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STEADY CONCENTRATION PERITONEAL DIALYSIS INCREASES ULTRAFILTRATION AND SODIUM REMOVAL COMPARED TO CAPD

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Background and Aims

Fluid and sodium removal may be a challenge during glucose-based PD, leading to increased use of high glucose solutions to maintain sufficient fluid removal. This may in turn lead to increased sodium sieving, resulting in a decreased sodium removal. Carry Life® UF uses Steady Concentration PD (SCPD), where the infusion of glucose compensates for glucose uptake and maintains the intraperitoneal glucose concentration at a sufficient level providing a continuous ultrafiltration throughout the dwell. The present study investigated the effect of Carry Life UF compared to a standard CAPD dwell regarding ultrafiltration, sodium removal and glucose absorption.

Method

Eight stable PD patients were included in the study. Subjects were treated with 5-hour Carry Life UF treatments using three different glucose doses (11, 14, 20 g/h). An initial fill with 1500 ml, 13.6 g/l glucose PD solution was used. A small volume of dialysate was drained hourly to avoid overfill. A standard 4-hour Peritoneal Equilibration Test (PET) (2000 ml, 22.7 g/l glucose) was used as control. Data expressed as mean ± SD, statistical analysis using one-way ANOVA.

Results

Ultrafiltration was significantly increased during the Carry Life UF treatments compared to PET (646±256, 739±312, 863±380 ml for 11 g/h, 14 g/h and 20 g/h, respectively, vs. 162±242 ml for PET, $p<0.01$). Sodium removal increased significantly during Carry Life UF treatments (86±27, 92±33, 110±37 mmol/dwell for 11, 14, and 20 g glucose/h) compared to PET (22±33 mmol/dwell, $p<0.001$). Figure a shows that the intraperitoneal glucose concentration increased during the first hours of the Carry Life UF treatments and remained stable during the remainder of the treatments. During PET the glucose concentration decreased gradually during the treatment. The maximum intraperitoneal glucose concentration did not exceed 26 g/l (144 mmol/l) during the Carry Life UF treatments. The UF volume per gram of glucose uptake was significantly higher for the two lower Carry Life UF glucose doses compared to PET (Figure b).

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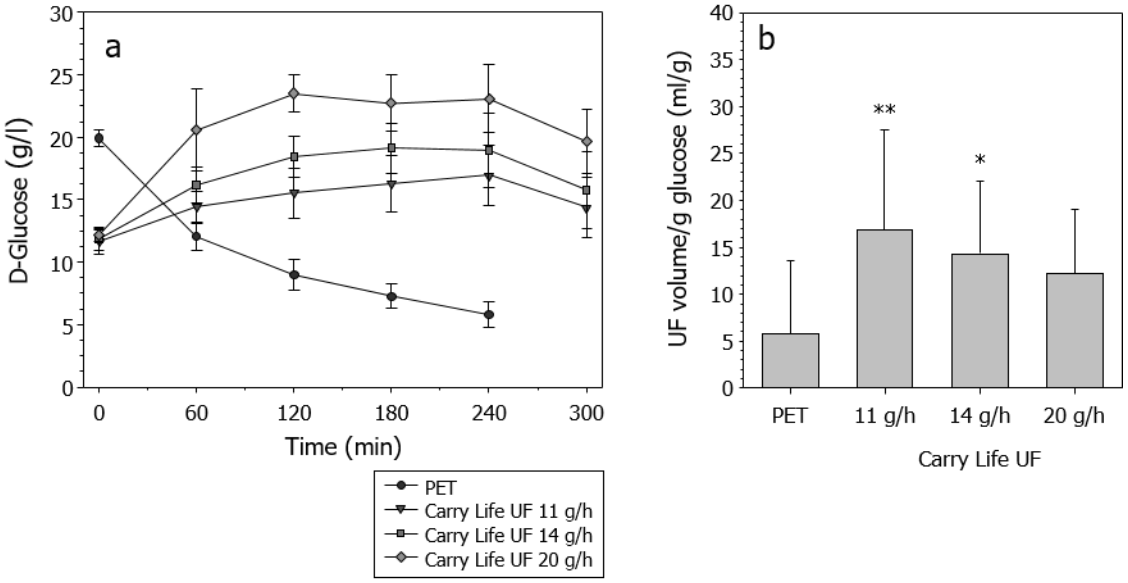
Conclusion

SCPD performed with Carry Life® UF maintained a stable intraperitoneal glucose concentration during the 5-hour treatment which generated significantly higher UF volumes compared to 4-hour PET. During the Carry Life UF treatments glucose was used more efficiently, particularly for the two lowest doses, in comparison to PET. The increased sodium removal with Carry Life® UF enables a better balance between UF volume and sodium removal than for example during APD. In summary, SCPD using Carry Life® UF increases the efficiency of PD compared to standard, glucose-based CAPD with respect to ultrafiltration and sodium removal.

Figure



Intraperitoneal glucose concentration in g/l during treatments. Initial concentration calculated from residual volume and instilled fluid. Last measurement measured in total drained volume (a).
Ultrafiltration efficiency expressed as ultrafiltration volume in ml per gram of glucose absorbed during treatments, *p<0.05, **p<0.01 (b).

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