

COCHRANE COMMENTARIES

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High-flux versus low-flux haemodialysis membranes for end-stage kidney disease

What is this review about?

This systematic review summarised the randomised trials providing data for the effects of high-flux compared with low-flux haemodialysis on patient outcomes (mortality, hospitalisation, carpal tunnel syndrome or amyloid-related arthropathy and adverse events).

What are the findings?

High-flux haemodialysis had little or no effect on all-cause mortality (10 trials, 2915 participants; relative risk 0.95, 95% confidence interval, 0.87 to 1.04) or death due to infection (3 trials, 2547 participants; RR, 0.90, 95% CI 0.71 to 1.14) (Fig. 1). There was evidence that high-flux haemodialysis reduced cardiovascular mortality (5 trials, 2612 participants; RR, 0.83, 95% CI, 0.70 to 0.99). On average, treating 100 patients with high-flux haemodialysis for 2 years did not prevent death overall but may prevent 3 cardiovascular-related deaths (95% CI, 0 to 6). Information was scant for quality of life, hospitalisation, and complications of accumulating beta-2-microglobulin including carpal tunnel syndrome and arthropathy, and adverse events. Planned analyses to investigate how differences in patient characteristics, dialysis delivery, or study design affected results were not possible due to the small number of studies contributing data.

What are the findings based on?

This was a systematic review of randomised controlled trials. Thirty-three trials (3820 patients) compared high-flux with low-flux haemodialysis membranes. Sixteen studies (3221 patients) presented data that could be included in summary meta-analyses. Trial sample sizes were highly variable (12 to 1846 patients) and trials were generally of short duration (follow-up varied between one month and six years; median 3 months). High-flux membranes consisted of polysulfone, polyacrylonitrile, polyamide, or polymethylmethacrylate, as well as high-flux cellulose or cuprammonium. Low-flux membranes were cuprophane, cellulose or, more recently, polysulfone. Seven studies reported reuse of dialysis membranes and 10 studies permitted single use of dialysis membranes only. The average age of patients ranged between 50 and 65 years. One large trial enrolled patients within 2

months of starting haemodialysis whereas the remainder included patients if they had been on haemodialysis for at least three months. The methodological quality of several aspects of trial design was frequently suboptimal or not clearly reported. For instance, less than one-quarter of studies did not adequately describe treatment allocation concealment, blinding of participants or investigators, blinding of outcome assessment or unselected reporting of important outcomes. Such limitations in study quality may have had unpredictable effects on our summary estimates of high flux dialysis efficacy.

Implications for practice

- Compared to low-flux haemodialysis, high-flux haemodialysis has little or no effect on total mortality but lowers risk of cardiovascular death
- Any effects of dialysis flux on quality of life, hospitalisation, adverse events and skeletal problems related to amyloid accumulation are imprecise, because data for these outcomes were limited
- Whether other differences in dialysis delivery might change the effects of membrane flux is unclear on current evidence. Similarly, whether the effects of high-flux differed between different patient subgroups (for example, individuals with diabetes) could not be investigated with current trial data

Clinical perspective

Current trial data support the use of high-flux membranes in patients treated with haemodialysis, which may reduce cardiovascular mortality. However, membrane flux has little or no effect on total mortality and available trial data are inconclusive for the effects of membrane flux on adverse events related to treatment. According to the Australia and New Zealand Dialysis and Transplant Registry (ANZDATA), approximately 96% of patients in Australia and 72% of patients in New Zealand receiving haemodialysis were treated using high flux membranes in December 2010. Given that most patients on dialysis now receive dialysis using high-flux membranes, additional trials in this area are unlikely.

