In patients with head injury undergoing rapid sequence intubation, does pretreatment with intravenous lignocaine/lidocaine lead to an improved neurological outcome: a review of the literature
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Authors’ objectives
The authors’ apparent objective was to review the literature pertaining to the question: ‘In patients with head injury undergoing rapid sequence intubation (RSI), does pre-treatment with intravenous lignocaine/lidocaine lead to an improved neurological outcome?’.

Searching
MEDLINE (from 1966 to present), EMBASE (from 1988 to present), PubMed and the Cochrane Library were searched. A full search strategy was reported in the methods section of the paper. The searches were limited to papers published in any language describing studies in humans. The bibliographies of the papers obtained were examined for additional references, and advice was sought from experts in the field.

Study selection
Study designs of evaluations included in the review
The authors did not specify any inclusion or exclusion criteria relating to the study design. Prospective randomised controlled trials (RCTs) were included in the review. Observational studies were also included if they contained information directly relevant to the questions posed.

Specific interventions included in the review
Intravenous lignocaine (lidocaine). Studies comparing pre-treatment with intravenous lignocaine (lidocaine) with no pre-treatment were included in the review.

Participants included in the review
Patients suffering a major head injury and undergoing RSI were included in the review.

Outcomes assessed in the review
The authors did not define any specific outcome measures to be included in the review, referring only to ‘neurological outcome’.

How were decisions on the relevance of primary studies made?
The title and abstract (if available) were read and if relevant, or considered potentially relevant, the full paper was obtained and appraised.

The authors do not state how many of the reviewers performed the selection.

Assessment of study quality
The included prospective randomised controlled trials were appraised according to the following criteria:

- whether the patients were randomly assigned to the treatment and whether the randomisation was concealed;
- whether all the patients who entered the trial were accounted for at its conclusion;
- whether the patients were analysed in the groups to which they were randomised;
- whether the patients and clinicians were blinded to which treatment was being received;
aside from the experimental treatment, whether the groups were treated equally; and
whether the groups were similar at the start of the trial.

The authors do not state how the appraisal was conducted.

The authors did not report any assessment of the methodological quality of the observational studies.

Data extraction
The authors do not state how the data were extracted for the review, or how many of the reviewers performed the data extraction.

Methods of synthesis
How were the studies combined?
The individual papers were summarised in a narrative form, and how close the papers came to answering the review question was illustrated graphically.

How were differences between studies investigated?
The authors do not state a method for assessing any differences between the studies.

Results of the review
Six studies with a total of 98 participants were included in the review: 5 RCTs (89 participants) and one crossover cohort study (9 patients).

In order to answer the review question, the patient population would be those patients presenting to the emergency department with acute brain injury (less than 12 hours from the time of injury), requiring RSI as a component of their emergency management. No such study was identified. The closest reported group were comatose patients suffering from closed traumatic head injury ventilated on intensive care units, already intubated.

Furthermore, no study dealt with RSI; some described elective anaesthesia and intubation, while others evaluated the effect of lignocaine (lidocaine) administered intravenously prior to endotracheal suctioning.

The ideal outcome would be neurological status at discharge or later. No paper reported this outcome and the surrogate marker of intracranial pressure change was used.

Authors’ conclusions
The literature search did not reveal any papers that answered the review question directly. The authors stated 'it is our belief that no such study, at present, exists in the literature'.

There was no evidence to suggest that, in acute traumatic head injury, pre-treatment with intravenous lignocaine (lidocaine) before RSI reduces intracranial pressure or improves the neurological outcome. The evidence for such an effect and the benefit of pre-treatment came from 42 fully premedicated patients who were undergoing elective neurosurgery with elective anaesthesia, not RSI, for tumour resection. The evidence obtained from studies looking at the intracranial pressure rise associated with endotracheal suctioning did not contribute to answering the question as it was not applicable to the patient population. The administration of intravenous lignocaine (lidocaine) as a pre-treatment for patients with acute head injury undergoing RSI should only occur in clinical trials.

CRD commentary
The research question to be addressed by the review was clearly expressed in terms of the patient population, treatment and outcome. However, detailed inclusion and exclusion criteria for the primary studies were not defined. The literature search was of reasonable quality, no language restrictions were applied, and attempts appear to have been made to
identify unpublished research. The authors acknowledged that some potentially important papers may have been missed by not handsearching all possibly relevant journals, but it was not possible to do this. Experts in this area were unable to identify any significant papers that were not evaluated.

The methodological quality of the included RCTs was assessed. However, no published validity assessment tool was used and the results were poorly described. A limited description of the included studies was given in the text of the review, and from this it was apparent that the study populations and designs varied considerably. No study directly addressed the review question.

The authors’ conclusions regarding the lack of evidence to justify pre-treatment with lignocaine (lidocaine) in the specified population appear valid.

**Implications of the review for practice and research**

**Practice:** The authors state that there is currently no evidence to support the use of intravenous lignocaine (lidocaine) as a pre-treatment for RSI patients with head injury, and its use should only occur in clinical trials.

**Research:** The authors did not state any implications for further research.

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