Bi-Lateral Popliteal Aneurysm Leading to Acute Lower Limb Ischemia

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Introduction

- Popliteal artery aneurysms (PAA) are a weakening and dilation of the popliteal artery. They are rare and more commonly occur bilaterally.[1]
- Risk factors for popliteal aneurysm include older age, smoking, male sex, genetics, inflammation, and hemodynamic stability.[2]
- Common presentation for PAAs include lower extremity ischemia that is caused by either acute or chronic thrombosis and distal embolization.[3,4]
- PAA ruptures occur in the popliteal space surrounded by muscles and tendons causing swelling and pain. A ruptured PAA can cause a hematoma, neurological pain and present similarly to a DVT. [3]
- PAA make up about 70% of peripheral aneurysms and are commonly asymptomatic. [4]
- Computed tomography angiogram (CTA) is the most definitive diagnostic testing that helps rule in or out of the diagnosis. Due to the rarity of this disease, non-vascular clinicians easily overlook and misdiagnose this aneurysm resulting in poor clinical outcomes and delayed treatment outcomes.[4]
- Develop in an 18-month period resulting in thromboembolic complications and limb loss.[5]
- Treatment of a ruptured PAA is surgical management. This is performed by creating a bypass from the proximal arterial segment to the aneurysm, to the arterial segment below the aneurysm. Removing the aneurysm from blood flow circulation is important for future complications. Other surgical options are considered, or a stent graph is placed percutaneously though a small incision in the groin. Success of these procedures is dependent on the ability of the graft to stay patent.[5,6]
- Endovascular aneurysm repair (EVAR) has similar clinical outcomes compared to an open thrombectomy with about one half the patients having complications after five years.[6]
- Connective tissue diseases as Marfan and Ehlers-Danlos syndromes are rarely tested for and diagnosed, which is sometimes an underlying cause of pathology for popliteal or other aneurysms.[7]

Case Description

Chief Complaint: Left Knee Pain

HPI: 66-year-old Caucasian male presented to the emergency room with left knee pain. He felt a pop in his left knee in the morning with immediate pain. It worsened as the day progressed and his left foot felt cold despite trying to ambulate with it. He said that as the day progressed, he felt less pain and more of a "numbness" around his knee and his foot changed to a white color. He has never had this happen before but has spent more time on his knees putting down floor tile the past few weeks.

Past Medical History: Type II Diabetes

Past Surgical History: Left Shoulder Surgery

Family History: Father had similar situation years prior with bypass.

Social History: 40 pack years of cigarettes. Quit 17 years ago. Currently uses marijuana and denies current alcohol and drug use. Retired and lives with his wife. No recent travel.

Medications: metformin 1000mg PO BID

Allergies: None

ROS: (+)lower left leg pain, numbness. Denies erythema, fever, edema, decreased ROM. No fatigue, lightheadednesss, CP, SOB, cough or leg heaviness.

Physical Exam

Vital Signs: 98.6˚ F temporal, 53bpm, 134/66mmHg, 18 RR and 99% O2 RA

General: Alert, Oriented x3, Cooperative, Speech was clear and fluent, well dressed, well groomed.

Psychiatric: Mental Status Exam intact. Mood is happy.

HEENT: Atraumatic normocephalic, Mucous membrane pink and moist.

Cardiovascular: Regular rate and rythem S1, S2. No murmurs, rubs or gallops.

Lungs: Clear to auscultation, No crackles, wheezes, rales or rhonchi. No accessory muscle use.

Abdomen: Soft, non-distended. Flat, no scars, normoactive bowl sounds in all 4 quadrants. No hepatosplenomegaly.

Neurological: Normal speech. No sensation to light and sharp touch on left foot.

Skin/Extremities: Atraumatic. Left foot was pale, cool, no palpable DP or PT pulses of LLE, pain at rest. Palpable bilateral femoral pulse and bounding left popliteal pulse. Posterior tibialis and dorsalis pedis 2+ on right lower extremity. Full ROM bilaterally on lower extremities.

