Publication Brief

Validation in the sheep of an ultrasound velocity dilution technique for haemodialysis graft flow.

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BACKGROUND
A quick, simple, and inexpensive method for measuring the flow in a patient's vascular access would permit routine monitoring during hemodialysis, and provide information of access graft deterioration sufficiently early to increase the success of minimally invasive remedial procedures.

METHOD
• A PTFE graft was implanted in sheep between the carotid artery and the jugular vein.
• While the sheep was under general anaesthesia and on hemodialysis, a 5-10 ml bolus of isotonic NaCl was injected into the blood of the sheep, diluting the protein concentration of the blood.
• Pump tubing flow was measured by a transit-time blood flowmeter.
• Graft flow was estimated by the pump tubing flow combined with the areas of perturbation generated by the injection before and after mixing in the access flow.
• Calculated graft flow was compared to flow measured directly by a transit-time flowprobe on the same carotid artery.

RESULTS
• Over a 10-fold range (20 mL/min to 1260 mL/min), graft flow measured by ultrasound velocity dilution agreed well with graft flow measured directly by the transit-time ultrasound flowsensor.
• The scatter was 76 mL/min about the regression line.

CONCLUSION
Ultrasound velocity dilution provides a method for measuring flow in the graft accurate enough for clinical evaluation of patients on dialysis.

REFERENCE