RoB 2: a revised tool for assessing risk of bias in randomised trials. BMJ. 2019 Aug 28;366:l4898. doi: 10.1136/bmj.l4898. PMID: 31462531.
3. Wells GA, Shea B, O'Connell D, et al. The Newcastle-Ottawa Scale (NOS) for assessing the quality of nonrandomised studies in meta-analyses. http://www.ohri.ca/programs/clinical_epidemiology/oxford.asp. Accessed 06/03/2022.
4. Buse DC, Rabany L, Lin T, et al. Combining Guided intervention of education and relaxation (GIER) with remote electrical neuromodulation (REN) in the acute treatment of migraine. Pain Med. 2022 Feb 11;pnac021 doi: https://dx.doi.org/10.1093/pm/pnac021. PMID: 35148414.
5. McAllister P, Winner PK, Ailani J, et al. Eptinezumab treatment initiated during a migraine attack is associated with meaningful improvement in patient-reported outcome measures: secondary results from the randomized controlled RELIEF study. J Headache Pain. 2022 Feb 07;23(1):22. doi: https://dx.doi.org/10.1186/s10194-021-01376-7. PMID: 35130832.
6. Winner PK, McAllister P, Chakhava G, et al. Effects of intravenous eptinezumab vs placebo on headache pain and most bothersome symptom when initiated during a migraine attack: a randomized clinical trial. JAMA. 2021 Jun 15;325(23):2348-56. doi: https://dx.doi.org/10.1001/jama.2021.7665. PMID: 34128999.
7. Yuan H, Curran JG, Keith SW, et al. Intravenous ibuprofen for acute treatment of migraine: a double-blind, randomized, placebo-controlled pilot study. Headache. 2021 Oct;61(9):1432-40. doi: 10.1111/head.14214. PMID: 34601736.
8. Gur STA, Ahiskalioglu EO, Aydin ME, et al. Intravenous lidocaine vs. NSAIDs for migraine attack in the ED: a prospective, randomized, double-blind study. Eur J Clin Pharmacol. 2022 Jan;78(1):27-33. doi: 10.1007/s00228-021-03219-5. PMID: 34528122.
9. Arikan C, Yilmaz A, Ozen M, et al. Oral paracetamol versus zolmitriptan to treat acute migraine attack in the emergency department. Signa Vitae. 2021 Sep;17(5):110-6. doi: 10.22514/sv.2021.040.
10. Lipton RB, Munjal S, Tepper SJ, et al. A Multicenter, randomized, double-blind, placebo-controlled study of the efficacy, tolerability, and safety of celecoxib oral solution (ELYXYB) in acute treatment of episodic migraine with or without aura. J Pain Res. 2021;14:2529-42. doi: https://dx.doi.org/10.2147/JPR.S322292. PMID: 34447267.
11. Lipton RB, Munjal S, Dodick DW, et al. Acute treatment of migraine with celecoxib oral solution: results of a randomized, placebo-controlled clinical trial. J Pain Res. 2021;14:549-60. doi: https://dx.doi.org/10.2147/JPR.S287571. PMID: 33658842.
12. Kandil M, Jaber S, Desai D, et al. MAGraine: magnesium compared to conventional therapy for treatment of migraines. Am J Emerg Med. 2021 Jan;39:28-33. doi: 10.1016/j.ajem.2020.09.033. PMID: 33041146.
13. Motamed H, Mozafari J, Porozan S, et al. Magnesium sulfate and acute migraine: a randomized clinical trial. Ann Clin Anal Med. 2020 Sep;11(5):369-73. doi: 10.4328/Acam.20072..

14. Hodgson SE, Harding AM, Bourke EM, et al. A prospective, randomized, double-blind trial of intravenous chlorpromazine versus intravenous prochlorperazine for the treatment of acute migraine in adults presenting to the emergency department. Headache. 2021 Apr;61(4):603-11. doi: https://dx.doi.org/10.1111/head.14091. PMID: 33797074.

15. Sakai F, Takeshima T, Homma G, et al. Phase 2 randomized placebo-controlled study of lasmiditan for the acute treatment of migraine in Japanese patients. Headache. 2021 May;61(5):755-65. doi: https://dx.doi.org/10.1111/head.14122. PMID: 33990951.

16. Ashina M, Reuter U, Smith T, et al. Randomized, controlled trial of lasmiditan over four migraine attacks: findings from the CENTURION study. Cephalalgia. 2021 Mar;41(3):294-304. doi: 10.1177/0333102421989232. PMID: 33541117.

17. Martin VT, Ahmed Z, Hochstetler HM, et al. Tolerability and safety of lasmiditan treatment in elderly patients with migraine: post hoc analyses from randomized studies. Clin Ther. 2021 Jun;43(6):1066-1078. doi: https://dx.doi.org/10.1016/j.clinthera.2021.04.004. PMID: 34366152.

18. Clemow DB, Baygani SK, Hauck PM, et al. Lasmiditan in patients with common migraine comorbidities: a post hoc efficacy and safety analysis of two phase 3 randomized clinical trials. Curr Med Res Opin. 2020 Nov;36(11):1791-806. doi: 10.1080/03007995.2020.1808780. PMID: 32783644.

19. Reuter U, Krege JH, Lombard L, et al. Lasmiditan efficacy in the acute treatment of migraine was independent of prior response to triptans: findings from the CENTURION study. Cephalalgia. 2022 Jan;42(1):20-30. doi: 10.1177/03331024211048507. PMID: 34644189.

20. Goadsby PJ, Wietecha LA, Dennehy EB, et al. Phase 3 randomized, placebo-controlled, double-blind study of lasmiditan for acute treatment of migraine. Brain. 2019 Jul 1;142(7):1894-904. doi: 10.1093/brain/awz134. PMID: 31132795.

21. Kuca B, Silberstein SD, Wietecha L, et al. Lasmiditan is an effective acute treatment for migraine: a phase 3 randomized study. Neurology. 2018 Dec 11;91(24):e2222-e2232. doi: 10.1212/wnl.0000000000006641. PMID: 30446595.

22. Meek R, Graudins A, McDonald M, et al. Comparing propofol with placebo for early resolution of acute migraine in adult emergency department patients: A double-blind randomised controlled trial. Emerg Med Australas. 2021;33(3):465-72 doi: 10.1111/1742-6723.13659. PMID: 33070469.

23. Akbas I, Kocak MB, Kocak AO, et al. Intradermal mesotherapy versus intravenous dexketoprofen for the treatment of migraine headache without aura: a randomized controlled trial. Ann Saudi Med. 2021 May-Jun;41(3):127-34. doi: https://dx.doi.org/10.5144/0256-4947.2021.127. PMID: 34085549.

24. Friedman BW, Irizarry E, Williams A, et al. A randomized, double-dummy, emergency department-based study of greater occipital nerve block with bupivacaine vs intravenous metoclopramide for treatment of migraine. Headache. 2020 Nov;60(10):2380-8. doi: 10.1111/head.13961. PMID: 32981043.

25. Hokenek NM, Ozer D, Yilmaz E, et al. Comparison of greater occipital nerve and supra orbital nerve blocks methods in the treatment of acute migraine attack: a randomized double-blind controlled trial. Clin Neurol Neurosurg. 2021 Aug;207:106821. doi: https://dx.doi.org/10.1016/j.clineuro.2021.106821. PMID: 34304069.

26. Antal A, Bischoff R, Stephani C, et al. Low Intensity, transcranial, alternating current stimulation reduces migraine attack Burden in a home application set-up: a double-blinded, randomized feasibility study. Brain Sci. 2020 Nov 21;10(11):888. doi: 10.3390/brainsci10110888. PMID: 33233400.

27. Domingues FS, Gayoso MV, Sikandar S, et al. Analgesic efficacy of a portable, disposable, and self-applied transcutaneous electrical nerve stimulation device during migraine attacks: A real-life randomized controlled trial. Pain pract. 2021 Nov;21(8):850-858. doi: https://dx.doi.org/10.1111/papr.13042. PMID: 34013542.

28. Shah R, Assis F, Narasimhan B, et al. Trans-nasal high-flow dehumidified air in acute migraine headaches: a randomized controlled trial. Cephalalgia. 2021 Aug;41(9):968-78. doi: https://dx.doi.org/10.1177/03331024219977 66. PMID: 33631965.

Authors

Juliana H. VanderPluym, M.D.
Rashmi B. Halker Singh, M.D.
Magdoleen H. Farah, M.B.B.S.
Kelly E. Viola, M.P.S.
Bashar Hasan, M.D.
Samer Saadi, M.D.
Sahrish Shah, M.B.B.S.
Tarek Nayfeh, M.D.
Larry J. Prokop, M.L.S.
M. Hassan Murad, M.D., M.P.H.
Zhen Wang, Ph.D.

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None of the investigators have any affiliations or financial involvement that conflicts with the material presented in this report.

The information in this report is intended to help healthcare decision makers—patients and clinicians, health system leaders, and policymakers, among others—make well-informed decisions and thereby improve the quality of health care services. This report is not intended to be a substitute for the application of clinical judgment. Anyone who makes decisions concerning the provision of clinical care should consider this report in the same way as any medical reference and in conjunction with all other pertinent information, i.e., in the context of available resources and circumstances presented by individual patients.

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Afterword

The Agency for Healthcare Research and Quality (AHRQ), through its Evidence-based Practice Centers (EPCs), sponsors the development of systematic reviews to assist public- and private-sector organizations in their efforts to improve the quality of healthcare in the United States. These reviews provide comprehensive, science-based information on common, costly medical conditions, and new healthcare technologies and strategies.

Systematic reviews are the building blocks underlying evidence-based practice; they focus attention on the strength and limits of evidence from research studies about the effectiveness and safety of a clinical intervention. In the context of developing recommendations for practice, systematic reviews can help clarify whether assertions about the value of the intervention are based on strong evidence from clinical studies. For more information about AHRQ EPC systematic reviews, see https://effectivehealthcare.ahrq.gov/about/epc/evidence-synthesis.

This quarterly surveillance report provides up-to-date information about the evidence base to inform health plans, providers, purchasers, government programs, and the healthcare system as a whole on the state of the science. Transparency and stakeholder input are essential to the Effective Health Care Program. Please visit the website (www.effectivehealthcare.ahrq.gov) to see draft research questions and reports or to join an email list to learn about new program products and opportunities for input.

If you have comments on this report, they may be sent by mail to the Task Order Officer named below at: Agency for Healthcare Research and Quality, 5600 Fishers Lane, Rockville, MD 20857, or by email to epc@ahrq.hhs.gov.

Robert Otto Valdez, Ph.D., M.H.S.A.
Director
Agency for Healthcare Research and Quality

Arlene S. Bierman, M.D., M.S.
Director
Center for Evidence and Practice Improvement
Agency for Healthcare Research and Quality

Craig A. Umscheid, M.D., M.S.
Director
Evidence-based Practice Center Program
Center for Evidence and Practice Improvement
Agency for Healthcare Research and Quality

Suchitra Iyer, Ph.D.
Task Order Officer
Evidence-based Practice Center Program
Center for Evidence and Practice Improvement
Agency for Healthcare Research and Quality

Appendix Contents

Appendixes

Appendix Tables and Figures

Appendix A. Key Questions

For Acute Treatment for Episodic Migraine, the following Key Questions were determined based on input from multiple Key Informants.

Key Question 1. Opioid Therapy

a. What is the comparative effectiveness of opioid therapy versus: (1) nonopioid pharmacologic therapy (e.g., acetaminophen, nonsteroidal anti-inflammatory drugs [NSAIDs], triptans, ergot alkaloids, combination analgesics, muscle relaxants, anti-nausea medications, and cannabis) or (2) nonpharmacologic therapy (e.g., exercise, cognitive behavioral therapy, acupuncture, biofeedback, noninvasive neuromodulation devices) for outcomes related to pain, function, pain relief satisfaction, and quality of life and after followup at the following intervals: <1 day; 1 day to <1 week; 1 week to <2 weeks; 2 weeks to 4 weeks?

b. How does effectiveness of opioid therapy vary depending on: (1) patient demographics (e.g., age, race, ethnicity, gender, socioeconomic status [SES]); (2) patient medical comorbidities (previous opioid use, body mass index [BMI]); (3) dose of opioids; (4) duration of opioid therapy, including number of opioid prescription refills and quantity of pills used?

c. What are the harms of opioid therapy versus nonopioid pharmacologic therapy or nonpharmacologic therapy with respect to: (1) misuse, opioid use disorder, and related outcomes; (2) overdose; (3) medication overuse headache (MOH); (4) other harms, including gastrointestinal-related harms, falls, fractures, motor vehicle accidents, endocrinologic harms, infections, cardiovascular events, cognitive harms, and psychological harms (e.g., depression)?

d. How do harms vary depending on: (1) patient demographics (e.g., age, gender); (2) patient medical comorbidities; (3) the dose of opioid used; (4) the duration of opioid therapy?

e. What are the effects of prescribing opioid therapy versus not prescribing opioid therapy for acute treatment of episodic migraine pain on (1) short-term (<3 months) continued need for prescription pain relief,

such as need for opioid refills, and (2) long-term opioid use (3 months or greater)?

f. For patients with episodic migraine being considered for opioid therapy for acute treatment, what is the accuracy of instruments for predicting risk of opioid misuse, opioid use disorder, or overdose?

g. For patients with episodic migraine being considered for opioid therapy for acute treatment, what is the effectiveness of instruments for predicting risk of opioid misuse, opioid use disorder, or overdose?

h. For patients with episodic migraine being considered for opioid therapy for acute treatment, what is the effect of the following risk mitigation strategies on the decision to prescribe opioids: (1) existing opioid management plans; (2) patient education; (3) clinician and patient values and preferences related to opioids; (4) urine drug screening; (5) use of prescription drug monitoring program data; (6) availability of close followup?

Key Question 2. Nonopioid Pharmacologic Therapy

a. What is the comparative effectiveness of nonopioid pharmacologic therapy (e.g., acetaminophen, NSAIDs, triptans, ergot alkaloids, combination analgesics, muscle relaxants, anti-nausea medications, and cannabis) versus: (1) other nonopioid pharmacologic treatments, such as those in a different medication class; or (2) nonpharmacologic therapy for outcomes related to pain, function, pain relief satisfaction, and quality of life after followup at the following intervals: <1 day; 1 day to <1 week; 1 week to <2 weeks; 2 weeks to 4 weeks?

b. How does effectiveness of nonopioid pharmacologic therapy vary depending on: (1) patient demographics (e.g., age, race, ethnicity, gender); (2) patient medical comorbidities; (3) the type of nonopioid medication; (4) dose of medication; (5) duration of treatment?

c. What are the harms of nonopioid pharmacologic therapy versus other nonopioid pharmacologic therapy or nonpharmacologic therapy with respect to: (1) misuse; (2) overdose; (3) MOH; (4) other harms, including gastrointestinal-related harms, cardiovascular-related harms, kidney-related harms, falls, fractures, motor vehicle accidents, endocrinological

harms, infections, cognitive harms, and psychological harms (e.g., depression)?

d. How do harms vary depending on: (1) patient demographics (e.g., age, gender); (2) patient medical comorbidities; (3) the type of nonopioid medication; (4) dose of medication; (5) the duration of therapy?

Key Question 3. Nonpharmacologic Therapy

a. What is the comparative effectiveness of nonpharmacologic therapy versus sham treatment, waitlist, usual care, attention control, and no treatment after followup at the following intervals: <1 day; 1 day to <1 week; 1 week to <2 weeks; 2 weeks to 4 weeks?

b. What is the comparative effectiveness of nonpharmacologic treatments (e.g., exercise, cognitive behavioral therapy, acupuncture, biofeedback, noninvasive neuromodulation devices) for outcomes related to pain, function, pain relief satisfaction, and quality of life?

c. How does effectiveness of nonpharmacologic therapy vary depending on: (1) patient demographics (e.g., age, gender); (2) patient medical comorbidities?

d. How do harms vary depending on: (1) patient demographics (e.g., age, gender); (2) patient medical comorbidities; (3) the type of treatment used; (4) the frequency of therapy; (5) the duration of therapy?

Appendix B. Population, Interventions, Comparisons, Outcomes, Timing, and Setting

The related population, interventions, comparisons, outcomes, timing, and setting (PICOTS) are listed in Table B.1.

Table B.1. PICOTS (population, interventions, comparisons, outcomes, timing, and setting)

PICOTS Elements	Inclusion Criteria	Exclusion Criteria
Population	Patients with episodic migraine seeking abortive treatment Adults 18 years and older *Special populations: General adult Older populations >65 years Patients with history of substance use disorder Patients currently under treatment for opioid use disorder with opioid agonist therapy or naltrexone Patients with a history of mental illness Patients with history of overdose Pregnant/breastfeeding women Patients with comorbidities (e.g. kidney disease, sleep disordered breathing)	Animals Children (age <18 years)

PICOTS Elements	Inclusion Criteria	Exclusion Criteria
Interventions	KQ1 a-e: Any systemic opioid abortive therapy, including: Codeine Fentanyl (Actiq, Duragesic, Fentora, Abstral, Onsolis) Hydrocodone (Hysingla, Zohydro ER) Hydrocodone/acetaminophen (Lorcet, Lortab, Norco, Vicodin) Hydromorphone (Dilaudid, Exalgo) Meperidine (Demerol) Methadone (Dolophine, Methadose) Morphine (Kadian, MS Contin, Morphabond) Oxycodone (OxyContin, Oxaydo) Oxycodone and acetaminophen (Percocet, Roxicet) Oxycodone and naloxone And other agonists, partial agonists and mixed mechanism opioids KQ1 f-g: Instruments and genetic/metabolic tests for predicting risk of misuse, opioid use disorder, and overdose KQ1 h: Risk mitigation strategies, including: Existing opioid management plans Patient education Clinician and patient values and preferences related to opioids Urine drug screening Use of prescription drug monitoring program data Availability of close followup And others KQ2: Any oral, injection, infusion, topical nonopioid abortive drug, including: Acetaminophen NSAIDs (if compared against active treatment) Triptans (if compared against active treatment) Ergot alkaloids Combination analgesics Muscle relaxants Anti-nausea medications Cannabis And others KQ3: Any non-invasive nonpharmacologic abortive therapy, including: Exercise Cognitive behavioral therapy Acupuncture And others	For all KQs, exclude invasive treatments (surgical interventions, etc.), and preventive (prophylactic) treatment For KQ2, exclude NSAIDs vs placebo and triptans vs placebo
Comparators	KQ1 a-e: Usual care, another opioid therapy, nonopioid pharmacologic therapy, nonpharmacologic therapy KQ1 f: Reference standard for misuse, opioid use disorder, or overdose; or other benchmarks KQ1 g-h: Usual care KQ2: Another nonopioid pharmacologic therapy, nonpharmacologic therapy KQ3: Sham treatment, waitlist, usual care, attention control, and no treatment, another non-invasive nonpharmacologic therapy	None

PICOTS Elements	Inclusion Criteria	Exclusion Criteria
Outcomes	KQ1. Opioid Therapy: KQ1 a-e. Pain, function, pain relief satisfaction and quality of life, harms/adverse events (including withdrawal, risk of misuse, opioid use disorder, overdose, medication overuse headache). KQ1 f. Measures of diagnostic accuracy KQ1 g-h. Misuse, opioid use disorder, overdose and other harms KQ2. Non-Opioid Therapy: Pain, function, pain relief satisfaction, quality of life, harms/adverse events KQ3: Noninvasive nonpharmacological therapy: Pain, function, pain relief satisfaction, quality of life, harms/adverse events	None
Timing	At the following intervals: <1 day; 1 day to <1 week; 1 week to <2 weeks; 2 weeks to 4 weeks	None
Settings	ED, physician's office, hospital	None
Study design	Original studies (evaluating interventions other than triptans and NSAIDs) RCTs Comparative observational studies Systematic reviews or meta-analyses (evaluating triptans and NSAIDs) Any sample size Relevant systematic reviews, or meta-analyses (used for identifying additional studies)	In vitro studies, nonoriginal data (e.g. narrative reviews, editorials, letters, or erratum), single-arm observational studies, case series, qualitative studies, cost-benefit analysis, cross-sectional (i.e., nonlongitudinal) studies, before-after studies, survey
Publications	Studies published in English only	Foreign language studies

Abbreviations: ED = emergency department; KQ = Key Question; NSAID = nonsteroidal anti-inflammatory drug; PICOTS = population, interventions, comparisons, outcomes, timing, and setting; RCT = randomized clinical trial

Appendix C. Search Strategy

Ovid

Database(s): APA PsycInfo 1806 to March Week 2 2022, EBM Reviews - Cochrane Central Register of Controlled Trials January 2022, EBM Reviews - Cochrane Database of Systematic Reviews 2005 to March 16, 2022, Embase 1974 to 2022 March 21, Ovid MEDLINE(R) and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations, Daily and versions 1946 to March 21, 2022

Search Strategy:

#	Searches
1	exp Migraine Disorders/dt, th [Drug Therapy, Therapy]
2	migraine*.ti,ab,hw,kw.
3	exp narcotic analgesic agent/
4	exp Analgesics, Opioid/
5	(acetorphine or acetylcodeine or acetylmethadol or Alfentanil or Alphaprodine or anileridine or apadoline or azidomorphine or benzhydrocodone or bezitramide or bremazocine or "Brompton mixture" or Buprenorphine or Butorphanol or ciramadol or cocodamol or Codeine or codydramol or conorfone or cyclazocine or Dextromoramide or Dextropropoxyphene or dextrorphan or dezocine or diamorphine or diconal or dihydrocodeine or dihydroetorphine or Dihydromorphine or dimethylthiambutene or Diphenoxylate or dipipanone or enadoline or eptazocine or ethylketazocine or Ethylketocyclazocine or Ethylmorphine or etonitazene or Etorphine or etoxeridine or faxeladol or Fentanyl or furethidine or gelonida or Heroin or Hydrocodone or isalmadol or isomethadone or ketazocine or ketobemidone or ketogan or kyotorphin or lefetamine or levacetylmethadol or levomethadone or Levorphanol or Meperidine or Meptazinol or metazocine or Methadone or "Methadyl Acetate" or methylsamidorphan or Morphine or "morphinomimetic agent*" or "morphinomimetic drug*" or morphinone or Nalbuphine or narcotic* or nicocodine or nicomorphine or noracymethadol or norbuprenorphine or nordextropropoxyphene or normorphine or norpethidine or norpropoxyphene or "o nortramadol" or oliceridine or opiate or Opiate* or opioid* or Opium or oripavine or Oxycodone or Oxymorphone or pentamorphone or Pentazocine or pethidine or phenadoxone or phenaridine or Phenazocine or phencyclidine or Phenoperidine or picenadol or piminodine or Pirinitramide or piritramide or profadol or Promedol or propiram or sameridine or samidorphan or semorphone or Sufentanil or tapentadol or thebaine or tifluadom or Tilidine or tonazocine or Tramadol or trimeperidine).ti,ab,hw,kw.
6	exp Anti-Inflammatory Agents, Non-Steroidal/
7	exp cyclooxygenase inhibitors/
8	exp cyclooxygenase 2 inhibitors/
9	Aspirin/
10	sulindac/

