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Subject: Arterial Ultrasound (Duplex Ultrasounds and Physiologic Testing)

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DESCRIPTION:

Tests addressed in this guideline include duplex ultrasound imaging of the extracranial arteries; duplex ultrasound imaging of the aorta, Inferior Vena Cava and Iliac vessels; duplex ultrasound imaging of the arteries of the upper & lower extremities; and physiologic testing for peripheral arterial disease (PAD) of the upper & lower extremities.

Duplex Ultrasound Imaging of the Extracranial Arteries

- Standard anatomic coverage: arteries of both the anterior (carotid) and posterior (vertebrobasilar) extracranial systems.
- For the purposes of this guideline symptoms are defined as follows:
 - Anterior symptoms (carotid vascular territory) include unilateral motor or sensory deficit, speech impairment, or amaurosis fugax (temporary loss of vision)
 - Posterior symptoms (vertebrobasilar territory) include vertigo, ataxia, diplopia (double vision), dysphagia, dysarthria
 - The terms cerebrovascular attack (CVA) and transient ischemic attack (TIA) do not apply specifically to either anterior or posterior circulation.
- Severity of vascular stenosis is defined as follows:
 - Mild disease: <50% stenosis
 - Moderate disease: 50%-69% stenosis
 - Severe disease: 70%-99% stenosis

- Total occlusion: 100% stenosis.
- The term “revascularization” should be taken to mean carotid endarterectomy, or stent implantation.

Duplex Ultrasound Imaging of the Aorta, Inferior Vena Cava and Iliac Vessels

- Standard anatomic coverage: Abdominal aorta, inferior vena cava (IVC), iliac vasculature and bypass grafts involving these vessels.
- For the purposes of this guideline the term “repair” when used in discussion of aortoiliac disease should be taken to mean any of the following; open surgical repair of abdominal aortic aneurysm (AAA), aorto-iliac endograft placement for management of aorto-iliac aneurysm, aortic or iliac stent placement, or surgical bypass procedures.
- The periodic surveillance guidelines for patients with AAA who have not undergone repair are based on maximum external aortic diameter.
- Symptoms are defined as follows:
 - Claudication is defined as muscle fatigue, cramping, or pain that reproducibly begins during exercise and that promptly resolves with rest
 - Rest pain is similar to the pain of claudication but it occurs at rest in a patient with an established diagnosis of PAD or with physical examination evidence of advanced PAD such as markedly diminished pulses, gangrene or ulceration
 - Atypical symptoms describe limb pains other than rest pain or claudication.

Duplex Ultrasound Imaging of the Arteries of the Upper and Lower Extremities

- Standard anatomic coverage: Arteries of the upper and lower extremities.
- It is conventional to report ABI measurements as follows: Noncompressible values defined as greater than 1.40, normal values 1.00 to 1.40, borderline 0.91 to 0.99, and abnormal 0.90 or less.
- For the purposes of this guideline symptoms are defined as follows:
 - Claudication is defined as muscle fatigue, cramping, or pain that reproducibly begins during exercise and that promptly resolves with rest
 - Rest pain is similar to the pain of claudication but it occurs at rest in a patient with an established diagnosis of PAD or with physical examination evidence of advanced PAD such as markedly diminished pulses, gangrene or ulceration
 - Atypical symptoms describe limb pains other than rest pain or claudication.

Physiologic Testing for Peripheral Arterial Disease (PAD) of the Upper and Lower Extremities

- Standard anatomic coverage: Arteries of the upper and lower extremities.
- It is conventional to report ABI measurements as follows: Noncompressible values defined as greater than 1.40, normal values 1.00 to 1.40, borderline 0.91 to 0.99, and abnormal 0.90 or less.

POSITION STATEMENT:

Note: This guideline is not applicable for surveillance following percutaneous revascularization (e.g. angioplasty, stent placement).

