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Systematic review: Is Metoclopramide more effective than Sumatriptan in relieving pain from migraine in adults in the Emergency Department (ED) setting?

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ABSTRACT

Migraine headache is a common disorder; patients attending Emergency Departments (ED) for migraine symptoms internationally account for 1–3% of total ED annual attendances.

A systematic review was undertaken of reports comparing the effectiveness of metoclopramide intravenously (IV) with that of sumatriptan subcutaneously (SC), in an ED setting, for the immediate relief of migraine and their measurable effects in relieving pain intensity.

Findings of two identified comparable reports confirm the individual efficacy of the study drugs in pain relief. However, whilst one report concludes that there is no statistical or significant clinical advantage for one drug over the other, the other report suggests that metoclopramide has a distinct advantage.

One study is well structured methodologically, but the other has significant risk of bias.

The analysis of the chosen studies demonstrates the need for rigorous study design and robust reporting requirements to obviate this risk. Further studies are required to explore comparable effect.

Implications for clinical practice from the report outcomes indicate the individual effectiveness of both study drugs in providing pain relief for migraine in the Emergency setting, but not the comparable efficacy of one drug over the other.

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1. Introduction

Migraine headache is a common disease from which, in England, 6.7 million people suffer (Neurological Alliance, 2014). Patients attending Emergency Departments (ED) internationally for migraine symptoms account for 1–3% of total ED attendances a year (Kelly and Holdgate, 2006; Smitherman et al., 2013). In the Global Burden of Disease Survey 2013 (Vos et al., 2015), migraine was ranked as the sixth most prevalent disorder worldwide with years lost to disability.

Migraines are three times more prevalent in females than males (Lipton et al., 2000), and the direct cost to the NHS is more than £1 billion annually (Ridsdale et al., 2007); they are disabling, causing anxiety and depression (Mehta, 2015), and costly in terms of sick days impacting on the economy with overall costs estimated at £5 billion (McCrone et al., 2011).

The pathophysiology of migraine still remains unclear and the management of migraines is quite varied in EDs (Salazar-Zúñiga and Garfias-Arvizu, 2006).

In search of optimal interventions for the management of migraine symptoms in the ED setting, a scoping exercise was conducted into the use of triptans and anti-emetics to identify comparable interventions. Recent evidence reviewing dopamine antagonists such as metoclopramide and serotonin agonists like sumatriptan was examined and considered (Friedman et al., 2005; Talabi et al., 2013).

During the scoping exercise it emerged that there were few recent randomised controlled trials (RCT) or systematic reviews providing comparable studies of these two interventions, and moreover, a significant proportion of studies had methodological flaws, inferring high risk of bias (Cenker, 2014).

A review question was formulated to identify, compare and contrast through an analysis of RCTs, the comparable effectiveness of metoclopramide intravenously (IV) versus sumatriptan subcutaneously (SC), in an ED setting, for the immediate relief of migraine and their comparable and measurable effect on pain intensity.

2. Method

A literature search was performed to reveal RCT trials to compare metoclopramide IV to sumatriptan SC in migraine attack by using keywords metoclopramide, sumatriptan and migraine. Medline

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(PubMed), the Cochrane Database of Systematic Reviews and Google Scholar were reviewed for trials assessing metoclopramide and sumatriptan in migraine attack. Articles in full text and written in English were to be selected. The term 'headaches' was not included as specificity and sensitivity to "migraine" only were required.

Exclusion criteria included those that did not include an RCT, children, those not based in an emergency setting and those that did not include only the two highlighted treatment drugs at the specified dosages, which were determined, at the results stage, through a review of the wider literature.

Selection was also reviewed in relation to similarities in comparable pain score assessment instruments, use of International Headache Society ([The International Classification of Headache Disorders, 2013](#)) criteria for patient selection, clinical exclusion criteria, size of study groups and similarity in statistical analyses of results.

Criteria for analysis of the selected studies included an evaluation of study protocols to reveal potential bias (relating to randomisation, selection, blindness, allocation concealment, intention-to-treat analysis, outcome data and publication); reporting standards; outcomes heterogeneity and implications for clinical practice ([Greenhalgh, 2014](#)). A narrative commentary was undertaken as there were insufficient studies for a meta-analysis.

2.1. Search results

The data base search revealed 243 relevant articles; papers were excluded using the criteria detailed in the Method section. This analysis is detailed below in the PRISMA chart flow diagram ([Moher et al., 2009](#)), Fig. 1.

