**Patient Name:** \_\_\_\_\_\_\_\_

**Date of Birth**: \_\_\_\_\_\_\_

**Operating Physician:** Peter H. Lin, M.D.

**Date of Service:** \_\_\_\_\_\_

**Referring physician:** \_\_\_\_\_\_\_\_

**Pre-operative Diagnosis:** Arm pain

**Post-operative Diagnosis:** Same.

**ICD-10 Diagnosis Codes:**

N18.6 End stage renal disease

T82.898A Other specified complication of vascular prosthetic devices, implants and grafts, initial encounter

E78.5 Hyperlipidemia, unspecified

J44.9 Chronic obstructive pulmonary disease, unspecified

E11.9 Type 2 diabetes mellitus without complications

T82.858A Stenosis of vascular prosthetic devices, implants and grafts, initial encounter

M79.602 Pain in left arm

I77.1 Stricture of artery

I10 Essential (primary) hypertension

**Procedures Performed:**

1. Ultrasound guidance for vascular access of right common femoral artery (CPT# 76937)
2. Catheter placement of descending thoracic aorta for aortography, radiological supervision and interpretation (CPT# 75600-XU)
3. Selective catheter placement of left subclavian artery and axillary artery for angiography (CPT# 36217)
4. Selective catheter placement of left brachial artery for angiography (CPT# 36218)
5. Left upper extremity angiography, radiological supervision and interpretation (CPT# 75710-XU)
6. Transluminal balloon angioplasty of left subclavian artery (CPT# 37246)
7. Transluminal balloon angioplasty of left axillary artery (CPT# 37247)
8. Transluminal balloon angioplasty of left brachial artery (CPT# 37247-XS)
9. Intravascular ultrasound of the thoracic aorta (CPT# 37252), left subclavian artery (CPT# 37253), axillary artery (CPT# 37253-XS), brachial artery (CPT# 37253-XS), radial artery (CPT# 37253-XS), and ulnar artery (CPT# 37253-XS).

**Fluoroscopy time:** 8.1 minutes

**Contrast:** 35 cc of Optiray-240.

**Medication:** 3,000 U Heparin IV. 1% buffered lidocaine locally.

**Moderate sedation:** Under physician supervision, 1 mg Versed and 50 mcg fentanyl were administered intravenously for moderate sedation. Pulse oximetry, heart rate and BP are continuously monitored by an independent trained observer present. Dr. Lin was present during the entire procedure and spent 60 minutes of face to face sedation time with the patient.

**Merit-Based Incentive Payment System (MIPS) Code**: G9500

**MIPS Measure**: #145: Radiation Exposure indices, OR Exposure Time and Number of Fluorographic Images Documented in Final Procedure Report

**EBL:** Minimal.

**Complication**s: None immediate.

**Clinical History:**

======== **Pre-AV Access Creation** =======

The patient was recently evaluated for arteriovenous access creation for hemodialysis. On physical examination, the patient has diminished upper extremity arterial pulses suggestive of arterial occlusive disease. A recent upper extremity arterial duplex ultrasound revealed biphasic flow with probable arterial stenosis in the upper extremity. The patient is therefore scheduled for an upper extremity arteriogram evaluation to further assess the upper extremity arterial circulation. Possible endovascular interventions with balloon angioplasty and/or stent placement will be considered if an arterial stenosis is identified in the upper extremity arterial circulation. I have discussed with the patient regarding potential benefits and risks of the treatment plan. Potential benefits of the planned procedure include improvement of the upper extremity arterial circulation with endovascular treatment which may include balloon angioplasty or stenting. Potential risks of the procedure include contrast-induced nephropathy, renal failure requiring hemodialysis, groin bleeding, groin infection, vessel occlusion due to thrombosis, and vessel perforation. The overall risk of these complications is 2%. The patient verbalized understanding of the benefits and risks the treatment plan.

========  **Steal Phenomenon** =======

The patient reports worsening of ischemic pain in the upper extremity due to an arterial steal phenomenon caused by the arteriovenous access. The patient has absence of palpable radial and ulnar arterial pulses which were augmented with AV graft compression. A recent upper extremity arterial duplex ultrasound revealed monophasic arterial flow in the upper extremity. The patient is therefore scheduled for an upper extremity arteriography to further assess the upper extremity arterial circulation. Possible endovascular interventions with balloon angioplasty and/or stent placement will be considered if an arterial stenosis is identified in the upper extremity arterial circulation. I have discussed with the patient regarding potential benefits and risks of the treatment plan. Potential benefits of the planned procedure include improvement of the upper extremity arterial circulation with endovascular treatment which may include balloon angioplasty or stenting. Potential risks of the procedure include contrast-induced nephropathy, renal failure requiring hemodialysis, groin bleeding, groin infection, vessel occlusion due to thrombosis, and vessel perforation. The overall risk of these complications is 2%. The patient verbalized understanding of the benefits and risks the treatment plan.

