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Theme : Clinical Research on PD Fluids and Regimens

Metabolism of oligosaccharides in end-stage renal disease patients

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Objective. Plasma α -amylase activity is increased in comparison to healthy controls in end-stage renal disease (ESRD) patients (pts) and remains high also in hemodialysis (HD) and in peritoneal dialysis (PD) pts using glucose (GLU) solutions whereas the activity is reduced in PD pts using icodextrin (ICO) solutions. We hypothesized that the degradation of carbohydrates is dependent on the plasma amylase activity and investigated *ex vivo* the speed of degradation of a synthetic saccharide molecule (maltoheptaose, G7) supplemented into plasma of healthy subjects, ESRD, HD, and PD pts using GLU solutions for all dwells and PD pts using ICO solution for the long dwell.

Methods. The degradation of G7 was followed in plasma samples that were incubated at 37°C for 4 hrs. For comparison, the same experiments were conducted in samples spiked with synthetic porcine amylase. Total α -amylase was measured enzymatically with routine methodology. G7 degradation products (maltose (G2) to G7) were measured with HPLC, and from these data the speed of G7 degradation was calculated.

Results. Although ESRD, HD and GLU pts had higher than normal amylase activity, the speed of degradation of G7 was slower than in healthy, and much slower in ICO pts (who had low amylase levels), Figure 1. Supplementation with porcine amylase only partly normalized the G7 degradation speed in all group of patients. The speed of degradation of the supplemented G7 was related to the endogenous amylase activities in all groups.

Conclusions. A model system was developed to study *ex vivo* the relationship between genuine α -amylase activity and the actual rate of carbohydrate (represented by exogenous maltoheptaose) breakdown. These results show that uremic pts degrade maltoheptaose *ex vivo* at a slower speed, or much slower speed (in the case of ICO pts). These results suggest that the α -amylase enzyme system is altered in ESRD pts, leading to slower breakdown of polysaccharides.

Figure:

Fig. 1

[IMAGE]