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Commentary

Haemodiafiltration, haemofiltration and haemodialysis for end-stage kidney disease

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What is this review about?

This review compared different types of dialysis in people with end-stage kidney disease (ESKD). The review compared convective dialysis modalities (haemofiltration (HF), haemodiafiltration (HDF) and acetate-free biofiltration (AFB)) with diffusive (haemodialysis (HD)) modalities and measured effects on clinical outcomes (mortality, major cardiovascular events, hospitalisation and treatment-related adverse events)

What are the findings?

Convective dialysis had no significant effect on all-cause mortality (11 studies, RR 0.87, 95% CI 0.72 to 1.05), but reduced cardiovascular mortality by 25% (6 studies, RR 0.75, 95% CI 0.61 to 0.92) (Fig. 1). Nonfatal cardiovascular events and hospitalizations did not differ significantly but were reported in fewer studies. Adverse events were not systematically evaluated in most studies, and data for health-related quality of life were sparse.

Results were very heterogeneous for treatment-related surrogate outcomes. Convective therapies significantly reduced predialysis levels of B2 microglobulin (MD −5.55 mg/dL, 95% CI −9.11 to −1.98) and increased dialysis dose (Kt/V urea) (MD 0.07, 95% CI −0.00 to 0.14) compared with diffusive therapy. When the analysis was limited to studies comparing HDF with HD, the results were very similar.

What are the findings based on?

Thirty five studies (4039 participants) compared HF, HDF or AFB with HD, three studies (54 participants) compared AFB with HDF and three studies (129 participants) compared HDF with HF.

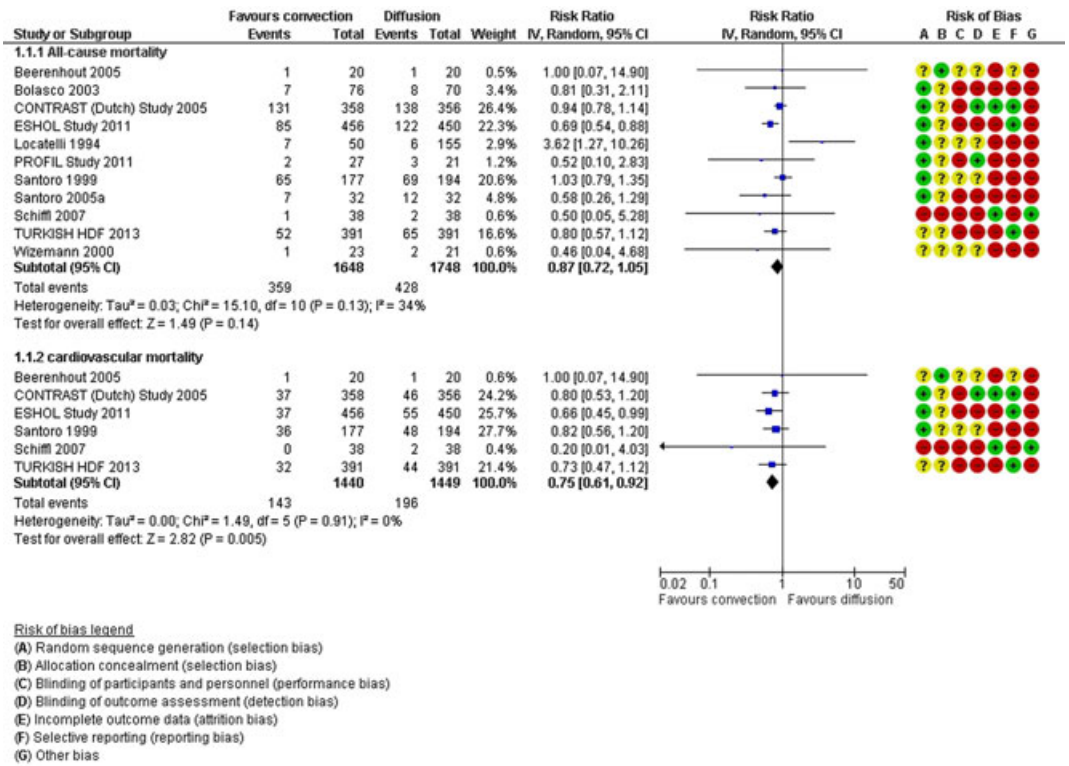

Fig. 1 Effects of haemofiltration, haemodiafiltration (HDF) or acetate-free biofiltration versus haemodialysis on all-cause mortality and cardiovascular mortality.

Of the 22 studies evaluating HDF, all but three reported convection methods using fluid generated on-line (on-line HDF). In the HD control group, high-flux membranes, low-flux membranes or both membranes were used. Convection strategies were highly heterogeneous and no study randomized participants to specific targeted convection volumes. In 16 (46%) studies, adequate vascular access for high-volume dialysis was required. Most studies included patients who were anuric or had minimal kidney function. Follow-up duration ranged between 2 and 24 months (median 6 months). Sample sizes varied between 5 and 906 (median, 24) participants.

Risks of bias in all studies were generally high resulting in low confidence in estimated treatment effects (Fig. 1). Considering selection bias, randomization sequence generation and allocation concealment were adequately reported in 11 and one trial, respectively. A key risk of bias present was incomplete outcome data or loss of patients to follow-up, which occurred in all but five studies. This bias is problematic when outcome data were missing for 10% or greater of participants, or when loss to follow-up was differential across trial arms. Of the three largest studies contributing to the meta-analyses, ESHOL Study 2011 did not include 39% of randomized patients in their analyses, and in the TURKISH HDF 2013, 21% of participants left the study for reasons other than death including 10% of the participants allocated to HDF due to vascular access problems. Twenty-three studies were at high risk of incomplete follow-up. All but four studies were at high risk of other sources of bias including commercial sponsor on authorship, data management, or both.

Implications for practice

- Overall, convective therapy does not reduce the risk of all-cause mortality but may reduce the cardiovascular mortality and hypotension during dialysis.
- Convective therapy had uncertain effects on rates of nonfatal cardiovascular events and hospitalization.
- Adverse events were not systematically evaluated in most studies.
- Serious limitations in study methodology markedly reduced our confidence in any treatment benefits of convective therapy.

Clinical perspective

This review provides little support for the routine use of convective dialysis, with evidence suggesting limited or very limited confidence in estimated benefits of convective dialysis therapies. Data for AFB are particularly sparse and are probably less relevant to global practice, as the uptake and use of AFB are geographically limited mainly to Italy. Convective dialysis may reduce cardiovascular events or rates of hypotension during dialysis but effects on mortality, nonfatal cardiovascular events and hospitalization are inconclusive. Until there are additional robust studies, widespread uptake of convective therapies including HDF is not warranted, and targeting higher convection volumes to improve outcomes is not supported by high-quality evidence.

Nistor I, Palmer SC, Craig JC, Saglimbene V, Vecchio M, Covic A, Strippoli GFM. Haemodiafiltration, haemofiltration and haemodialysis for end-stage kidney disease. *Cochrane Database of Systematic Reviews* 2015, Issue 5. Art. No.: CD006258. DOI: 10.1002/14651858.CD006258.pub2.