#	Searches
11	(Aceclofenac or Acemetacin or "Acetylsalicylic acid" or Alclofenac or Aminopyrine or Amodiaquine or Amoxiprin or Ampyrone or Antipyrine or Apazone or Aspirin or Azapropazone or Benorilate or Benorylate or Bromelains or Bromfenac or "BW-755C" or Celecoxib or "Choline magnesium salicylate" or "Choline magnesium trisalicylate" or clinoril or Clofazimine or Clofezone or Clonixin or "COX-1 inhibitor*" or "COX-2 inhibitor*" or "COX-2 selective inhibitor*" or Coxib* or Curcumin or "Cyclooxygenase 1 inhibitor*" or "Cyclooxygenase 2 inhibitor*" or "Cyclooxygenase inhibitor*" or "Cyclo-oxygenase inhibitor*" or Dapsone or Dexibuprofen or Dexketoprofen or Diclofenac or Diflunisal or Dipyrone or Droxicam or Epirizole or Ethenzamide or Etodolac or Etoricoxib or Faislamine or Fenbufen or Fenoprofen or "Flufenamic acid" or Flunoxaprofen or Flurbiprofen or "Glycyrrhizic Acid" or Ibuprofen or Ibuproxam or Indomethacin or Indoprofen or Kebuzone or Ketoprofen or Ketorolac or Licofelone or Lornoxicam or Loxoprofen or Lumiracoxib or "Magnesium salicylate" or "Meclofenamic Acid" or "Mefenamic Acid" or Meloxicam or Mesalamine or Metamizole or "Methyl salicylate" or Mofebutazone or Nabumetone or Naproxen or "Niflumic Acid" or "Nonsteroidal antiinflammator*" or "Nonsteroidal anti-inflammator*" or "Non-steroidal antiinflammator*" or "Non-steroidal anti-inflammator*" or "Nordihydroguaiaretic Acid" or NSAID* or osenal or Oxametacin or Oxaprozin or Oxyphenbutazone or Parecoxib or "Pentosan Sulfuric Polyester" or Phenazone or Phenylbutazone or Piroxicam or Pirprofen or Prenazone or Proglumetacin or Rofecoxib or Salicylamide or Salicylate or Sulfasalazine or Sulfinpyrazone or Sulindac or Suprofen or Tenoxicam or "Tiaprofenic acid" or "Tolfenamic acid" or Tolmetin or Valdecoxib).ti,ab,hw,kw.
12	exp Tryptamines/
13	exp triptan derivative/
14	("5-ht" or "5-hydroxytryptamine*" or "5-methoxytryptamine*" or dimethyltryptamine* or enteramine* or hippophaine* or hydroxytryptamine* or indolylethylamine* or meksamine* or methoxydimethyltryptamine* or methoxytryptamine* or methylbufotenin or mexamine* or Serotonin or triptan* or tryptamine*).ti,ab,hw,kw.
15	exp Ergot Alkaloids/
16	(Bromocriptine* or Cabergoline* or "clavine alkaloid*" or "clavines alkaloid*" or Dihydroergocornine* or Dihydroergocristine* or Dihydroergocryptine* or Dihydroergotamine* or Dihydroergotoxine* or Ergoline* or "Ergoloid Mesylate*" or Ergonovine* or "ergot agent*" or "ergot alkaloid*" or "ergot drug*" or "ergot medication*" or Ergotamine* or Ergotamines or "ergotoxine alkaloid*" or "ergots alkaloid*" or Lisuride* or "Lysergic Acid" or "Lysergic Acid Diethylamide*" or Metergoline* or Methylergonovine* or Methysergide* or Nicergoline* or Pergolide*).ti,ab,hw,kw.
17	exp Analgesics/

#	Searches
18	(Acetaminophen or Adenosine or Amantadine or Amitriptyline or analgesic* or analgetic* or anbesol or anodyne* or anpirtoline or antalgic* or antinociceptive* or antrafenine or auralgan or axomadol or befiradol or bicifadine or brivaracetam or brivoligide or bromadoline or "Calcitonin Gene-Related Peptide Receptor Antagonist*" or cannabidivarin or capsaicin or Carbachol or Carbamazepine or cebranopadol or cibinetide or cizolirtine or Clonidine or crobenetine or Cyclazocine or dapansutrile or dasolampanel or davasaicin or deacetyllappaconitine or "Dentin Desensitizing" or "desensitizing agent*" or "desensitizing drug*" or "desensitizing medication*" or Dexmedetomidine or difelikefalin or Dihydroergotamine or dimiracetam or dizatrifone or doxpicomine or drinidene or Dronabino or Duloxetine or ecopladib or edronocaine or efipladib or elismetrep or "embelate potassium" or enkephalin or epibatidine or equagesic or Ergotamine or ethoheptazine or fadolmidine or fasinumab or "floctafenic acid" or floctafenine or flunixin or "flunixin meglumine" or flupirtine or Flurbiprofen or frakefamide or fulranumab or funapide or Gabapentin or gefapixant or giripladib or "glafenic acid" or Glafenine or "gw 493838" or "gw 842166" or hasamal or ibudilast or Ibuprofen or indantadol or Interleukin or Ketamine or lacosamide or lappaconitine or lenabasum or letimide or lexanopadol or "Magnesium Sulfate" or mavatrep or Medetomidine or Methotrimeprazine or Milnacipran or Mitoxantrone or Nefopam or neurotropin or "Nitrous Oxide" or nuvanil or olodanrigan or olorinab or olvanil or "omega conotoxin" or panidex or "pf 3557156" or "pf 4136309" or "pf 4480682" or "pf 592379" or "pf 738502" or Phenacetin or Pizotyline or pravadoline or Pregabalin or Quinine or ralfinamide or retigabine or ruzadolane or sampirtine or senrebotase or shogaol or strascogesic or tanezumab or tazadolene or tebanicline or tetrodotoxin or tivanisiran or traxoprodil or vedaclidine or vixotrigine or Xylazine).ti,ab,hw,kw.
19	exp Muscle Relaxants, Central/
20	exp muscle relaxant agent/

#	Searches
21	(afloqualone or alcuronium or "atracurium besilate" or azumolene or baclofen or Baclofent or botulinum or branaplam or Carisoprodol or "chandonium iodide" or Chlormezanone or Chlorphenesin or chlorproethazine or Chlorzoxazone or cisatracurium or curare or curaremimetic* or curariform or curarizing or Dantrolene or decamethonium or "depolarizing neuromuscular" or deutolperisone or diadonium or Diazepam or "dihydro beta erythroidine" or dimethyltubocurarine or doxacurium or duador or eperisone or fazadinium or febarbamate or flumetramide or gallamine or gantacurium or "hexafluronium bromide" or idrocilamide or inaperisone or lanperisone or "mebezonium iodide" or Medazepam or Mephenesin or Meprobamate or metaxalone or Methocarbamol or mivacurium or "Muscle relaxant*" or "muscle relaxing" or "musculotropic relaxant*" or "musculotropic relaxing" or myorelaxant or myotonolytic* or nefopam or nelezaprine or "neuromuscular agent*" or "neuromuscular blocker*" or "neuromuscular blocking" or "neuromuscular depolarizing agent*" or "neuromuscular depolarizing drug*" or "neuromuscular depolarizing medication*" or "neuromuscular drug*" or "neuromuscular medication*" or "neuromuscular nondepolarizing agent*" or "neuromuscular nondepolarizing drug*" or "neuromuscular nondepolarizing medication*" or "neuromuscular synapse blocking agent*" or "neuromuscular synapse blocking drug*" or "neuromuscular synapse blocking medication*" or "nondepolarizing neuromuscular blocking agent*" or "nondepolarizing neuromuscular blocking drug*" or "nondepolarizing neuromuscular blocking medication*" or norgesic or Orphenadrine or pancuronium or phenprobamate or pipecuronium or promoxolane or pyrocurine or Quinine or "rapacuronium bromide" or rocuronium or silperisone or styramate or suxamethonium or "tiemonium methylsulfate" or tizanidine or Tolperisone or toxiferine or "tubocurarine chloride" or vecuronium or vesamicol or Xylazine or Zoxazolamine).ti,ab,hw,kw.
22	exp Antiemetics/
23	exp Nausea/dt [Drug Therapy]
24	exp Vomiting/dt [Drug Therapy]
25	(((drug* or agent* or medication*) adj3 (nausea or vomit*)) or alizapride or "anti emetic*" or antiemetic* or antimetic* or "anti-metic*" or antinausea* or "anti-nausea*" or antivomit* or "anti-vomit*" or Aprepitant or azasetron or batanopride or belidral or bendectin or benzquinamide or bromopride or buclizine or casopitant or chlorcyclizine or chlorphenethazine or Chlorpromazine or cinnarizine or cisapride or clebopride or Cyclizine or dazopride or debendox or Dexamethasone or Diazepam or difenidol or Dimenhydrinate or Diphenhydramine or dixyrazine or "dolasetron mesilate" or Domperidone or Doxylamine or dronabinol or Droperidol or exepanol or ezlopitant or fabesetron or fosaprepitant or fosnetupitant or Granisetron or Haloperidol or hydrodolasetron or icospiramide or indisetron or lerisetron or lintopride or Lorazepam or lurosetron or maropitant or Meclizine or meclozine or Methylprednisolone or Metoclopramide or metopimazine or nabilone or netupitant or norchlorpromazine or Olanzapine or Ondansetron or Palonosetron or pancopride or Prochlorperazine or Promazine or promethazine or ramosetron or renzapride or ricasetron or rolapitant or Scopolamine or sulpiride or telmapitant or tetrahydrocannabinol or Thiethylperazine or transmer or Trifluoperazine or Triflupromazine or trimethobenzamide or Tropisetron or vestipitant or vofopitant or zacopride).ti,ab,hw,kw.

#	Searches
26	exp Cannabis/
27	exp cannabinoid/
28	exp "cannabis use"/
29	exp Marijuana Smoking/
30	exp Cannabinoids/
31	exp Cannabidiol/
32	("1 butyl 3 1 naphthoyl indole" or "11 hydroxydronabinol" or "2 arachidonoylglycerol" or "2 methyl 3 1 naphthoyl 1 propylindole" or "3 1 naphthoyl 1 pentylindole" or "3 2 iodo 5 nitrobenzoyl 1 1 methyl 2 piperidinylmethyl indole" or "3 hydroxy delta9 tetrahydrocannabinol" or "ajulemic acid" or anandamide or bhang or bhangs or cannabi or cannabichromene or cannabidiol or cannabielsoin or cannabigerol or cannabinoid or cannabinol or cannabis or cannador or charas or Cindica or deacetyllevonantradol or dexanabinol or dextronantradol or dronabinol or endocannabinoid or ganja or ganjas or hashish or hashishs or hemp or hemps or levonantradol or marihuana* or marijuana* or methanandamide or "n oleoylethanolamine" or nabilone or nabiximols or nantradol or "noladin ether" or palmidrol or tetrahydrocannabinol or "tetrahydrocannabinolic acid" or virodhamine).mp.
33	exp Biofeedback, Psychology/
34	("alpha feedback*" or biofeedback* or "bogus physiological feedback*" or "brainwave feedback*" or "eeg feedback*" or "electroencephalography feedback*" or "electromyography feedback*" or "false physiological feedback*" or myofeedback* or neurofeedback* or "psychophysiologic feedback*").ti,ab,hw,kw.
35	Electric Stimulation Therapy/
36	exp neuromodulation/
37	(((Electric* or electro or galvano or Transcutaneous*) adj3 (stimulat* or stimulus)) or electrostimulation* or electrostimulus or electrotherap* or "E-stim" or ESTIM or FES or galvanostimulation* or galvanostimulus or Neuromodulation or neuromodulatory).ti,ab,hw,kw.
38	exp Cognitive Therapy/
39	exp Cognitive Behavior Therapy/
40	(CBT or "Cognitive behavioral therap*" or "Cognitive therap*").ti,ab,hw,kw.
41	exp Acupuncture/
42	exp Acupuncture Therapy/
43	(acupressure or acupuncture or "auricular needl*" or auriculotherapy or "ear needl*" or electroacupuncture or moxibustion or Shiatsu or "Tui Na").ti,ab,hw,kw.
44	exp exercise/
45	exp exercise therapy/
46	(aerobics or anaerobics or bicycling or biking or "endurance training" or exercis* or "fitness training" or isometrics or "physical exertion" or "physical activit*" or "resistance training" or running or "strength training" or swimming or walking or weightlifting).ti,ab,hw,kw.

#	Searches
47	(drug* or pharmacotherap* or medication* or agent* or chemotherap* or intervention* or manag* or therap* or treat*).ti,ab,hw,kw.
48	or/3-47
49	2 and 48
50	1 or 49
51	exp evidence based medicine/
52	exp meta analysis/
53	exp Meta-Analysis as Topic/
54	exp "systematic review"/
55	exp Guideline/ or exp Practice Guideline/
56	exp controlled study/
57	exp Randomized Controlled Trial/
58	exp triple blind procedure/
59	exp Double-Blind Method/
60	exp Single-Blind Method/
61	exp latin square design/
62	exp Placebos/
63	exp Placebo Effect/
64	exp comparative study/
65	exp intervention studies/
66	exp Cross-Sectional Studies/
67	exp Cross-Over Studies/
68	exp Cohort Studies/
69	exp longitudinal study/
70	exp retrospective study/
71	exp prospective study/
72	exp clinical trial/
73	clinical study/
74	exp case-control studies/
75	exp confidence interval/
76	exp multivariate analysis/

#	Searches
77	((evidence adj based) or (meta adj analys*) or (systematic* adj3 review*) or guideline* or (control* adj3 study) or (control* adj3 trial) or (randomized adj3 study) or (randomized adj3 trial) or (randomised adj3 study) or (randomised adj3 trial) or "pragmatic clinical trial" or (doubl* adj blind*) or (doubl* adj mask*) or (singl* adj blind*) or (singl* adj mask*) or (tripl* adj blind*) or (tripl* adj mask*) or (trebl* adj blind*) or (trebl* adj mask*) or "latin square" or placebo* or nocebo* or multivariate or "comparative study" or "comparative survey" or "comparative analysis" or (intervention* adj2 study) or (intervention* adj2 trial) or "cross-sectional study" or "cross-sectional analysis" or "cross-sectional survey" or "cross-sectional design" or "prevalence study" or "prevalence analysis" or "prevalence survey" or "disease frequency study" or "disease frequency analysis" or "disease frequency survey" or crossover or "cross-over" or cohort* or "longitudinal study" or "longitudinal survey" or "longitudinal analysis" or "longitudinal evaluation" or longitudinal* or ((retrospective or "ex post facto") adj3 (study or survey or analysis or design)) or retrospectiv* or "prospective study" or "prospective survey" or "prospective analysis" or prospectiv* or "concurrent study" or "concurrent survey" or "concurrent analysis" or "clinical study" or "clinical trial" or "case control study" or "case base study" or "case referrent study" or "case referent study" or "case referent study" or "case compeer study" or "case comparison study" or "matched case control" or "multicenter study" or "multi-center study" or "odds ratio" or "confidence interval" or "change analysis" or ((study or trial or random* or control*) and compar*)).mp,pt.
78	or/51-77
79	50 and 78
80	limit 79 to ("all adult (19 plus years)" or "young adult (19 to 24 years)" or "adult (19 to 44 years)" or "young adult and adult (19-24 and 19-44)" or "middle age (45 to 64 years)" or "middle aged (45 plus years)" or "all aged (65 and over)" or "aged (80 and over)") [Limit not valid in APA PsycInfo,CCTR,CDSR,Embase; records were retained]
81	limit 80 to (adult <18 to 64 years> or aged <65+ years>) [Limit not valid in APA PsycInfo,CCTR,CDSR,Ovid MEDLINE(R),Ovid MEDLINE(R) Daily Update,Ovid MEDLINE(R) PubMed not MEDLINE,Ovid MEDLINE(R) In-Process,Ovid MEDLINE(R) Publisher; records were retained]
82	limit 79 to ("all infant (birth to 23 months)" or "all child (0 to 18 years)" or "newborn infant (birth to 1 month)" or "infant (1 to 23 months)" or "preschool child (2 to 5 years)" or "child (6 to 12 years)" or "adolescent (13 to 18 years)") [Limit not valid in APA PsycInfo,CCTR,CDSR,Embase; records were retained]
83	limit 82 to (embryo or infant or child or preschool child <1 to 6 years> or school child <7 to 12 years> or adolescent <13 to 17 years>) [Limit not valid in APA PsycInfo,CCTR,CDSR,Ovid MEDLINE(R),Ovid MEDLINE(R) Daily Update,Ovid MEDLINE(R) PubMed not MEDLINE,Ovid MEDLINE(R) In-Process,Ovid MEDLINE(R) Publisher; records were retained]
84	83 not 81
85	79 not 84
86	migraine*.ti.
87	85 and 86

#	Searches
88	limit 87 to (dissertation abstract or editorial or erratum or note or addresses or autobiography or bibliography or biography or blogs or comment or dictionary or directory or interactive tutorial or interview or lectures or legal cases or legislation or news or newspaper article or overall or patient education handout or periodical index or portraits or published erratum or video-audio media or webcasts) [Limit not valid in APA PsycInfo,CCTR,CDSR,Embase,Ovid MEDLINE(R),Ovid MEDLINE(R) Daily Update,Ovid MEDLINE(R) PubMed not MEDLINE,Ovid MEDLINE(R) In-Process,Ovid MEDLINE(R) Publisher; records were retained]
89	from 88 keep 205-228
90	(87 not 88) or 89
91	limit 90 to yr="2020 -Current"
92	remove duplicates from 91
93	limit 90 to yr="2018 -2019"
94	remove duplicates from 93
95	limit 90 to yr="2015-2017"
96	remove duplicates from 95
97	limit 90 to yr="2010-2014"
98	remove duplicates from 97
99	limit 90 to yr="2002-2009"
100	remove duplicates from 99
101	90 not (91 or 93 or 95 or 97 or 99)
102	remove duplicates from 101
103	92 or 94 or 96 or 98 or 100 or 102

Scopus

1	TITLE(migraine*)
2	TITLE-ABS-KEY(acetorphine or acetylcodeine or acetylmethadol or Alfentanil or Alphaprodine or anileridine or apadoline or azidomorphine or benzhydrocodone or bezitramide or bremazocine or "Brompton mixture" or Buprenorphine or Butorphanol or ciramadol or cocodamol or Codeine or codydramol or conorfone or cyclazocine or Dextromoramide or Dextropropoxyphene or dextrorphan or dezocine or diamorphine or diconal or dihydrocodeine or dihydroetorphine or Dihydromorphine or dimethylthiambutene or Diphenoxylate or dipipanone or enadoline or eptazocine or ethylketazocine or Ethylketocyclazocine or Ethylmorphine or etonitazene or Etorphine or etoxeridine or faxeladol or Fentanyl or furethidine or gelonida or Heroin or Hydrocodone or isalmadol or isomethadone or ketazocine or ketobemidone or ketogan or kyotorphin or lefetamine or levacetylmethadol or levomethadone or Levorphanol or Meperidine or Meptazinol or metazocine or Methadone or "Methadyl Acetate" or methylsamidorphan or Morphine or "morphinomimetic agent*" or "morphinomimetic drug*" or morphinone or Nalbuphine or narcotic* or nicocodine or nicomorphine or noracymethadol or norbuprenorphine or nordextropropoxyphene or normorphine or norpethidine or

norpropoxyphene or "o nortramadol" or oliceridine or opiate or Opiate* or opioid* or Opium or oripavine or Oxycodone or Oxymorphone or pentamorphone or Pentazocine or pethidine or phenadoxone or phenaridine or Phenazocine or phencyclidine or Phenoperidine or picenadol or piminodine or Pirinitramide or piritramide or profadol or Promedol or propiram or sameridine or samidorphan or semorphone or Sufentanil or tapentadol or thebaine or tifluadom or Tilidine or tonazocine or Tramadol or trimeperidine)

3 TITLE-ABS-KEY(Aceclofenac or Acemetacin or "Acetylsalicylic acid" or Alclofenac or Aminopyrine or Amodiaquine or Amoxiprin or Ampyrone or Antipyrine or Apazone or Aspirin or Azapropazone or Benorilate or Benorylate or Bromelains or Bromfenac or "BW-755C" or Celecoxib or "Choline magnesium salicylate" or "Choline magnesium trisalicylate" or clinoril or Clofazimine or Clofezone or Clonixin or "COX-1 inhibitor*" or "COX-2 inhibitor*" or "COX-2 selective inhibitor*" or Coxib* or Curcumin or "Cyclooxygenase 1 inhibitor*" or "Cyclooxygenase 2 inhibitor*" or "Cyclooxygenase inhibitor*" or "Cyclo-oxygenase inhibitor*" or Dapsone or Dexibuprofen or Dexketoprofen or Diclofenac or Diflunisal or Dipyrone or Droxicam or Epirizole or Ethenzamide or Etodolac or Etoricoxib or Faislamine or Fenbufen or Fenoprofen or "Flufenamic acid" or Flunoxaprofen or Flurbiprofen or "Glycyrrhizic Acid" or Ibuprofen or Ibuproxam or Indomethacin or Indoprofen or Kebuzone or Ketoprofen or Ketorolac or Licofelone or Lornoxicam or Loxoprofen or Lumiracoxib or "Magnesium salicylate" or "Meclofenamic Acid" or "Mefenamic Acid" or Meloxicam or Mesalamine or Metamizole or "Methyl salicylate" or Mofebutazone or Nabumetone or Naproxen or "Niflumic Acid" or "Nonsteroidal antiinflammator*" or "Nonsteroidal anti-inflammator*" or "Non-steroidal antiinflammator*" or "Non-steroidal anti-inflammator*" or "Nordihydroguaiaretic Acid" or NSAID* or osenal or Oxametacin or Oxaprozin or Oxyphenbutazone or Parecoxib or "Pentosan Sulfuric Polyester" or Phenazone or Phenylbutazone or Piroxicam or Pirprofen or Prenazone or Proglumetacin or Rofecoxib or Salicylamide or Salicylate or Sulfasalazine or Sulfinpyrazone or Sulindac or Suprofen or Tenoxicam or "Tiaprofenic acid" or "Tolfenamic acid" or Tolmetin or Valdecoxib)

4 TITLE-ABS-KEY("5-ht" or "5-hydroxytryptamine*" or "5-methoxytryptamine*" or dimethyltryptamine* or enteramine* or hippophaine* or hydroxytryptamine* or indolylethylamine* or meksamine* or methoxydimethyltryptamine* or methoxytryptamine* or methylbufotenin or mexamine* or Serotonin or triptan* or tryptamine*)

