In-vivo Dialysis Kinetics of 300 ml/min and 500 ml/min Dialysate Flows

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Background

Dialysate flow rates (Q_D) are typically 500-800 ml/min with the intent to maximize urea removal during hemodialysis.

We previously conducted kinetic modeling of 300 ml/min compared to 500 ml/min Q_D and concluded that lower Q_n would be expected to provide adequate hemodialysis in majority of patients.

Tablo® Hemodialysis System is a newer dialysis technology that operates at 300 ml/min Q making understanding fine in-vivo urea kinetics relevant.

This study presents in vivo kinetic data in patients undergoing hemodialysis using the Tablo® Hemodialysis System with a dialysis flow rate of 300ml/min.

Methods

The study group included 6 patients undergoing chronic hemodialysis via a fistula (n=4) or graft (n=2).

Mean age was 58 years; mean weight was 85kg.

We performed a prospective, open label, randomized, cross-over evaluation of in-vivo kinetics of serum urea, phosphorus, and other solutes at variable Q_{D} .

All patients participated in 2 complete dialysis sessions in each of 3 treatment conditions:

- 500ml/min Q_D (Phoenix® Sytem)
- 2. 300ml/min Q_D (Tablo® Sytem)
- . 300ml/min Q_D (Tablo® Sytem) with Revaclear[™] Max dialyzer, and 15 minutes extended time

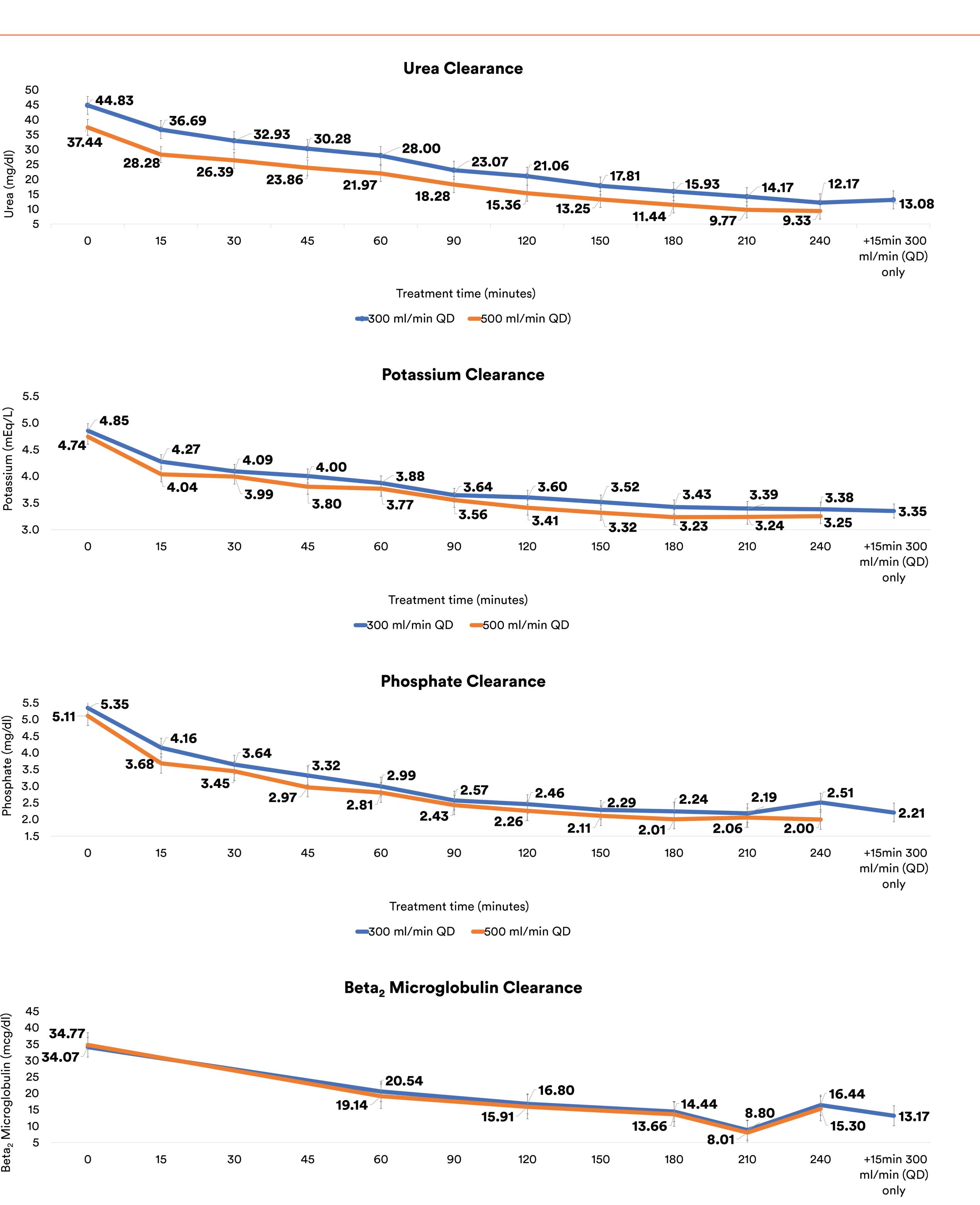
All patient treatments maintained an otherwise fixed prescription (blood flow rate, dialysate potassium, treatment duration, and dialyzer type).

