

REFERRAL GUIDELINES TO VMC

VASCULAR SURGERY

Abdominal aortic aneurysm (AAA)

Definition: AAA is an abdominal aortic dilation of > 2.5 - 3 cm OR an aortic diameter dilation to one and half time the size of an adjacent normal aorta.

Diagnosis:

- 1- Strong aortic pulse on abdominal exam
- 2- Plain abdominal X-rays
- 3- Abdominal ultrasound or aortic duplex
- 4- CT or MRI of abdomen and pelvis

Referral:

All patients with AAA need to be referred to vascular surgery and should be seen in clinic within 2-4 weeks

Popliteal or femoral artery aneurysm

Definition: Dilation of popliteal or femoral artery of > 1.5 cm OR arterial diameter dilation to one and half time the size of an adjacent normal artery.

Diagnosis:

- 1- Strong popliteal or femoral pulse on exam
- 2- Popliteal or femoral artery duplex ultrasound
- 3- CT scan or MRI of the lower extremity

Studies before referral:

If popliteal or femoral artery aneurysm is suspected and no imaging was performed, please obtain popliteal or femoral artery duplex ultrasound then refer to vascular surgery.

Referral:

All patients need to be referred to vascular surgery and should be seen in clinic within 2-4 weeks

Iliac artery aneurysm

Definition: Dilation of common iliac artery of > 2 cm OR iliac diameter dilation to one and half time the size of an adjacent normal artery. Also could be a dilation of internal iliac artery > 2 cm.

Diagnosis:

- 1- Strong pulse on abdominal exam
- 2- Abdominal or pelvic X-Rays
- 3- Abdominal or pelvic duplex ultrasound
- 4- CT scan or MRI of the abdomen and pelvis

Referral:

All patients with Iliac AA need to be referred to vascular surgery and should be seen in clinic within 2-4 weeks

Thoracic and Thoraco-abdominal aortic aneurysm (TAAA)

Definition: Any descending thoracic aortic dilation of > 3 cm OR an aortic diameter dilation to one and half time the size of an adjacent normal aorta.

Diagnosis:

- 1- Strong aortic pulse on abdominal exam
- 2- Plain abdominal or chest X-rays
- 3- Abdominal ultrasound or aortic duplex
- 4- CT or MRI of chest or abdomen
- 5- Echo-cardiogram (TTE or TEE)

Referral:

All patients with TAAA need to be referred to vascular surgery and should be seen in clinic within 2-4 weeks

Aortic dissection**Definition:**

Type A: Dissection of ascending aorta → refer to Cardio-thoracic surgery

Type B: Dissection of descending aorta → refer to vascular surgery

Diagnosis: CTA, MRA or Echo

Therapy:

- 1- Strict blood pressure control
- 2- Smoking cessation
- 3- Statins
- 4- ASA 81 mg daily
- 5- Referral to vascular surgery. Patient should be seen in clinic within 1-2 weeks
- 6- Acute dissections should be **sent emergently to the ER.**

Renal or mesenteric artery aneurysms

Definition: Dilation of the artery (SMA, Celiac, IMA or Renal) of >1.5 cm OR diameter dilation to one and half time the size of an adjacent normal artery.

Diagnosis:

- 1- Strong pulse on abdominal exam
- 2- Arterial duplex ultrasound of the abdomen
- 3- CT scan or MRI of the abdomen and pelvis
- 4- Abdominal X-rays

Studies before referral:

If mesenteric or renal artery aneurysm is suspected and no imaging was performed, please obtain abdominal duplex ultrasound then refer to vascular surgery.

Referral:

All patients need to be referred to vascular surgery and should be seen in clinic within 2-4 weeks

Extracranial Carotid or innominate artery aneurysm

Definition: Dilation of carotid artery of > 1.5 cm OR diameter dilation to one and half time the size of an adjacent normal artery. Dilation of the innominate artery of > 2.5 cm.

Diagnosis:

- 1- Palpable carotid aneurysm on exam
- 2- Carotid or innominate artery duplex ultrasound
- 3- CT scan or MRI of the neck or the chest

Studies before referral:

If aneurysm is suspected and no imaging was performed, please obtain carotid or innominate artery duplex ultrasound then refer to vascular surgery.