5 TITLE-ABS-KEY(Bromocriptine* or Cabergoline* or "clavine alkaloid*" or "clavines alkaloid*" or Dihydroergocornine* or Dihydroergocristine* or Dihydroergocryptine* or Dihydroergotamine* or Dihydroergotoxine* or Ergoline* or "Ergoloid Mesylate*" or Ergonovine* or "ergot agent*" or "ergot alkaloid*" or "ergot drug*" or "ergot medication*" or Ergotamine* or Ergotamines or "ergotoxine alkaloid*" or "ergots alkaloid*" or Lisuride* or "Lysergic Acid" or "Lysergic Acid Diethylamide*" or Metergoline* or Methylergonovine* or Methysergide* or Nicergoline* or Pergolide*)

6 TITLE-ABS-KEY(Acetaminophen or Adenosine or Amantadine or Amitriptyline or analgesic* or analgetic* or anbesol or anodyne* or anpirtoline or antalgic* or antinociceptive* or antrafenine or auralgan or axomadol or befiradol or bicifadine or brivaracetam or brivoligide or bromadoline or "Calcitonin Gene-Related Peptide Receptor Antagonist*" or cannabidivarin or capsaicin or Carbachol or Carbamazepine or

cebranopadol or cibinetide or cizolirtine or Clonidine or crobenetine or Cyclazocine or dapansutrile or dasolampanel or davasaicin or deacetyllappaconitine or "Dentin Desensitizing" or "desensitizing agent*" or "desensitizing drug*" or "desensitizing medication*" or Dexmedetomidine or difelikefalin or Dihydroergotamine or dimiracetam or dizatrifone or doxpicomine or drinidene or Dronabino or Duloxetine or ecopladib or edronocaine or efipladib or elismetrep or "embelate potassium" or enkephalin or epibatidine or equagesic or Ergotamine or ethoheptazine or fadolmidine or fasinumab or "floctafenic acid" or floctafenine or flunixin or "flunixin meglumine" or flupirtine or Flurbiprofen or frakefamide or fulranumab or funapide or Gabapentin or gefapixant or giripladib or "glafenic acid" or Glafenine or "gw 493838" or "gw 842166" or hasamal or ibudilast or Ibuprofen or indantadol or Interleukin or Ketamine or lacosamide or lappaconitine or lenabasum or letimide or lexanopadol or "Magnesium Sulfate" or mavatrep or Medetomidine or Methotrimeprazine or Milnacipran or Mitoxantrone or Nefopam or neurotropin or "Nitrous Oxide" or nuvanil or olodanrigan or olorinab or olvanil or "omega conotoxin" or panidex or "pf 3557156" or "pf 4136309" or "pf 4480682" or "pf 592379" or "pf 738502" or Phenacetin or Pizotyline or pravadoline or Pregabalin or Quinine or ralfinamide or retigabine or ruzadolane or sampirtine or senrebotase or shogaol or strascogesic or tanezumab or tazadolene or tebanicline or tetrodotoxin or tivanisiran or traxoprodil or vedaclidine or vixotrigine or Xylazine)

7 TITLE-ABS-KEY(afloqualone or alcuronium or "atracurium besilate" or azumolene or baclofen or Baclofent or botulinum or branaplam or Carisoprodol or "chandonium iodide" or Chlormezanone or Chlorphenesin or chlorproethazine or Chlorzoxazone or cisatracurium or curare or curaremimetic* or curariform or curarizing or Dantrolene or decamethonium or "depolarizing neuromuscular" or deutolperisone or diadonium or Diazepam or "dihydro beta erythroidine" or dimethyltubocurarine or doxacurium or duador or eperisone or fazadinium or febarbamate or flumetramide or gallamine or gantacurium or "hexafluronium bromide" or idrocilamide or inaperisone or lanperisone or "mebezonium iodide" or Medazepam or Mephenesin or Meprobamate or metaxalone or Methocarbamol or mivacurium or "Muscle relaxant*" or "muscle relaxing" or "musculotropic relaxant*" or "musculotropic relaxing" or myorelaxant or myotonolytic* or nefopam or nelezaprine or "neuromuscular agent*" or "neuromuscular blocker*" or "neuromuscular blocking" or "neuromuscular depolarizing agent*" or "neuromuscular depolarizing drug*" or "neuromuscular depolarizing medication*" or "neuromuscular drug*" or "neuromuscular medication*" or "neuromuscular nondepolarizing agent*" or "neuromuscular nondepolarizing drug*" or "neuromuscular nondepolarizing medication*" or "neuromuscular synapse blocking agent*" or "neuromuscular synapse blocking drug*" or "neuromuscular synapse blocking medication*" or "nondepolarizing neuromuscular blocking agent*" or "nondepolarizing neuromuscular blocking drug*" or "nondepolarizing neuromuscular blocking medication*" or norgesic or Orphenadrine or pancuronium or phenprobamate or pipecuronium or promoxolane or pyrocurine or Quinine or "rapacuronium bromide" or rocuronium or silperisone or styramate or suxamethonium or "tiemonium methylsulfate" or tizanidine or Tolperisone or toxiferine or "tubocurarine chloride" or vecuronium or vesamicol or Xylazine or Zoxazolamine)

8 TITLE-ABS-KEY(((drug* or agent* or medication*) W/3 (nausea or vomit*)) or alizapride or "anti emetic*" or antiemetic* or antimetic* or "anti-metic*" or antinausea* or "anti-nausea*" or antivomit* or "anti-vomit*" or Aprepitant or azasetron or

batanopride or belidral or bendectin or benzquinamide or bromopride or buclizine or casopitant or chlorcyclizine or chlorphenethazine or Chlorpromazine or cinnarizine or cisapride or clebopride or Cyclizine or dazopride or debendox or Dexamethasone or Diazepam or difenidol or Dimenhydrinate or Diphenhydramine or dixyrazine or "dolasetron mesilate" or Domperidone or Doxylamine or dronabinol or Droperidol or exepanol or ezlopitant or fabesetron or fosaprepitant or fosnetupitant or Granisetron or Haloperidol or hydrodolasetron or icospiramide or indisetron or lerisetron or lintopride or Lorazepam or lurosetron or maropitant or Meclizine or meclozine or Methylprednisolone or Metoclopramide or metopimazine or nabilone or netupitant or norchlorpromazine or Olanzapine or Ondansetron or Palonosetron or pancopride or Prochlorperazine or Promazine or promethazine or ramosetron or renzapride or ricasetron or rolapitant or Scopolamine or sulpiride or telmapitant or tetrahydrocannabinol or Thiethylperazine or transmer or Trifluoperazine or Triflupromazine or trimethobenzamide or Tropisetron or vestipitant or vofopitant or zacopride)

9 TITLE-ABS-KEY("1 butyl 3 1 naphthoyl indole" or "11 hydroxydronabinol" or "2 arachidonoylglycerol" or "2 methyl 3 1 naphthoyl 1 propylindole" or "3 1 naphthoyl 1 pentylindole" or "3 2 iodo 5 nitrobenzoyl 1 1 methyl 2 piperidinylmethyl indole" or "3 hydroxy delta9 tetrahydrocannabinol" or "ajulemic acid" or anandamide or bhang or bhangs or cannabi or cannabichromene or cannabidiol or cannabielsoin or cannabigerol or cannabinoid or cannabinol or cannabis or cannador or charas or Cindica or deacetyllevonantradol or dexanabinol or dextronantradol or dronabinol or endocannabinoid or ganja or ganjas or hashish or hashishs or hemp or hemps or levonantradol or marihuana* or marijuana* or methanandamide or "n oleoylethanolamine" or nabilone or nabiximols or nantradol or "noladin ether" or palmidrol or tetrahydrocannabinol or "tetrahydrocannabinolic acid" or virodhamine)

10 TITLE-ABS-KEY("alpha feedback*" or biofeedback* or "bogus physiological feedback*" or "brainwave feedback*" or "eeg feedback*" or "electroencephalography feedback*" or "electromyography feedback*" or "false physiological feedback*" or myofeedback* or neurofeedback* or "psychophysiologic feedback*")

11 TITLE-ABS-KEY(((Electric* or electro or galvano or Transcutaneous*) W/3 (stimulat* or stimulus)) or electrostimulation* or electrostimulus or electrotherap* or "E-stim" or ESTIM or FES or galvanostimulation* or galvanostimulus or Neuromodulation or neuromodulatory)

12 TITLE-ABS-KEY(CBT or "Cognitive behavioral therap*" or "Cognitive therap*")

13 TITLE-ABS-KEY(acupressure or acupuncture or "auricular needl*" or auriculotherapy or "ear needl*" or electroacupuncture or moxibustion or Shiatsu or "Tui Na")

14 TITLE-ABS-KEY(aerobics or anaerobics or bicycling or biking or "endurance training" or exercis* or "fitness training" or isometrics or "physical exertion" or "physical activit*" or "resistance training" or running or "strength training" or swimming or walking or weightlifting)

15 TITLE-ABS-KEY(drug* or pharmacotherap* or medication* or agent* or chemotherap* or intervention* or manag* or therap* or treat*)

16 TITLE-ABS-KEY((evidence W/1 based) or (meta W/1 analys*) or (systematic* W/3 review*) or guideline* or (control* W/3 study) or (control* W/3 trial) or (randomized W/3 study) or (randomized W/3 trial) or (randomised W/3 study) or (randomised W/3 trial) or "pragmatic clinical trial" or (doubl* W/1 blind*) or (doubl* W/1 mask*) or

(singl* W/1 blind*) or (singl* W/1 mask*) or (tripl* W/1 blind*) or (tripl* W/1 mask*) or (trebl* W/1 blind*) or (trebl* W/1 mask*) or "latin square" or placebo* or nocebo* or multivariate or "comparative study" or "comparative survey" or "comparative analysis" or (intervention* W/2 study) or (intervention* W/2 trial) or "cross-sectional study" or "cross-sectional analysis" or "cross-sectional survey" or "cross-sectional design" or "prevalence study" or "prevalence analysis" or "prevalence survey" or "disease frequency study" or "disease frequency analysis" or "disease frequency survey" or crossover or "cross-over" or cohort* or "longitudinal study" or "longitudinal survey" or "longitudinal analysis" or "longitudinal evaluation" or longitudinal* or ((retrospective or "ex post facto") W/3 (study or survey or analysis or design)) or retrospectiv* or "prospective study" or "prospective survey" or "prospective analysis" or prospectiv* or "concurrent study" or "concurrent survey" or "concurrent analysis" or "clinical study" or "clinical trial" or "case control study" or "case base study" or "case referrent study" or "case referent study" or "case referent study" or "case compeer study" or "case comparison study" or "matched case control" or "multicenter study" or "multi-center study" or "odds ratio" or "confidence interval" or "change analysis" or ((study or trial or random* or control*) and compar*))

17 1 and (2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15) and 16

18 TITLE-ABS-KEY(newborn* or neonat* or infant* or toddler* or child* or adolescent* or paediatric* or pediatric* or girl or girls or boy or boys or teen or teens or teenager* or preschooler* or "pre-schooler*" or preteen or preteens or "pre-teen" or "pre-teens" or youth or youths) AND NOT TITLE-ABS-KEY(adult or adults or "middle age" or "middle aged" OR elderly OR geriatric* OR "old people" OR "old person*" OR "older people" OR "older person*" OR "very old")

19 17 and not 18

20 DOCTYPE(ed) OR DOCTYPE(bk) OR DOCTYPE(er) OR DOCTYPE(no) OR DOCTYPE(sh)

21 19 and not 20

22 INDEX(embase) OR INDEX(medline) OR PMID(0* OR 1* OR 2* OR 3* OR 4* OR 5* OR 6* OR 7* OR 8* OR 9*)

23 21 and not 22

Clinicaltrials.gov

Condition or disease: " migraine"
Limited to Adult, Older Adult

Appendix D. Characteristics of Included Studies

Table D.1. Characteristics of included studies

Author, Year	Country, Study Design, Study Period	Study Setting (Outpatient, Inpatient, ED)	Intervention(s) and Comparison	Route of Administration, Dose, and Duration	Length of Followup (Days)	Patient Characteristics
Akbas, 2021[1]	RCT in Turkey, 12/01/2019 to 02/29/2020	ED	Mesotherapy (thiocolchicoside plus lidocaine plus tenoxicam)	Intradermal, first mixture 2 mg thiocolchicoside plus 16.2 mg lidocaine plus 5 mg tenoxicam for the glabella, the area between the eyes and ears and the painful area, second mixture 16.2 mg lidocaine plus 5 mg tenoxicam for the pericarotid region	7 days	77 patients aged 36±17.8 years, 42.1% female, BMI 24.5±1.33
	RCT in Turkey, 12/01/2019 to 02/29/2020	ED	Dexketoprofen	IV, 50 mg, once over 5 minutes	7 days	77 patients aged 36±17 years, 43.1% female, BMI 24.5±1.4
Antal, 2020[2]	RCT in Germany	Outpatient	Transcranial alternating current stimulation	Transcranial stimulation over the visual cortex, 0.4 mA, 140 Hz, for 15 minutes	2 days	16 patients aged 31.1±8.9 years
	RCT in Germany	Outpatient	Sham stimulation	Sham stimulation over the visual cortex, for 15 minutes	2 days	9 patients aged 28.1±10.5 years
Arikan, 2021[3]	RCT in Turkey, 01/2016 to 12/2016	ED	Paracetamol (acetaminophen)	Oral, 1000 mg, once	1 hour	100 patients aged 29.5±10.3 years, 73.7% female.
	RCT in Turkey, 01/2016 to 12/2016	ED	Zolmitriptan	Oral, 2.5 mg, once	1 hour	100 patients aged 32.2±10.6 years, 72.2% female.
Ashina, 2021[4]	RCT in Europe, North America, and Asia	Outpatient	Lasmiditan 200 mg	Oral, 200 mg, once for four attacks	2 days	486 patients, aged 42±12 years, 86% female, 77% White
	RCT in Europe, North America, and Asia	Outpatient	Lasmiditan 100 mg	Oral, 100 mg, once for four attacks	2 days	485 patients, aged 42±12 years, 83% female, 77% White
	RCT in Europe, North America, and Asia	Outpatient	Placebo	Oral, once for three attacks and lasmiditan 50 mg for either the third or fourth attack	2 days	500 patients, aged 41±12 years, 83% female, 77% White

Author, Year	Country, Study Design, Study Period	Study Setting (Outpatient, Inpatient, ED)	Intervention(s) and Comparison	Route of Administration, Dose, and Duration	Length of Followup (Days)	Patient Characteristics
Buse, 2022[5]	Comparative observational study in the United States, 03/08/2020 to 04/19/2021	Outpatient	Remote electrical neuromodulation	Nociceptive nerve fiber stimulation in the upper arm for 45 minutes	2	85 patients aged 47.68±13.85 years, 91.8% female.
	Comparative observational study in the United States, 03/08/2020 to 04/19/2021	Outpatient	Remote electrical neuromodulation plus guided intervention of education and relaxation	Nociceptive nerve fiber stimulation in the upper arm for 45 minutes plus 25-minute educational video	2	85 patients aged 47.71±13.91 years, 91.8% female.
Domingues, 2021[6]	RCT in Brazil, 11/2017 to 03/2018	Outpatient	External trigeminal nerve stimulation	Transcutaneous electrical nerve stimulation, pulse width 80 µs, frequency 55 Hz, continuous and intermittent (automatic) modes, ramp 2 seconds, pulse train 1 second (continuous), and 3 seconds (intermittent) with mild, moderate, and intense levels that ranged from 16 to 26 volts, over 20 seconds	90 days	44 patients aged 41±10.8 years, 97.7% female, 23% White
	RCT in Brazil, 11/2017 to 03/2018	Outpatient	Sham stimulation	Electrical current for 30 seconds and no current for the next 15 seconds	90 days	33 patients aged 38±9.7 years, 97% female, 28% White

Author, Year	Country, Study Design, Study Period	Study Setting (Outpatient, Inpatient, ED)	Intervention(s) and Comparison	Route of Administration, Dose, and Duration	Length of Followup (Days)	Patient Characteristics
Friedman, 2020[7]	RCT in the United States, 11/2017 to 03/2020	ED	Greater occipital nerve block	Adjacent to the greater occipital nerve, total of 6 ml of bupivacaine 0.5% (3 ml each side) once, in addition to an IV drip of normal saline placebo administered over 15 minutes	2 days	51 patients aged 39±11 years, 86% female
	RCT in the United States, 11/2017 to 03/2020	ED	Metoclopramide	Sham greater occipital nerve block, total of 6 ml of normal saline injected adjacent to the greater occipital nerve bilaterally (3 ml each side), in addition to an IV drip of 10 mg metoclopramide administered over 15 minutes	2 days	48 patients aged 38±11 years, 71% female
Gur, 2021[8]	RCT in Turkey	ED	Lidocaine	IV, 1.5 mg/kg as an intravenous bolus, followed by a 1 mg/kg/h infusion over the first 30 minutes plus 100 ml saline and a 0.5 mg/kg/h infusion over the second 30 minutes, once	1.5 hour	50 patients aged 43±16.3 years, 62% female.
	RCT in Turkey	ED	Dexketoprofen trometamol	IV, normal saline at the same bolus volume as the other group, and then were administered 50 mg dexketoprofen in 100 ml saline and a saline infusion at the same volume as lidocaine over the first 30 minutes. For the second 30 minutes, the patients received normal saline at the same bolus volume as in the lidocaine group, once.	1.5 hour	50 patients aged 37±15.6 years, 54% female.
Hodgson, 2021[9]	RCT in Australia, 04/01/2018 to 03/01/2020	ED	Chlorpromazine	IV, 12.5 mg once over 30 minutes	2 hours	33 patients aged 36.7±10.7 years, 75% female
	RCT in Australia, 04/01/2018 to 03/01/2020	ED	Prochlorperazine	IV, 12.5 mg once over 30 minutes	2 hours	33 patients aged 42.5±11.8 years, 88% female

Author, Year	Country, Study Design, Study Period	Study Setting (Outpatient, Inpatient, ED)	Intervention(s) and Comparison	Route of Administration, Dose, and Duration	Length of Followup (Days)	Patient Characteristics
Hokenek, 2021[10]	RCT in Turkey, 07/2020 to 03/2021	ED	Greater occipital nerve block	Subcutaneous Injection, 1% lidocaine and 0.9% NaCl, once	2 hours	37 patients aged 36.5±10.37 years, 40% female
	RCT in Turkey, 07/2020 to 03/2021	ED	Supraorbital nerve block	Subcutaneous Injection, 1% lidocaine and 0.9% NaCl, once	2 hours	31 patients aged 36±11.11 years, 67.9% female
	RCT in Turkey, 07/2020 to 03/2021	ED	Combination of greater occipital nerve block plus supraorbital nerve block	Subcutaneous Injection, 1% lidocaine for greater occipital nerve and 1% lidocaine for supraorbital nerve, once	2 hours	43 patients aged 37±9.62 years, 62.8% female
	RCT in Turkey, 07/2020 to 03/2021	ED	Placebo	Subcutaneous Injection, 0.9% NaCl for greater occipital nerve and 0.9% NaCl for supraorbital nerve, once	2 hours	31 patients aged 36±15.55 years, 63% female
Kandil, 2020[11]	RCT in the United States, 08/2019 to 03/2020	ED	Magnesium sulfate	IV, 2 g/50 ml dextrose 5% in water, once over 20 minutes	2 hours	61 patients aged 34±15.6 years, 72% female, 49% White, 41% Black, 10% Hispanic, BMI 31.2±7.7
	RCT in the United States, 08/2019 to 03/2020	ED	Prochlorperazine	IV, 10 mg/50 ml dextrose 5% in water, once over 20 minutes	2 hours	52 patients aged 37.5±15.2 years, 88% female, 27% White, 54% Black, 17% Hispanic, BMI 33.4±7.2
	RCT in the United States, 08/2019 to 03/2020	ED	Metoclopramide	IV, 10 mg/50 ml dextrose 5% in water, once over 20 minutes	2 hours	44 patients aged 37.5±13.7 years, 75% female, 52% White, 36% Black, 11% Hispanic, BMI 30.1±6.1
Lipton, 2021[12]	RCT in the United States, 12/13/2016 to 10/06/2017	Outpatient	Celecoxib	Oral, 120 mg, once	1 day	268 patients aged 41±11.96 years, 84% female, 75.8% White, 20.5% Black, 13.1% Hispanic, 1.6% Asian, 2% other, BMI 30.83±8.22
	RCT in the United States, 12/13/2016 to 10/06/2017	Outpatient	Placebo	Oral, 4.8 ml, once	1 day	267 patients aged 39.6±12.09 years, 90% female, 73.1% White, 21.7% Black, 14.5% Hispanic, 2.4% Asian, 0.4% Native Hawaiian or other Pacific Islander,0.4% American Indian or Alaska Native, 2% other, BMI 30.13±7.78

Author, Year	Country, Study Design, Study Period	Study Setting (Outpatient, Inpatient, ED)	Intervention(s) and Comparison	Route of Administration, Dose, and Duration	Length of Followup (Days)	Patient Characteristics
Lipton, 2021[13]	RCT in the United States, 12/2016 to 10/2017	Outpatient	Celecoxib	Oral, 120 mg, once	2-7 days	316 patients aged 41.4±14 years, 82% female, 74% White, 22.1% Black, 13.8% Hispanic, 0.3% Asian, 3.5% other, BMI 30±7.3
	RCT in the United States, 12/2016 to 10/2017	Outpatient	Placebo	Oral, 4.8 ml, once	2-7 days	315 patients aged 40.4±13 years, 86.6% female, 73.9% White, 22.3% Black, 14.5% Hispanic, 1.1% Asian, 2.8% other, BMI 30.4±7.4
Meek, 2020[14]	RCT in Australia, 03/01/2016 to 10/31/2018	ED	Propofol	IV, maximum dose 140 mg over 40 minutes (initial dose of 40 mg followed by up to five doses of 20 mg, over 5 minutes apart)	2 days	21 patients, aged 35±9.6 years, 81% female
	RCT in Australia, 03/01/2016 to 10/31/2018	ED	Placebo	IV, maximum dose 14 ml (20% intralipid), over 40 minutes (initial dose of 4 ml followed by up to five doses of 2 ml, over 5 minutes apart)	2 days	19 patients, aged 35±11.9 years, 84% female
Motamed, 2020[15]	RCT in Iran, 10/2017 to 11/2018	ED	Metoclopramide plus magnesium sulfate	IV, 2 g magnesium sulfate plus 10 mg metoclopramide once	45 minutes	40 patients aged 20-30 years (12.5%), 31-40 years (52.5%), >40 (35%) years, 50% female
	RCT in Iran, 10/2017 to 11/2018	ED	Metoclopramide	IV, 10 mg metoclopramide plus placebo once	45 minutes	40 patients aged 20-30 years (22.5%), 31-40 years (42.5%), >40 (35%) years, 50% female
Sakai, 2021[16]	RCT in Japan, 05/30/2019 to 06/08/2020	Outpatient	Lasmiditan 50 mg	Oral, 50 mg, once	3-28 days	109 patients aged 44.9±10.2 years, 86.2% female, BMI 22.4±3.7
	RCT in Japan, 05/30/2019 to 06/08/2020	Outpatient	Lasmiditan 100 mg	Oral, 100 mg, once	3-28 days	261 patients aged 45.7±9.7 years, 84.6% female, BMI 22.6±3.7
	RCT in Japan, 05/30/2019 to 06/08/2020	Outpatient	Lasmiditan 200 mg	Oral, 200 mg, once	3-28 days	218 patients aged 44.7±10.4 years, 79.7% female, BMI 22.7±3.4
	RCT in Japan, 05/30/2019 to 06/08/2020	Outpatient	Placebo	Oral, once	3-28 days	258 patients aged 45.2±9 years, 83.2% female, BMI 22.6±4.1

