What Is Post-Ischemic Reperfusion Injury?

The nature of kidney transplant is that flow to the kidney is interrupted from the time that the kidney is procured from the donor (either live or cadaver) until it is anastomosed to vessels in the recipient. During the time when the cells in the donor kidney are not receiving oxygen, ischemic injury to the kidney can result. In order to slow down the transport processes within the kidney and minimize the possibility of injury, the kidney is maintained as close to 4°C as possible, from the time it is removed from the donor to the time it is reattached in the recipient. Nevertheless, postischemic injury to the renal allograft is a common complication during renal transplantation. It is reported to occur between 25 - 30% of the time in cadaveric kidneys.¹

Reperfusion injury is characterized by a depressed glomerular filtration rate (GFR) due to tubular injury, hypofiltration and drop in pressure that is necessary for reabsorption. It is often referred to as delayed graft function and the transplant recipient must then be put back on dialysis.

Post-ischemic reperfusion injury and subsequent filtration failure has been studied in animals by interrupting blood flow to the native kidney for 30 to 60 minutes and then reperfusing the kidney. When the kidney is reperfused, the filtration rate has been shown to be depressed for a week or more before it recovers.

Bryan D. Myers and colleagues at Stanford University and MIT have studied reperfusion injury extensively. In their studies,¹² they have taken advantage of the intraoperative opportunity to evaluate early allograft function by measuring renal blood flow 45 minutes after reperfusion.¹² The used 12-16 mm transit time ultrasound flowprobes to measure flow in the renal vein following transplant. Pressure was also measured and vascular resistance was calculated by dividing the arterio-venous pressure drop by renal blood flow.

REFERENCES
