



Significance of a protocol based arteriovenous dialysis access site maintenance program

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Background

Venous Neointimal Hyperplasia (VNH) can cause Arteriovenous Access Site (AVS) dysfunction and failure at various times after creation

Treatment modalities are currently only symptomatic and aim to restore access function

Surveillance and maintenance protocols have proved to reduce rate of thrombotic episodes

The benefit of AVS surveillance to the longevity of the AVS is not clear.

Background

1048

Clinical Journal of the American Society of Nephrology

Clin J Am Soc Nephrol 2: 1043-1053, 2007

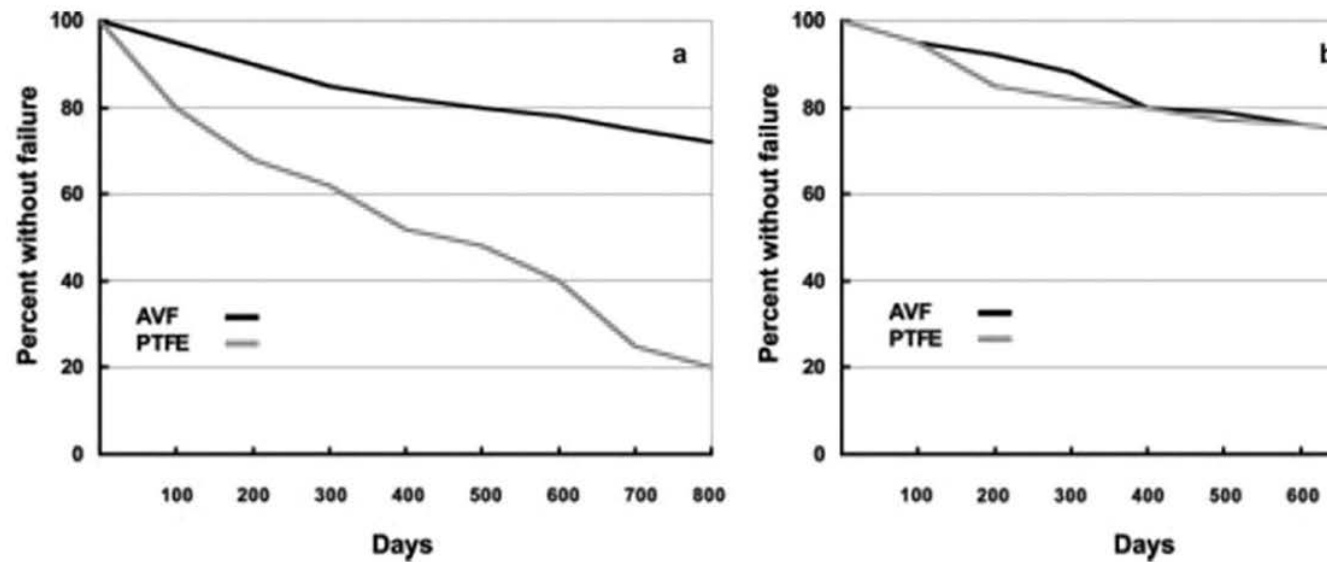


Figure 6. Unassisted (a) and assisted (b) survival of fistulas *versus* grafts when primary failure is excluded. Reprinted from reference (110).

Hypothesis

Diligent monitoring and focus on the progression of the disease, may lead to interventions at earlier stages, better understanding of the natural history of the specific AVS disease progression and prevention of failure measured by improvement of the long-term AVS survival

Methods

- ▶ Retrospective collection of data from patients treated by dedicated outpatient Dialysis Access Center (DAC)
- ▶ Information collected from DAC database including reports from office visits, Ultrasound examinations and procedure details
- ▶ Access Loss is defined as AVS abandonment and creation of a new access.
- ▶ Statistical analysis consisted of relative risks calculation based on AVS failure data and one tail t-test between means.

Inclusion criteria

Consecutive patients between 18-100 years of age, evaluated or treated at the DAC, with an established AVS, which is being used for hemodialysis

GROUP A

- ▶ Patients compliant to the follow up protocol
- ▶ Entry point : maturation of site created at DAC

or

completion of 2 subsequent, scheduled follow up visits for patients enrolled prior to development of site dysfunction

GROUP B

- ▶ Failure to comply with protocol
- ▶ Patients referred with a clinical problem, including thrombosis, without regular previous follow-up

Components of a maintenance protocol

- ▶ Place of service
 - ▶ DAC
- ▶ Evaluation tools
 - ▶ Doppler Ultrasound, H&P, coordination with dialysis clinics
- ▶ Evaluation frequency
 - ▶ Q 3 or Q 6 months
- ▶ Treatment protocols
 - ▶ Local anesthesia,
 - ▶ Interchangeable surgical procedures and endovascular interventions within Hybrid Operating Rooms

Results

- ▶ Between July 2017 and November 2017, **311 AVS** on 301 patients were evaluated and treated by the DAC
- ▶ Median follow up period **730 days**
- ▶ **Group A: 259 AVS**
- ▶ **Group B: 52 AVS**

Demographics

Parameters	Group A (n=259)	Group B (n=52)	P value
Age (mean)	65	65	P = 0.56
Hypertension	95%	90%	P = 0.28
Diabetes	52%	52%	P = 0.97
Male gender	57%	50%	P = 0.38

Indications for intervention

Indication	Group A %	Group B %	P value
Thrombosis	34 %	42 %	0.06
Low flow state	26% *	15%	0.007
Post dialysis bleeding	12%	10	0.36
Aneurysm	8%	8%	0.99
Edema	6%	11%. *	0.028
Pain	4%	3%	0.48
Water hammer pulse	6%	5%	0.73
Abnormal dialysis machine parameters	7%	5%	0.31
Steal	0 %	3% *	0.01
Mega-fistula	0%	2% *	0.02

Procedures per year

	Group A	Group B
PTA	0.6	0.32
Stent (PTFE covered)	0.1	0.06
Surgical Revision	0.16	0.1
Thrombectomy (Thr)	0.08	0.16
Thr and Stent	0.11	0.07
Thr and PTA	0.18	0.09
total	1.23	0.8

Procedures in group B patients outside of the DAC were not available to the data analysis

Access loss rates (median follow up 730 days)

	Group A (n = 259)	Group B (n = 52)	P value
AVF	1%	18% *	$P = 0.001$
AVG	5%	31% *	$P = 0.028$
Total	1.5%	22% *	$P < 0.0001$

AVF= Arteriovenous Fistula, AVG=Arteriovenous Graft, *=statistical significance

Relative Risk calculation for access failure (Group A vs. Group B)

RR	0.0730 *
95% CI	(0.0242 to 0.2204) *
P	< 0.0001
NNT	5.100*

RR = Relative Risk, 95% CI = 95% Confidence interval, NNT = number needed to treat, * = statistically significant finding

Discussion

- ▶ Current protocol demonstrated significant potential to prolong AV access site long term survival compared to non protocol patients and historical controls
- ▶ It is based on frequent surveillance and timely intervention
- ▶ Patient compliance pivotal component and in our experience can improve by education on the natural history of the disease

Discussion

- ▶ Protocol patients underwent procedures at earlier stages of the disease (low flow state vs edema, steal and mega-fistula)
- ▶ Further randomized studies required to confirm its value

Conclusion

Protocol surveillance and maintenance of AVS, in this cohort of patients, was associated with overwhelmingly significant decrease of access failure rates within a median follow up period of 730 days