Author, Year	Country, Study Design, Study Period	Study Setting (Outpatient, Inpatient, ED)	Intervention(s) and Comparison	Route of Administration, Dose, and Duration	Length of Followup (Days)	Patient Characteristics
Shah, 2021[17]	RCT in the United States, 09/2018 to 09/2019	Outpatient	Dry oxygen	Transnasal, 15 L/minute, once over 15 minutes with nasal saline drops	1 day	12 patients aged 49±15.4 years, 91% female, 92% White
	RCT in the United States, 09/2018 to 09/2019	Outpatient	Dry air	Transnasal, 15 L/minute, once over 15 minutes with nasal saline drops	1 day	11 patients aged 47±16 years, 82% female, 91% White
	RCT in the United States, 09/2018 to 09/2019	Outpatient	Humidified oxygen	Transnasal, 15 L/minute, once over 15 minutes with nasal saline drops	1 day	20 patients aged 54±15 years, 80% female, 80% White
	RCT in the United States, 09/2018 to 09/2019	Outpatient	Humidified air	Transnasal, 15 L/minute, once over 15 minutes with nasal saline drops	1 day	8 patients aged 46±11.3 years, 88% female, 75% White
Winner, 2021[18, 19]	RCT in the United States and Georgia, 11/04/2019 to 07/08/2020	Outpatient	Eptinezumab	IV, 100 mg (total volume of 100 ml with 0.9% saline), once over 30-45 minutes	28 days	241 patients aged 44.9±12 years, 84.9% female, 84% White, 12.6% Black, 12.2% Hispanic, 0.8% Asian, 0.8% American Indian or Alaska native, 0.4% Native Hawaiian or other Pacific Islander, 1.3% multiple, BMI 27±4.5
	RCT in the United States and Georgia, 11/04/2019 to 07/08/2020	Outpatient	Placebo	IV, total volume of 100 ml with 0.9% saline, once over 30-45 minutes	28 days	244 patients aged 44.1±12.1 years, 83.1% female, 88% White, 7.9% Black, 12.8% Hispanic, 1.2% Asian, 0.4% American Indian or Alaska native, 0.4% Native Hawaiian or other Pacific Islander, 1.7% multiple, 0.4% other, BMI 26.6±4.4
Yuan, 2021[20]	RCT in the United States 06/2011 to 05/2017	ED	Ibuprofen	IV, 800 mg diluted in 250 ml of normal saline, once over 7-10 minutes.	24 hours	23 patients aged 42.8±10.5 years, 70% female.
	RCT in the United States 06/2011 to 05/2017	ED	Placebo	IV, 250 ml of normal saline, once over 7-10 minutes.	24 hours	21 patients aged 40.3±12.1 years, 81% female.

Abbreviations: BMI = body mass index; ED = emergency department; g = gram; Hz = hertz; IV = intravenous; L = liter; µs = microsecond; mA = milliampere; mg = milligram; mg/kg = milligram/kilogram, mg/kg/h = milligram/kilogram/hour; ml = milliliter; NaCl = sodium chloride; RCT = randomized clinical trial

Appendix E. Results From Included Studies

Table E.1. Results from included studies: KQ 2, nonsteroidal anti-inflammatory drugs

Author, Year, Study Design	Study Setting (Outpatient, Inpatient, ED)	Intervention(s) and Comparator	Route of Administration, Dose, and Duration	Length of Followup	Conclusion
Gur, 2021,[8] RCT	ED	Dexketoprofen trometamol vs. Lidocaine	IV, normal saline at the same bolus volume as the other group, and then were administered 50 mg dexketoprofen in 100 ml saline and a saline infusion at the same volume as lidocaine over the first 30 minutes. For the second 30 minutes, the patients received normal saline at the same bolus volume as in the lidocaine group, once vs. IV, 1.5 mg/kg as an intravenous bolus, followed by a 1 mg/kg/h infusion over the first 30 minutes plus 100 ml saline and a 0.5 mg/kg/h infusion over the second 30 minutes, once	1.5 hour	There was no significant difference in pain scale at 1.5 hours.
Lipton, 2021,[12] RCT	Outpatient	Celecoxib vs. Placebo	Oral, 120 mg, once vs. Oral, 4.8 ml, once	1 day	Celecoxib was superior to placebo for the outcomes of pain free, pain relief, function scale at 2 hours and sustained pain free and sustained pain relief at 24 hours. No significant difference was found on adverse events. No serious adverse events or withdrawal due to adverse events were reported.
Lipton, 2021,[13] RCT	Outpatient	Celecoxib vs. Placebo	Oral, 120 mg, once vs. Oral, 4.8 ml, once	2-7 days	No significant difference was observed on pain free at 2 hours, and number of adverse events.

Author, Year, Study Design	Study Setting (Outpatient, Inpatient, ED)	Intervention(s) and Comparator	Route of Administration, Dose, and Duration	Length of Followup	Conclusion
Yuan, 2021,[20] RCT	ED	Ibuprofen vs. Placebo	IV, 800 mg diluted in 250 ml of normal saline, once over 7-10 minutes vs. IV, 250 ml of normal saline, once over 7-10 minutes	24 hours	There was no significant difference in pain free at 2 hours, pain relief at 2 hours, sustained pain free at 24 hours, or adverse events. No serious adverse events were observed.

Abbreviations: ED = emergency department; IV = intravenous; KQ = Key Question; mg = milligram; mg/kg = milligram/kilogram; mg/kg/h = milligram/kilogram/hour; ml = milliliter; RCT = randomized clinical trial

Table E.2. Results from included studies: KQ 2, antiemetic

Author, Year, Study Design	Study Setting (Outpatient, Inpatient, ED)	Intervention(s) and Comparator	Route of Administration, Dose, and Duration	Length of Followup	Conclusion
Hodgson, 2021,[9] RCT	ED	Chlorpromazine vs. Prochlorperazine	IV, 12.5 mg once over 30 minutes vs. IV, 12.5 mg once over 30 minutes	2 hours	There was no statistically significant difference on reduction of pain scale at 2 hours. Significantly more adverse events were reported in the chlorpromazine group than the prochlorperazine group.
Kandil, 2020,[11] RCT	ED	Magnesium sulfate vs. Prochlorperazine vs. Metoclopramide	IV, 2 g/50 ml dextrose 5% in water, once over 20 minutes vs. IV, 10 mg/50 ml dextrose 5% in water, once over 20 minutes vs. IV, 10 mg/50 ml dextrose 5% in water, once over 20 minutes	2 hours	There was no statistically significant difference on reduction of pain scale at 2 hours and adverse events.
Motamed, 2020,[15] RCT	ED	Metoclopramide plus magnesium sulfate vs. Metoclopramide	IV, 2 g magnesium sulfate plus 10 mg metoclopramide once vs. IV, 10 mg metoclopramide plus placebo once	45 minutes	There was no statistically significant difference on reduction of pain scale at 2 hours. No adverse events were reported in either group.

Abbreviations: ED = emergency department; g = gram; IV = intravenous; KQ = Key Question; mg = milligram; ml = milliliter; RCT = randomized clinical trial

Table E.3. Results from included studies: KQ 2, 5-HT1F

Author, Year, Study Design	Study Setting (Outpatient, Inpatient, ED)	Intervention(s) and Comparator	Route of Administration, Dose, and Duration	Length of Followup	Conclusion
Ashina, 2021,[4] RCT	Outpatient	Lasmiditan 200 mg vs. Lasmiditan 100 mg vs. Placebo	Oral, 200 mg, once for four attacks vs. Oral, 100 mg, once for four attacks vs. Oral, placebo once for 3 attacks and lasmiditan 50 mg for either the third or fourth attack	2 days	Significantly more patients treated by lasmiditan 200 mg, or 100 mg reported pain free, pain relief and restored function at 2 hours, and sustained pain free at 1 day and 2 days, compared with placebo. Significantly more adverse events were reported in the lasmiditan groups. No death was reported.
Sakai, 2021,[16] RCT	Outpatient	Lasmiditan 50 mg vs. Lasmiditan 100 mg vs. Lasmiditan 200 mg vs. Placebo	Oral, 50 mg, once vs. Oral, 100 mg, once vs. Oral, 200 mg, once vs. Oral, once	3-28 days	Significantly more patients treated by lasmiditan 200 mg, or 100 mg reported pain free, pain relief, and improved function at 2 hours, and sustained pain free at 1 day and 2 days, compared with placebo. Lasmiditan 50 mg reported significantly more patients with pain relief at 2 hours, compared to placebo. Significantly more adverse events were reported in the lasmiditan groups. No serious adverse events, death, and withdrawal due to adverse events were reported.

Abbreviations: ED = emergency department; KQ = Key Question; mg = milligram; RCT = randomized clinical trial

Table E.4. Results from included studies: KQ 2, calcitonin gene-related peptide monoclonal antibodies

Author, Year, Study Design	Study Setting (Outpatient, Inpatient, ED)	Intervention(s) and Comparator	Route of Administration, Dose, and Duration	Length of Followup	Conclusion
Winner, 2021,[18, 19] RCT	Outpatient	Eptinezumab vs. Placebo	IV, 100 mg (total volume of 100 ml with 0.9% saline), once over 30-45 minutes vs. IV, total volume of 100 ml with 0.9% saline, once over 30-45 minutes	28 days	Eptinezumab significantly increased pain free at 2 hours and 1 day, sustained pain free at 1 day and 2 days, and quality of life at 4 weeks.

Abbreviations: ED = emergency department; IV = intravenous; KQ = Key Question; mg = milligram; ml = milliliter; RCT = randomized clinical trial

Table E.5. Results from included studies: KQ 2, other interventions

Author, Year, Study Design	Study Setting (Outpatient, Inpatient, ED)	Intervention(s) and Comparator	Route of Administration, Dose, and Duration	Length of Followup	Conclusion
Akbas, 2021,[1] RCT	ED	Mesotherapy (thiocolchicoside plus lidocaine plus tenoxicam) vs. Dexketoprofen	Intradermal, first mixture 2 mg thiocolchicoside plus 16.2 mg lidocaine plus 5 mg tenoxicam for the glabella, the area between the eyes and ears and the painful area, second mixture 16.2 mg lidocaine plus 5 mg tenoxicam for the pericarotid region vs. IV, 50 mg, once over 5 minutes	7 days	Patients in the mesotherapy group reported significantly more pain relief and reduction of pain scores at 2 hours and 24 hours. No significant difference was found in adverse events.
Friedman, 2020,[7] RCT	ED	Greater occipital nerve block vs. Metoclopramide	Adjacent to the greater occipital nerve, total of 6 ml of bupivacaine 0.5% (3 ml each side) once, in addition to an IV drip of normal saline placebo administered over 15 minutes vs. Sham greater occipital nerve block, total of 6 ml of normal saline injected adjacent to the greater occipital nerve bilaterally (3 ml each side), in addition to an IV drip of 10 mg metoclopramide administered over 15 minutes	2 days	There was no significant difference between the two groups on pain scale at 2 hours, sustained pain relief and sustained pain free at 2 days, and adverse events.

Author, Year, Study Design	Study Setting (Outpatient, Inpatient, ED)	Intervention(s) and Comparator	Route of Administration, Dose, and Duration	Length of Followup	Conclusion
Hokenek, 2021,[10] RCT	ED	Greater occipital nerve block vs. Supraorbital nerve block vs. Combination of greater occipital nerve block and supraorbital nerve block vs. Placebo	Subcutaneous Injection, 1% lidocaine and 0.9% NaCl, once vs. Subcutaneous Injection, 1% lidocaine and 0.9% NaCl, once vs. Subcutaneous Injection, 1% lidocaine for greater occipital nerve and 1% lidocaine for supraorbital nerve, once vs. Subcutaneous Injection, 0.9% NaCl for greater occipital nerve and 0.9% NaCl for supraorbital nerve, once	2 hours	Patients with greater occipital nerve block, supraorbital nerve block, or the combination of greater occipital nerve block and supraorbital nerve block reported significantly more reduction of pain scales at 2 hours, compared to placebo, while patients with greater occipital nerve block and the combination reported significantly more reduction of pain scales at 2 hours than those in the supraorbital nerve block group. No serious adverse events were reported.
Meek, 2020,[14] RCT	ED	Propofol vs. Placebo	IV, maximum dose 140 mg over 40 minutes (initial dose of 40 mg followed by up to five doses of 20 mg, over 5 minutes apart) vs. IV, maximum dose 14 ml (20% intralipid), over 40 minutes (initial dose of 4 ml followed by up to five doses of 2 ml, over 5 minutes apart)	2 days	Significantly more patients in the propofol group reported pain relief at 40 minutes and adverse events, compared to the placebo group. There was no significant difference in pain free and reduction of pain scale at 40 minutes and sustained pain free at 2 days.

Abbreviations: ED = emergency department; IV = intravenous; KQ = Key Question; mg = milligram; ml = milliliter; NaCl = sodium chloride; RCT = randomized clinical trial

Table E.6. Results from included studies: KQ 2, triptans

Author, Year, Study Design	Study Setting (Outpatient, Inpatient, ED)	Intervention(s) and Comparator	Route of Administration, Dose and Duration	Length of Followup	Conclusion
Arikan, 2021[3], RCT	ED	Zolmitriptan vs. Paracetamol (acetaminophen)	Oral, 1000 mg, once vs Oral, 2.5 mg, once	1 hour	There was no significant difference between zolmitriptan and paracetamol (acetaminophen) in pain scale at 1 hour. No treatment related adverse events were reported.

Abbreviations: ED = emergency department; KQ = Key Question; mg = milligram; RCT = randomized clinical trial

Table E.7. Results from included studies: KQ 3, nonpharmacologic therapy

Author, Year, Study Design	Study Setting (Outpatient, Inpatient, ED)	Intervention(s) and Comparator	Route of Administration, Dose and Duration	Length of Followup	Conclusion
Antal, 2020,[2] RCT	Outpatient	Transcranial alternating current stimulation vs. Sham stimulation	Transcranial stimulation over the visual cortex, 0.4 mA, 140 Hz, for 15 minutes vs. Sham stimulation over the visual cortex, for 15 minutes	2 days	Patients in the transcranial stimulation reported significantly more pain reduction at 2 hours and sustained pain free at 1 day and 2 days, compared to those in the sham group.
Buse, 2022,[5] Comparative observational study	Outpatient	Remote electrical neuromodulation vs. Remote electrical neuromodulation plus guided intervention of education and relaxation	Nociceptive nerve fiber stimulation in the upper arm for 45 minutes vs. Nociceptive nerve fiber stimulation in the upper arm for 45 minutes plus 25-minutes educational video	2 hours	Significantly more patients in the combined group (remote electrical neuromodulation plus guided intervention of education and relaxation) reported restored function and improved function at 2 hours. There was no significant difference in pain relief and pain free at 2 hours.
Domingues, 2021,[6] RCT	Outpatient	External trigeminal nerve stimulation vs. Sham stimulation	Transcutaneous electrical nerve stimulation, pulse width 80 µs, frequency 55 Hz, continuous and intermittent (automatic) modes, ramp 2 seconds, pulse train 1 second (continuous), and 3 seconds (intermittent) with mild, moderate, and intense levels that ranged from 16 to 26 volts, over 20 seconds vs. Electrical current for 30 seconds and no current for the next 15 seconds	90 days	Patients treated by transcutaneous electrical nerve stimulation reported significantly more reduction of pain scale at 2 hours, compared to sham stimulation. No patients reported adverse events.

Author, Year, Study Design	Study Setting (Outpatient, Inpatient, ED)	Intervention(s) and Comparator	Route of Administration, Dose and Duration	Length of Followup	Conclusion
Shah, 2021,[17] RCT	Outpatient	Dry oxygen vs. Dry air vs. Humidified oxygen vs. Humidified air	Transnasal, 15 L/minute, once over 15 minutes with nasal saline drops vs. Transnasal, 15 L/minute, once over 15 minutes with nasal saline drops vs. Transnasal, 15 L/minute, once over 15 minutes with nasal saline drops vs. Transnasal, 15 L/minute, once over 15 minutes with nasal saline drops	1 day	Patients with dry oxygen, dry air, or humidified oxygen reported significantly more reduction of pain scale at 2 hours than those in the humidified air group; while patients with dry air reported significantly more pain relief at 2 hours than those with humidified air. No significant difference between dry oxygen, dry air, or humidified oxygen was reported on pain scale at 2 hours. No significant adverse events were reported.

Abbreviations: ED = emergency department; Hz = hertz; KQ = Key Question; L = liter; µs = microsecond; mA = milliampere; RCT = randomized clinical trial

Appendix F. Risk of Bias

Table F.1. Risk of bias (Newcastle Ottawa tool) for included comparative studies from surveillance reports 1, 2, and 3

Author, Year	Representativeness of Study Cohort	Ascertainment of Exposure	Outcome Not Present Before the Exposure	Comparability Between Groups	Outcome Data Source	Independent Blind Assessment of Outcome	Loss During Followup	Overall ROB
Buse, 2022[5]	Low	Low	Low	High	Low	High	Low	High

Abbreviations: ROB = risk of bias

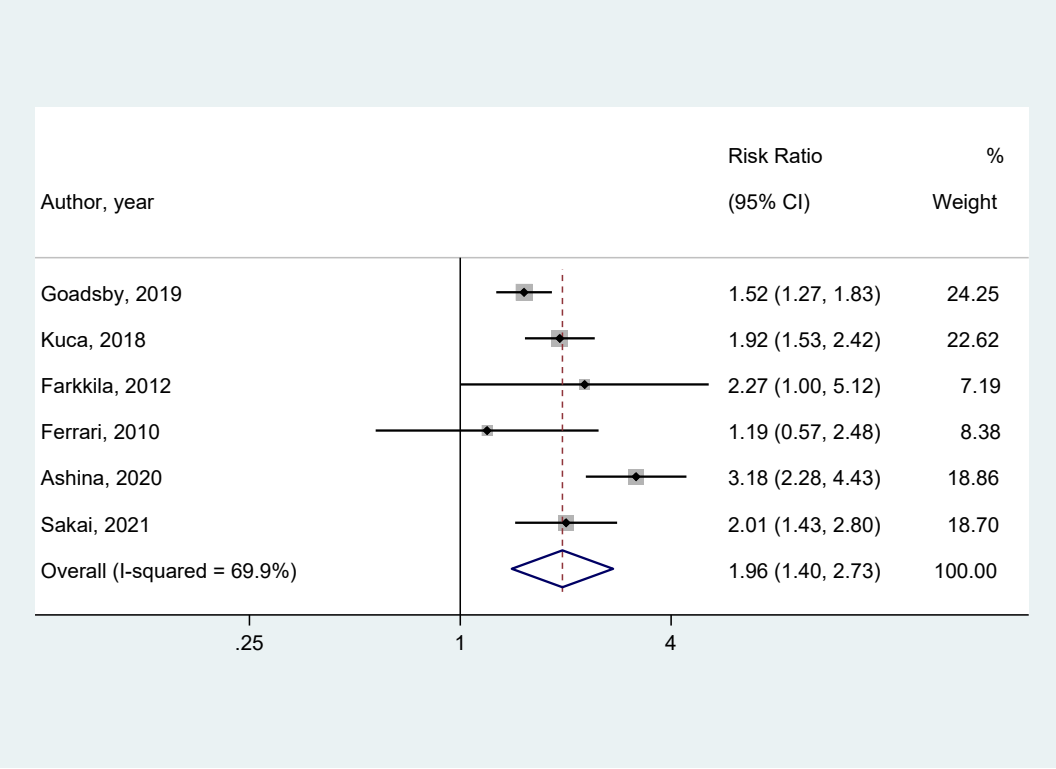
Table F.2. Risk of bias (Cochrane ROB tool) for included randomized clinical trial studies from surveillance reports 1, 2, and 3

Author, Year	Overall ROB	ROB From Randomization Process	ROB Due to Deviations From Intended Interventions	ROB Due to Missing Outcome Data	ROB in Measurement of Outcomes	ROB in Selection of the Reported Results
Akbas, 2021[1]	High risk	Low risk	High risk	Low risk	Moderate risk	Low risk
Antal, 2020[2]	Moderate risk	Low risk	Low risk	Moderate risk	Low risk	Low risk
Arikan, 2021[3]	Moderate risk	Low risk	Moderate risk	Low risk	Low risk	Moderate risk
Ashina, 2021[4]	High risk	Moderate risk	Low risk	High risk	Low risk	Low risk
Domingues, 2021[6]	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Friedman, 2020[7]	Moderate risk	Moderate risk	Low risk	Low risk	Low risk	Low risk
Hodgson, 2021[9]	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Hokenek, 2021[10]	Moderate risk	Low risk	Low risk	Low risk	Low risk	Moderate risk
Gur, 2021[8]	Moderate risk	Moderate risk	Low risk	Low risk	Low risk	Low risk
Kandil, 2020[11]	Moderate risk	Low risk	Low risk	Low risk	Moderate risk	Low risk
Lipton, 2021[12]	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Lipton, 2021[13]	High risk	High risk	Low risk	Low risk	Low risk	Low risk
Meek, 2020[14]	High risk	Low risk	Low risk	High risk	Moderate risk	Moderate risk
Motamed, 2020[15]	Moderate risk	Moderate risk	Low risk	Low risk	Low risk	Low risk
Sakai, 2021[16]	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Shah, 2021[17]	Moderate risk	Low risk	Moderate risk	Low risk	Moderate risk	Low risk
Winner, 2021[18, 19]	Low risk	Low risk	Low risk	Low risk	Moderate risk	Low risk
Yuan, 2021[20]	Moderate risk	Moderate risk	Low risk	Low risk	Moderate risk	Low risk