Duplex Ultrasound Imaging of the Extracranial Arteries

Duplex ultrasound imaging for extracranial arterial disease **meets the definition of medical necessity** for **ONE** of the following indications (1, 2, or 3):

1. Member with suspected extracranial arterial disease and with **ONE** of the following:
 - New or worsening anterior or posterior neurological symptoms
 - Evaluation prior to transcatheter aortic valve replacement (TAVR)/ transcatheter aortic valve implantation (TAVI)
 - Hollenhorst plaque seen on retinal examination
 - Evaluation for subclavian or vertebral steal syndrome in member who develop lightheadedness or impaired vision in the setting of upper extremity exertion
 - Evaluation for known or suspected carotid artery dissection
 - Evaluation of syncope when cardiovascular causes (e.g. rhythm disturbance, valvular disease) have been excluded
 - Evaluation for known or suspected aneurysm, arteriovenous malformation (AVM) or fistula (AVF).
2. Member with established extracranial arterial disease who has not undergone revascularization and with **ONE** of the following:
 - New or worsening anterior or posterior neurological symptoms (does not apply to member with syncope or near-syncope)
 - Evaluation of syncope when cardiovascular causes (e.g. rhythm disturbance, valvular disease) have been excluded
 - Evaluation prior to TAVR (TAVI)
 - Surveillance studies every 6 months (appropriate for member with severe (70%-99%) carotid stenosis provided that the member is a candidate for revascularization)
 - Annual surveillance studies, after the first year (appropriate for member with moderate (50%-69%) stenosis provided that the member is a candidate for revascularization).
3. Member with established extracranial arterial disease who has undergone revascularization and with **ONE** of the following:
 - A baseline study (within 1 month following revascularization)
 - New or worsening neurological symptoms
 - Two imaging studies (appropriate at about 6 and 12 months within the first year following revascularization)
 - Annual surveillance studies (appropriate after the first year)
 - Evaluation prior to TAVR (TAVI)
 - Following an abnormal surveillance study revealing severe (70% or greater) stenosis, additional studies at six month intervals (appropriate provided the member is a candidate for repeat revascularization).

Duplex Ultrasound Imaging of the Aorta, Inferior Vena Cava and Iliac Vessels

Duplex imaging of the aorta and iliac arteries **meets the definition of medical necessity** for **ONE** of the following indications (1,2, 3,or 4):

1. Asymptomatic **member** without signs or symptoms of disease (screening studies) and **ONE** of the following:
 - A single screening study for AAA in male member aged 60-75 years who has a first degree relative with AAA
 - A single screening study for AAA in male member aged 60-75 years who is a current or former smoker
 - A single screening study for AAA for female member aged 60-75 who has a first degree relative with AAA and is a current or former smoker.
2. Member with suspected aorto-iliac disease who has abnormal signs or symptoms and **ONE** of the following:
 - Pulsatile abdominal mass
 - Suspected or established femoral or popliteal artery aneurysm
 - Thoracic aortic aneurysm
 - Abnormal abdominal X-ray suggestive of AAA
 - Decreased or absent femoral pulse
 - Lower extremity claudication
 - Abnormal physiological testing suggesting aorto-iliac disease
 - Abdominal or femoral bruit
 - Evidence of atheroembolic disease of the lower extremities (e.g. ischemic or discolored toes, livedo reticularis).
3. Member with established aorto-iliac disease who has not undergone repair, has an established diagnosis of AAA, and **ONE** of the following:
 - New or worsening symptoms or signs of aorto-iliac disease
 - AAA greater than or equal to 4.5 cm (may undergo surveillance imaging as frequently as every six (6) months)
 - AAA greater than or equal to 3.5 cm and less than 4.5 cm (may undergo surveillance imaging at six (6) monthly intervals in the first year following diagnosis and annually thereafter)
 - AAA greater than or equal to 3.0 cm and less than 3.5 cm (may undergo surveillance imaging one year after diagnosis and then every three (3) years thereafter)
 - Iliac aneurysms greater than or equal to 3.0 cm (may undergo surveillance imaging as frequently as every six (6) months)
 - Iliac aneurysm less than 3.0 cm (may undergo surveillance imaging annually)
 - Pre-procedure planning.
4. Member with established aorto-iliac disease who has undergone repair and **ONE** of the following:
 - New or worsening symptoms or signs of aorto-iliac disease
 - Baseline study after aortic or iliac stent placement
 - Baseline study after aortic or iliac endograft

