

Dynamics of oxygen saturation, fluid and blood pressure during hemodialysis and their associations with clinical outcomes

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Propositions
accompanying the dissertation

Dynamics of oxygen saturation, fluid and blood pressure during hemodialysis and their associations with clinical outcomes

Hanjie Zhang
Maastricht, 18 December 2018

1. On-line monitoring of arterial oxygen saturation identifies prolonged intradialytic hypoxemia in about 10% hemodialysis patients with arterio-venous fistula or graft as vascular access and provides a rationale for intradialytic oxygen treatment. (Chapter 2)
2. Real time monitoring of central venous oxygen saturation and calculation of estimated upper body blood flow serves as a sensitive indicator of patient's hemodynamic status and should be included in clinical practice. (Chapter 5)
3. The trajectories of central venous oxygen saturation and estimated upper body blood flow before and after AVF creation can provide insights into the AVF maturation process and the associated hemodynamic response. (Hanjie Zhang, Conference of the International Society of Hemodialysis 2018, book of abstract)
4. The "favourable" relative blood volume (RBV) ranges could be used for development of an RBV-guided ultrafiltration feedback control system. (Chapter 6)
5. A peri-dialytic rise of systolic blood pressure (SBP) is generally an indicator of fluid overload and increased mortality risk but can be beneficial in patients with low pre-dialytic SBP. Therefore, peri-dialytic changes in SBP should be interpreted in the context of other hemodynamic variables. (Chapter 7)
6. Modelling of physiological systems allows the design of a virtual clinical trial. (Doris H. Fuerstinger, CPT Pharmacometrics Syst Pharmacol., 2018)
7. Metabolomic "signatures" of spent peritoneal dialysate has the potential to predict changes in peritoneal membrane transport characteristics and therefore identify patient at risk for technique failure at an early stage.
8. Hemodialysis patients on both hemispheres and in different climatological regions experience comparable seasonal changes of clinical and laboratory parameters with a 6 months' time shift, suggesting common underlying biological phenomena. (Adrian M. Guinsburg, BMC Nephrology, 2015)
9. Irrespective of region of the world, patients experience comparable changes of clinical and laboratory parameters before death (Len Usvyat, Kidney Int., 2013). Including dynamics in prediction models may provide a "window of opportunity" for early intervention.
10. Contemporary health risks find parallel in ancient Chinese philosophy, for example, when sedentary lifestyle (Yin) is more prevalent than an active one (Yang), illnesses such as cardiovascular disease can follow; on the other hand, overly exertion can result in locomotor diseases.