The risk of a bleed after delayed head injury presentation to the ED: systematic review protocol.

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The protocol was designed in accordance with PRSIMA guidelines [1].

Contributors:

CM had the idea for the systematic review. CM and CSM developed the protocol, and will undertake the electronic search, data extraction, quality assessment and data synthesis. WT has a supervisory role.

Support:

CM is an academic clinical fellow in emergency medicine and therefore indirectly receives funding from the National Institute of Health Research. There are no other sources of support or funding for this systematic review.
Introduction

Head injuries represent a very common reason for attendance to Emergency Departments (ED) – in England and Wales an estimated 1.4 million such attendances occur a year[2]. Ninety-five percent of these attendances are patients with minor/mild head injuries, as defined by a Glasgow Coma Scale (GCS) score of 13, 14 or 15 [2] [3]. Research has been directed at differentiation of patients with minor/mild head injury into those who are sufficiently low risk to be discharged on the basis of clinical history and examination alone and those who require a Computed Tomography (CT) scan of the head to rule out serious intra-cranial pathology. In the UK, National Institute for Health and Clinical Excellence (NICE) guidelines are used to facilitate this risk assessment, which are based upon the Canadian CT head rules (CCHR) [4]. The CCHR was derived in a population of patients presenting within 24 hours. Both the NICE guidelines and CCHR have only been validated in populations of patients presenting within 24 hours [2] [5-10].

Not all patients present to the ED immediately after sustaining a head injury with some presenting after 24 hours [11]. There is some evidence that patients with a minor head injury and intra-cranial haemorrhage will deteriorate within 24 hours [12][13]. Therefore, patients who present after 24 hours may be a distinct and more benign sub-population. Application of current guidelines may risk over-investigating this group.

However, there are case reports of patients with delayed onset intra-cranial haemorrhage following a head injury [14] [15]. This pathology can occur many
days after the initial injury as can clinical deterioration. Also, patients who re presenta the ED after a head injury are an established high risk group [16].

Time of presentation to the ED following a head injury could affect the likelihood of intra-cranial pathology. This has implications to the risk assessment of patients who present in a delayed manner, especially as guidelines which aid this have only been validated in patients that present within 24 hours.

This systematic review aims to assess whether delay in presentation following a head injury affects the likelihood of intra-cranial pathology. The relevant population is patients presenting the ED following a head injury. The intervention is delay in presentation. The comparator is of patients presenting acutely. Outcome measures are of traumatic findings on CT scan, death and neurosurgery.

**Methods:**

Eligibility:

The nature of this systematic review question precludes the inclusion of RCTs and therefore lower level evidence will be evaluated. Preliminary review of of the literature also indicates that there are likely to be few studies of poor quality. Therefore the following inclusion and exclusion criteria will be applied. Studies must be conducted in populations of patients presenting in a delayed manner to the ED following a head injury. No specific time as to what constitutes a delay will be applied but included studies must specifically evaluate a population of patients who have presented after a defined time delay. Included studies must
measure an outcome of traumatic intra-cranial pathology as identified by CT scan. Any study design, apart from single cases studies, will be included.

Information Sources:
NICE [1], SIGN [17] and NSW [18] head injury guidelines and bibliographies will reviewed for any relevant studies. MEDLINE and EMBASE will be searched with the electronic search strategy present in the appendix. Bibliography searches of articles identified through the electronic search strategy will also be undertaken.

Data handling and extraction:
Electronic searches will be saved on OVID online and transferred to the electronic storage facility of endnote. Studies identified by additional sources will be uploaded to end note. Studies will be considered for inclusion through a title and abstract review of papers identified from the electronic searches and by review of bibliographies by two independent reviewers (CM and CMS). Potential papers will be assessed against the pre-defined inclusion criteria. The full-texts of potentially relevant studies will be obtained and reviewed for final inclusion. Disagreement will be resolved by discussion or referral to WT. Data extraction will include the nature of the population being studied, notably the time of delay in presentation, type of study, outcome measures and results. The primary outcome being assessed is any traumatic intra-cranial pathology as identified by CT. Secondary outcomes of death and need for neurosurgery will also be extracted. As the types of studies included may vary a descriptive quality assessment, including for risks of bias, will be undertaken at the data extraction
stage. As cohort studies are anticipated to be identified this quality assessment will be informed by the Ottawa-Newcastle Scale [19].

Data Synthesis and Meta-analysis:

As few studies of variable methodology and quality are anticipated to be identified only a narrative data synthesis is planned. Meta-analysis of studies identified is also thought not to be possible and therefore is also not planned.

References:


### Appendix: Database Search Strategy

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