It was determined at the results stage to include specific treatment dosages of metoclopramide IV 20 mg and sumatriptan SC 6 mg. This was decided because these quantities and routes of administration are seen as appropriate practice standards for the treatment of migraine in the wider literature ([Colman et al., 2004](#); [Corbo et al., 2001](#); [Derry et al., 2012](#)) but evidence is varied and relatively limited.

Eleven papers were fully read to assess suitability and criteria for quality. Eight papers reviewed were excluded due to a comparison of different drugs and dissimilar dosages; one paper was in Spanish and omitted as an English translation was not available.

Two reports ([Friedman et al., 2005](#); [Talabi et al., 2013](#)) were selected for review to address the focussed question as they were the only two RCT studies identified in the search that compare these two drugs only on a similar basis.

Both are reported as RCTs, comparing similar doses and administration of metoclopramide 20 mg IV and sumatriptan 6 mg SC for their effect on migraine headaches in an ED setting with similar primary outcomes.

[Friedman et al. \(2005\)](#) examine 78 adults older than 18 years in two arms; the population is largely female black/Latino in their mid-30s who meet the International Headache Society (IHS) checklist conditions for migraine with or without aura.

[Talabi et al. \(2013\)](#) studied 124 adult Iranian patients in two arms, gender 39% male, presenting with headache, meeting the IHS checklist conditions for migraine with or without aura.

Other similarities of the studies include, pain score assessment instruments, criteria for patient selection, exclusion criteria, and size of study groups and similar analysis of results.

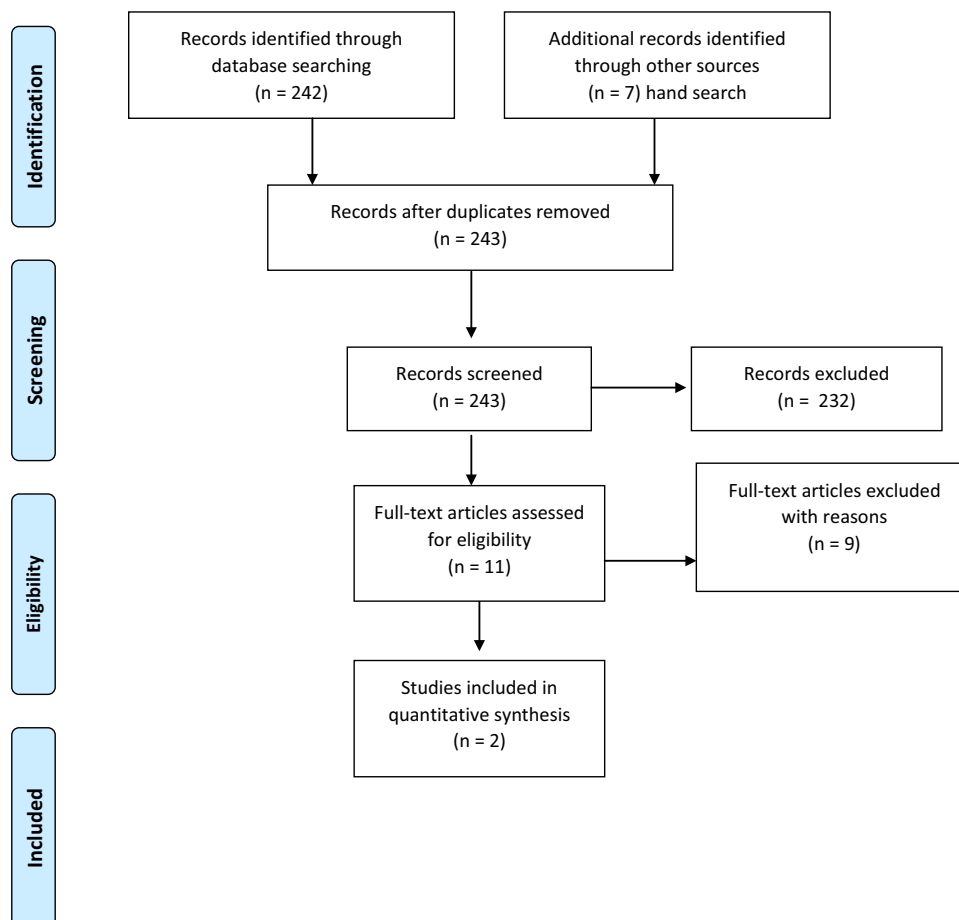


Fig. 1. PRISMA flow diagram ([Moher et al., 2009](#)).

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