Diagnostics

Labs: All within normal ranges

CTA Findings: Blood flow present from Superficial femoral artery (SFA) and within the distal left SFA. Bilateral popliteal aneurysm, L>R with no run-off below the aneurysm on the LLE. Emboli within the proximal left PA.

Figure 1. CTA Bilateral Popliteal Aneurysm

Figure 2. Lower Extremity POD #1

Figure 3. Left Lateral Fasciotomy Site

Surgical Intervention

1.Systemically heparinized throughout the procedure.

2.Vascular surgeon dissected down to popliteal artery.

3.Proximal access for bypass by dissecting down to superficial femoral artery.

4.Subfascial tunnel created.

5.Longitudinal arteriotomy on distal popliteal artery.

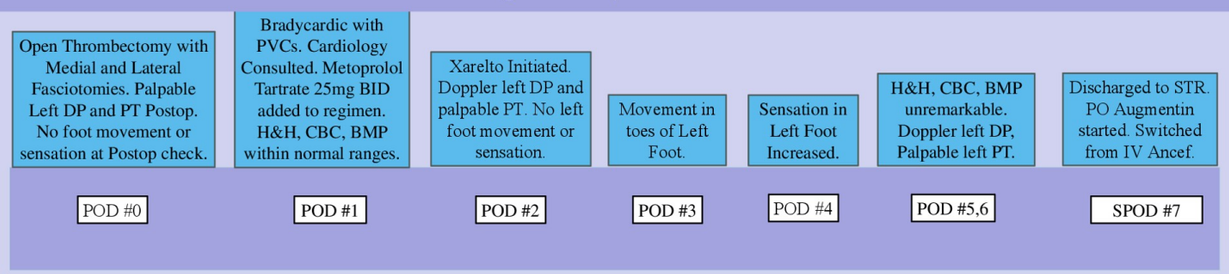
6.A small amount of thrombus was removed with no back-bleeding.

7.Proximal bypass graft anastomosis created. Anastomosis had good hemostasis. PT palpable.

8.Lateral calf fasciotomy for anterior and lateral compartments. Posterior and deep fasciotomy.

9.Incisions tentatively closed with staples in case of swelling or rhabdomyolysis.

Figure 4. Hospital Course



Patient Outcomes

- Treatment: open thrombectomy with left lower extremity medial and lateral compartment fasciotomies.
- Wound Management: wound vacuum placed on fasciotomy sites with daily dressing changes, flushed with normal saline.
- Discharge Plan: short term rehab for 2 weeks, daily PT with wound changes. Signal DP with Doppler, palpable PT with petechial rash on LLE. Unable to dorsiflex or plantar flex at discharge.
- Follow Up: follow up with vascular surgeon in 2 weeks regarding progress and further management of the right popliteal aneurysm.

Discussion

- Popliteal aneurysm should be considered in the differential for any older male patient presenting with lower extremity pain with additional risk factors.
- Ischemia is the most common physical exam finding however it can present with swelling, hematoma or neurological pain. [3,4]
- Diagnostic testing and physical exam findings are likely to be within normal limits. CTA is the most important test in ruling in the diagnosis. [4]
- Endovascular aneurysm repair or open thrombectomy both provide similar clinical outcomes in providing the most appropriate management of PAA. [6]
- Patients are at a high risk for limb loss within 6 months of procedure, other electrolyte imbalances, myocardial infarction, rhabdomyolysis and compartment syndrome. [8]

Conclusion

- Popliteal artery aneurysms are rare but the most common peripheral artery aneurysm. They typically present bilaterally. If seen unilaterally, there should be a high suspicion and evaluation of the other extremity.
- CTA is the diagnostic test of choice in a patient suspected of PAA.
- Popliteal artery aneurysms can be managed surgically either through EVAR or open thrombectomy. Success of procedure and risk of limb loss is solely dependent on the bypass graft created.
- The biggest risk after surgery is compartment syndrome and patients are at a high risk for limb loss during the recovery period.
- The purpose of this case study is to educate medical professionals on the presentation, evaluation and treatment of a patient presenting with a ruptured popliteal artery aneurysm. It is important for clinicians to be aware of popliteal artery aneurysms and their risk factors as they may be underdiagnosed and if not intervened upon early, may result in limb loss.

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