

DIALYSER UREA CLEARANCE: NOT EXACTLY WHAT IT SAYS ON THE TIN

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PROBLEM: Regular monitoring of dialysis quality assurance (QA) alerted us an increase in the number of patients failing to achieve adequacy targets, a small number of whom had symptoms potentially attributable to under-dialysis. Initial investigation suggested that the common theme was a recent change from dialyser model A to dialyser model B.

PURPOSE: To quantify the effect of this dialyser change on delivered dialysis dose, to identify causes of decreased efficiency, and to recommend adjustments in practice to avoid recurrence.

DESIGN: We performed a retrospective study of parameters of dialysis adequacy in all 64 patients who had recently changed from dialyser model A to dialyser model B. Data was extracted from QA information stored on our data-base. Data acquired immediately before the change was compared with that obtained in the first QA test following the change, usually 1 to 3 months later. Dialysis was prescribed to deliver a target two-pool total Kt/V (dialysis plus renal) of 1.2, initially using values of urea clearance obtained from the product literature. There were no changes in blood or dialysis fluid flow rates.

FINDINGS: There was no significant change in pre-dialysis blood urea levels following the dialyser change. Post-dialysis blood urea levels however increased significantly (7.8 ± 3.1 to 8.7 ± 3.5 mmol/l: $p = 0.008$). There was a significant reduction in delivered total Kt/V (1.36 ± 0.27 to 1.22 ± 0.30 : $p = 0.004$) which was completely accounted for by a significant decrease in the dialysis component of Kt/V (1.08 ± 0.30 to 0.92 ± 0.33 : $p < 0.001$). There was no significant change in the renal Kt/V component. The kinetically calculated urea distribution volume (KV) increased significantly (29.67 ± 7.12 to 39.85 ± 15.02 litres: $p < 0.001$). Normalised protein catabolic rates (NPCR) decreased significantly (0.95 ± 0.24 to 0.89 ± 0.22 : $p = 0.028$). This decrease in efficiency required a significant increase in dialysis duration (Td) in order to regain adequacy targets (158 ± 26 to 176 ± 34 : $p < 0.001$):

CONCLUSION: Systematic under-dialysis occurred because of failure of dialyser model B to deliver urea clearances approximating those in the product literature. Our routine monitoring allowed detection of the problem, albeit after at least 1 to 3 months of under-dialysis. We now check delivered dialysis dose immediately following a change in dialyser model to allow prompt adjustment of prescription.

RELEVANCE: Dialysis efficiency requires rechecking immediately following any change in dialyser model since values of urea clearance quoted in product literature may far exceed those obtainable clinically.