



## VASC-ALERT ACCESS SURVEILLANCE CASE STUDY

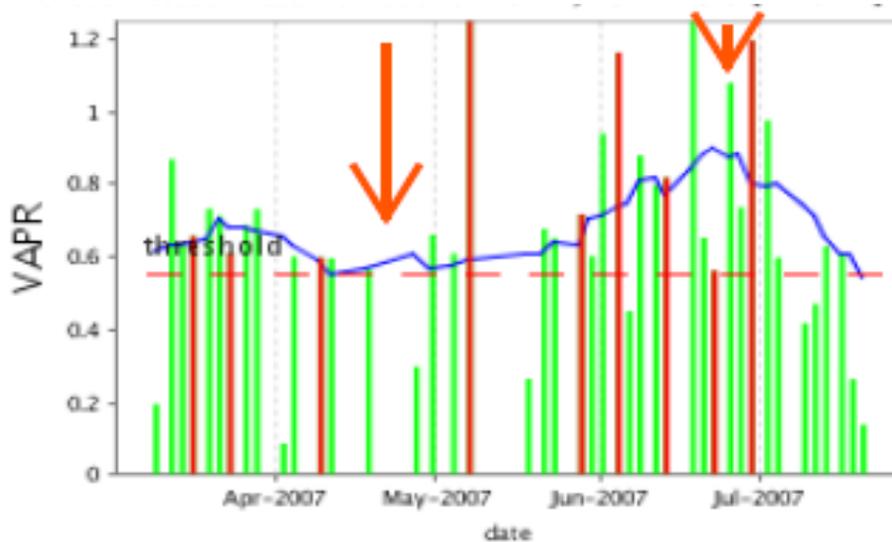
### PATIENT PROFILE

60 year old male  
Primary cause of ESRD: Type 2 Adult Onset Diabetes  
Dialysis start date: 3/30/05  
Dialysis access: Left forearm loop graft  
Dialysis access placed: 3/13/07  
Treatment time: 4 hours/240 minutes 3 times per week  
Ordered BFR: 450 - 500ml/min  
Kt/V result at time of intervention: 1.8

There were no clinical signs or symptoms that were indicative of access dysfunction or stenosis (e.g. no increase in venous pressure, no excessive bleeding, no decrease in blood flow, no difficulty in cannulation, no decrease in Kt/V) other than moderate edema of the left forearm, but the patient had consistent alerts.

### VASC-ALERT DATA

#### Venous Access Pressure Ratio



This patient had multiple high readings and alerts issued by Vasc-Alert. In the above VAPR graph the vertical green and red lines indicate the average VAPR for the dialysis session. The vertical red lines occur on dates where an alert was issued. The horizontal red dashed line is a pre-set threshold value. The blue line is a moving average which is used to visualize the trend of the graph more easily. The red arrows indicate when an intervention took place. The dates on the graph are in month/year format. Gaps in data are typically due to a lack of source data (missed treatment or hospitalization) or incomplete source data. For example, calculations may not have been made due to missing access type, needle gauge or blood pressure data.

### HISTORY AND EXAM

Previous failed right arm AVG 3/07. Declot of left arm loop graft 4/07 with extensive disease. On exam, moderate edema of left forearm noted. The patient had a clotted access 4/07 and 6/25/07

and was sent for a declotting procedure on each occasion. The access was determined to have multiple significant stenoses on 6/25/07. The red arrows on the graph indicate the intervention dates, and a drop in VAPR values below the threshold is seen after each procedure.

## **PROCEDURE**

The patient's left arm was prepped and draped in the usual sterile fashion. Lidocaine was used for local anesthesia. An 18-gauge needle was used to cannulate the graft just above the apex of the loop laterally. Due to mild edema, this was not successful. Cannulation was then successful at a superficial segment of the graft on the medial side just at the apex. The 0.035-inch Roadrunner guidewire was advanced up the arm, and a 7 French sheath was inserted over the wire. A 5 French straight catheter was placed over the wire with tip at the level of the rib edge. Medications were given to achieve adequate conscious sedation. A pull back venogram revealed multiple areas of stenoses that were confirmed when balloon angioplasty was performed. There was 80% stenosis in the basilic vein at the humeral head. Another long segment of stenosis (3 cm) was in the basilic vein at the level of the mid humerus. A 60% stenosis was also seen at the venous anastomosis. There was no stenosis at the previously angioplastied subclavian vein.

A 4 French Fogarty balloon was used for thromboaspiration on the venous side. However, venous outflow was not established due to no blood flow from the venous sheath. Due to multiple lesions, we decided to proceed with angioplasty prior to opening the arterial plug. An 8mm X 6 cm Workhorse balloon was placed over the wire and used to angioplasty the entire outflow starting at the humeral head to venous sheath. Stricture of the balloon confirmed the stenoses and the balloon completely dilated throughout. There was minimal flow out of the venous sheath afterwards.

A second cannulation was performed higher in the arm on the lateral side facing the arterial anastomosis to access the inflow for thrombectomy after infiltration of Lidocaine. The 0.035 inch guidewire was advanced across the arterial anastomosis, and a 6 French sheath was inserted over the wire. The wire was removed. The 4 French Fogarty balloon was then advanced across the arterial anastomosis and thromboaspiration was performed. Arterial inflow was established.

Venogram after thrombectomy revealed residual stenoses. The same balloon was used to re-angioplasty the lesions with improvement. There was a 20% residual stenosis at the humeral head, 20 % residual at the mid humerus and no residual at the venous anastomosis.

The 0.035 inch wire was inserted into the arterial sheath and advanced across the arterial anastomosis. A 5 French straight catheter was then placed over the wire into the brachial artery. A selective arteriogram was performed since the retrograde arteriogram would increase the risk of arterial embolus. A segment of the brachial artery 10cm above the anastomosis to well below the bifurcation was visualized and no stenosis was seen at the arterial anastomosis. Arterial run-off did not reveal any distal emboli.

After the procedures, flow in the access was rated excellent. Hemostasis was obtained with a z-stitch at the cannulation sites. The patient tolerated the procedure. There was no central stenosis to explain the arm edema, although it is suspected to be related to the related venous outflow stenoses.

## **FINDINGS**

1. Thrombosed arteriovenous graft, left forearm brachial basilic
2. 80% stenosis basilic vein at the humeral head
3. Long 80% stenosis basilic vein mid humerus
4. 60% stenosis venous anastomosis

## **SUMMARY**

The patient was sent for access declotting and found to have several hemodynamically significant stenoses that were treated by angioplasty. Shortly after intervention the patient's VAPR results returned to normal and fell below the threshold.