Abbreviations: ROB = risk of bias

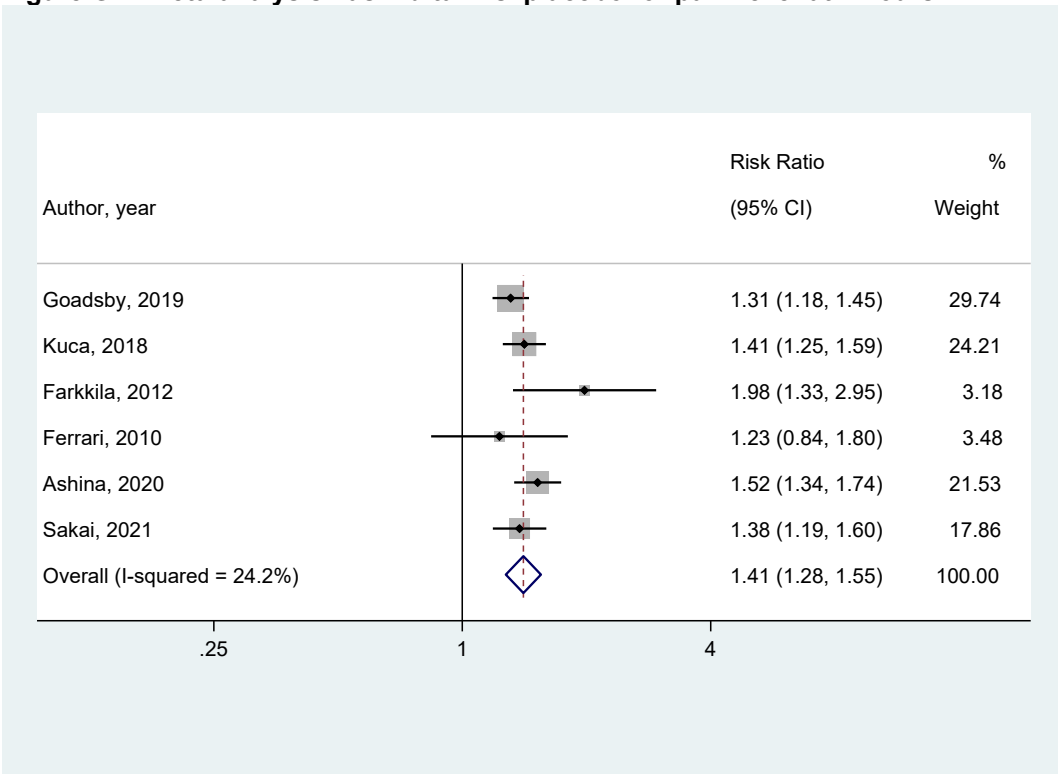
Appendix G. Forest Plots for Updated Meta-Analyses

Figure G.1. Meta-analysis: lasmiditan vs. placebo for pain free at 2 hours



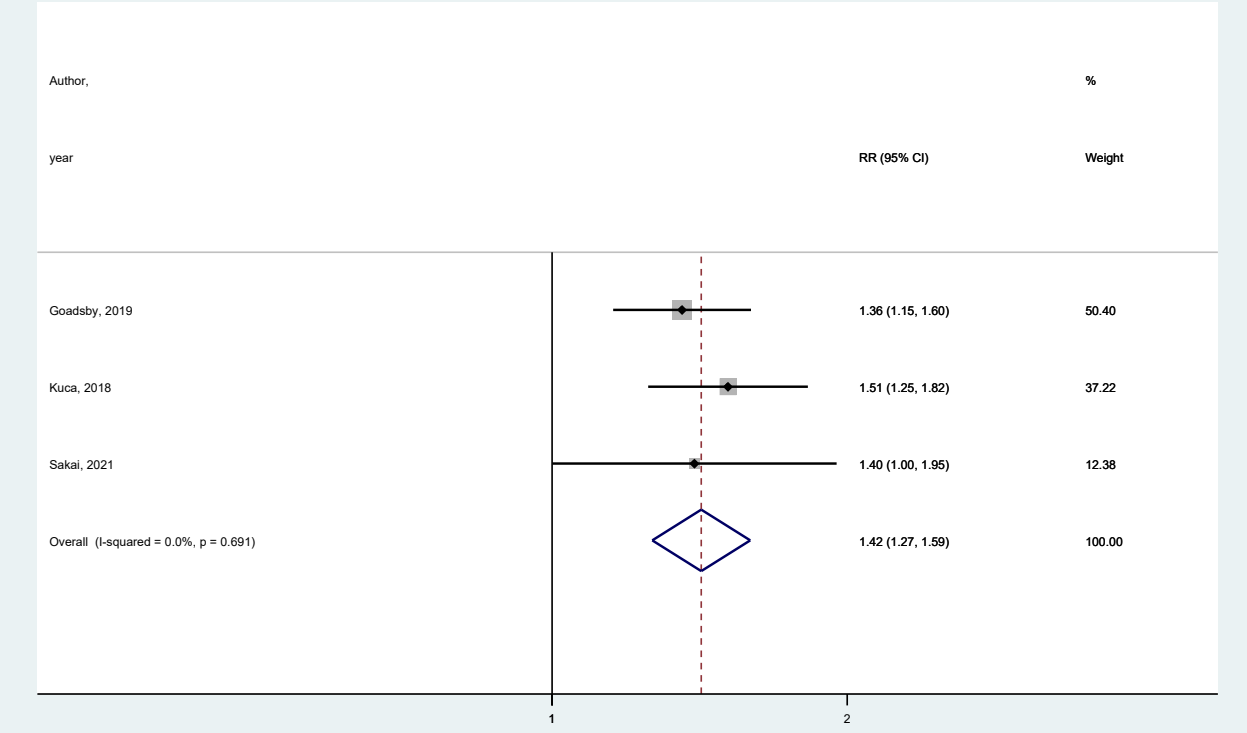
Abbreviations: CI = confidence interval

Figure G.2. Meta-analysis: lasmiditan vs. placebo for pain relief at 2 hours



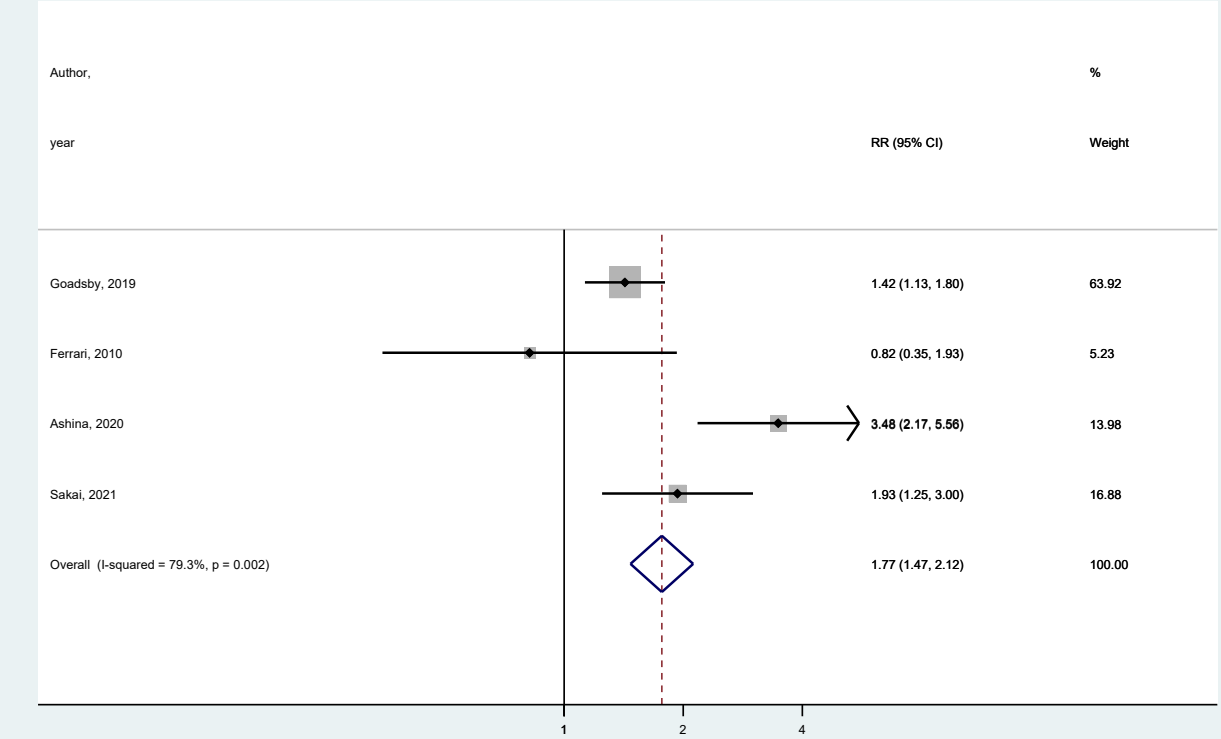
Abbreviations: CI = confidence interval

Figure G.3. Meta-analysis: lasmiditan vs. placebo for function free at 2 hours



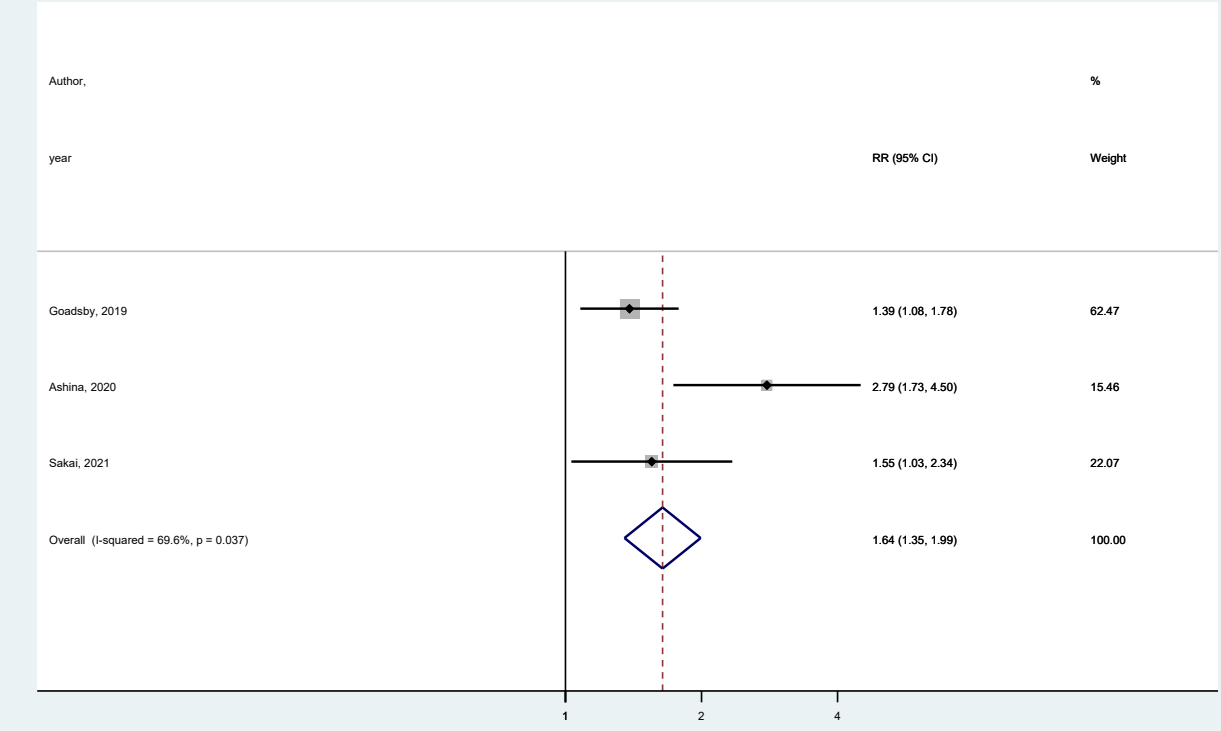
Abbreviations: CI = confidence interval; RR = Risk Ratio

Figure G.4. Meta-analysis: lasmiditan vs. placebo for sustained pain free at 1 day



Abbreviations: CI = confidence interval; RR = Risk Ratio

Figure G.5. Meta-analysis: lasmiditan vs. placebo for sustained pain free at 1 week



Abbreviations: CI = confidence interval; RR = Risk Ratio

Appendix H. Excluded Studies

1. A randomized controlled trial of a[Euro sign]oeuplifting yang and dispersing stagnation, activating the channel and alleviating paina[Euro sign] acupuncture therapy for migraine. http://wwwwhoint/trialsearch/Trial2aspx?TrialID=ChiCTR2000032308. 2020. PMID: n/a. [Outcomes not of interest]
2. A study of LY3451838 in participants with migraine. https://clinicaltrialsgov/show/NCT04498910. 2020. PMID: n/a. [Outcomes not of interest]
3. A/S HL. Eptinezumab in adults with migraine and medication overuse headache. https://ClinicalTrials.gov/show/NCT04772742; 2021. PMID: n/a. [Intervention not of interest]
4. Abu-Zaid A, AlBatati SK, AlHossan AM, et al. Galcanezumab for the management of migraine: a systematic review and meta-analysis of randomized placebo-controlled trials. Cureus. 2020 Nov 22;12(11):e11621. doi: 10.7759/cureus.11621. PMID: 33376635. [Outcomes not of interest]
5. Acupuncture in migraine without aura patients. https://clinicaltrialsgov/show/NCT04542811. 2020. PMID: n/a. [Outcomes not of interest]
6. Afyonkarahisar Health Sciences University. Sphenopalatine Ganglion Blockade in Migraine. In: ClinicalTrials.gov. Bethesda, MD: National Library of Medicine (US); 2000- [2022] https://ClinicalTrials.gov/show/NCT05210192. Identifier: NCT05210192 [Intervention not of interest]
7. Ailani J, Andrews J, Tockhorn-Heidenreich A, et al. Total pain burden in patients with treatment-resistant migraine: effects of galcanezumab in the CONQUER Phase 3b trial. Eur J Neurol. 2021 June;28 (SUPPL 1):272. doi: http://dx.doi.org/10.1111/ene.14974. PMID: 635426815. [Population not of interest]
8. Ailani J, Blumenfeld A, Klein B, et al. An optional second dose of ubrogepant is effective in achieving 2-hour pain freedom in the acute treatment of migraine. Neurology. 2020 Apr 14;94(15). PMID: n/a. [Type of publication (Conference abstract)]
9. Akerman S, Romero-Reyes M, Karsan N, et al. Therapeutic targeting of nitroglycerin-mediated trigeminovascular neuronal hypersensitivity predicts clinical outcomes of migraine abortives. Pain. 2021 May 1;162(5):1567-77. doi: 10.1097/j.pain.0000000000002142. PMID: 33181579. [Population not of interest]
10. Alanya Alaaddin Keykubat University. Comparison of osteopathic manipulative therapy and myofacial relaxation techniques in people diagnosed with migraine. In: ClinicalTrials.gov. Bethesda, MD: National Library of Medicine (US); 2000- [cited 2021]. https://clinicaltrials.gov/ct2/show/NCT04976725. Identifier: NCT04976725 [Population not of interest]
11. Allergan. Observational study to assess adverse events when adult female participants are treated with Ubrelvy (ubrogepant) during pregnancy. In: ClinicalTrials.gov. Bethesda, MD: National Library of Medicine (US); 2000- [cited 2021]. https://ClinicalTrials.gov/show/NCT05158894. Identifier: NCT05158894. [Outcomes not of interest]

12. Allergan. Study to assess adverse events and drug to drug interaction of oral tablet atogepant and ubrogepant in adult participants with a history of migraine. https://ClinicalTrials.gov/show/NCT04818515; 2021. PMID: n/a. [Population not of interest]

13. Allergan. Study to Assess Adverse Events When Ubrogepant Tablets in Combination With Atogepant Tablets Are Used to Treat Adult Participants With Migraine. In: ClinicalTrials.gov. Bethesda, MD: National Library of Medicine (US); 2000- [2022] https://ClinicalTrials.gov/show/NCT05264129. Identifier: NCT05264129 [Outcomes not of interest]

14. Amgen. A study to evaluate treatment satisfaction with erenumab in participants with migraine. https://ClinicalTrials.gov/show/NCT04825678; 2021. PMID: n/a. [Intervention not of interest]

15. Ashina M, Cohen JM, Gandhi SK, et al. Reduction in the severity and duration of headache following fremanezumab treatment in patients with episodic and chronic migraine. Headache. 2021 Jun;61(6):916-26. doi: 10.1111/head.14127. PMID: 34115380. [Intervention not of interest]

16. Ashina M, Goadsby PJ, Dodick DW, et al. Cardiovascular safety of erenumab in patients with migraine with or without a history of aura. European Journal of Neurology. 2020 May;27 (Supplement 1):12. PMID: n/a. [Type of publication (Conference abstract)]

17. Ashina M, Goadsby PJ, Dodick DW, et al. Cardiovascular safety of erenumab in patients with migraine and aura. Headache. 2020 June;60 (Supplement 1):101-2. PMID: n/a. [Type of publication (Conference abstract)]

18. Ashina M, Krikke-Workel J, Krege J, et al. Randomized, controlled trial of lasmiditan over four migraine attacks: consistency findings (1825). [abstract] 73rd AAN Annual Meeting, April 17-22, 2021. Neurology. 2021 Apr 13;96(15 Supplement):1825. [Type of publication (Conference abstract)]

19. Ashina M, Krikke-Workel J, Krege J, et al. Randomized, controlled trial of lasmiditan over four migraine attacks: consistency findings. Cephalalgia. 2020 Oct;40:14-5. doi: http://dx.doi.org/10.1177/0333102420962311. PMID: n/a. [Type of publication (Conference abstract)]

20. Ataturk U. Acupuncture in migraine without aura patients. 2020 March 1. PMID: n/a. [Outcomes not of interest]

21. Ataturk U. Mesotherapy versus systemic therapyin treatment of migraine headache. 2020 December 1. PMID: n/a. [Duplicate]

22. Aurora S, Smith T, Jeleva M, et al. A long-term, open label safety and tolerability study of precision olfactory delivery of DHE in acute migraine treatment (STOP 301): exploratory efficacy results (2490). [abstract] 73rd AAN Annual Meeting, April 17-22, 2021. Neurology. 2021 Apr 13;96(15 Supplement):2490. [Type of publication (Conference abstract)]

23. Bae J-Y, Sung H-K, Kwon N-Y, et al. Cognitive Behavioral Therapy for Migraine Headache: A Systematic Review and Meta-Analysis. Medicina (B Aires). 2021 Dec 28;58(1):44. doi: https://dx.doi.org/10.3390/medicina58010044. PMID: 35056352. [Outcomes not of interest]

24. Bagherzadi A, Emani R, Ghavami H, et al. Comparing the effect of heat and cold therapy on the intensity of nitrate induced migraine type headache in cardiac inpatients: a randomized controlled trial. Agri. 2021 Jul;33(3):148-54. doi: 10.14744/agri.2020.00907. PMID: 34318912. [Population not of interest]

25. Bandara SMR, Samita S, Kiridana AM, et al. Effectiveness of paranasal air suction on acute migraine using portable air sucker - a randomized, double blind study. BMC Neurol. 2021 Apr 24;21(1):176. doi: 10.1186/s12883-021-02203-x. PMID: 33892652. [Population not of interest]

26. Bandara SMR, Samita S, Kiridana AM, et al. Effectiveness of paranasal air suction on acute migraine using portable air sucker - a randomized, double blind study. BMC Neurol. 2021 Apr 24;21(1):9. doi: ARTN 17610.1186/s12883-021-02203-x. PMID: n/a. [Population not of interest]

27. Barchakh Z, Mardani Valandani Z, Khorvash F. The effectiveness of compassion-focused therapy for improving emotional control and reducing the severity of pain in migraine patients. Practice in Clinical Psychology. 2021 Win;9(1):51-60. doi: 10.32598/jpcp.9.1.740.1. PMID: n/a. [Population not of interest]

28. Barreto T. Acute treatments for episodic migraine in adults. Am Fam Physician. 2021 Nov 1;104(5):509-12. PMID: 34783486. [Study design not of interest]

29. Basutkar RS, Vinod CE, Saju SJ, et al. Optimal dosing of lasmiditan in the management of acute migraine attack: a systematic review and meta-analysis. Ann. 2021 Mar-Apr;24(2):155-63. doi: https://dx.doi.org/10.4103/aian.AIAN_1223_20. PMID: 34220057. [Systematic review]

30. Beauchene JK, Levien TL. Lasmiditan: Acute migraine treatment without vasoconstriction. A Review. J Pharm Technol. 2021 Oct;37(5):244-53. doi: 10.1177/87551225211024630. PMID: 34752575. [Study design not of interest]

31. Beier D, Callesen HE, Carlsen LN, et al. Manual joint mobilisation techniques, supervised physical activity, psychological treatment, acupuncture and patient education in migraine treatment: a systematic review and meta-analysis. Cephalalgia. 2021 Aug 18:3331024211034489. doi: 10.1177/03331024211034489. PMID: 34404258. [Irrelevant systematic review]

32. Biohaven Pharmaceuticals I. Randomized trial in adult subjects with acute migraines. 2020 October 27. PMID: n/a. [Duplicate]

33. Biohaven Pharmaceuticals I. Safety and efficacy trial of BHV3000 (rimegepant) 75 mg for the acute treatment of migraine. 2020 October 22. PMID: n/a. [Duplicate]

34. Blumenfeld AM, Knievel K, Manack Adams A, et al. Ubrogepant is safe and efficacious in participants taking concomitant preventive medication for migraine: a pooled analysis of phase 3 trials. Adv Ther. 2021 Dec 7 [Epub ahead of print]. doi: 10.1007/s12325-021-01923-3. PMID: 34874514. [Intervention not of interest]

35. Brigham, Hospital Ws, Technology MIo. ACT for high frequency migraine; a virtual mindfulness intervention. https://ClinicalTrials.gov/show/NCT05003362; 2020. PMID: n/a. [Intervention not of interest]

36. Cai G, Xia Z, Charvet L, et al. A systematic review and meta-analysis on the efficacy of repeated transcranial direct current stimulation for migraine. J Pain Res. 2021;14:1171-83. doi: 10.2147/JPR.S295704. PMID: 33953607. [Irrelevant systematic review]

37. Cevoli S, Pensato U, Favoni V. Moving closer to the ideal migraine acute treatment. Neurol Sci. 2020 Dec;41(Suppl 2):381-2. doi: 10.1007/s10072-020-04650-9. PMID: 32885392. [Study design not of interest]

38. Chen L, Cai Z. The efficacy of ginger for the treatment of migraine: a meta-analysis of randomized controlled studies. Am J Emerg Med. 2021 Aug;46:567-71. doi: 10.1016/j.ajem.2020.11.030. PMID: 33293189. [Systematic review]

39. Chen L, Cai Z. The efficacy of ginger for the treatment of migraine: a meta-analysis of randomized controlled studies. Am J Emerg Med. 2021 08;46:567-71. doi: https://dx.doi.org/10.1016/j.ajem.2020.11.030. PMID: 33293189. [Systematic review]

40. Chowdhury D, Chaudhuri J, Ghosh P, et al. Efficacy and safety of erenumab in indian episodic migraine population: india subanalysis of Global EMPOwER study. Eur J Neurol. 2021 Jun;28:704-. doi: http://dx.doi.org/10.1111/ene.14975. PMID: n/a. [Type of publication (Conference abstract)]

