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P153 -Home Haemodialysis (HHD) with low dialysate volume (LDV) – The Green benefit

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Human health has been adversely affected by man-made greenhouse gas emissions which has serious implications for the health of future generations. In England, 3.2% of the total CO₂ emissions are accounted for by the healthcare industry alone producing 18million tons CO₂eq. National Health Services CO₂ emissions exceeds the total emissions from all aircraft departing from Heathrow, the largest European airport. Dialysis patient care accounts for 62.5% of the carbon footprint of a renal service. In UK, the prevalence rate of dialysis patients is 440 patients/million-population, that is 25,261 haemodialysis (HD) patients in 2016. 1256 patients received dialysis at home. In-centre HD undertaking dialysis 3x4hours/week consumes more than 55,000Litres of water/patient/year and contributes 3,818kgCO₂eq to the carbon footprint.

A LDV system may have less emissions compared to traditional machines.

Methods:

On average in Europe, patients using LDV with NxStage system one (NSO) dialyse 5.7 times for 2.6hours/week with 24.3Litres of dialysate/session to deliver a 2.61stdKt/V.

Based on manufacturers data, we calculated fluids volume, weight and energy required with NSO and compared with requirements to deliver 3times/week HD or the same clearance with traditional machines (3.5times/week to deliver a 2.6stdKt/V in the same patient).

Results:

Reduced water usage

NSO prepares dialysate in-situ with deionization technology and converts 1L source water to 1L of ultrapure dialysate as against traditional osmosis water systems which have a conversion rate of around 50%.

Frequent therapy as above utilizes 7377 litres of source water/year, only 13% of the 56,160L of water used in centre HD and 12% of the 59,717L of water required to deliver the same clearance with a traditional system.

Low shipping volume of dialysate concentrates

Fluids is the main contributor to shipping volumes in dialysis supplies. PureFlow system allows a minimal shipping volume of 422L of concentrate/patient-year vs. 702-780L of acid concentrate (dilution 1/43-1/35) in conventional HD or 819-910L to deliver the same clearance as with NSO.

PureFlow concentrate equals 1.5ton and 0.8m³/patient-year. Conventional therapy equals 0.9-1.1ton and 1.4-1.7m³ (dilution 1/43-1/35) of acid concentrate. Delivering the same clearance with a traditional system equals 1.0-1.2ton and 1.6-2.0m³.

Less energy consumption

NSO with PureFlow utilizes 8.2-10.7kwh to deliver 6 sessions/week. This is 28% less than 29.6-52.9kwh to deliver 3sessions/week with a traditional system. Including the energy used for water treatment which amounts to 32.5-63.2kwh/week without heat disinfection, PureFlow usage is less than 20% of this.

Cost implications for patients in UK

Utilities represents 4.4% of dialysis costs in a renal unit. Patients on HHD might have to cover operating costs out of their pocket. NSO limits utilities usage while providing 4.8treatments/week and can reduce this value by 81% to £44/year vs. £236 with a traditional machine.

Conclusion

HHD with LDV is a much greener option for dialysis patients which despite its increased frequency, significantly reduces the carbon footprint without making any compromises on treatment. Such systems are the order of the day where one is constantly looking for cost effective greener options in delivering treatments for our patients.