



Lecture Code : DS02-S3

Session Name : Dialysis Specialist Physician Course 2

Session Topic : Dialysis Specialist Physician Course 2

Date & Time, Place : June 14 (Sun) / 10:40-12:40 / Room 3 (GBR 103), 1F

Green Dialysis: Reducing Waste and Water Consumption

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Dialysis is a life-sustaining therapy, but it is also one of the most resource-intensive forms of chronic medical care. Conventional hemodialysis requires large volumes of water, substantial electricity, repeated patient transportation, and continuous use of disposable plastic and pharmaceutical products. Recent green nephrology literature emphasizes that in-center hemodialysis can generate a major annual carbon footprint, with electricity, transport, water treatment, dialysis consumables, and supply chains serving as key contributors. The challenge is therefore not whether dialysis should be delivered, but how it can be delivered with less environmental harm while maintaining patient safety and treatment quality. Green dialysis represents a practical and ethical approach to reducing the environmental burden of kidney replacement therapy. One of the most important targets is reverse osmosis reject water, because a typical dialysis water system may discard a substantial proportion of incoming water before dialysate production. Potential solutions include recovery and repurposing of reject water for hospital sanitation, toilet flushing, gardening, or other non-clinical uses, depending on local regulation and water-quality monitoring. Additional water-saving approaches include optimizing disinfection protocols, reducing unnecessary dialysate flow when clinically appropriate, using energy-efficient dialysis machines, and considering low-flow or incremental dialysis prescriptions in carefully selected patients. Waste reduction is another major pillar of sustainable dialysis. Hemodialysis generates large amounts of plastic tubing, dialyzers, packaging, paper, sharps, and pharmaceutical waste. Practical interventions include better segregation of infectious and non-infectious waste, transition to paperless reporting, central acid delivery, online priming, bulk purchasing, inventory control, take-back or recycling programs with manufacturers, and rational medication use. Pharmaceutical waste can be reduced through deprescribing, oral formulations when appropriate,

longer-acting agents, multidose vials, reduced shipment frequency, and correct disposal pathways. Green dialysis also extends beyond the dialysis room. Home hemodialysis, peritoneal dialysis, telehealth follow-up, transport reduction, care closer to home, preservation of residual kidney function, and prevention of CKD progression can all reduce environmental burden. Implementation requires leadership, staff education, green committees, procurement reform, quality-improvement metrics, and institutional commitment. Sustainable dialysis should not be viewed as a compromise, but as a component of high-quality kidney care. By starting with feasible actions—measuring water use, improving waste segregation, recovering reject water, and engaging dialysis staff—each unit can contribute to safer, more resilient, and environmentally responsible kidney care.

Keywords: Green nephrology , Water Reduction, Water Conservation, Sustainable Kidney Care, Home Dialysis

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