Calculating equilibrated $K_t/V$ using the stop dialysate flow method of post-dialysis urea sampling

The stop dialysate flow method of post-dialysis urea sampling\(^1\) has been in use within all Scottish renal units since 1999. Waiting 5 minutes after stopping dialysate flow has several advantages as well as allowing a more accurate sample to be collected. Although this 5-minute urea value can be used to calculate a urea reduction ration (URR), calculating a value for $K_t/V$ is less straightforward. No method is available to calculate a $K_t/V$ value directly from a 5-minute post dialysis sample since all $K_t/V$ equations have been created based on either immediate/early post-dialysate sampling or based on a 30-minute sample.

However it is possible to use a 5-minute post urea sample and estimate 30 minute urea with a high degree of accuracy (R-squared value = 0.97). This method is described below.

Step 1. 
Calculate estimated 30-minute urea value\(^2\)

$$\text{Estimated 30-minute urea} = (1.06 \times \text{5-minute urea}) + 0.22$$

Step 2. 
Use value estimated 30-minute urea in single-pool Daugirdas $K_t/V$ equation\(^3\)

$$K_t/V = -\ln(R - 0.008 t) + (4 - 3.5 x R) \times \frac{UF}{W}$$

in which $\ln$ is the natural logarithm; $R$ is the post-dialysis blood urea * pre-dialysis blood urea; $t$ is the dialysis session length in hours; $UF$ is the ultrafiltration volume in litres; and $W$ is the post-dialysis weight in kg

This method has been validated in patients receiving haemodiafiltration as well as low and high-flux haemodialysis\(^4\).

References


http://www.srr.scot.nhs.uk/Projects/Projects1.html#adequ