**Technique:** The risks, benefits, and alternatives of the procedure were discussed with the patient. Written informed consent was obtained. The patient's medication records were evaluated and reviewed within the patient’s chart. The patient's laboratory values were carefully reviewed within the patient’s chart. The patient was placed in the supine position on the angiographic suite and the right groin was prepped and draped in the standard usual sterile fashion. 1% lidocaine was used to anesthetize the groin. Next under real-time ultrasound guidance, a 21-gauge micropuncture needle was used to access the right common femoral artery. An ultrasound image was permanently saved. A microcatheter-introducer sheath was inserted. A 0.035’ guidewire was inserted through the sheath into the abdominal aorta and exchanged for a 5 French vascular sheath. Ipsilateral common femoral artery angiogram was performed to evaluate the access site for suitability of a closure device.

Next selective catheterization of the descending thoracic aorta was performed with a diagnostic catheter. A thoracic angiogram was performed. Next a vertebral catheter was used to select the left subclavian artery and an angiogram was performed in the anteroposterior projection. The catheter was then used to select the left axillary artery followed by left brachial artery. Multiple digital subtraction angiograms of the left upper extremity were performed in the anteroposterior projection.

A 0.014” microwire was advanced through the angled catheter and selectively cannulated the radial artery. Intravascular ultrasound of the left upper extremity was performed by placing an IVUS catheter through the 0.014” guidewire whereby subclavian artery, axillary artery, brachial artery, and radial artery were evaluated. Multiple images of these segmental arteries were evaluated using intravascular ultrasound using a pullback technique. The intravascular ultrasound images were saved on a local workstation and used for interpretation and to guide treatment.

These angiographic evaluations including intravascular ultrasound revealed the followings: 1. Patent thoracic aorta without significant stenosis, 2. Subclavian artery with \_\_\_% luminal stenosis in which the largest and smaller luminal diameters being 6 mm and 3 mm, respectively. 3. Axillary artery with \_\_\_ % luminal stenosis in which the largest and smaller luminal diameters being \_\_\_ mm and 3 mm, respectively. 4. Brachial artery with \_\_\_\_% luminal stenosis in which the largest and smaller luminal diameters being \_\_\_ mm and \_\_\_ mm, respectively. 5. Radial artery with \_\_\_\_% luminal stenosis in which the largest and smaller luminal diameters being 3 mm and \_\_ mm, respectively.

==== < PTA of Subclavian Artery > =====

Based on these findings, we proceeded with balloon angioplasty of the left subclavian artery using a \_\_\_ mm x \_\_\_ mm angioplasty catheter. The balloon catheter was positioned across the stenotic segment of the subclavian artery and insufflated to 10 atmospheric pressure for a total of 30 seconds. Completion angiogram revealed successful radiographic result with residual stenosis of less than \_\_\_%.

==== < PTA of Axillary Artery > =====

Next we turned our attention to the axillary artery. We placed a \_\_\_ mm angioplasty balloon to dilate the axillary artery stenosis. The balloon was insufflated to 10 atmospheric pressure for a total of one minute. Completion angiogram revealed successful radiographic result with residual stenosis of less than \_\_\_%.

==== < PTA of Brachial Artery > =====

We placed a \_\_\_\_ mm angioplasty balloon to treat the brachial artery stenosis. The balloon was insufflated to 10 atmospheric pressure for a total of one minute. Completion angiogram revealed successful radiographic result with residual stenosis of less than \_\_\_%.

==== < PTA of Radial Artery > =====

Next we placed a \_\_\_\_ mm angioplasty balloon to treat the radial artery stenosis. The balloon was positioned across the stenotic segment of the radial artery, and insufflated to 10 atmospheric pressure for a total of 30 seconds. Completion angiogram revealed successful radiographic result with residual stenosis of less than \_\_\_%.

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Following these interventions, the catheter and sheath were removed from the femoral artery. A closure device using Angioseal was used in the femoral artery to achieve adequate hemostasis. Standard dressings were applied. The patient tolerated the procedure well with no immediate complications and returned to the recovery area in stable condition.

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**Findings of left upper extremity arterial circulation:**

1. Thoracic aorta: patent without significant stenosis or aneurysm.

2. Subclavian artery: \_\_\_ 20% luminal stenosis vs. patent flow without significant stenosis.

3. Axillary artery: \_\_\_ 20% luminal stenosis vs. patent flow without significant stenosis.

4. Brachial artery: \_\_\_ 20% luminal stenosis vs. patent flow without significant stenosis.

5. Radial artery \_\_\_ 20% luminal stenosis vs. patent flow without significant stenosis.

**Treatment Outcomes:**

Successful balloon angioplasty of left upper extremity arterial circulation including left subclavian artery, axillary artery, brachial artery, and radial artery.

**Plan:**

The patient will be scheduled for left upper extremity arteriovenous access creation which is scheduled in \_\_\_ weeks. The patient will continue with hemodialysis via the jugular vein tunneled dialysis catheter.

**Thank you for the opportunity to participate in the care of your patient.**

**Regards,**



**Peter H. Lin, M.D.**

**Vascular Surgery**