41. Citrome L, Sanchez Del Rio M, Dong Y, et al. Benefit-risk assessment of galcanezumab versus placebo for the treatment of episodic and chronic migraine using the metrics of number needed to treat and number needed to harm. Adv Ther. 2021 Aug;38(8):4442-60. doi: 10.1007/s12325-021-01848-x. PMID: 34264500. [Outcomes not of interest]

42. Clemow DB, Baygani SK, Hauck PM, et al. Lasmiditan in patients with common migraine comorbidities: a post hoc efficacy and safety analysis of two phase 3 randomized clinical trials. Curr Med Res Opin. 2020 Nov;36(11):1791-806. doi: 10.1080/03007995.2020.1808780. PMID: 32783644. [Type of publication (Conference abstract)]

43. Clemow DB, Baygani SK, Hauck PM, et al. Lasmiditan in patients with common migraine comorbidities: a post hoc efficacy and safety analysis of two phase 3 randomized clinical trials. Curr Med Res Opin. 2020 Nov;36(11):1791-806. doi: 10.1080/03007995.2020.1808780. PMID: 32783644. [Duplicate]

44. Clemow DB, Hochstetler HM, Dong Y, et al. Effect of a change in lasmiditan dose on efficacy and safety in patients with migraine. Postgrad Med. 2021 May;133(4):449-59. doi: 10.1080/00325481.2020.1860619. PMID: 33730977. [Duplicate]

45. Cohen F, Friedman BW. A randomized study of IV prochlorperazine plus diphenhydramine versus IV hydromorphone for migraine-associated symptoms: a post hoc analysis. Headache. 2021 Sep;61(8):1227-33. doi: 10.1111/head.14185. PMID: 34363617. [Outcomes not of interest]

46. Cosslett T, Mitchell C. The use of calcitonin gene related peptide monoclonal antibodies in the difficult to treat migraine population. J Neurol. 2021 Feb;268(2):734-6. doi: 10.1007/s00415-020-10392-7. PMID: 33439329. [Study design not of interest]

47. Croop R, Berman G, Kudrow D, et al. Long-term safety of rimegepant 75 mg for the acute treatment of migraine (Study 201). Headache. 2020 June;60 (Supplement 1):111-2. PMID: n/a. [Type of publication (Conference abstract)]

48. Croop R, Jensen C, Thiry A, et al. Rimegepant is effective for the acute treatment of migraine in patients who have discontinued or currently use triptans: results from 3 phase 3 clinical trials. Neurology Conference: 72nd Annual Meeting of the American Academy of Neurology, AAN. 2020;94(15 Supplement). PMID: n/a. [Type of publication (Conference abstract)]

49. Croop R, Madonia J, Conway CM, et al. 63rd Annual Scientific Meeting American Headache Society((R)). Headache. 2021 Jun;61 Suppl 1:1-178. doi: 10.1111/head.14130. PMID: 34081778. [Type of publication (Conference abstract)]

50. de Tommaso M, Delussi M, Gentile E, et al. Effect of single dose erenumab on cortical responses evoked by cutaneous a-delta fibers: a pilot study in migraine patients. Cephalalgia. 2021 Aug;41(9):1004-14. doi: 10.1177/0333102421996345. PMID: 33593077. [Outcomes not of interest]

51. DeFalco AP, Lazim R, Cope NE. Rimegepant orally disintegrating tablet for acute migraine treatment: a review. Ann Pharmacother. 2021 May;55(5):650-7. doi: 10.1177/1060028020954800. PMID: 32909437. [Study design not of interest]

52. Deighton A, Johnston K, Harris L, et al. Acute migraine medication and medication overuse headache: a systematic literature review. Neurology (4505). [abstract] 73rd AAN Annual Meeting, April 17-22, 2021. Neurology. 2021 Apr 13;96(15 Supplement):4505. [Type of publication (Conference abstract)]

53. Deighton A, Johnston KM, Dabirvaziri P, et al. Acute migraine medication and medication overuse headache: a systematic literature review. Headache. 2020 Jun;60:59-60. PMID: n/a. [Type of publication (Conference abstract)]

54. Diener HC. Episodic migraine: Systematic review and meta-analysis on the treatment of acute migraine attacks. [German]. Psychopharmakotherapie. 2021 November;28(6):283-4. [Foreign language]

55. Dodick D, Goadsby P, Lu KF, et al. Ubrogepant achieves onset of pain relief at 1 hour for the acute treatment of migraine. Neurology. 2020 Apr 14;94(15). PMID: n/a. [Type of publication (Conference abstract)]

56. Dr. Lutfi Kirdar Kartal T, Research H. Comparison of great occipital nerve and supraorbital nerve blockade methods at treatment of acute migraine attack in the emergency department. 2020 August 15. PMID: n/a. [Duplicate]

57. Dudeney J, Sharpe L, McDonald S, et al. Are psychological interventions efficacious for adults with migraine? A systematic review and meta-analysis. Headache. 2022 Feb 05; doi: https://dx.doi.org/10.1111/head.14260. PMID: 35122436. [Outcomes not of interest]

58. Dudman DC, Tauqeer F, Kaur M, et al. A systematic review and meta-analyses on the prevalence of pregnancy outcomes in migraine treated patients: a contribution from the IMI2 ConcePTION project. J Neurol. 2021 Apr 1;01:01. doi: 10.1007/s00415-021-10534-5. PMID: 33792783. [Irrelevant systematic review]

59. Effect of craniosacral therapy in the management of migraine. http://wwwwhoint/trialsearch/Trial2aspx?TrialID=CTRI. 2020;07(026360). PMID: n/a. [Outcomes not of interest]

60. Efficacy and safety of nerivio for the acute treatment of menstrual migraine. 2020 September 9. PMID: n/a. [Outcomes not of interest]

61. Efficacy of onabotulinumtoxinA in migraine. 2020 March 13. PMID: n/a. [Study design not of interest]

62. ElHawary H, Barone N, Baradaran A, et al. Efficacy and Safety of Migraine Surgery: A Systematic Review and Meta-analysis of Outcomes and Complication Rates. Ann Surg. 2022 Feb 01;275(2):e315-e23. doi: https://dx.doi.org/10.1097/SLA.0000000000005057. PMID: 35007230. [Intervention not of interest]

63. Eli Lilly C. A study of LY3451838 in participants with migraine. 2020 November 16. PMID: n/a. [Duplicate]

64. Eli Lilly Company. A study of galcanezumab (LY2951742) in adult participants with episodic migraine. In: ClinicalTrials.gov. Bethesda, MD: National Library of Medicine (US); 2000- [cited 2021]. https://ClinicalTrials.gov/show/NCT05127486. Identifier: NCT05127486 . [Intervention not of interest]

65. Erratum: effect of ubrogepant vs placebo on pain and the most bothersome associated symptom in the acute treatment of migraine: the ACHIEVE II randomized clinical trial (JAMA - Journal of the American Medical Association (2019) 322: 19 (1887-1898) DOI: 10.1001/jama.2019.16711). JAMA - journal of the american medical association. 2020;323(13):1318-. PMID: n/a. [Study design not of interest]

66. Ezzati A, Fanning K, Buse D, et al. Use of predictive modeling to determine treatment-response to OTC medications in acute migraine: results from the American migraine prevalence and prevention study (AMPP) (1587). [abstract] 73rd AAN Annual Meeting, April 17-22, 2021. Neurology. 2021 Apr 13;96(15 Supplement):1587. [Type of publication (Conference abstract)]

67. Fang X, Chiang C, Serrano D. 63rd Annual Scientific Meeting American Headache Society((R)). Headache. 2021 Jun;61 Suppl 1:1-178. doi: 10.1111/head.14130. PMID: 34081778. [Type of publication (Conference abstract)]

68. Fayoum University. Management of migraine using enerumab and traditional therapy at the time of COVID-19. In: ClinicalTrials.gov. Bethesda, MD: National Library of Medicine (US); 2000- [cited 2021]. https://ClinicalTrials.gov/show/NCT05052008. Identifier: NCT05052008. [Population not of interest]

69. Frank F, Ulmer H, Sidoroff V, et al. CGRP-antibodies, topiramate and botulinum toxin type A in episodic and chronic migraine: a systematic review and meta-analysis. Cephalalgia. 2021 Oct;41(11-12):1222-39. doi: 10.1177/03331024211018137. PMID: 34130525. [Irrelevant systematic review]

70. Franklin M, Druyts E. ICER's assessment of lasmiditan, rimegepant, and ubrogepant for acute migraine. J Manag Care Spec Pharm. 2020 Nov;26(11):1464-6. doi: 10.18553/jmcp.2020.26.11.1464. PMID: 33119438. [Commentary]

71. Friedman BW, Irizarry E, Williams A, et al. 17 A randomized study of greater occipital nerve block with bupivacaine versus intravenous metoclopramide for acute migraine. Annals of Emergency Medicine. 2020 October;76 (4 Supplement):S7. PMID: n/a. [Type of publication (Conference abstract)]

72. Gao B, Yang Y, Wang Z, et al. Efficacy and safety of rimegepant for the acute treatment of migraine: evidence from randomized controlled trials. Front Pharmacol. 2019;10:1577. doi: 10.3389/fphar.2019.01577. PMID: 32038251. [Systematic review]

73. Ghanizada H, Al-Karagholi MA, Arngrim N, et al. Effect of adrenomedullin on migraine-like attacks in patients with migraine: a randomized crossover study. Neurology. 2021 May 18;96(20):e2488-e99. doi: 10.1212/WNL.0000000000011930. PMID: 33827963. [Intervention not of interest]

74. Ghanizada H, Al-Karagholi MA, Arngrim N, et al. Effect of adrenomedullin on migraine-like attacks in patients with migraine: a randomized crossover study. Neurology. 2021 May 18;96(20):e2488-e99. doi: 10.1212/WNL.0000000000011930. PMID: 33827963. [Intervention not of interest]

75. Ghorbani Z, Togha M, Rafiee P, et al. Vitamin D3 might protect against inflammation in migraine: post hoc analysis of a randomized clinical trial. Cephalalgia Reports. 2020 January-December;3:3. PMID: n/a. [Type of publication (Conference abstract)]

76. Goadsby PJ, Blumenfeld AM, Lipton RB, et al. Time course of efficacy of ubrogepant for the acute treatment of migraine: clinical implications. Cephalalgia. 2021 Apr;41(5):546-60. doi: 10.1177/0333102420970523. PMID: 33241721. [Duplicate]

77. Goadsby PJ, Blumenfeld AM, Lipton RB, et al. Time course of efficacy of ubrogepant for the acute treatment of migraine: clinical implications. Cephalalgia. 2021 Apr;41(5):546-60. doi: 10.1177/0333102420970523. PMID: 33241721. [Duplicate]

78. Guo W, Jin H, Wang Y, et al. Efficacy and safety of cutting therapy in the treatment of migraine. Medicine (United States). 2021 17 Dec;100(50):E28084. doi: https://dx.doi.org/10.1097/MD.0000000000028084. PMID: 34918662. [Study design not of interest]

79. Gur STA, Ahiskalioglu EO, Aydin ME, et al. Intravenous lidocaine vs. NSAIDs for migraine attack in the ED: a prospective, randomized, double-blind study. Eur J Clin Pharmacol. 2022 Jan;78(1):27-33. doi: https://dx.doi.org/10.1007/s00228-021-03219-5. PMID: 34528122. [Duplicate]

80. H. Lundbeck A/S. A study with Lu AG09222 in adults with migraine who have not been helped by prior preventive treatments. In: ClinicalTrials.gov. Bethesda, MD: National Library of Medicine (US); 2000- [cited 2021]. https://ClinicalTrials.gov/show/NCT05133323. Identifier: NCT05133323. [Intervention not of interest]

81. H. Lundbeck A/S. A Study With Lu AG09222 in Adults With Migraine Who Have Not Been Helped by Prior Preventive Treatments. In: ClinicalTrials.gov. Bethesda, MD: National Library of Medicine (US); 2000- [2022]. https://clinicaltrials.gov/ct2/show/NCT05133323. Identifier: NCT05133323. [Intervention not of interest]

82. H. Lundbeck A/S. Real World Effectiveness of Eptinezumab in Participants With Migraine. In: ClinicalTrials.gov. Bethesda, MD: National Library of Medicine (US); 2000- [2022] https://ClinicalTrials.gov/show/NCT05284019. Identifier: NCT05284019 [Outcomes not of interest]

83. Ha DK, Kim MJ, Han N, et al. Comparative efficacy of oral calcitonin-gene-related peptide antagonists for the treatment of acute migraine: updated meta-analysis. Clin Drug Investig. 2021 Feb;41(2):119-32. doi: 10.1007/s40261-020-00997-1. PMID: 33426614. [Systematic review]

84. Hagan JC 3rd. Systematic review and meta-analysis of acute treatments for episodic migraine in adults. JAMA. 2021 Oct 26;326(16):1636. doi: 10.1001/jama.2021.14060. PMID: 34698791. [Type of publication (Editorial letter)]

85. Herbacure N. Improvement of migraine severity and frequency with Migraineguard ™ supplement a randomized, placebo-controlled, double-blind, trial. 2020 April 1. PMID: n/a. [Outcomes not of interest]

86. Herranz-Gómez A, García-Pascual I, Montero-Iniesta P, et al. Effectiveness of exercise and manual therapy as treatment for patients with migraine, tension-type headache or cervicogenic headache: an umbrella and mapping review with meta-meta-analysis. Applied Sciences. 2021;11(15). doi: 10.3390/app11156856. [Population not of interest]

87. Hershey AD, Irwin S, Rabany L, et al. Comparison of remote electrical neuromodulation (REN) and standard-care medications for acute treatment of migraine in adolescents: a post-hoc analysis. Pain Med. 2021 Jun 29;29:29. doi: 10.1093/pm/pnab197. PMID: 34185084. [Population not of interest]

88. Hershey AD, Lin T, Gruper Y, et al. Remote electrical neuromodulation for acute treatment of migraine in adolescents. Headache. 2021 Feb;61(2):310-7. doi: 10.1111/head.14042. PMID: 33349920. [Population not of interest]

89. Hokenek NM, Erdogan MO, Hokenek UD, et al. Treatment of migraine attacks by transcutaneous electrical nerve stimulation in emergency department: a randomize controlled trial. Am J Emerg Med. 2021 Jan;39:80-5. doi: 10.1016/j.ajem.2020.01.024. PMID: 31983598. [Duplicate]

90. Hokenek NM, Erdogan MO, Hokenek UD, et al. Treatment of migraine attacks by transcutaneous electrical nerve stimulation in emergency department: a randomize controlled trial. Am J Emerg Med. 2021 Jan;39:80-5. doi: 10.1016/j.ajem.2020.01.024. PMID: 31983598. [Duplicate]

91. Houts CR, McGinley JS, Nishida TK, et al. Systematic review of outcomes and endpoints in acute migraine clinical trials. Headache. 2021 Feb;61(2):263-75. doi: 10.1111/head.14067. PMID: 33611818. [Systematic review]

92. Huang L, Zhou PY, Cao ZH. Observation of efficacy of transcranial magnetic stimulation combined with ibuprofen in treatment of migraine patients and its influence on VAS scores. Basic & Clinical Pharmacology & Toxicology. 2020 Nov;127(SUPPL 3):112-. PMID: n/a. [Type of publication (Conference abstract)]

93. Hutchinson S, Dodick DW, Treppendahl C, et al. Ubrogepant for the acute treatment of migraine: pooled efficacy from ACHIEVE I and ACHIEVE II phase 3 trials. Headache. 2020 Jun;60:93-. PMID: n/a. [Type of publication (Conference abstract)]

94. Hutchinson S, Dodick DW, Treppendahl C, et al. Ubrogepant for the acute treatment of migraine: pooled safety and tolerability from ACHIEVE I and ACHIEVE II phase 3 studies. Neurology. 2020 Apr 14;94(15). PMID: n/a. [Type of publication (Conference abstract)]

95. Hutchinson S, Dodick DW, Treppendahl C, et al. Ubrogepant for the acute treatment of migraine: pooled efficacy, safety, and tolerability from the ACHIEVE I and ACHIEVE II phase 3 randomized trials. Neurol Ther. 2021 Jun;10(1):235-49. doi: 10.1007/s40120-021-00234-7. PMID: 33608814. [Duplicate]

96. Iaconangelo C, Serrano D, Manack Adams A, et al. 63rd Annual Scientific Meeting American Headache Society((R)). Headache. 2021 Jun;61 Suppl 1:1-178. doi: 10.1111/head.14130. PMID: 34081778. [Type of publication (Conference abstract)]

97. Iaconangelo C, Serrano D, Manack Adams A, et al. 63rd Annual Scientific Meeting American Headache Society((R)). Headache. 2021 Jun;61 Suppl 1:1-178. doi: 10.1111/head.14130. PMID: 34081778. [Type of publication (Conference abstract)]

98. Ingvaldsen SH, Tronvik E, Brenner E, et al. A biofeedback app for migraine: development and usability study. JMIR Form Res. 2021 Jul 28;5(7):e23229. doi: 10.2196/23229. PMID: 34319243. [Outcomes not of interest]

99. Irct20161203031212N. The effect of alpha-lipoic acid on migraine. http://wwwwhoint/trialsearch/Trial2aspx?TrialID=IRCT20161203031212N3. 2020. PMID: n/a. [Intervention not of interest]

100. Irct20170316033099N. The effectiveness of melatonin on migraine headaches. http://wwwwhoint/trialsearch/Trial2aspx?TrialID=IRCT20170316033099N12. 2021. PMID: n/a. [Intervention not of interest]

101. Jakate A, Blumenfeld AM, Boinpally R, et al. Pharmacokinetics, safety, and tolerability of ubrogepant for the acute treatment of migraine following coadministrationwith preventive monoclonal antibody treatment. Neurology. 2021;96(15 SUPPL 1). [Intervention not of interest]

102. Jakate A, Boinpally R, Butler M, et al. Safety and tolerability of ubrogepant for the acute treatment of migraine following co-administration with preventive monoclonal antibody treatment. Headache. 2020 Jun;60:124-. PMID: n/a. [Type of publication (Conference abstract)]

103. Jankowska A, Pogoda A, Staszewski J. Intravenous sodium valproate for acute migraine: a meta-analysis. Eur J Neurol. 2021 Jun;28:226-. doi: http://dx.doi.org/10.1111/ene.14974. PMID: n/a. [Type of publication (Conference abstract)]

104. Jie G, Mi-mi X, Ya-ying P. Clinical observation of electroacupuncture with different frequencies for migraine without aura. J Acupunct Tuina Sci. 2021;19(2):129-32. doi: 10.1007/s11726-021-1236-x. [Outcomes not of interest]

105. Johnston K, Popoff E, Deighton A, et al. Comparative efficacy and safety of rimegepant versus ubrogepant and lasmiditan for acute treatment of migraine: a network metaanalysis (NMA). Neurology Conference: 72nd Annual Meeting of the American Academy of Neurology, AAN. 2020;94(15 Supplement). PMID: n/a. [Type of publication (Conference abstract)]

106. Johnston K, Popoff E, Deighton A, et al. Comparative efficacy and safety of rimegepant, ubrogepant, and lasmiditan for acute treatment of migraine: a network meta-analysis. Expert rev. 2021 Jul 02:1-12. doi: https://dx.doi.org/10.1080/14737167.2021.1945444. PMID: 34148501. [Systematic review]

107. Johnston KM, Popoff E, Deighton A, et al. Comparative efficacy and safety of rimegepant vs ubrogepant and lasmiditan for acute treatment of migraine: a network meta-analysis (NMA). Headache. 2020 Jun;60:65-6. PMID: n/a. [Type of publication (Conference abstract)]

108. Johnston KM, Powell L, Popoff E, et al. 63rd Annual Scientific Meeting American Headache Society((R)). Headache. 2021 Jun;61 Suppl 1:1-178. doi: 10.1111/head.14130. PMID: 34081778. [Type of publication (Conference abstract)]

109. Jones A, O'Gorman C, Lipton RB, et al. Efficacy and safety of AXS-07 (MoSEIC meloxicam-rizatriptan) for the acute treatment of migraine: results from the INTERCEPT phase 3, randomized, double-blind, placebo-controlled trial. [abstract] The International Headache Congress – IHS and EHF Joint Congress 2021, 8-12 September 2021. J Headache Pain 2021;22(103):P0276. https://doi.org/10.1186/s10194-021-01293-9 [Type of publication (Conference abstract)]

110. Jones A, O'Gorman C, Tabuteau H. 63rd Annual Scientific Meeting American Headache Society((R)). Headache. 2021 Jun;61 Suppl 1:1-178. doi: 10.1111/head.14130. PMID: 34081778. [Type of publication (Conference abstract)]

111. Jones A, O'Gorman C, Tepper SJ, et al. 63rd Annual Scientific Meeting American Headache Society((R)). Headache. 2021 Jun;61 Suppl 1:1-178. doi: 10.1111/head.14130. PMID: 34081778. [Type of publication (Conference abstract)]

112. Joshi S, Aurora SK, Wang S, et al. 63rd Annual Scientific Meeting American Headache Society((R)). Headache. 2021 Jun;61 Suppl 1:1-178. doi: 10.1111/head.14130. PMID: 34081778. [Type of publication (Conference abstract)]

113. Joshi S, Aurora SK, Wang S, et al. PND7 assessing the comparative efficacy of INP104 for acute treatment of migraine attacks: a matching-adjusted indirect comparison. Value in Health. 2021 June;24:S159. doi: 10.1016/j.jval.2021.04.791. PMID: n/a. [Type of publication (Conference abstract)]

114. Joyner KR, Morgan KW. Novel therapies in acute migraine management: small-molecule calcitonin gene-receptor antagonists and serotonin 1F receptor agonist. Ann Pharmacother. 2021 06;55(6):745-59. doi: https://dx.doi.org/10.1177/1060028020963574. PMID: 32993366. [Systematic review]

115. Jurgens TP, Ning X, Kessler Y, et al. Pooled analysis of cardiovascular safety with fremanezumab treatment in patients with migraine by number of cardiovascular or cerebrovascular risk factors. Headache. 2020 June;60 (Supplement 1):3-4. PMID: n/a. [Type of publication (Conference abstract)]

116. Kandil M, Jaber S, Desai D, et al. MAGraine: magnesium compared to conventional therapy for treatment of migraines. Am J Emerg Med. 2021 Jan;39:28-33. doi: 10.1016/j.ajem.2020.09.033. PMID: 33041146. [Duplicate]

117. Karabuk University. Comparison of Wet Cupping and Acupuncture in Migraine. In: ClinicalTrials.gov. Bethesda, MD: National Library of Medicine (US); 2000- [2022] https://ClinicalTrials.gov/show/NCT05282134. Identifier: NCT05282134 [Population not of interest]

