Vascular Access Surveillance Reduces Vascular Access Thrombosis Rates (VATR)
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Abstract

BACKGROUND: Vascular access thromboses result in missed treatments (Tx), disrupted patient Tx schedules and reduce dialysis facility revenues. Detection of hemodynamically significant stenoses should reduce vascular access thrombosis rates (VATR). Adoption of KDQI Vascular Access Surveillance (KVAS) Guidelines by hemodialysis centers is anticipated to reduce VATR and offset the effort required by VAS. VAS by access flow does not reduce VATR, while duplex ultrasonography (DU) stenoses detection does. DU is cost-prohibitive for large-scale implementation. Consequently, we developed an algorithm that derived access pressure ratios (intra-access pressure / MAP) Vasc-Alert® and explored the following hypothesis. Vasc-Alert® usage followed by referral for correction decreases VATR.

METHODS: A single dialysis center contributed data from 07/2003 through 08/2005 for analysis. Tx with permanent and temporary catheters were excluded. Baseline data were acquired from 08/03-12/03 and data were analyzed at 8-mo intervals by linear regression and results expressed as means ± SD.

RESULTS: A total of 48,678 Tx were analyzed by the Vasc-Alert® surveillance algorithm. The baseline VATR prior to the completion of Vasc-Alert® implementation equaled 0.60 ± 0.17. A persistent and steady decline of VATR was demonstrated during follow-up interval: 0.54 ± 0.13, 0.33 ± 0.11 and 0.21 ± 0.05 (linear regression: y = -0.19x + 0.41, P = 0.048). The last VATR mean approach the previously reported minimum VATR (Besarab et al. Kidney Int. 47:1364-1373, 1995).

DISCUSSION: We conclude that Vasc-Alert® surveillance reduces VATR in a heterogeneous dialysis population. The large dataset compiled from each patient with Vasc-Alert® facilitates large-scale trend analysis that is unavailable with current existing technologies.

Introduction

Vascular access thromboses result in missed treatments (Tx), disrupted patient Tx schedules and reduce dialysis facility revenues. Adoption of KDQI Vascular Access Surveillance Guidelines by hemodialysis (HD) centers is anticipated to reduce the vascular access thrombosis rate (VATR) by detecting hemodynamically significant stenoses, thereby permitting appropriate “elective” intervention prior to vascular access thrombosis. Methods of VAS include access flow, duplex ultrasonography (DU) and some form of intra-access pressure monitoring. DU is cost-prohibitive for large-scale implementation. We have developed an algorithm that derives intra-access pressure ratios (intra-access pressure / MAP) from routine collated venous drip chamber pressure and blood pump settings (Vasc-Alert®) and explored this hypothesis: Vasc-Alert® usage, followed by referral to a vascular surgeon for correction, reduces VATR.

Methods

- Thrombotic events for native fistulas and synthetic grafts were tracked for 24 months in a large urban dialysis center.
- The inability to cannulate, obtain blood flow from a permanent access, with consequent inability to perform HD was defined as a thrombotic event.
- Vascular access surveillance was introduced in the first 6-month period and utilized until the present time.
- Thrombotic events were calculated using the following considerations:
  - Event rate = (Thrombotic events / Tx No.) in a specified interval of time = VATR
  - Rate per treatment year (events / patient-year) = VATR × 156 (assuming 12 treatment months with 13 treatments per month.)

Results

To determine if access surveillance benefits can be demonstrated in reducing the vascular access thrombosis rate in a large urban dialysis center.

Table 1. Monthly thrombotic events compared with the total number of patients treated for each access type. 104 grafts and 30 fistulas cluttered during the study. There was a persistent decline in thrombotic events per patient-year following the introduction of Vasc-Alert surveillance.

Vascular Access Thrombosis Rates

Discussion

We conclude that access pressure surveillance with Vasc-Alert® reduces VATR in a heterogeneous dialysis population. The large dataset compiled from each patient with Vasc-Alert® facilitates large-scale trend analysis that is unavailable with current existing technologies. Aggressive monitoring provided with each "treatment pressure surveillance" reduces thrombotic events in the treatment setting.

References