Publication Brief

Proactive Monitoring of Pediatric Hemodialysis Vascular Access: Effects of Ultrasound Dilution on Thrombosis Rates

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BACKGROUND
Ultrasound dilution (UD) has been shown to be a practical and reliable predictor of venous outflow in children receiving hemodialysis (HD).

STUDY OBJECTIVE
To assess the impact of a proactive UD monitoring program upon VAT in pediatric patients and on the cost of vascular access management in a pediatric hemodialysis program.

STUDY
• Monthly UD access flow measurements (222) were performed in 21 children receiving hemodialysis.
• Vascular access flow (QA) was corrected for body surface area and reported as Qacorr.
• VAT rates were compared between the year-before and year-after ultrasound dilution surveillance was initiated.
• Mean values for variables potentially associated with VAT were compared to values from a size-matched seven patient group without VAT (mean wgt 45.4 kg; 4 AVG, 2 AVF) during the study period.
• During the latter half of the UD period (rapid referral period), patients with corrected vascular access flow rates (Qacorr) of <650 mL/min/1.73 m² were referred for balloon angioplasty within 48 hours.

RESULTS
• Nine patients (mean wgt 47.7 kg experienced 18 VATs (7 AVG, 1AVF) over the two year study period.
• Mean corrected vascular access flow rates (Qacorr) were lower in patients with subsequent VAT (562 +/- 290 mL/min/1.73 m²) versus patients without VAT (1005 +/- 372 mL/min/1.73 m²; P = 0.02).
• The VAT rate was significantly lower during the UD period (4.1 VAT/100 patient-months) versus the pre-UD period (11.0 VAT/100 patient-months; P = 0.03).
• During the rapid referral period, VAT rates further decreased to 0.96 VAT/100 patient-months (P < 0.001).
• Vascular access management costs were 65% higher ($1264 vs. $765/patient-month) in the pre-UD period, reflecting the increased cost for treatment of VAT.

CONCLUSIONS
• Monthly corrected vascular access flow rates (Qacorr) of <650 mL/min/1.73 m² is predictive of imminent VAT in children receiving hemodialysis.
• Prompt referral for angioplasty of VA with corrected vascular access flow rates <650 mL/min/1.73 m² leads to decreased VAT rates in children.

TAKE HOME
First pediatric study to report decrease in thrombosis rates with ultrasound dilution surveillance.

REFERENCES


• Transonic Reference # HD261AH
• Transonic Reference # HD177A

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