Interfacility transport of patients with decompression illness: literature review and consensus statement


CRD summary
This review concluded that there is little evidence about air transportation of people with suspected decompression illness. It recommends that the altitude of air transport should, where possible, not exceed 500 feet (152 metres) above the departure level. Despite limitations in the reporting of review methods, the authors' conclusion appears reasonable given the very limited evidence available.

Authors' objectives
To evaluate interfacility air medical transport for patients with suspected decompression illness (DCI).

Searching
MEDLINE and EMBASE were searched from inception to 2004 using the reported search terms. In addition, eight specified institutions with expertise in diving medicine were contacted and the reference lists of retrieved reports and relevant reviews were screened. No language restrictions were applied.

Study selection
Study designs of evaluations included in the review
Clinical trials, case series, case reports, consensus statements and expert opinion papers were eligible for inclusion in the review.

Specific interventions included in the review
Studies that evaluated interfacility air medical transport were eligible for inclusion. Where stated, the included studies assessed air transport flying at levels under 1,000 feet above ground level.

Participants included in the review
Studies of patients with suspected DCI were eligible for inclusion in the review.

Outcomes assessed in the review
Inclusion criteria were not specified in terms of the outcomes. The review assessed complications due to air transport.

How were decisions on the relevance of primary studies made?
One reviewer identified all relevant material and two reviewers independently selected the studies.

Assessment of study quality
The authors did not state that they assessed validity. However, the included studies were graded using the hierarchy of study design described by the Oxford Centre for Evidence-Based Medicine. See Web Address at end of abstract (accessed 0/04/2008).

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction. Complications and symptoms due to air transport were extracted, along with details of plane altitudes.

Methods of synthesis
How were the studies combined?
The studies were combined in a narrative. The results from each case series were described in the text and additional descriptive information was tabulated.

How were differences between studies investigated?
Some differences between the studies were noted in the tables.

**Results of the review**
Two retrospective case series (n=9) and seven citations (either letters in peer-reviewed journals or opinions of organisations) were identified.

**Case series.**
One case series (n=6) reported that DCI symptoms worsened in 4 patients when the altitude of the helicopter rose above 700 to 1,000 feet above ground level, but were resolved at 500 feet above ground level. No symptoms were noted in the other 2 patients when the helicopter stayed below 500 feet above ground level.

The other case series (3 patients who experienced symptoms on a commercial flight after hypobaric high-altitude military training) reported no complications in any of the 3 patients when the helicopter stayed below 1,000 feet above ground level.

**Expert opinion.**
None of the expert opinions cited clinical trials or prospective cohort studies. Expert opinions recommended a maximum altitude of 500 to 1,000 feet but did not specify whether this was above sea level or ground level.

**Authors' conclusions**
There was a dearth of studies and evidence-based recommendations for the air transportation of people with suspected DCI. Transport that allowed the minimum total transport time should be selected. Where air transport is used, the altitude should not exceed 500 feet (152 metres) above the departure level.

**CRD commentary**
The review question was broadly defined, but justifiably so in view of the type of intervention under investigation. Several relevant sources were searched and attempts were made to minimise language and publication bias. Methods were used to minimise reviewer error and bias when selecting the studies, but it was unclear whether similar steps were taken when extracting the data. The authors did not assess the validity of the two clinical studies but instead used an evidence grading system to assess the strength of the evidence.

In view of the paucity of data, a narrative synthesis limited to the reporting of study findings seemed appropriate. There was, as the authors stated, very little evidence but it is likely that this represented all the existing evidence on this topic. Despite limitations in the reporting of review methods, the authors' conclusion appears reasonable in view of the very limited evidence.

**Implications of the review for practice and research**
Practice: The authors provided an algorithm for managing patients with DCI. The algorithm recommended: the use of ground transport unless air transport to an adequate facility is more rapid; and the use of an air transport altitude of not more than 500 feet (152 metres) above the departure level, with a maximum 1,000 feet altitude if flying conditions or terrain require this. The algorithm assumed that air medical crews can carry out advanced life support and that all means of transport provide high-concentration supplemental oxygen.

Research: The authors stated that research is needed to validate the management recommended in the algorithm and to identify those variables associated with transport that influence outcomes in patients with DCI.
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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.