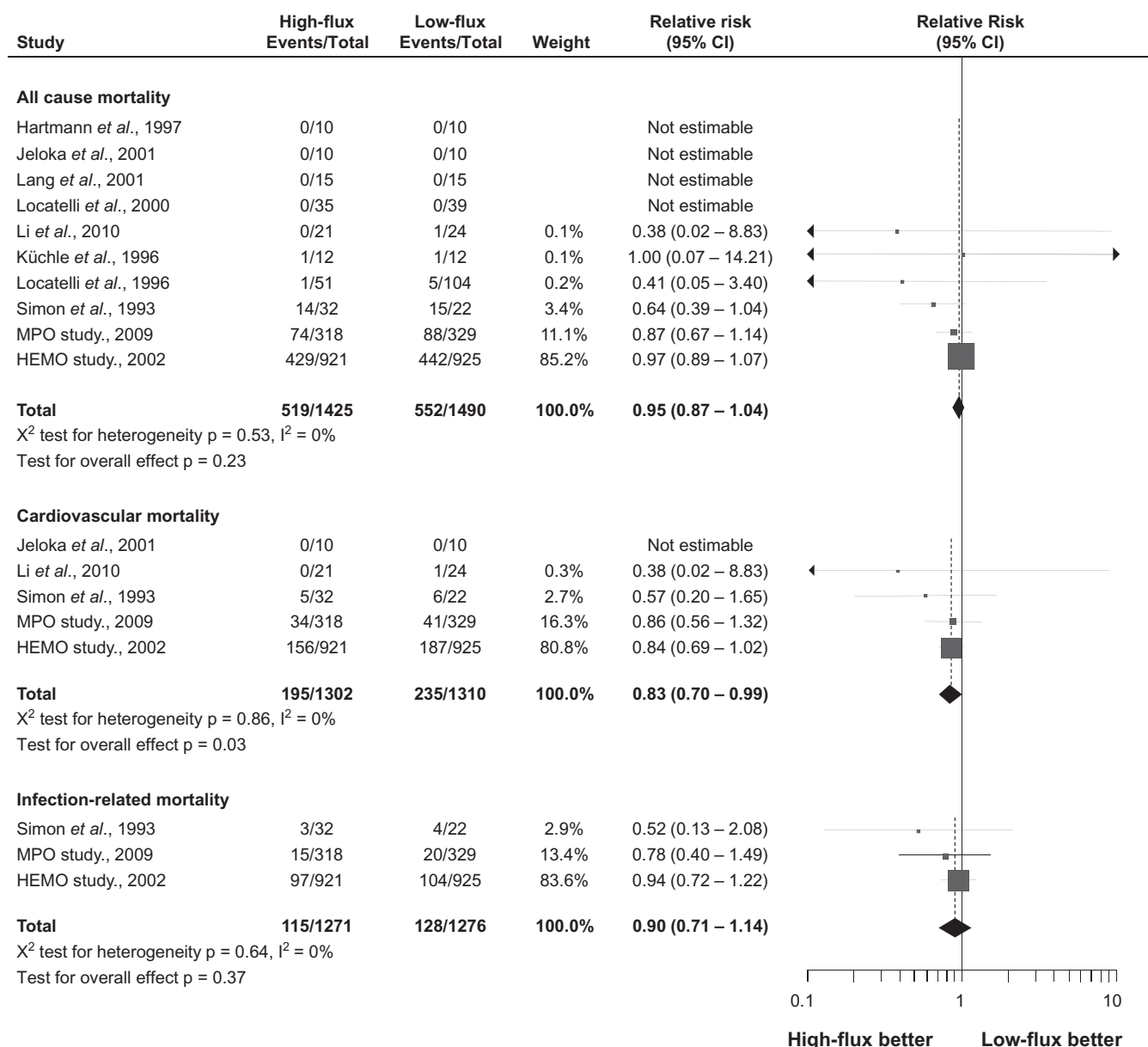


Fig. 1 Effect of high-flux versus low-flux haemodialysis membranes on total and cause-specific mortality.

Citation

Palmer SC, Rabindranath KS, Craig JC, Roderick PJ, Locatelli F, Strippoli GFM. High-flux versus low flux membranes for end-stage kidney disease. *Cochrane Database of Systematic Reviews* 2012 Sep 12; 9: CD005016: doi: 10.1002/14651858.CD005016.pub2

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