- Follow-up surveillance study at 6 monthly intervals after aortic or iliac endograft when endograft leak or increasing residual aneurysm sac size was noted on the study
- Follow-up surveillance study at yearly intervals after aortic or iliac endograft when there was no evidence of endograft leak or increasing residual aneurysm sac size on the preceding study
- Baseline study of surgical bypass grafting involving the aorto-iliac vessels
- Follow-up surveillance study at 6-12 months following surgical bypass grafting involving the aorto-iliac vessels
- Annual follow-up surveillance study starting 1 year after surgical bypass grafting involving the aorto-iliac vessels
- Every 6 months for endografts that are increasing in size or endoleaks
- Pre-procedure planning.

Duplex imaging of the inferior vena cava (IVC) and iliac veins **meets the definition of medical necessity** for any **ONE** of the following situations:

- Suspected or established IVC or iliac vein thrombus
- Suspected or established IVC or iliac vein mass
- Suspected or established external compression of the IVC or iliac veins
- To establish patency of the IVC in a member with an IVC filter
- To evaluate tumor extension into the IVC in a member with renal or adrenal tumors
- To assist in evaluation of volume status in a member with unexplained hypotension (not usually performed in the outpatient setting).

Duplex Ultrasound Imaging of the Arteries of the Upper Extremities

Duplex imaging for peripheral arterial disease of the upper extremities **meets the definition of medical necessity** for **ONE** of the following indications (1,2,3,or 4):

1. Symptomatic member with suspected PAD and **ONE** of the following:
 - Atypical symptoms with inconclusive physiological testing
 - Claudication with normal or inconclusive physiological testing
 - Resting ischemic pain
 - Evidence of atheroembolic disease of the upper extremities (e.g. ischemic or discolored fingers, livedo reticularis).
2. Member with established PAD and **ONE** of the following:
 - Atypical symptoms with inconclusive physiological testing
 - Claudication with normal or inconclusive physiological testing
 - Resting ischemic pain
 - Evidence of atheroembolic disease of the upper extremities (e.g. ischemic or discolored fingers, livedo reticularis)

- Persistent claudication despite a trial of conservative therapy and are being evaluated for revascularization
 - Routine baseline study for member who has undergone revascularization (percutaneous or surgical)
 - Underwent revascularization when surveillance (no new or worsening symptoms) physiological testing is inconclusive
 - A follow-up surveillance (no new or worsening symptoms) study at 6-12 months following surgical revascularization
 - An annual follow-up surveillance (no new or worsening symptoms) study starting 1 year after revascularization (appropriate for member who have undergone surgical revascularization).
3. Evaluation of vascular access complications for a member who has had vascular access and **ONE** of the following:
- A pulsatile mass
 - A bruit or thrill at the vascular access site
 - A significant (more than would be expected for the procedure performed) hematoma at the vascular access site
 - Severe pain (more than would be expected for the procedure performed) at the vascular access site
 - Evidence of atheroembolic disease of the upper extremities (e.g. ischemic or discolored fingers, livedo reticularis).
4. **One** of the following miscellaneous indications:
- Following limb trauma when there is suspicion of vascular injury
 - To assess the suitability of upper extremity arteries for use as bypass conduits prior to CABG or in creation of arteriovenous (AV) fistula for dialysis
 - For evaluation of suspected positional arterial obstruction (e.g. thoracic outlet syndrome)
 - Known or suspected aneurysm.