118. Kawata AK, Ladd MK, Lipton RB, et al. Reducing the physical, social, and emotional impact of episodic migraine: Results from erenumab STRIVE and ARISE phase III randomized trials. Headache. 2022 Feb;62(2):159-68. doi: https://dx.doi.org/10.1111/head.14258. PMID: 35137394. [Outcomes not of interest]

119. Kellerman D, Engels J. Comparison of efficacy outcomes in trials using a M207 in the acute treatment of a single migraine or multiple migraines (2136). [abstract] 73rd AAN Annual Meeting, April 17-22, 2021. Neurology. 2021 Apr 13;96(15 Supplement):2136. [Type of publication (Conference abstract)]

120. Kessing R. ACHIEVE II trial: Ubrogepant compared to placebo for migraine attacks. [German]. Fortschritte der Neurologie Psychiatrie. 2020 01 Aug;88(8):486-7. PMID: n/a. [Foreign language]

121. Kou RZ, Yang F, Lin Q, et al. [Clinical observation on horizontal penetration needling combined with rizatriptan monobenzoate tablets for migraine without aura in acute stage]. Zhongguo Zhen Jiu. 2021 Sep 12;41(9):993-6. doi: 10.13703/j.0255-2930.20201203-k0007. PMID: 34491648. [Foreign language]

122. Krikke-Workel J, Krege J, Ashina M, et al. PAINWeek Abstract Book 2020. Postgrad Med. 2020;132(sup1):1-76. doi: 10.1080/00325481.2020.1824967. PMID: 634270843. [Type of publication (Conference abstract)]

123. Kurian A, Reghunadhan I, Thilak P, et al. Short-term efficacy and safety of topical beta-blockers (timolol maleate ophthalmic solution, 0.5%) in acute migraine: a randomized crossover trial. JAMA Ophthalmol. 2020 Nov 1;138(11):1160-6. doi: 10.1001/jamaophthalmol.2020.3676. PMID: 33001159. [Population not of interest]

124. Kuruvilla D, Starling A, Tepper SJ, et al. A phase 3 randomized, double-blind, sham-controlled trial of e-TNS for the acute treatment of migraine (TEAM). [abstract] The International Headache Congress – IHS and EHF Joint Congress 2021, 8-12 September 2021. J Headache Pain 2021;22(103):AL059. https://doi.org/10.1186/s10194-021-01293-9 [Type of publication (Conference abstract)]

125. Levin M, Buse D, Blumenfeld A, et al. Rimegepant 75 mg is effective for the acute treatment of migraine regardless of attack frequency: results from 3 phase 3 trials. Neurology. 2020 Apr 14;94(15). PMID: n/a. [Type of publication (Conference abstract)]

126. Li M, Wang W, Gao W, et al. Comparison of acupuncture and sham acupuncture in migraine treatment: an overview of systematic reviews. Neurology. 2021 Nov 26. [Epub ahead of print]. doi: 10.1097/NRL.0000000000000386. PMID: 34842579. [Population not of interest]

127. Lim C, Singh M. Subcutaneous sumatriptans for acute migraine attacks in adults. Acad Emerg Med. 2021 Jul;28(7):814-5. doi: 10.1111/acem.14208. PMID: 33426737. [Study design not of interest]

128. Lin L, Min J, Yun-Ling Z, et al. [Systematic review and meta-analysis on efficacy and safety of yangxue qingnao granules in treatment of migraine]. Zhongguo Zhong Yao Za Zhi. 2020 Nov;45(21):5093-102. doi: 10.19540/j.cnki.cjcmm.20200729.501. PMID: 33350224. [Foreign language]

129. Lipton R, Dodick D, Goadsby P, et al. Ubrogepant is effective in the acute treatment of migraine with mild pain. Neurology Conference: 72nd Annual Meeting of the American Academy of Neurology, AAN. 2020;94(15 Supplement). PMID: n/a. [Type of publication (Conference abstract)]

130. Lipton RB, Blumenfeld AM, Croop R, et al. Rimegepant is effective for the acute treatment of migraine in subjects who have discontinued or currently use triptans: results from 3 phase 3 clinical trials. Headache. 2020 June;60 (Supplement 1):122. PMID: 632639034. [Type of publication (Conference abstract)]

131. Lipton RB, Blumenfeld AM, Jensen CM, et al. Rimegepant for the acute treatment of migraine: subgroup analyses from 3 phase 3 clinical trials by number of triptans previously tried and failed (P-161). [abstract] 63rd Annual Scientific Meeting American Headache Society® Headache. 2021;61(SUPPL 1):144-5. [Type of publication (Conference abstract)]

132. Lipton RB, Blumenfeld AM, Jensen CM, et al. 63rd Annual Scientific Meeting American Headache Society((R)). Headache. 2021 Jun;61 Suppl 1:1-178. doi: 10.1111/head.14130. PMID: 34081778. [Type of publication (Conference abstract)]

133. Lipton RB, Contreras-De Lama J, Serrano D, et al. 63rd Annual Scientific Meeting American Headache Society((R)). Headache. 2021 Jun;61 Suppl 1:1-178. doi: 10.1111/head.14130. PMID: 34081778. [Type of publication (Conference abstract)]

134. Lipton RB, Dodick DW, Goadsby PJ, et al. 63rd Annual Scientific Meeting American Headache Society((R)). Headache. 2021 Jun;61 Suppl 1:1-178. doi: 10.1111/head.14130. PMID: 34081778. [Type of publication (Conference abstract)]

135. Lipton RB, Dodick DW, Goadsby PJ, et al. Migraine Trust Virtual 2020 – Oral presentations. Cephalalgia. 2020 October;40(1_suppl):3-17. doi: 10.1177/0333102420962311. PMID: 634192764. [Type of publication (Conference abstract)]

136. Lipton RB, Dodick DW, Goadsby PJ, et al. Ubrogepant is effective in the acute treatment of migraine with mild pain. Headache. 2020 June;60 (Supplement 1):126. PMID: n/a. [Type of publication (Conference abstract)]

137. Lipton RB, Singh RBH, Revicki DA, et al. Improved functionality, satisfaction, and global impression of change with ubrogepant for the acute treatment of migraine in triptan insufficient responders. Headache. 2020 Jun;60:95-. PMID: n/a. [Type of publication (Conference abstract)]

138. L'Italien G, Croop R, Stock E, et al. Acute treatment with oral rimegepant 75mg reduces migraine-related disability: results from a one year, open-label safety study (BHV3000-201). Neurology. 2020 Apr 14;94(15). PMID: n/a. [Type of publication (Conference abstract)]

139. Lombard LA, Reuter U, Krege JH, et al. 63rd Annual Scientific Meeting American Headache Society((R)). Headache. 2021 Jun;61 Suppl 1:1-178. doi: 10.1111/head.14130. PMID: 34081778. [Type of publication (Conference abstract)]

140. Loo L, Lipton RB, Tepper SJ, et al. A close association of pain freedom with freedom from most bothersome symptom and from migraine-related functional disability in lasmiditan studies samurai and spartan. Headache. 2020 June;60 (Supplement 1):97. PMID: n/a. [Type of publication (Conference abstract)]

141. Loo LS, Buse D, Lombard L, et al. Trajectory of migraine-related disability over 12 months with lasmiditan for acute treatment of migraine in the GLADIATOR study. Neurology. 2020 Apr 14;94(15). PMID: n/a. [Type of publication (Conference abstract)]

142. Loo LS, Lipton R, Tepper S, et al. PAINWeek Abstract Book 2020. Postgrad Med. 2020;132(sup1):1-76. doi: 10.1080/00325481.2020.1824967. PMID: 634270829. [Type of publication (Conference abstract)]

143. Lund University B. Nasal cavity cooling for the symptomatic relief of migraine headache - a pilot study. 2021 March. PMID: n/a. [Study design not of interest]

144. MacGregor E, Komori M, Krege JH, et al. 63rd Annual Scientific Meeting American Headache Society((R)). Headache. 2021 Jun;61 Suppl 1:1-178. doi: 10.1111/head.14130. PMID: 34081778. [Type of publication (Conference abstract)]

145. Marmura M, Cohen JM, Ning X, et al. Time gained with long-term fremanezumab treatment in patients with chronic and episodic migraine. [abstract] International Headache Congress 8-12 September 2021. Cephalalgia. 2021 Sep;41(1_suppl):P0323. doi: 10.1177/03331024211034005. PMID: 34492213. [Type of publication (Conference abstract)]

146. Martin V, Nagy AJ, Janelidze M, et al. Impact of Baseline Characteristics on the Efficacy and Safety of Eptinezumab in Patients With Migraine: Subgroup Analyses of PROMISE-1 and PROMISE-2. Clin Ther. 2022 Feb 05. doi: https://dx.doi.org/10.1016/j.clinthera.2022.01.006. PMID: 35131090. [Intervention not of interest]

147. Martin VT, Ahmed Z, Buchanan AS, et al. Tolerability of lasmiditan in elderly patients with migraine. Headache. 2020 June;60 (Supplement 1):125. PMID: n/a. [Type of publication (Conference abstract)]

148. McAllister P, Berman G, Kudrow D, et al. Rimegepant 75 mg demonstrates superiority to placebo on nausea freedom: results from a post hoc pooled analysis of 3 phase 3 trials in the acute treatment of migraine. Neurology. 2020 Apr 14;94(15). PMID: n/a. [Type of publication (Conference abstract)]

149. McAllister P, Ning X, Cohen JM, et al. Improvements in quality-of-life, productivity, and satisfaction with fremanezumab in migraine patients >=60 years of age: pooled results of 3 randomised, double-blind, placebocontrolled phase 3 studies. European Journal of Neurology. 2020 May;27 (Supplement 1):301. PMID: 632534616. [Type of publication (Conference abstract)]

150. McAllister P, Winner PK, Chakhava G, et al. 63rd Annual Scientific Meeting American Headache Society((R)). Headache. 2021 Jun;61 Suppl 1:1-178. doi: 10.1111/head.14130. PMID: 34081778. [Type of publication (Conference abstract)]

151. McCurry R, Krashin D, Schorn M, et al. Effectiveness of erenumab-aooe, fremanezumab-vfrm and galcanezumab-gnlm in migraine patients at tertiary headache clinic with emphasis on high-frequency migraine patients. Neurology. 2020 Apr 14;94(15). PMID: n/a. [Type of publication (Conference abstract)]

152. Min J, Yun-Ling Z, Yan LU, et al. [Systematic review and meta-analysis on randomized controlled trial of efficacy and safety for acupuncture versus flunarizine in treatment of migraine]. Zhongguo Zhong Yao Za Zhi. 2020 Nov;45(21):5083-92. doi: 10.19540/j.cnki.cjcmm.20200521.502. PMID: 33350223. [Foreign language]

153. Moisset X, Pereira B, Ciampi de Andrade D, et al. Neuromodulation techniques for acute and preventive migraine treatment: a systematic review and meta-analysis of randomized controlled trials. J Headache Pain. 2020 Dec 10;21(1):142. doi: 10.1186/s10194-020-01204-4. PMID: 33302882. [Systematic review]

154. Nahas SJ, Cohen JM, Ramirez Campos V, et al. 63rd Annual Scientific Meeting American Headache Society((R)). Headache. 2021 Jun;61 Suppl 1:1-178. doi: 10.1111/head.14130. PMID: 34081778. [Type of publication (Conference abstract)]

155. Nahas SJ, Hindiyeh N, Friedman DI, et al. Long term safety, tolerability, and efficacy of intracutaneous zolmitriptan (M207) in the acute treatment of migraine. J Headache Pain. 2021 May 17;22(1):37. doi: 10.1186/s10194-021-01249-z. PMID: 34001002. [Study design not of interest]

156. Navarro-Perez MP, Ballesta-Martinez S, Rodriguez-Montolio J, et al. Acute migraine management in the emergency department: experience from a large Spanish tertiary hospital. Intern Emerg Med. 2021 Nov;16(8):2243-9. doi: 10.1007/s11739-021-02698-9. PMID: 33712966. [Outcomes not of interest]

157. Nct. A randomized controlled trial of acupuncture in treating migraine. https://clinicaltrialsgov/show/NCT04766762. 2021. PMID: n/a. [Intervention not of interest]

158. Nct. Eptinezumab in adults with migraine and medication overuse headache. https://clinicaltrialsgov/show/NCT04772742. 2021. PMID: n/a. [Intervention not of interest]

159. Nedd M, Garland S, Falk N, et al. Ubrogepant: an oral calcitonin gene-related peptide (CGRP) receptor antagonist for abortive migraine treatment. Ann Pharmacother. 2021 Jun 10:10600280211023810. doi: https://dx.doi.org/10.1177/10600280211023810. PMID: 34109839. [Systematic review]

160. Neuromed IRCCS. Effectiveness of Multimodal Physical Therapy in Migraine. In: ClinicalTrials.gov. Bethesda, MD: National Library of Medicine (US); 2000- [2022] https://ClinicalTrials.gov/show/NCT05226559. Identifier: NCT05226559 [Outcomes not of interest]

161. Nierenburg H, Rabany L, Lin T, et al. Remote electrical neuromodulation (REN) for the acute treatment of menstrual migraine: a retrospective survey study of effectiveness and tolerability. Pain Ther. 2021 Dec;10(2):1245-53. doi: 10.1007/s40122-021-00276-7. PMID: 34138449. [Study design not of interest]

162. Nocira LLC. Automated variable pattern insufflator device (AVPI) for the acute treatment of migraine. 2020 March 9. PMID: n/a. [Duplicate]

163. Nurathirah MN, Yazid MB, Norhayati MN, et al. Efficacy of ketorolac in the treatment of acute migraine attack: A systematic review and meta-analysis. Acad Emerg Med. 2022 Feb 09. doi: https://dx.doi.org/10.1111/acem.14457. PMID: 35138658. [Intervention not of interest]

164. O'Gorman C, Jones A, Lipton RB, et al. 63rd Annual Scientific Meeting American Headache Society((R)). Headache. 2021 Jun;61 Suppl 1:1-178. doi: 10.1111/head.14130. PMID: 34081778. [Type of publication (Conference abstract)]

165. Ou MQ, Fan WH, Sun FR, et al. A systematic review and meta-analysis of the therapeutic effect of acupuncture on migraine. Front Neurol. 2020;11:596. doi: 10.3389/fneur.2020.00596. PMID: 32714268. [Outcomes not of interest]

166. Paget MA, Tockhorn-Heidenreich A, Belger M, et al. Generalisability of the CONQUER trial results to routine clinical practice: galcanezumab versus placebo in patients with inadequately controlled migraine. European Journal of Neurology. 2020 May;27:1082-. PMID: n/a. [Type of publication (Conference abstract)]

167. Patel K, Batchu S, Wang R, et al. The use of electrical nerve stimulation to treat migraines: a systematic review. Cureus. 2021 Aug;13(8):e17554. doi: 10.7759/cureus.17554. PMID: 34646611. [Population not of interest]

168. Pavlovic J, Ailani J, Hutchinson S, et al. 63rd Annual Scientific Meeting American Headache Society((R)). Headache. 2021 Jun;61 Suppl 1:1-178. doi: 10.1111/head.14130. PMID: 34081778. [Type of publication (Conference abstract)]

169. Pavlovic J, Dodick D, Friedman D, et al. Rimegepant 75 mg provides early and sustained relief of migraine with a single dose: results from 3 phase 3 clinical trials. Neurology Conference: 72nd Annual Meeting of the American Academy of Neurology, AAN. 2020;94(15 Supplement). PMID: n/a. [Type of publication (Conference abstract)]

170. Pavlovic J, Dodick D, Newman L, et al. Rimegepant is effective for the acute treatment of migraine in subjects taking concurrent preventive medication: results from 3 phase 3 trials. Neurology. 2020 Apr 14;94(15). PMID: n/a. [Type of publication (Conference abstract)]

171. Pavlovic J, Dodick DW, Friedman D, et al. Rimegepant 75 mg provides early and sustained relief of migraine with a single oral dose: results from 3 phase 3 clinical trials. Headache. 2020 Jun;60:96-. PMID: n/a. [Type of publication (Conference abstract)]

172. Pellesi L, Al-Karagholi MA, De Icco R, et al. Effect of vasoactive intestinal polypeptide on development of migraine headaches: a randomized clinical trial. JAMA Netw Open. 2021 Aug 2;4(8):e2118543. doi: 10.1001/jamanetworkopen.2021.18543. PMID: 34357396. [Intervention not of interest]

173. Peres MFP, Vasudeva R, Baygani SK, et al. Lasmiditan efficacy in migraine attacks with mild vs. moderate or severe pain. Curr Med Res Opin. 2021 Jun;37(6):1031-8. doi: 10.1080/03007995.2021.1903846. PMID: 33784930. [Duplicate]

174. Polavieja P, Belger M, Kumar Venkata S, et al. 63rd Annual Scientific Meeting American Headache Society((R)). Headache. 2021 Jun;61 Suppl 1:1-178. doi: 10.1111/head.14130. PMID: 34081778. [Type of publication (Conference abstract)]

175. Popoff E, Johnston KM, Croop R, et al. Matching-adjusted indirect comparisons of intermittent oral rimegepant vs placebo and injectable anti-CGRP-targeted monoclonal antibodies examining monthly migraine days in the treatment of migraine. Headache. 2020 Jun;60:73-4. PMID: n/a. [Type of publication (Conference abstract)]

176. Pozo-Rosich P, Samaan KH, Schwedt TJ, et al. Galcanezumab provides consistent efficacy throughout the dosing interval among patients with episodic and chronic migraine: a post hoc analysis. Adv Ther. 2021 Jun;38(6):3154-65. doi: 10.1007/s12325-021-01708-8. PMID: 33950375. [Population not of interest]

177. Qi X, Fan G, Jia H. The probiotic lactobacillus casei shirota attenuates symptoms of vestibular migraine: a randomised placebo-controlled double-blind clinical trial. Beneficial Microbes. 2020;11(5):469-76. doi: 10.3920/Bm2020.0058. PMID: n/a. [Outcomes not of interest]

178. Rabany L, Buse DC. 63rd Annual Scientific Meeting American Headache Society((R)). Headache. 2021 Jun;61 Suppl 1:1-178. doi: 10.1111/head.14130. PMID: 34081778. [Type of publication (Conference abstract)]

179. Rapoport AM, Strom S, Kollins J, et al. Safety of dihydroergotamine for acute migraine treatment: reality vs perception. Headache. 2020 Jun;60:24-. PMID: n/a. [Type of publication (Conference abstract)]

180. RDC Clinical Pty Ltd A study evaluating the effectiveness of PEA compared to placebo for reducing pain severity and duration of migraines. In: ClinicalTrials.gov. Bethesda, MD: National Library of Medicine (US); 2000- [cited 2021]. https://clinicaltrials.gov/ct2/show/NCT05046522. Identifier: NCT05046522 . [Duplicate]

181. Reuter U, Krege JH, Lombard L, et al. Lasmiditan efficacy in the acute treatment of migraine was independent of prior response to triptans: Findings from the CENTURION study. Cephalalgia. 2022 Jan;42(1):20-30. doi: https://dx.doi.org/10.1177/03331024211048507. PMID: 34644189. [Duplicate]

182. Reuter U, Lombard L, Krege J, et al. Lasmiditan is effective in the acute treatment of migraine in patients with insufficient response to triptans: findings from the modified-parallel, placebo-controlled, double-blind, phase 3 consistency CENTURION study. [abstract] The International Headache Congress – IHS and EHF joint congress 2021. J Headache Pain 2021;22(103):P0387. https://doi.org/10.1186/s10194-021-01293-9 [Type of publication (Conference abstract)]

183. Rezaeian T, Ahmadi M, Mosallanezhad Z, et al. The impact of myofascial release and stretching techniques on the clinical outcomes of migraine headache: a randomized controlled trial. J Res Med Sci. 2021;26:45. doi: 10.4103/jrms.JRMS_745_18. PMID: 34484377. [Population not of interest]

184. Rezaeian T, Mosallanezhad Z, Nourbakhsh MR, et al. Effects of dry needling technique into trigger points of the sternocleidomastoid muscle in migraine headache: a randomized controlled trial. Am J Phys Med Rehabil. 2020 Dec;99(12):1129-37. doi: 10.1097/PHM.0000000000001504. PMID: 32544109. [Outcomes not of interest]

185. Riphah International University. Effects Of Dry Needling On Sternocleidomastoid Muscle For Pain And Disability In Migraine. In: ClinicalTrials.gov. Bethesda, MD: National Library of Medicine (US); 2000- [2022] https://ClinicalTrials.gov/show/NCT05285852. Identifier: NCT05285852 [Population not of interest]

186. Rosen N, Mathew P, Buchanan A, et al. PAINWeek Abstract Book 2020. Postgrad Med. 2020;132(sup1):1-76. doi: 10.1080/00325481.2020.1824967. PMID: 634270792. [Type of publication (Conference abstract)]

187. Rosen NL, Mathew PG, Buchanan AS, et al. Long-term cardiovascular safety of lasmiditan for the acute treatment of migraine for up to one year: interim results of an open-label phase 3 study (Gladiator). Headache. 2020 June;60 (Supplement 1):111. PMID: n/a. [Type of publication (Conference abstract)]

188. Schim J, Hutchinson S, Lipton R, et al. Rimegepant is safe and tolerable for the acute treatment of migraine in patients using preventive migraine medications: results from a long-term open-label safety study (2370). [abstract] 73rd AAN Annual Meeting, April 17-22, 2021. Neurology. 2021 Apr 13;96(15 Supplement):2370. [Type of publication (Conference abstract)]

189. Schindler EAD, Sewell RA, Gottschalk CH, et al. Exploratory controlled study of the migraine-suppressing effects of psilocybin. Neurother. 2021 Jan;18(1):534-43. doi: 10.1007/s13311-020-00962-y. PMID: 33184743. [Intervention not of interest]

190. Schobel VR. 63rd Annual Scientific Meeting American Headache Society((R)). Headache. 2021 Jun;61 Suppl 1:1-178. doi: 10.1111/head.14130. PMID: 34081778. [Type of publication (Conference abstract)]

191. Scripps H, Kaneka C. Effects of a multispecies probiotic on migraine. 2021 April 1. PMID: n/a. [Outcomes not of interest]

192. Scuteri D, Corasaniti MT, Tonin P, et al. Role of CGRP pathway polymorphisms in migraine: a systematic review and impact on CGRP mAbs migraine therapy. J Headache Pain. 2021 Jul 30;22(1):87. doi: 10.1186/s10194-021-01295-7. PMID: 34330208. [Irrelevant systematic review]

193. Seo J, Chu H, Kim C-H, et al. Cupping therapy for migraine: a PRISMA-compliant systematic review and meta-analysis of randomized controlled trials. Evid Based Complement Alternat Med. 2021;2021:7582581. doi: https://dx.doi.org/10.1155/2021/7582581. PMID: 33833822. [Outcomes not of interest]

