



Outcome of endovascular treatment of arteriovenous access thrombosis in patients on hemodialysis: A 5-year single centre retrospective review

Dr. Pui Man Chung, Dr. Siu Chun Wong, Dr. Ting Fung Ng, Dr. Lik Fai Cheng
Department of Radiology, Princess Margaret Hospital, Hong Kong

Background:

Arteriovenous fistula (AVF) and arteriovenous graft (AVG) are common hemodialysis accesses in patients with end stage renal disease. They are commonly associated with access stenosis, thrombosis and failure. Either surgical or endovascular interventions would be employed to preserve them. Our study aims to focus on endovascular management and outcome of AVF or AVG thrombosis.

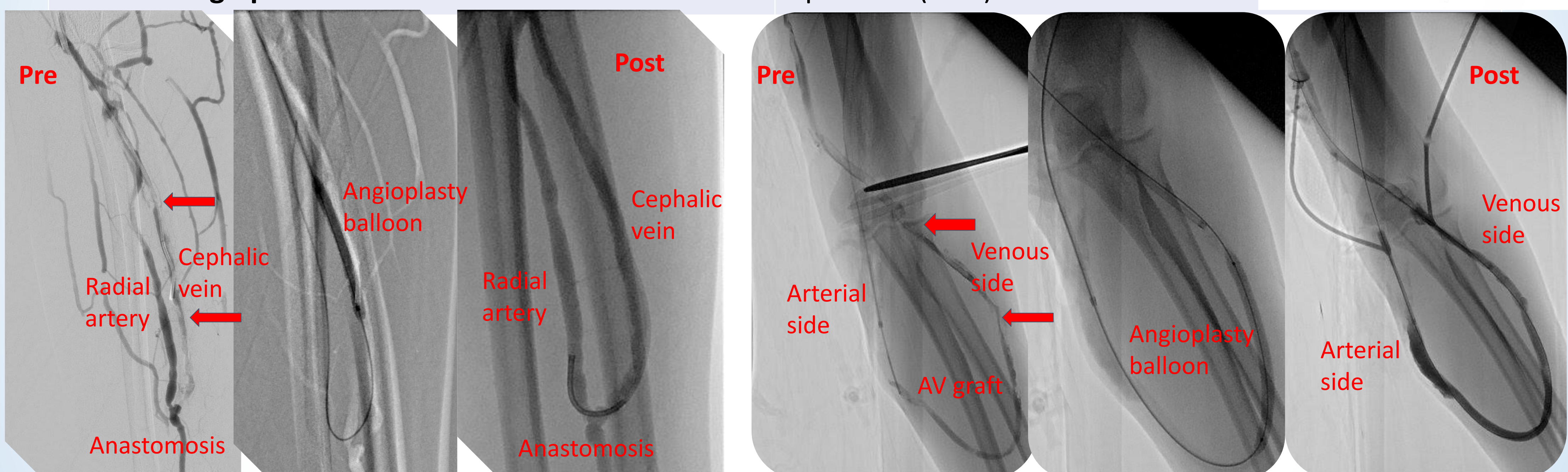
Methods:

23 cases of AVF or AVG thrombosis in patients on hemodialysis from December 2019 to February 2023 were recruited retrospectively from our hospital, which provided hemodialysis service. All of them underwent endovascular balloon declotting with or without catheter directed thrombolysis provided by our team of specialist interventional radiologists.

Patient Demographics

Gender	13 M (57%) 10 F (43%)
Mean age (years old)	58.7
AVF or AVG	AVF : 17 (74%) AVG : 6 (26%)
Side of upper limb access	Left : 16 (70%) Right : 7 (30%)
Types of access	Brachiocephalic: 5 (22%) Brachiocephalic: 8 (35%) Radiocephalic: 9 (39%) Radioantecubital: 1 (4%)
Mean time from AV access creation to current thrombosis episode (years)	4.6
Previous thrombosis episodes	8 patients (35%)
Previous angioplasties	8 patients (35%)

Fountain catheter directed thrombolysis catheter with numerous side holes



Case of thrombosed left radiocephalic AV fistula in a 46yo lady. Retrograde puncture was performed with a 6Fr sheath. Venous limb was diffusely small in caliber suggesting a poorly matured AVF. Filling defects (red arrows) were noted at the venous limb at forearm level. Balloon declotting was performed with 4x40mm and 5x40mm balloon catheters. Post procedure showed patent AVF without significant intraluminal thrombus.

Case of thrombosed left brachiocephalic AV graft in a 55yo man. Antegrade and retrograde punctures were performed with 6Fr sheaths. Angiogram shows filling defects at the AV graft and distal basilic vein (red arrows). Angioplasty was performed with 7x80mm and 8x40mm balloons from outflow to inflow side. 60,000 iu urokinase was infused at the thrombosed site with Fountain catheter directed thrombolysis system. Post angiogram showed improvement of stenosis and restoration of the venous lumen.

Results

Method of vascular access	Retrograde puncture : 19	Antegrade puncture: 1	Antegrade + retrograde puncture : 3
Treatment received	Balloon declotting + urokinase infusion: 18 (78%)		Balloon declotting only: 5 (22%)
1 year access patency rate	15 out of 18 patients (83%) (5 patients passed away within one year)		
Need of future angioplasties or stenting	9 patients (6 of them performed within one year of thrombosis)		

Complications during endovascular thrombolysis:

1 patient had right arm hematoma caused by injury to a small arm muscular branch. The bleeder was embolized.
1 patient had a venous side injury of the access requiring ligation and creation of a new access within the same month.
None of the patients suffered from compartment syndrome or pulmonary embolism.

Methods of endovascular thrombolysis

No significant relationship

Re-thrombosis rate (p=0.54)

Future angioplasty/stenting rate (p=0.36)

Conclusion:

Endovascular treatment of arteriovenous access thrombosis is safe, effective and minimally invasive, with high 1 year patency and low complication rate. It can preserve vital vascular access for patients requiring hemodialysis.

References:

