Treatment of carbon monoxide poisoning: a critical review of human outcome studies comparing normobaric oxygen with hyperbaric oxygen

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Authors' objectives
To assess the relative efficacy of hyperbaric oxygen (HBO) and normobaric oxygen (NBO) in the treatment of carbon monoxide poisoning.

Searching
MEDLINE and government databases (e.g. the Defense Technical Information Centre, the National Technical Information Service, and the Undersea and Hyperbaric Medical Society database) were searched using the terms 'carbon monoxide', 'carbon monoxide poisoning', 'delayed neurologic sequelae', 'hyperbaric oxygen', 'normobaric oxygen' and 'hyperbaric therapy'. Bibliographies of retrieved articles were examined for additional material.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs), prospective non-randomised studies and studies using historic controls.

Specific interventions included in the review
HBO and NBO.

Participants included in the review
Adults and children with mild to moderate or severe carbon monoxide poisoning (n=884).

Outcomes assessed in the review
Neuropsychiatric sequelae were assessed.

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the authors performed the selection.

Assessment of study quality
The authors do not report the criteria used to assess validity, or how the validity assessment was performed.

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

Methods of synthesis
How were the studies combined?
Studies were combined by a narrative review, where the results of each study are discussed. The authors compared patient groups based on age, duration of exposure, depth of coma, carboxyhaemoglobin level and blood-pressure. Limited information about the individual studies is presented in tabular format.

How were differences between studies investigated?
Each study was discussed in terms of its strengths and weaknesses.
Results of the review

Six studies in total: 2 RCTs, 2 prospective non-randomised trials and 2 retrospective studies.

The 2 RCTs reported more neuropsychiatric sequelae with NBO treatment than with HBO treatment: 34 versus 32% and 38 versus 0%. The 2 prospective non-randomised studies reported similar findings, as did 1 of the retrospective studies. The other retrospective study reported less neuropsychiatric sequelae with HBO treatment than with NBO treatment: 0 versus 4%.

In 2 studies, the efficacy of single- and multiple-HBO treatment was examined. One study found that the frequency of delayed neuropsychological sequelae at a 1-month follow-up was significantly less in patients who received at least 22 treatments, than in those who received only one. In the other study, no significant difference was found in the incidence of delayed sequelae between patients receiving multiple or single doses. However, the patients in each of the studies differed.

Authors’ conclusions

The results of past scientific enquiry provide some support for HBO therapy in the treatment of a wide range of carbon monoxide poisonings. No randomised controlled, blinded clinical trial demonstrated a clear advantage of HBO treatment over NBO treatment in reducing morbidity and mortality in carbon monoxide poisoning.

CRD commentary

No information is presented on how the review was carried out, including the methodological criteria used and the search dates employed. The studies are not grouped according to their study designs, but each individual study is discussed along with its strengths and weaknesses.

Bibliographic details


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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.