Meta-analysis: the dialysis mode and immunological response to hepatitis B virus vaccine in dialysis population

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CRD summary
This review evaluated the immune response to hepatitis B vaccine in patients on haemodialysis compared with peritoneal dialysis. The authors concluded that there was no significant association between immune response and mode of dialysis. The lack of a quality assessment of the included studies and the reliance upon largely observational studies mean that the authors’ conclusions may not be reliable.

Authors' objectives
To evaluate the immune response to hepatitis B (HB) vaccine in patients on haemodialysis (HD) compared with peritoneal dialysis (PD).

Searching
MEDLINE, Current Contents and selected specialist journals were searched from 1980 to December 2005; the keywords were reported. Reference lists from qualitative reviews and published clinical trials were screened. No language restrictions were applied to the search. Only studies that were published in full were included.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) and observational studies were eligible for inclusion.

Specific interventions included in the review
Studies that evaluated primary vaccination with plasma-derived or recombinant DNA HB vaccine were eligible for inclusion. The vaccine could be given according to any dose schedule or any route of administration. Studies that only evaluated booster doses of vaccine, or used HB vaccine plus adjuvant administration, were excluded. Details of the various different vaccination schedules used in the included studies were reported.

Participants included in the review
Studies in which patients on HD were compared with patients on PD were eligible for inclusion. Studies of patients with positive serology for hepatitis B surface antigen (HBsAg), antibodies to HBsAg or the human immunodeficiency virus (HIV), and patients who had been previously vaccinated or had received a renal transplant were excluded. In all of the included studies patients received regular maintenance dialysis and all of the PD patients received continuous ambulatory PD. The mean age of the patients in the included studies ranged from 12.2 to 65 years, the mean duration of dialysis (where reported) ranged from 9 to 91 months, and the rates of diabetes mellitus ranged from 0 to 29% (based on 6 studies). Three studies involved children (mean age less than 18 years).

Outcomes assessed in the review
Studies that reported the immune response to the HB vaccine were eligible for inclusion. The studies had to either report the relative risk (RR) of vaccine response (seroprotection) with a measure of variance or sufficient data to enable its calculation; studies that reported inadequate data were excluded. Seroprotection was defined as an anti-HB antibody level above 10 IU/mL.

How were decisions on the relevance of primary studies made?
The reporting of inter-reviewer concordance levels for study inclusion implied that more than one reviewer independently selected studies.
Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
Two reviewers independently extracted the data and resolved any disagreements through consensus. For each study, the number of patients with seroprotection was extracted for each treatment group and RRs with 95% confidence intervals (CIs) were calculated. Data from patients who did not complete the vaccination schedule were excluded from the analysis.

Methods of synthesis
How were the studies combined?
A pooled RR with 95% CI was calculated using a random-effects model (DerSimonian and Laird). A value of 0.5 was added to cells with zero events. The possibility of publication bias was explored using a funnel plot.

How were differences between studies investigated?
Statistical heterogeneity was assessed using the chi-squared test. Subgroup analyses were used to examine the effects of studies in which the primary outcome was seroprevention, studies based on recombinant HB vaccine, studies of adults only and studies set in the developed world.

Results of the review
Fourteen studies (n=1,211) were included: 10 cohort studies and 4 prospective controlled trials (n=248).

The meta-analysis showed no significant difference in seroprevention for HD patients compared with PD patients (RR 1.0, 95% CI: 0.92, 1.13). No significant heterogeneity was found (p=0.13).

The authors reported that the funnel plot was symmetrical and showed no evidence of publication bias.

The results were similar for the four subgroup analyses, with no subgroup analysis showing a significant difference in seroprevention between patient groups.

Authors' conclusions
There was no significant association between immune response and the mode of dialysis.

CRD commentary
The review addressed a clear question that was defined in terms of the participants, intervention, outcomes and study design. Several relevant sources were searched, but a small number of search terms were used and full details of the journals searched were not reported; this makes it difficult to assess the adequacy of the search. No attempts to locate unpublished studies were reported, although appropriate methods were used to assess publication bias and no evidence of it was found. Methods were used to minimise reviewer errors and bias in the study selection and data extraction processes. Study validity was not assessed, thus the results from these studies and any synthesis may not be reliable.

Data from studies of different designs (cohorts and prospective controlled trials) were combined in a meta-analysis, statistical heterogeneity was assessed, and subgroup analyses were conducted. However, study quality (including study design) was not taken into account in the analysis or conclusions. The lack of a validity assessment of the included studies and the reliance upon largely cohort studies mean that the authors' conclusions may not be reliable.

Implications of the review for practice and research
Practice: The authors stated that patients receiving PD should receive the same vaccination schedule as chronic HD patients.
Research: The authors did not state any implications for further research.

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