194. Seydi P, Bagheri-Nesami M, Mohammadpour-Tahamtan RA, et al. Efficacy of acupressure on intensity of acute migraine in patients attending an emergency department: a randomized clinical trial. [Persian]. Journal of Mazandaran University of Medical Sciences. 2021 December;31(203):83-94. [Foreign language]

195. Shahsavani S, Mashhadi A, Bigdeli I. The effect of group emotional schema therapy on cognitive emotion strategies in women with migraine headaches: a pilot study. International journal of cognitive therapy. 2020;13(4):328-40. PMID: n/a. [Population not of interest]

196. Shao Q, Rascati KL, Lawson KA, et al. Impact of emergency department opioid use on future health resource utilization among patients with migraine. Headache. 2021 Feb;61(2):287-99. doi: 10.1111/head.14071. PMID: 33599982. [Outcomes not of interest]

197. Shi M, Guo J, Li Z, et al. Network meta-analysis on efficacy and safety of different anti-CGRP monoclonal antibody regimens for prophylaxis and treatment of episodic migraine. Neurol Res. 2021 Nov;43(11):932-49. doi: 10.1080/01616412.2021.1940672. PMID: 34281473. [Irrelevant systematic review]

198. Smith T, Krikke-Workel J, Krege J, et al. Randomized, controlled trial of lasmiditan over four migraine attacks: first attack findings (1791). [abstract] 73rd AAN Annual Meeting, April 17-22, 2021. Neurology. 2021 Apr 13;96(15 Supplement):1791. PMID: n/a. [Type of publication (Conference abstract)]

199. Smith TR, Aurora SK, Hocevar-Trnka J, et al. 63rd Annual Scientific Meeting American Headache Society((R)). Headache. 2021 Jun;61 Suppl 1:1-178. doi: 10.1111/head.14130. PMID: 34081778. [Type of publication (Conference abstract)]

200. Smith TR, McAllister P, Berman G, et al. Low rates of rescue medication usage in subjects treated with a single dose of rimegepant 75 mg for the acute treatment of migraine: results from 3 phase 3 clinical trials. Headache. 2020 Jun;60:112-3. PMID: n/a. [Type of publication (Conference abstract)]

201. Smith TR, Spierings ELH, Cady R, et al. Safety and tolerability of eptinezumab in patients with migraine: a pooled analysis of 5 clinical trials. J Headache Pain. 2021 Mar 30;22(1):16. doi: 10.1186/s10194-021-01227-5. PMID: 33781209. [Outcomes not of interest]

202. Smith TR, Spierings ELH, Cady R, et al. Safety and tolerability of eptinezumab in patients with migraine: a pooled analysis of 5 clinical trials. Journal of headache and pain. 2021;22(1):11. PMID: n/a. [Intervention not of interest]

203. Smith TR, Winner P, Aurora SK, et al. STOP 301: A Phase 3, open-label study of safety, tolerability, and exploratory efficacy of INP104, Precision Olfactory Delivery (POD R) of dihydroergotamine mesylate, over 24/52 weeks in acute treatment of migraine attacks in adult patients. Headache. 2021 09;61(8):1214-26. doi: https://dx.doi.org/10.1111/head.14184. PMID: 34363701. [Intervention not of interest]

204. Soni P, Chawla E. Quality of life related to functional disability in migraine patients: a systematic review and network-meta analysis. Clin J Pain. 2021 Aug 23;23:23. doi: https://dx.doi.org/10.1097/AJP.0000000000000972. PMID: 34419975. [Outcomes not of interest]

205. St. Luke's Hospital P. Osteopathic manipulative treatment and migraine headaches. https://ClinicalTrials.gov/show/NCT04976985; 2022. PMID: n/a. [Intervention not of interest]

206. Stauffer VL, Wang S, Bonner J, et al. Evaluation of injection-site-related adverse events with galcanezumab: a post hoc analysis of phase 3 studies in participants with migraine. BMC Neurol. 2020 May 19;20(1):194. doi: 10.1186/s12883-020-01775-4. PMID: 32429851. [Intervention not of interest]

207. Strom S, Kollins J, Albrecht D. The efficacy of dihydroergotamine vs emerging acute migraine medications. Headache. 2020 Jun;60:26-7. PMID: n/a. [Type of publication (Conference abstract)]

208. Study to evaluate oral ubrogepant in the acute treatment of migraine during the prodrome in adult participants. 2020 August 21. PMID: n/a. [Duplicate]

209. Swiat Zdrowia, Wroclaw Medical University. Migraine in Poland - a web-based cross-sectional survey. In: ClinicalTrials.gov. Bethesda, MD: National Library of Medicine (US); 2000- [cited 2021]. https://ClinicalTrials.gov/show/NCT05087420. Identifier: NCT05087420 [Intervention not of interest]

210. Tassorelli C, Bragg S, Krege J, et al. Abstracts of the 7(th) Congress of the European Academy of Neurology, Virtual 2021. Eur J Neurol. 2021 Jun;28 Suppl 1:1-921. doi: 10.1111/ene.14968. PMID: 34143923. [Type of publication (Conference abstract)]

211. Tavakoli F, Tafakhori A, Zebardast J, et al. A new technique employing direct tactile pressure on the common carotid artery to relieve acute episode attack of migraine headache: a single-arm interventional study. Front Emerg Med. 2021 Feb;5(1):e7. [Study design not of interest]

212. Tehrani MRH, Kalhor L, Khosravi A, et al. .. Journal of Advances in Medical and Biomedical Research. 2021;29(132):14-20. PMID: n/a. [Outcomes not of interest]

213. Tepecik Training Research Hospital. Efficacy of Greater Occipital Nerve Radiofrequency for Refractory Migraine Treatment. In: ClinicalTrials.gov. Bethesda, MD: National Library of Medicine (US); 2000- [2022] https://ClinicalTrials.gov/show/NCT05199064. Identifier: NCT05199064[Population not of interest]

214. Tepper SJ, Ailani J, Ford JH, et al. Effects of galcanezumab on health-related quality of life in patients with treatment-resistant migraine: results from CONQUER study. European Journal of Neurology. 2020 May;27 (Supplement 1):445. PMID: n/a. [Type of publication (Conference abstract)]

215. Tepper SJ, Ashina M, Reuter U, et al. Reduction in acute migraine-specific and non-specific medication use in patients treated with erenumab: post-hoc analyses of episodic and chronic migraine clinical trials. J Headache Pain. 2021 Jul 23;22(1):81. doi: 10.1186/s10194-021-01292-w. PMID: 34301173. [Intervention not of interest]

216. Tepper SJ, Lin T, Montal T, et al. Real-world experience with remote electrical neuromodulation in the acute treatment of migraine. Pain Med. 2020 Dec 25;21(12):3522-9. doi: 10.1093/pm/pnaa299. PMID: 32935848. [Outcomes not of interest]

217. Tepper SJ, Sharon R. 63rd Annual Scientific Meeting American Headache Society((R)). Headache. 2021 Jun;61 Suppl 1:1-178. doi: 10.1111/head.14130. PMID: 34081778. [Type of publication (Conference abstract)]

218. Tepper SJ, Vasudeva R, Krege JH, et al. Evaluation of 2-hour post-dose efficacy of lasmiditan for the acute treatment of difficult-to-treat migraine attacks. Headache. 2020 Sep;60(8):1601-15. doi: 10.1111/head.13897. PMID: 32634275. [Duplicate]

219. Terwindt G, Nagy AJ, Doty EG, et al. Characterization of treatment emergent adverse events in headache pain-free patients after lasmiditan dosing for the acute treatment of a single migraine attack. European Journal of Neurology. 2020 May;27:163-. PMID: n/a. [Type of publication (Conference abstract)]

220. Tfelt-Hansen P, Ashina M, Diener H, et al. Effect of erenumab on monthly migraine days and monthly migraine attacks in patients with episodic migraine. Headache. 2020 Jun;60:103-. PMID: n/a. [Outcomes not of interest]

221. The Third Affiliated hospital of Zhejiang Chinese Medical U. A randomized controlled trial of acupuncture in treating migraine. 2021 March 1. PMID: n/a. [Outcomes not of interest]

222. Theranica, University G, Clinic M. Real-world data analysis of REN treatment in migraine patients. https://ClinicalTrials.gov/show/NCT04992897; 2021. PMID: n/a. [Population not of interest]

223. Torres-Ferrus M, Gallardo VJ, Alpuente A, et al. The impact of anti-CGRP monoclonal antibodies in resistant migraine patients: a real-world evidence observational study. J Neurol. 2021 Oct;268(10):3789-98. doi: 10.1007/s00415-021-10523-8. PMID: 33772636. [Intervention not of interest]

224. Trugman JM, Ailani J, Hutchinson S, et al. Efficacy is maintained with long-term intermittent use of ubrogepant for the acute treatment of migraine. Neurology. 2020 Apr 14;94(15). PMID: n/a. [Type of publication (Conference abstract)]

225. Turner I, Buse D, Blumenfeld A, et al. Rimegepant 75 mg is more effective for migraine than nonsteroidal anti-inflammatory drugs: post hoc analysis of data from 2 phase 3 trials. Neurology Conference: 72nd Annual Meeting of the American Academy of Neurology, AAN. 2020;94(15 Supplement). PMID: n/a. [Type of publication (Conference abstract)]

226. Tuta-Quintero E, Zuleta-Sánchez N, Guerron-Gómez G, et al. Revisión de ensayos clínicos y estudios de cohorte para el tratamiento de la migraña con acupuntura. Revista Internacional de Acupuntura. 2021 01 Apr;15(2):51-9. doi: 10.1016/j.acu.2021.02.005. PMID: 2013160876. [Foreign language]

227. University AAK. Comparison of osteopathic manipulative therapy and myofacial relaxation techniques in people diagnosed with migraine. https://ClinicalTrials.gov/show/NCT04976725; 2021. PMID: n/a. [Population not of interest]

228. VanderPluym JH, Halker Singh RB, Urtecho M, et al. Acute treatments for episodic migraine in adults: a systematic review and meta-analysis. Jama. 2021 06 15;325(23):2357-69. doi: https://dx.doi.org/10.1001/jama.2021.7939. PMID: 34128998. [Systematic review]

229. Varangot-Reille C, Suso-Marti L, Romero-Palau M, et al. Effects of different therapeutic exercise modalities on migraine or tension-type headache: a systematic review and meta-analysis with a replicability analysis. J Pain. 2021 Dec 17 [Epub ahead of print]. doi: 10.1016/j.jpain.2021.12.003. PMID: 34929374. [Intervention not of interest]

230. Vargas BB, Baygani SK, Hauck P, et al. A close association of pain freedom with freedom from most bothersome symptom and from migraine-related functional disability in lasmiditan studies Samurai and Spartan. Annals of Neurology. 2020 Oct;88:S151-S2. PMID: n/a. [Type of publication (Conference abstract)]

231. Vernieri F, Altamura C, Aurilia C, et al. Effectiveness, safety, and tolerability of galcanezumab in a real-life setting in patients with migraine in Italy (the GARLIT study). Neurol Sci. 2020 Dec;41(Suppl 2):487-8. doi: 10.1007/s10072-020-04669-y. PMID: 32845481. [Brief communication]

232. Viau JA, Patel D, Cheng W, et al. Sodium valproate vs dopamine antagonists for acute migraine in the emergency department: a systematic review. Canadian Journal of Neurological Sciences. 2021. doi: http://dx.doi.org/10.1017/cjn.2021.195. PMID: 34382533. [Systematic review]

233. Vincent M, Peres M, Vasudeva R, et al. Lasmiditan efficacy in mild versus moderate or severe migraine headaches (1811). [abstract] 73rd AAN Annual Meeting, April 17-22, 2021. Neurology. 2021 Apr 13;96(15 Supplement):1811. [Type of publication (Conference abstract)]

234. von Mentzer B, Russo AF, Zhang Z, et al. A CGRP receptor antagonist peptide formulated for nasal administration to treat migraine. J Pharm Pharmacol. 2020 Oct;72(10):1352-60. doi: 10.1111/jphp.13317. PMID: 32588458. [Study design not of interest]

235. Wang F, Zhang H, Wang L, et al. Intravenous sodium valproate for acute migraine in the emergency department: a meta-analysis. Acta Neurol Scand. 2020 Dec;142(6):521-30. doi: 10.1111/ane.13325. PMID: 32740903. [Systematic review]

236. Wang PR, Lopez R, Seballos SS, et al. 2021 Annual Meeting Supplement. Acad Emerg Med. 2021 May;28 Suppl 1:S9-S418. doi: 10.1111/acem.14249. PMID: 33945187. [Type of publication (Conference abstract)]

237. Wang X, Chen Y, Song J, et al. Efficacy and safety of monoclonal antibody against calcitonin gene-related peptide or its receptor for migraine: a systematic review and network meta-analysis. Front Pharmacol. 2021;12:649143. doi: 10.3389/fphar.2021.649143. PMID: 33867991. [Irrelevant systematic review]

238. Wang YF, Chen YT, Shia BC, et al. PND116 treatment pattern and medication usage for patients with migraine in Taiwan. Value in Health. 2020 December;23 (Supplement 2):S643. PMID: n/a. [Type of publication (Conference abstract)]

239. Wei J, Liang X, Fu G, et al. Guidelines concerning pharmacological intervention for migraine in adults: a systematic review. [Chinese]. Chinese Journal of Evidence-Based Medicine. 2020;20(11):1316-25. PMID: n/a. [Foreign language]

240. Winner P, McAllister P, Chakhava G, et al. Efficacy and safety of eptinezumab initiated during a migraine attack: results from the RELIEF study. Eur J Neurol. 2021 Jun;28:271-. doi: http://dx.doi.org/10.1111/ene.14974. PMID: n/a. [Type of publication (Conference abstract)]

241. Wu B, Rao H, Yang S, et al. Efficacy and safety of the classic Chinese herbal prescription sanpian decoction on migraine: a meta-analysis. Explore (NY). 2020 Sep - Oct;16(5):318-27. doi: 10.1016/j.explore.2020.05.006. PMID: 32505521. [Intervention not of interest]

242. Xu Z, Chen L, Jin S, et al. The efficacy of memantine for the treatment of migraine: a meta-analysis of randomized controlled studies. Clin Neuropharmacol. 2021 May-Jun 01;44(3):94-8. doi: 10.1097/WNF.0000000000000425. PMID: 33961371. [Intervention not of interest]

243. Yan Z, Xue T, Chen S, et al. Different dosage regimens of eptinezumab for the treatment of migraine: a meta-analysis from randomized controlled trials. J Headache Pain. 2021 Mar 6;22(1):10. doi: 10.1186/s10194-021-01220-y. PMID: 33676408. [Irrelevant systematic review]

244. Yang M, Du T, Liang F, et al. The efficacy of acupuncture for treating menstrual migraine: a systematic review. Integrative Medicine Research. 2020;Conference: KIOM-SAR 2020 International Research Conference. South Korea. 9(Supplement 1). PMID: n/a. [Type of publication (Conference abstract)]

245. Yang Y, Sun Y, Gao B, et al. Lasmiditan for acute treatment of migraine in adults: a systematic review and meta-analysis of randomized controlled trials. CNS Drugs. 2020 Oct;34(10):1015-24. doi: 10.1007/s40263-020-00753-1. PMID: 32857291. [Systematic review]

246. Zhang D, Tang X, Jiang W, et al. Clinical study of high-frequency repetitive transcranial magnetic stimulation in treatment of migraine without aura. Chinese J Neuromedicine. 2021;20(7):711-5. doi: 10.3760/cma.j.cn115354-20210409-00234. [Foreign language]

247. Zhang Y, Deng Y, Zhang S, et al. Systematic review and meta-analysis of a variety of chemicals to treat migraine in the neurology department. Annals of Palliative Medicine. 2022 Jan;11(1):98-112. doi: https://dx.doi.org/10.21037/apm-21-3719. PMID: 35144402. [Intervention not of interest]

248. Zhang Z, Shu Y, Diao Y, et al. Calcitonin gene-related peptide receptor antagonist ubrogepant for the treatment of acute migraine: a meta-analysis. Medicine (Baltimore). 2021 Feb 26;100(8):e24741. doi: https://dx.doi.org/10.1097/MD.0000000000024741. PMID: 33663087. [Systematic review]

249. Zhu H, Tang Y, Zhou T, et al. The efficacy of lasmiditan for the treatment of migraine: a meta-analysis of randomized controlled studies. Clin Neuropharmacol. 2020 Nov/Dec;43(6):191-5. doi: 10.1097/WNF.0000000000000417. PMID: 32969971. [Systematic review]

250. Zion Medical Center. Migraine abortive treatment. In: ClinicalTrials.gov. Bethesda, MD: National Library of Medicine (US); 2000- [cited 2021]. https://ClinicalTrials.gov/show/NCT05048914. Identifier: NCT05048914. [Population not of interest]

Appendix I. Appendix References

1. Akbas I, Kocak MB, Kocak AO, et al. Intradermal mesotherapy versus intravenous dexketoprofen for the treatment of migraine headache without aura: a randomized controlled trial. Ann Saudi Med. 2021 May-Jun;41(3):127-34. doi: https://dx.doi.org/10.5144/0256-4947.2021.127. PMID: 34085549.

2. Antal A, Bischoff R, Stephani C, et al. Low intensity, transcranial, alternating current stimulation reduces migraine attack burden in a home application set-up: a double-blinded, Randomized feasibility study. Brain Sci. 2020 Nov 21;10(11):21. doi: 10.3390/brainsci10110888. PMID: 33233400.

3. Arikan C, Yilmaz A, Ozen M, et al. Oral paracetamol versus zolmitriptan to treat acute migraine attack in the emergency department. Signa Vitae. 2021 Sep;17(5):110-6. doi: 10.22514/sv.2021.040.

4. Ashina M, Reuter U, Smith T, et al. Randomized, controlled trial of lasmiditan over four migraine attacks: findings from the CENTURION study. Cephalalgia. 2021 Mar;41(3):294-304. doi: 10.1177/0333102421989232. PMID: 33541117.

5. Buse DC, Rabany L, Lin T, et al. Combining guided intervention of education and relaxation (GIER) with remote electrical neuromodulation (REN) in the acute treatment of migraine. Pain Med. 2022 Feb 11;pnac021. doi: https://dx.doi.org/10.1093/pm/pnac021. PMID: 35148414.

6. Domingues FS, Gayoso MV, Sikandar S, et al. Analgesic efficacy of a portable, disposable, and self-applied transcutaneous electrical nerve stimulation device during migraine attacks: a real-life randomized controlled trial. Pain Pract. 2021 Nov;21(8):850-858. doi: https://dx.doi.org/10.1111/papr.13042. PMID: 34013542.

7. Friedman BW, Irizarry E, Williams A, et al. A randomized, double-dummy, emergency department-based study of greater occipital nerve block with bupivacaine vs intravenous metoclopramide for treatment of migraine. Headache. 2020 Nov;60(10):2380-8. doi: 10.1111/head.13961. PMID: 32981043.

8. Gur STA, Ahiskalioglu EO, Aydin ME, et al. Intravenous lidocaine vs. NSAIDs for migraine attack in the ED: a prospective, randomized, double-blind study. Eur J Clin Pharmacol. 2022 Jan;78(1):27-33. doi: 10.1007/s00228-021-03219-5. PMID: 34528122.

9. Hodgson SE, Harding AM, Bourke EM, et al. A prospective, randomized, double-blind trial of intravenous chlorpromazine versus intravenous prochlorperazine for the treatment of acute migraine in adults presenting to the emergency department. Headache. 2021 Apr;61(4):603-11. doi: https://dx.doi.org/10.1111/head.14091. PMID: 33797074.

10. Hokenek NM, Ozer D, Yilmaz E, et al. Comparison of greater occipital nerve and supra orbital nerve blocks methods in the treatment of acute migraine attack: A randomized double-blind controlled trial. Clin Neurol Neurosurg. 2021 Aug;207:106821. doi: https://dx.doi.org/10.1016/j.clineuro.2021.106821. PMID: 34304069.

11. Kandil M, Jaber S, Desai D, et al. MAGraine: magnesium compared to conventional therapy for treatment of migraines. Am J Emerg Med. 2021 Jan;39:28-33. doi: 10.1016/j.ajem.2020.09.033. PMID: 33041146.

12. Lipton RB, Munjal S, Dodick DW, et al. Acute treatment of migraine with celecoxib oral solution: results of a randomized, placebo-controlled clinical trial. J Pain Res. 2021;14:549-60. doi: https://dx.doi.org/10.2147/JPR.S287571. PMID: 33658842.

13. Lipton RB, Munjal S, Tepper SJ, et al. A multicenter, randomized, double-blind, placebo-controlled study of the efficacy, tolerability, and safety of celecoxib oral solution (ELYXYB) in acute treatment of episodic migraine with or without aura. J Pain Res. 2021;14:2529-42. doi: https://dx.doi.org/10.2147/JPR.S322292. PMID: 34447267.

14. Meek R, Graudins A, McDonald M, et al. Comparing propofol with placebo for early resolution of acute migraine in adult emergency department patients: A double-blind randomised controlled trial. Emerg Med Australas. 2021;33(3):465-72. doi: 10.1111/1742-6723.13659. PMID: 33070469.

15. Motamed H, Mozafari J, Porozan S, et al. Magnesium sulfate and acute migraine: a randomized clinical trial. Ann Clin Anal Med. 2020 Sep;11(5):369-73. doi: 10.4328/Acam.20072.

16. Sakai F, Takeshima T, Homma G, et al. Phase 2 randomized placebo-controlled study of lasmiditan for the acute treatment of migraine in Japanese patients. Headache. 2021 May;61(5):755-65. doi: https://dx.doi.org/10.1111/head.14122. PMID: 33990951.

17. Shah R, Assis F, Narasimhan B, et al. Trans-nasal high-flow dehumidified air in acute migraine headaches: a randomized controlled trial. Cephalalgia. 2021 Aug;41(9):968-78. doi: https://dx.doi.org/10.1177/0333102421997766. PMID: 33631965.

18. Winner PK, McAllister P, Chakhava G, et al. Effects of Intravenous Eptinezumab vs Placebo on Headache Pain and Most Bothersome Symptom When Initiated During a Migraine Attack: A Randomized Clinical Trial. Jama. 2021 Jun 15;325(23):2348-56. doi: https://dx.doi.org/10.1001/jama.2021.7665. PMID: 34128999.

19. McAllister P, Winner PK, Ailani J, et al. Eptinezumab treatment initiated during a migraine attack is associated with meaningful improvement in patient-reported outcome measures: secondary results from the randomized controlled RELIEF study. J Headache Pain. 2022 Feb 07;23(1):22. doi: https://dx.doi.org/10.1186/s10194-021-01376-7. PMID: 35130832.

20. Yuan H, Curran JG, Keith SW, et al. Intravenous ibuprofen for acute treatment of migraine: a double-blind, randomized, placebo-controlled pilot study. Headache. 2021 Oct;61(9):1432-40. doi: 10.1111/head.14214. PMID: 34601736.