

## The IMPENDIA- EDEN Study

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Glucose has served as the important osmole for ultrafiltration in peritoneal dialysis (PD) for decades. Increasingly, there is a sense of unease about the long-term deleterious effects of dialysate glucose and systemic glucose loading on both the peritoneal membrane and the patient. Small, single-centre studies have suggested that PD using solutions other than glucose may lead to improvement in glycemic and lipid control in patients with diabetes. Dialysis solutions that don't utilize glucose include amino acid solutions and icodextrin. Neither of these solutions is licensed for use more than one time a day. Therefore, for a typical CAPD regimen, a "low-glucose" regimen includes one exchange of amino acid solution, one of icodextrin, and two glucose-based solutions.

The IMPENDIA and EDEN studies were randomized, double-blind multi-centre studies in 251 patients that compared long-term glycemic control, measured by HbA1C, using two dialysis regimens: the control regimen (4 glucose-based exchanges daily) and the "low glucose" regimen (2 glucose-based exchanges, 1 amino acid exchange, and 1 icodextrin exchange).

Study duration was 6 months. The HbA1C was statistically significantly lower by 0.5% in the low glucose group. There were also similar statistically significant reductions in serum triglycerides, VLDL lipoprotein and ApoB in the treatment group compared to controls.

Interestingly, and unexplained, there was also a higher mortality rate in the treatment group, including deaths from acute heart failure and malignant hypertension. At first blush, it is hard to understand why a low-glucose regimen would be associated with morbid and mortal events related to presumed extracellular fluid volume expansion, particularly since one of the treatment solutions was icodextrin. We certainly struggled with this finding. The events centered in the EDEN study, which was carried out in Colombia. It is possible that some investigators may have tried to avoid the use of more hypertonic solutions in the study group, to the detriment of the patients. However, this is just conjecture. In any case, it points out that in the drive to optimize metabolic endpoints, care must be given not to compromise extracellular fluid volume status.

While the glycosylated hemoglobin and lipid parameters were *statistically* significantly different between the treatment groups, it remains to be proven whether these differences translate into clinically-important outcomes. Certainly these are an emerging body of evidence that long-term glycemic control is associated with outcome in dialysis patients.

The important lesson to me of the IMPENDIA-EDEN trials is that, in a carefully-controlled randomized setting, there is now high-level evidence that the composition of fluid instilled in the peritoneal cavity does have an impact on metabolic parameters in our patients.