Referral:

All patients need to be referred to vascular surgery and should be seen in clinic within 2-4 weeks

Carotid artery occlusive disease (Carotid stenosis)

Definitions: Internal Carotid stenosis of > 50% on duplex ultrasound, MRA or CT angiogram.

Diagnosis:

- 1- Asymptomatic
- 2- Carotid bruit
- 3- Stroke with focal neurologic symptoms
- 4- TIA:
 - a- Transient Monocular blindness
 - b- Transient, one sided arm or leg weakness
 - c- Transient aphasia or slurred speech
- 5- Dizziness: Could happen with diffuse carotid and vertebral arterial disease.

Studies before referral:

All patients should have at least a Carotid duplex before referral. If patient is symptomatic please refer as urgent to be seen within a week. If patient had a stroke please send to ER immediately

Therapy and referral:

- 1- **Asymptomatic** Carotid stenosis up to 50%
 - a- ASA 81 mg daily
 - b- Risk factors modifications: Smoking cessation, HTN control, Statins ...etc
 - c- No need for vascular referral. Medical therapy only
- 2- **Asymptomatic** Carotid stenosis 50-69%
 - a. ASA 81 mg daily
 - b. Risk factors modifications: Smoking cessation, HTN control, Statins ...etc
 - c. Repeat duplex in 6 months
 - d. Refer to vascular surgery if stenosis increase >70%. Patient should be seen in clinic within 2-4 weeks
- 3- **Symptomatic** Carotid stenosis >50%
 - a. ASA 81mg daily
 - b. Plavix 75mg daily
 - c. Risk factors modifications: Smoking cessation, HTN control, Statins ...etc
 - d. Immediate referral to vascular surgery to be seen within a week if patient had a TIA
 - e. Please send patient to ER immediately if had a stroke
- 4- **Asymptomatic** Carotid stenosis of 70% or higher
 - a. ASA 81 mg daily
 - b. Risk factors modifications: Smoking cessation, HTN control, Statins ...etc

- c. Refer to vascular surgery to be seen within 2-4 weeks

Vertebral artery occlusive disease

Definition: Vertebral stenosis of > 70% on duplex ultrasound, MRA or CT angiogram.

Diagnosis:

- 1- Asymptomatic
- 2- Neck bruit
- 3- Stroke with focal neurologic symptoms (mainly posterior circulation)
- 4- TIA:
 - d- Transient Monocular blindness
 - e- Transient, one sided arm or leg weakness
 - f- Transient aphasia or slurred speech
- 5- Dizziness: Could happen with diffuse carotid and vertebral arterial disease or bilateral vertebral stenosis

Studies before referral:

All patients should have at least a Carotid and vertebral duplex before referral. If patient is symptomatic please refer as urgent to be seen within a week. If patient had a stroke please send to ER immediately

Therapy and referral:

- a- ASA 81mg daily
- b- Plavix 75mg daily
- c- Risk factors modifications: Smoking cessation, HTN control, Statins ...etc
- d- Asymptomatic stenosis → refer to vascular surgery to be seen within 2-4 weeks.
- e- Immediate referral to vascular surgery to be seen within a week if patient had a TIA
- f- Please send patient to ER immediately if had a stroke

Aortic occlusive disease

Definition: Aortic atherosclerosis with stenosis or occlusion (seen on any imaging). Weak or absent femoral pulses.

Therapy and management:

- 1- ASA 81 mg daily
- 2- Risk factors modifications: Smoking cessation, HTN control, DM control, Statins, ...etc
- 3- Obtain ABI (Ankle brachial index) to evaluate arterial perfusion to feet

- 4- Please refer all patients to vascular surgery clinic. Patient should be seen within 2-4 weeks

PAD (Peripheral arterial disease)

Claudication

Definition: Cramping Pain in calf with walking for a certain distance which urges patient to stop for a few minutes. Pain is reproducible at the same walking distance. No palpable pedal pulses on exam.

Therapy and management:

- 1- ASA 81 mg daily
- 2- Risk factors modifications: Smoking cessation, HTN control, DM control, Statins, ...etc
- 3- Obtain ABI (Ankle brachial index) to evaluate arterial perfusion to feet
- 4- If ABI are 0.5-0.9, continue the above and advise patient to perform walking exercise (Walk 30 min x 3 per week. When develops pain with walking, take a break and walk again until end of 30 minutes)
- 5- Refer to vascular surgery. Patient should be seen in 4-8 weeks.