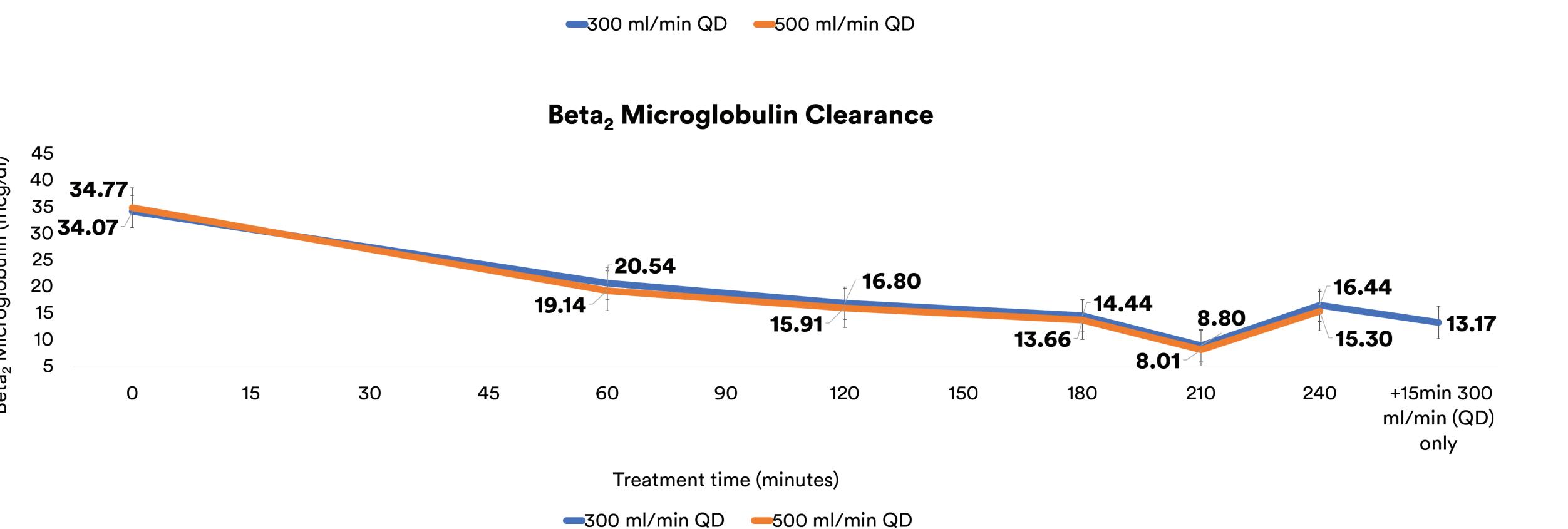
Results

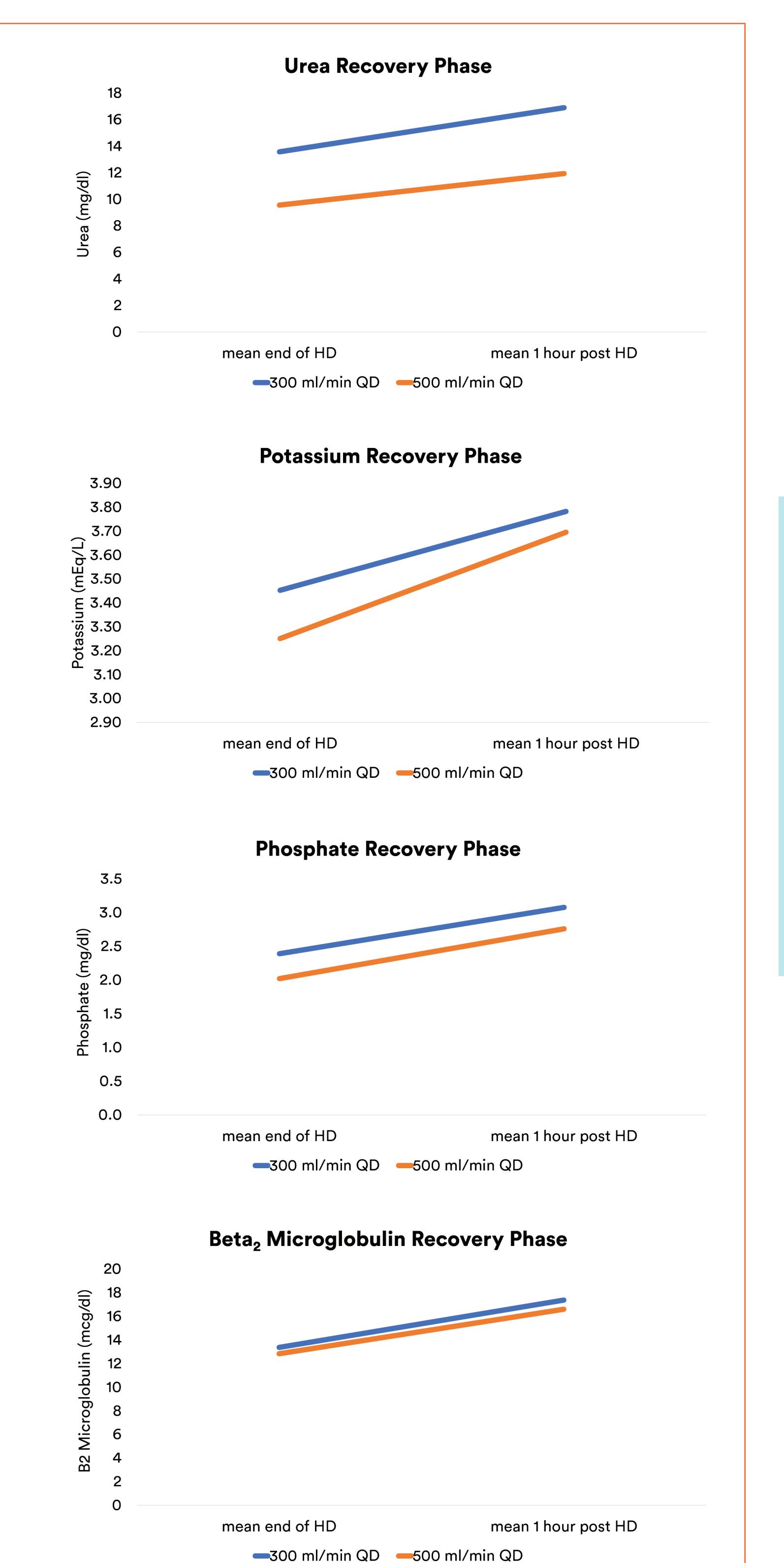
During hemodialysis, mean kinetic curves for serum beta, microglobulin, phosphate, sodium, potassium, carbon dioxide, osmolality, and urea during Q₂ 300ml/min and 500ml/min mirrored each other in all 6 patients.

Three patients completed treatment at 240 minutes, two patients completed treatment at 225 minutes, one patient completed treatment at 210 minutes.

The recovery phase at one hour for solutes displayed a rebound phase.







Objectives / Aims

To understand in-vivo kinetics of hemodialysis patients dialyzed with 500 ml/min and 300 ml/min Q and evaluate the differences in kinetic curves for small, middle and time dependent solutes while on dialysis as well solute changes in the post-dialysis rebound period.

Limitations

- Small number of patients.
- Kinetics over a single week.

Conclusion

- The Tablo[®] HD system, which provides 300 ml/min Q_D, has a similar kinetic profile to other HD systems which provide 500 ml/min Q_D.
- In-Vivo measurements indicate that 300 ml/min Q_D would be expected to provide similar clearances to traditional flow rates.

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