Supplementary material

Method of calculation of dialysis standard KT/V taking into account ultrafiltration weight (Daugirdas methodology)

STEP 1: Calculate spKt/V not taking into account fluid removal

$$spKt/V = \ln\left(\frac{Cpre}{Cpost}\right)$$ ***(EQUATION 1)***

Where Cpre s urea concentration pre-dialysis and Cpost is urea concentration post dialysis

STEP 2: Calculate eKt/V not taking into account fluid removal using Tattersall transformation

In this calculation the Tattersall time constant is modified from 35 mins to 30.7mins as per modifications recommended by Daugirdas (Kidney International (2010) 77, 637–644)

eKt/V=spKt/V from step 1* $\frac{\left(\frac{Td}{60}\right)}{(Td\times 60+30.7)}$ ***(EQUATION 2)***

Where Td is dialysis duration expressed in hours

STEP 3: Calculate Adjusted Watson Volume

Watson V needs to be downsized by 10% to account for higher modelled V compared to anthropometric Watson V (Daugirdas Kidney International (2010) 77, 637–644).

Calculate Watson Volume by standard equation and downgrade by 10%

Adjusted Watson V=Watson V * 0.9 ***(EQUATION 3)***

STEP 4: Calculate Leypoldt standard Kt/V

In this we employ eKt/V from equation 2. This equation for standard Kt/V does not account for UF volume. Leypoldt equation is as below (Leypoldt JK. Hemodial Int 2004; 8: 193–197. and Daugirdas Kidney International (2010) 77, 637–644):

$$\mathrm{stdKt}/V = \frac{10,080\,\frac{1-e^{-\mathrm{eKt}/V}}{t}}{\frac{1-e^{-\mathrm{eKt}/V}}{\mathrm{eKt}/V} + \frac{10,080}{\mathrm{Ft}} | - 1}$$

(EQUATION 4)

Where f=frequency, t=dialysis time, eKt/V is results from **Equation 2**

STEP 5: Calculate Standard Kt/V taking into account UF weight using Daugirdas methodology:

$$\mathrm{stK_d t}/V = S/(1 - (0.74/F)\cdot \mathrm{UFw}/V) \qquad \textbf{\textit{(EQUATION 5)}}$$

(equation 2 from Daugirdas et al, Kidney International (2010) 77, 637–644)

where S=StdKt/V from EQUATION 4, F=frequency (sessions/week), UFw=weekly fluid gain between HD sessions, V=adjusted Watson V from **Equation 3**

CALCULATION OF RESIDUAL RENAL FUNCTION STANDARD Kt/V

STEP 1: Calculate Urea clearance

$$\textbf{Urea clearance} = \frac{\dfrac{\boldsymbol{UrineVol \times 1000 \times UreaUrea}}{\boldsymbol{(UrineDuration \times 24 \times 60 - (Td \times 60))}}}{\left(\dfrac{\boldsymbol{(PostUrea + PreUrea)}}{\mathbf{2}}\right)} \qquad \textbf{(EQUATION 6)}$$

Where urea clearance units are ml/min, UrineVol=urine volume (L), UrineUrea=urine urea concentration (mmol/L), UrineDuration=Urine collection duration (whole days between HD session), Td=dialysis duration (hours), PostUrea=Blood urea concentration at end of HD when urine collection starts (mmol/L), PreUrea= Blood urea concentration at start of HD when urine collection ends (mmol/L).

This equation assumes that dialysis is occurring at regular time points and utilises duration of urine collection as days between HD sessions minus dialysis duration.

Step 2: Calculate urea clearance corrected for body surface area (used for screening process of study but not for calculation of Std Kt/V which uses unadjusted urea clearance

BSA=Dubois BSA (m^2)

BSA = 0.007184* Height in $cm^{0.725}$ * Weight in $Kg^{0.425}$ **(EQUATION 7)**

Urea clearance adjusted for BSA=Urea clearance *1.73/BSA **(EQUATION 8)**

Step 3: Calculate Adjustment factor needed to downgrade urea clearance so it can be used to calculate Standard Kt/V

This method applies a multiplier to Urea Clearance to downgrade it so that it is appropriately incorporated into the Standard Kt/V calculation (fKru=approximately 0.7, or 70%)

fKrU = $\frac{0.974}{(spKt/V+1.62)+0.4}$ **(EQUATION 9)**

(from Daugirdas Kidney International (2010) 77, 637–644). SpKt/V is that from **Equation 1**

Step 4: Adjust Urea clearance for incorporation into Standard Kt/V

Adjusted KrU=Urea clearance * fKrU **(EQUATION 10)**

Where Urea clearance is from equation 6 and fKrU is from **equation 9**

From equation 4 in Daugirdas, Kidney International (2010) 77, 637–644

Step5: Calculate Residual Renal Function equivalent Standard Kt/V

This is calculated as K*t/V where K=adjusted KrU, t=minutes in 7 days, V=Adjusted Watson Volume

Residual Renal Standard Kt/V = $\frac{Adjusted\ KrU \times 10080}{Adjusted\ Watson\ Volume \times 1000}$

(EQUATION 11)

from equation 5 in Daugirdas Kidney International (2010) 77, 637–644

Where Adjusted KrU is from equation 10 (ml/min) and Adjusted Watson Volume (L) is from **Equation 3** above.