***Online Appendix for the following article:* Use of on-line conductivity monitoring to study sodium mass balance in chronic hemodialysis patients: prospects for treatment individualisation**

Derivation of ionic mass balance (IMB) is derived by the Diascan® module using the following formula:

$$D = Qd \times (1 - [dC_{out}2 - dC_{out}1] / [dC_{in}2 - dC_{in}1])$$

Where *D* is ionic dialysance in ml/min. Q*d* is inlet dialysate flow (ml/min). *d*C is dialysate conductivity (mS/cm) at both the inlet, dC_{in} and outlet dC_{out} measured at two time points 1 and 2 before and during the transient increase.

Plasma water conductivity is derived from the calculated dialysance.

$$pC = dC_{in} - Qd / D\ (dC_{in} - dC_{out})$$

Where *pC* = plasma conductivity in millisiemens/centimetre (mS/cm). Effective plasma sodium conductivity derived by Diascan® has previously been shown to be significantly correlated to direct sodium conductivity measurement by conductivity meter (r=0.96; p<0.05) [21][19].

Ionic mass balance (IMB) is finally derived using the formula:

$$IMB = (Qd_{in} \times dC_{in} - Qd_{out} \times dC_{out}) \times 10 \times t$$

Where t = time (minutes) and Qd_{in} and Qd_{out} = dialysate inlet and outlet flow in ml/min respectively. IMB is predominately determined by sodium mass balance [37]. This has been shown to be significantly correlated to direct measurement of sodium in dialysate waste by ion-selective electrode (r=0.94; p<0.05) [21]. Positive values for IMB indicate net sodium removal from the patient. Plasma conductivity is measured by the Diascan® module to an accuracy of ±0.05 mS/cm (Hospal supplied technical data).

The convective contribution was calculated using the mean of the initial and final plasma conductivity values derived by the monitor using a relationship derived from previous kinetic modelling using the same Diascan module [38]

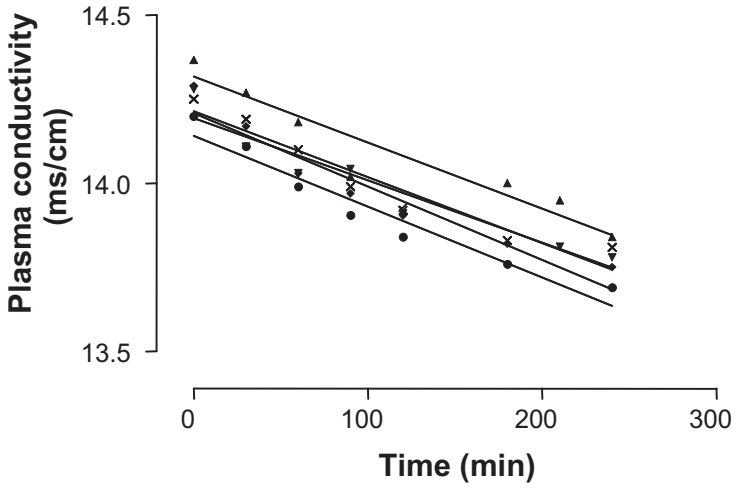
$$[Na^+] = (pC \times 10.4) - 9.57$$

where $[Na^+]$ is an estimate of plasma sodium. This Na^+ value was multiplied by the ultrafiltration volume to derive an estimate of convective loss, and diffusive loss was estimated by subtracting this value from the total IMB as follows:

IMB_{diff} = IMB – [((pC_1 + pC_2 / 2) x (10.4 – 9.57)) x UF volume]

where pC_1 and pC_2 denote the values for plasma conductivity at the start and end of each treatment session. This equation assumes a linear reduction in plasma conductivity. To check the validity of this assumption we randomly selected 5 of the 24 patients and additionally recorded the values at 30 minute intervals in 6 treatment sessions. Validation of our estimate for IMB_{diff} derivation for 5 randomly selected patients was shown with an approximately linear fall (r^2=0.89) seen in figure 5.

Figure 5.



Online supplementary figure 5. Fall in plasma conductivity over a dialysis treatment session in 5 randomly selected patients (r^2 = 0.84--0.93). $p < 0.0001$.