HEPATIC RESPONSE TO COOLER HEMODIALYSIS

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Background:
Hemodialysis exerts significant hemodynamic effects with widespread consequences on vulnerable vascular beds (such as the heart and brain). [1, 2] Cardiac injury, including myocardial stunning and subclinical myocardial ischemia, appears to be common and associated with significantly increased mortality. [2] The liver has been shown to have preserved blood flow during dialysis due to its dual blood supply and more specifically due to an increase in portal vein circulation. Even so, the liver excretory function is decreased, despite the increase in toxin-rich portal vein flow. Extracorporeal cooling during dialysis has been associated with protective effects on the brain and heart of dialysis patients. [4, 5] The effects of cooler dialysis on liver perfusion, function and endotoximia is unknown.

Objectives:
We are using CT perfusion imaging to examine the effect of cooler dialysate on hepatic blood flow during hemodialysis. These data will be related to systemic liver detoxifying function, cardiac contractility and, endotoxin levels.

Methods:
This is a pilot randomized cross-over study, of 20 hemodialysis patients from London Health Sciences Centre, London, Ontario. Subjects are asked to undergo two hemodialysis study sessions – one with standard dialysis temperature (36.5 degrees Celsius), and one with cooler dialysis fluid (35 degrees Celsius; order of the sessions will be randomly allocated). During the study sessions, while on hemodialysis, participants have dynamic contrast-enhanced CT studies of their liver using a 256-slice GE scanner. The images are analyzed by generating arterial and portal time density curves – corresponding to perfusion maps. Furthermore, subjects have non-invasive measurements of liver function (using indocyanine green clearance), echocardiograms, and blood investigations to assess endotoxin levels. The relations between endotoxin levels, liver function, hepatic perfusion during cooler versus standard dialysis will be evaluated.

Preliminary/Expected Results:
Enrollment and study sessions are currently underway. We expect that cooler dialysate will reduce hemodialysis-induced circulatory stress, and reduce the maladaptive response of liver during dialysis – including the increased portal vein flow and decreased excretory function.

References:


