Retrospective Cohort Study of Endovascular Therapy in the Salvage of Failing Arteriovenous Fistulas for Hemodialysis

Karthikeyan Damodharan, Kevin B. C. Khaw, Sum Leong, Apoorva Gogna, Nanda K. Venkatanarasimha, Chow Wei Too, Shaun X. Chan, Farah G. Irani, Ankur Patel1, Kiang Hiong Tay, Bien Soo Tan.

Singapore General hospital, Singapore.

OBJECTIVES

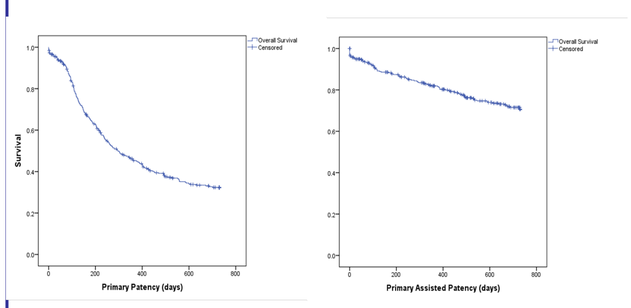
(1) To establish the success rates and complications of AVF interventions at our institution.

(2) To analyse the patient demographics, medical risk factors and technical factors affecting the outcome of endovascular therapy in our centre.

METHODS

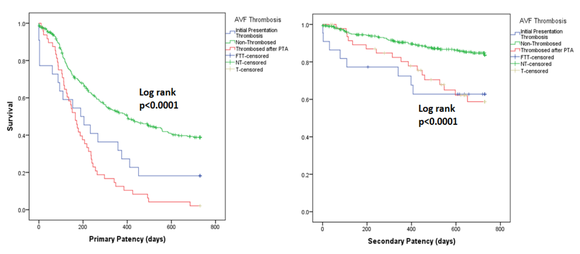
- A single centre retrospective cohort study was performed on patients with end Stage Renal Failure(ESRF) presenting for first time ET from Jan 2011 to Jun 2013
- 2 year follow up
- Endpoints
  - Primary Patency
  - Primary Assisted Patency
  - Secondary Patency
- Kaplan-Meier analysis and log-rank tests were used to assess AVF survival
- Cox regression analysis used to determine hazard ratios of other risk factors
- Statistical tests were performed using SPSS20

GRAPHS AND TABLES

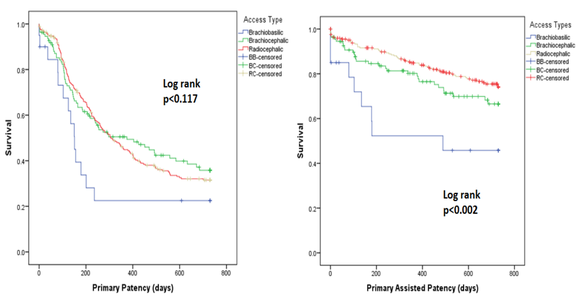


Circuit Primary Patency:
- 6 months: 64.5%
- 12 months: 45.3%
- 24 months: 32.4%

Circuit Primary Assisted Patency:
- 6 months: 87.7%
- 12 months: 81.9%
- 24 months: 70.6%



Kaplan Meier Survival Analysis of Initial Presentation Thrombosed (n=22), Thrombosed after initial PTA (n=48) and Non-thrombosed AVFs (n=308)



Kaplan Meier Survival of Radiocephalic (n=247), Brachiocephalic (n=111) and Brachoibasilic AVFs (n=20)

Primary Patency

	Univariate Cox Model		Multivariate Cox Model	
	Hazard Ratio (95% CI)	Sig.	Hazard Ratio (95% CI)	Sig.
AVF Thrombosis	**2.51 (1.88-3.36)**	**.000**	**2.55 (1.88-3.46)**	**.000**
AVF Age < 305 Days	**1.3 (1.14-1.48)**	**.000**	**2.1 (1.59-2.76)**	**.000**
Cephalic Arch Stenosis	**1.55 (1.00-2.38)**	**.047**	**2.99 (1.73-5.17)**	**.000**
Non-Maturation	**1.22 (1.02-1.46)**	**.029**	**1.66 (1.15-2.41)**	**.007**
Juxta Anastomotic Stenosis	1.33 (.978-1.80)	.069	**1.44 (1.04-2.02)**	**.030**
Age >65	**1.3 (1.00-1.68)**	**.049**	**1.29 (.990-1.68)**	**.060**
Chinese (vs Non Chinese)	1.35 (.998-1.82)	.051	1.22 (.894-1.65)	.212
Brachiobasilic AVF	1.71 (.987-2.95)	.056	1.41 (.797-2.94)	.238
Lesion Length >2cm vs 2cm or less	1.41 (1.09-1.83)	.009	1.15 (.880-1.51)	.304

Primary assisted patency

	Univariate Cox Model		Multivariate Cox Model	
	Hazard Ratio (95% CI)	Sig.	Hazard Ratio	Sig.
AVF Thrombosis	**10.32 (6.81-15.4)**	**.000**	**9.72 (6.13-15.4)**	**.000**
AVF Age < 305 Days	**1.36 (904-2.06)**	**.140**	**1.45 (.929-2.26)**	**.101**
Cephalic Arch Stenosis	**1.68 (3.16-1.66)**	**.106**	**1.66 (.758-3.63)**	**.206**
Non-Maturation	**1.09 (.606-1.95)**	**.778**		
Juxta Anastomotic Stenosis	**0.94 (.792-1.48)**	**.792**		
Diabetes	1.25 (1.02-1.53)	.032	1.05 (.841-1.30)	.686
Brachiobasilic AVF	**1.93 (1.22-3.07)**	**.005**	**1.75 (.838-3.67)**	**.136**
Lower Cephalic Vein	1.6 (.889-2.87)	.118	1.08 (.762-1.52)	.678
Basilic Vein Lesion	2.08 (.911-4.77)	.082	1.18 (.618-2.25)	.616
Lesion Length >2cm vs 2cm or less	1.32 (.880-1.99)	.179	1.00 (.808-1.25)	.974

RESULTS

- 870 procedures performed for 380 patients
- 59.2% Male, mean age 64.5 years
- Technical Success rate: 91.3%
- Defined as <30% residual stenosis
- Clinical Success rate: 96.4% (Defined as patient undergoing one subsequent successful dialysis)
- Complication rate: 2.53%
  3 major - 2 vessel ruptures , Embolus

Secondary patency

	Univariate Cox Model		Multivariate Cox Model	
	Hazard Ratio (95% CI)	Sig.	Hazard Ratio (95% CI)	Sig.
AVF Thrombosis	2.82 (1.72-4.62)	.000	3.13 (1.88-5.23)	.000
Cephalic Arch Stenosis	1.49 (1.06-2.08)	.020	2.03 (1.37-3.02)	.000
AVF Age (<305 days)	1.73 (1.05-2.84)	.030	1.37 (1.05-1.80)	.019
Previous AVF Revision	1.52 (0.892-2.58)	.124	1.18 (9.895-1.55)	.242

CONCLUSIONS

- AVF thrombosis is most strongly associated with AVF failure
- Patients with upper arm AVFs, diabetes, and lesion lengths >2cm are most at risk of thrombosis
- Vessel calibre more significant in lower arm AVFs than upper arm AVFs
- A targeted approach for these patients to undergo proactive surveillance or adjuvant antiplatelet therapy may increase AVF survival

REFERENCES

1. Irani FG, Tan BS, TanejaM, Lo R, Tay KH.Hemodialysis Access Interventions: An Asian Perspective. RajanDK (ed.), Essentials of Percutaneous Dialysis Interventions, Springer 2011, Ch21, 379-373
2. Renaud CJ, HoJP, Lee EJC, RoblessPA, VathsalaA.Comparative outcomes of primary autogenousfistulas in elderly, multiethnicAsian hemodialysispatients.J VascSurg. 2012; 56(2): 433–439
3. Tan TLX, May KK, RoblessPA, HoJP. Outcomes of Endovascular Intervention for Salvage of Failing HemodialysisAccess.Ann VascDis. 2011; 4(2): 87–92.
4. RajanDK, BunstonS, MisraS, Pinto R, LokCE. Dysfunctional autogenoushemodialysisfistulas: outcomes after angioplasty –are there clinical predictors of patency? Radiology. 2004;232(2):508–15.
5. Turmel-Rodrigues L, PengloanJ, BaudinS, et al. Treatment of stenosis and thrombosis in haemodialysis fistulas and grafts by interventional radiology. NephrolDial Transplant. 2000;15(12):2029–36.
6. Wong HL, Tan BS. Retrospective study of endovascular management of central venous occlusive disease related to hemodialysis.Thesis Submission, Duke-NUS Graduate Medical School, 2014
7. Liang HL, Pan HB, Chung HS, GerLP, Fang HC, Wu TH, Wu MT, Lai PH, Chen CK, Yang CF.Restoration of thrombosedBrescia-Ciminodialysis fistulas by using Percutaneous Transluminal Angioplasty.
Radiology. 2002; 223: 339-344
8. GrayRJ, Martin LG, TrerotolaSO.Reporting standards for Percutaneous Interventions in Dialysis Access. J VascIntervRadiol2003; 14:S433-S442
9. Yang TY, Cheng HW, WengHH, Chang ST, Chung CM, KoYS.Percutaneous Transluminal Angioplasty for Radial-Cephalic Fistulae with Stenosis at the Arteriovenous Junction.Am J Med Sci. 2012; 343(6): 435–439
10. Woo SK, WookBP ByungCK.The Primary Patency of Percutaneous Transluminal Angioplasty in HemodialysisPatients With Vascular Access Failure. Korean CircJ. 2011 Sep;41(9):512-517

53 ERA
520-SP
Dialysis. Vascular access.
Karthikeyan Damodharan
DOI: 10.3252/pso.eu.53era.2016
ePosters supported by F. Hoffmann- La Roche Ltd.
53rd CONGRESS ERA-EDTA VIENNA AUSTRIA MAY 21st-24th 2016
Held jointly with Österreichische Gesellschaft für Nephrologie
PosterSessionOnline.com