Rest pain

Definition: Pain that happens in the foot (Mainly forefoot and toes) which wakes up patient from sleep at night. Patient has to walk around to relieve the pain. No palpable pedal pulses on exam. Sometimes patient has dependent rubor (erythematous foot while foot is dependent) that turns white upon elevation (Pallor on elevation).

Therapy and management:

- 1- ASA 81 mg daily
- 2- Risk factors modifications: Smoking cessation, HTN control, DM control, Statins, ...etc
- 3- Obtain urgent ABI (Ankle brachial index) to evaluate arterial perfusion to feet
- 4- Urgent referral to vascular surgery. Patient should be seen within 2-3 weeks. No need to wait for ABI results.

Foot: Tissue loss, ulcers, open wounds, gangrene

Definition: Open wounds, ulcers or gangrene of foot or leg with Absence of pedal pulses.

Therapy and management:

- 1- ASA 81 mg daily
- 2- Risk factors modifications: Smoking cessation, HTN control, DM control, Statins, ...etc
- 3- Obtain urgent ABI (Ankle brachial index) to evaluate arterial perfusion to feet.
- 4- **Urgent referral** to vascular surgery. Patient should be seen within 1-2 weeks. No need to wait for ABI results

Chronic mesenteric occlusive disease

Definition: Atherosclerosis and stenosis of superior mesenteric artery (SMA), celiac trunk (CA) or inferior mesenteric artery (IMA) on arterial duplex, MRA or CTA

Diagnosis:

- 1- Could be asymptomatic with an incidental finding on imaging
- 2- Postprandial abdominal pain (pain happens within 15-30 minute after eating any food), unintentional weight loss and food fear (Avoids eating to avoid having pain). One symptom or combination of this triad could be present. Unintentional weight loss is the most common presentation. Patient usually has no tenderness on abdominal exam.
- 3- Mesenteric duplex ultrasound should be the first study performed for diagnosis.
- 4- CT Angiography of the abdomen could be the next step.

Therapy and management:

- 1- ASA 81 mg daily
- 2- Risk factors modifications: Smoking cessation, HTN control, DM control, Statins, ...etc
- 3- **Urgent referral** to vascular surgery. Patient should be seen within 2-3 weeks.

Chronic renal artery stenosis

Definition: Renal artery stenosis of > 60% (On duplex ultrasound) in patient who is taking 2-3 or more HTN meds.

Studies before referral:

Renal artery duplex ultrasound.

Therapy and management:

- 1- ASA 81 mg daily

- 2- Risk factors modifications: Smoking cessation, HTN control, DM control, Statins, ...etc
- 3- **Referral** to vascular surgery. Patient should be seen within 4-8 weeks.

Varicose veins

Definition:

Dilated varicose veins in legs or thighs due to venous insufficiency (reflux). No ulcers or tissue loss. Patient has normally palpable pedal pulses.

Diagnosis:

Dilated skin veins on exam of lower extremities.

And/Or:

- Leg swelling/edema.
- Pain in the leg which gets worse by the end of the day

Studies:

Venous duplex: shows superficial, deep and/or perforator venous reflux.

Therapy:

- 1- Knee high compression stockings 15-20 mmHg to wear all day and remove before bedtime. Stockings should be changed every 6 months
- 2- Lower extremity elevation while in sitting position to help decrease venous pressure in leg
- 3- Avoid long periods of standing
- 4- Please attempt the above therapy for 3-6 months **Before** referral to vascular surgery
- 5- If patient continues to be symptomatic after the initial therapy then please refer to vascular surgery.
- 6- Patient should be seen in clinic within 2 months from referral date.

Varicose veins of legs with skin discoloration

Definition:

Dilated varicose veins in legs or thighs due to venous insufficiency (reflux). No ulcers or tissue loss. Patient has normally palpable pedal pulses. Skin changes with discoloration.

Diagnosis:

Dilated skin veins on exam of lower extremities with skin discoloration.
Leg swelling/edema.
Pain in the leg which gets worse by the end of the day.

