

Kraus MA, Kansal S, Copland M, Komenda P, Weinhandl ED, Bakris GL, Chan CT, Fluck RJ, Burkart JM. Intensive Hemodialysis and Potential Risks with Increasing Treatment. *American Journal of Kidney Diseases*, Volume 68, Issue 5, S51 - S58.

A question of balance: Risks vs. benefits of intensive hemodialysis

Although intensive hemodialysis may address important clinical problems, increasing treatment may introduce risks pertaining to six domains: vascular access complications, infection, mortality, loss of residual renal function, solute balance, and patient and care partner burden.

Topics discussed in this summary include:

- Vascular access
- Residual kidney function
- Solute balance
- Infection
- Mortality
- Burden of therapy

Trials have shown increased access complications and infection

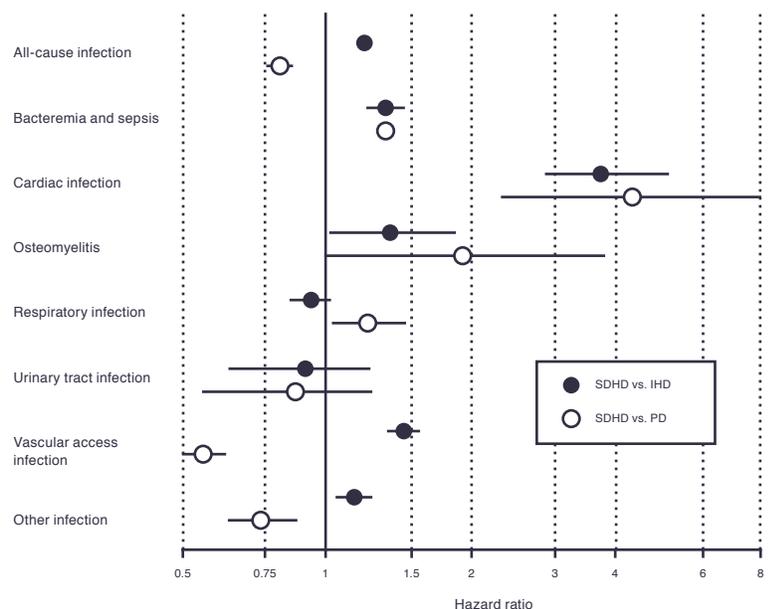
- In the Frequent Hemodialysis Network (FHN) trials, short daily and nocturnal schedules increased incidence of access complications, most commonly due to infection, although incidence of access loss was not statistically elevated.¹
- Observational studies regarding vascular access complications are mixed.^{2,3}
- Excess risk may be catalyzed by poor infection control practices in the home setting, where intensive hemodialysis is typically delivered, but with an assumption of fixed probability of bacterial contamination per cannulation, greater treatment frequency necessarily increases risk of infectious complications.^{4,5}

Data regarding mortality are equivocal

- With extended follow-up of subjects in the FHN trials, short daily hemodialysis was associated with lower risk of death, relative to conventional hemodialysis, while nocturnal hemodialysis was associated with higher risk.⁷ However, the FHN trials were never powered to assess mortality and suffer from significant limitations, including substantial crossover in treatment schedules after 12 months of follow-up.^{5,6,7}
- In many—but not all—observational studies, short daily hemodialysis has been associated with lower risk than both in-center hemodialysis and peritoneal dialysis; however, observational studies are subject to unmeasured confounding.^{8,9}

CHAPTER 6, FIGURE 1:⁵

Relative hazards of cause-specific infection-related hospitalization for short daily hemodialysis versus conventional in-center hemodialysis⁴ and versus peritoneal dialysis.¹² Abbreviations: IHD, in-center hemodialysis; PD, peritoneal dialysis; SDHD, short daily hemodialysis.



Increased treatment may increase loss of residual renal function and burden on caregivers and may deplete solutes

- Intensive hemodialysis has been reported to accelerate the loss of residual renal function in incident dialysis patients with substantial urine output, relative to conventional hemodialysis, and may deplete solutes (e.g., phosphorus), to the extent that supplementation is necessary.^{10,11,12}
- Intensive hemodialysis may increase burden on caregivers, possibly leading to technique failure.¹³

Conclusion

Ultimately, intensive hemodialysis is not a panacea for kidney failure. In spite of the benefits of intensive hemodialysis on cardiovascular function, health-related quality of life, and treatment tolerability, intensive hemodialysis appears to introduce specific risks pertaining to vascular access complications, infections, loss of residual renal function, and increased burden on caregivers. As much as enthusiasm for the clinical effects of intensive hemodialysis may be warranted, patients and clinicians must consider the potential disadvantages of dialyzing more frequently and consider both the potential benefits and risks of treatment and prepare for possible adverse effects.

All forms of hemodialysis, including treatments performed in-center and at home, involve some risks. In addition, there are certain risks unique to treatment in the home environment. Patients differ and not everyone will experience the reported benefits of more frequent hemodialysis.

Certain risks associated with hemodialysis treatment are increased when performing nocturnal therapy due to the length of treatment time and because therapy is performed while the patient and care partner are sleeping.

About this review

This summary is from a six-part series on intensive hemodialysis, covering the impact of intensive hemodialysis on cardiovascular disease, hypertension, mineral and bone disease, health-related quality of life, treatment tolerability, and potential risks. It was originally published as a supplement in the November 2016 issue of the *American Journal of Kidney Disease*.

For details, methodology, and full references for this summary—as well as the other topics in the series—visit AdvancingDialysis.org.

AdvancingDialysis.org is dedicated to providing clinicians and patients with better access to and more awareness of the reported clinical benefits and improved quality of life made possible with home dialysis, including more frequent, more intensive, and nocturnal therapy schedules.

AdvancingDialysis.org is a project of NxStage Medical, Inc.

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