Studies:

Venous duplex: shows superficial, deep and/or perforator venous reflux.

Therapy:

- 1- Knee high compression stockings 15-20 mmHg to wear all day and remove before bedtime. Stockings should be changed every 6 months.
- 2- Lower extremity elevation while in sitting position to help decrease venous pressure in leg.
- 3- Avoid long periods of standing
- 4- Please attempt the above therapy for 3-6 months **Before** referral to vascular surgery
- 5- If patient continues to be symptomatic after the initial therapy then please refer to vascular surgery.
- 6- Patient should be seen in clinic within 4-6 weeks from referral date.

Varicose veins of legs with skin discoloration and Ulceration

Definition:

Dilated varicose veins in legs or thighs due to venous insufficiency (reflux).
Ulcers or open wounds are present.
Patient has normally palpable pedal pulses.
Skin changes with discoloration could be present

Diagnosis:

Open wounds or ulcerations are present on leg
Dilated skin veins on exam of lower extremities with skin discoloration.
Leg swelling/edema.
Pain in the leg that gets worse by the end of the day.

Studies:

Venous duplex: shows superficial, deep and/or perforator venous reflux.

Therapy:

- 1- Compression dressing on affected leg (i.e. Unna boot) and wound clinic referral.

- 2- Knee high compression stockings 15-20 mmHg to wear all day and remove before bedtime on the contralateral leg (If no wound is present)
- 3- Lower extremity elevation while in sitting position to help decrease venous pressure in leg.
- 4- Avoid long periods of standing
- 5- Vascular referral. Patient should be seen in clinic within 4 weeks from referral date

Other vascular pathology

Aortic arch vessels atherosclerosis

Subclavian artery atherosclerosis

Common carotid artery atherosclerosis

Upper extremity atherosclerosis

If patient is asymptomatic, please refer patient to vascular clinic
Patient should be seen within 4-8 weeks

Symptomatic patients with pain or stroke like symptoms or TIA should be seen in clinic
within 1-2 weeks

Aberrant right subclavian artery

Definition: An aortic arch anomaly when the origin of the right subclavian artery comes off the proximal descending aorta (Normally comes off the innominate artery).

Diagnosis: one or more of those symptoms

- 1- Dysphagia (Called dysphagia lusoria)
- 2- Sometimes patient has chest pain and cardiac workup is normal.
- 3- Pulsations felt in chest with strenuous activities (e.g. exercise)
- 4- Right arm symptoms like embolic events or ischemia

Therapy:

- 1- ASA 81mg daily
- 2- Chest and neck CTA or MRA
- 3- Refer to vascular surgery. Patient should be seen within 2-3 weeks

Aortic arch anomalies

Any aortic arch anomalies require diagnosis with **CT angiography or MRA**
Then refer patient to vascular surgery to be seen within 2-3 weeks

Thoracic outlet syndrome

Definition: 3 types. Please obtain plain chest XR in all patients

-Venous type: DVT in the upper extremity veins (Mainly subclavian and brachial veins) with arm swelling. Sometimes DVT is absent but swelling is present. Usually happens in athletics but could happen in other subset of patients. Please treat as DVT and refer to vascular surgery. Should be seen within 2-4 weeks.

-Arterial type: Patients will have ischemic pain with arm movements or they develop subclavian artery aneurysm, which could cause distal emboli to fingers. Please refer to vascular surgery. Should be seen within 2-4 weeks.

-Neurogenic type: (Most common) : Patient will have radicular pain to hand and arm with use of the affected arm. Most of those patients can be treated conservatively with physical therapy.
Please refer patient to vascular to be seen within 2-4 weeks

DVT, upper or lower extremity

All acute DVT should be treated with full anticoagulation for 3-6 months by the medical service. Limb elevation should be recommended to the patient. Repeat venous duplex in 3 months from the initiation of therapy to re-evaluate the need for anticoagulation.

Exceptions:

Occlusive Acute ilio-femoral DVT should be referred immediately to ER or vascular surgery clinic.

- Immediately start full anticoagulation.
- Catheter directed thrombolysis could decrease the chance of post-phlebotic syndrome.
- Patient should be seen in vascular clinic **within one week** to evaluate the need for thrombolysis.