Duplex Ultrasound Imaging of the Arteries of the Lower Extremities

Duplex imaging for peripheral arterial disease of the lower extremities **meets the definition of medical necessity** for **ONE** of the following indications (1,2,3,or 4):

1. Symptomatic member with suspected PAD and with any **ONE** of the following:
 - Resting ischemic pain, non-healing wounds, or gangrene
 - Evidence of atheroembolic disease of the lower extremities (ischemic or discolored toes, livedo reticularis etc.).
2. Member with established PAD and with any **ONE** of the following:
 - Resting ischemic pain, non-healing wounds, or gangrene
 - Evidence of atheroembolic disease of the lower extremities (ischemic or discolored toes, livedo reticularis etc.)
 - Persistent claudication despite a trial of conservative therapy who are being evaluated for revascularization

- Routine baseline study for member who has undergone revascularization (percutaneous or surgical)
 - Underwent revascularization when surveillance (no new or worsening symptoms) physiological testing is inconclusive (ABI >1.40), borderline (ABI 0.91 – 0.99) or abnormal (ABI < or = 0.90)
 - A follow-up surveillance (no new or worsening symptoms) study at 6-12 months following surgical revascularization with a venous graft
 - An annual follow-up surveillance (no new or worsening symptoms) study starting 1 year after revascularization with a venous graft (appropriate for member who has undergone surgical revascularization).
3. Evaluation of vascular access complications for a member who has had vascular access and **ONE** of the following:
- A pulsatile mass
 - A bruit or thrill at the vascular access site
 - A significant (more than would be expected for the procedure performed) hematoma at the vascular access site
 - Severe pain (more than would be expected for the procedure performed) at the vascular access site
 - Evidence of atheroembolic disease of the lower extremities (ischemic or discolored toes, livedo reticularis etc.).
4. **One** of the following miscellaneous indications:
- Following limb trauma when there is suspicion of vascular injury
 - For evaluation of suspected positional arterial obstruction.

Physiologic Testing for Peripheral Arterial Disease (PAD) of the Upper and Lower Extremities

Diagnostic physiologic testing for peripheral arterial disease of the lower extremities **meets the definition of medical necessity** for **ONE** of the following indications (1,2, or 3):

1. Symptomatic member with suspected PAD and with any **ONE** of the following:
 - New or worsening exertional limb symptoms (claudication)
 - Resting limb pain thought to be due to ischemia (because of diminished or absent pulses)
 - Non-healing ulcers or gangrene of the lower extremities
 - No palpable pulses
 - Suspected acute limb ischemia (suggested by sudden onset of pain associated with pulselessness, pallor, loss of motor or sensory function).
2. Member with established PAD who has not undergone revascularization and with any **ONE** of the following:
 - Newly diagnosed PAD to establish a baseline
 - New or worsening exertional limb symptoms (claudication)
 - Non-healing leg ulcers or gangrene
 - Infection of the leg or foot with no palpable pulses

- Established PAD to establish the level of disease when intervention is anticipated.
3. Member with established PAD who has undergone revascularization and with any **ONE** of the following:
- New or worsening exertional limb symptoms (claudication)
 - Leg ulcers or gangrene
 - Infection of the leg or foot with no palpable pulses
 - A post procedure baseline surveillance (no new or worsening symptoms) study (usually performed within 6 months of the revascularization procedure)
 - A follow-up surveillance (no new or worsening symptoms) study at 6-12 months following surgical revascularization
 - An annual follow-up surveillance study (no new or worsening symptoms) starting 1 year after revascularization
 - To establish the level of disease when intervention is anticipated.

Diagnostic physiologic testing for peripheral arterial disease of the upper extremities **meets the definition of medical necessity** for **ONE** of the following indications (1,2,or 3):

1. Symptomatic member with suspected PAD and with any **ONE** of the following:
 - New or worsening exertional arm or hand symptoms (claudication)
 - Unilateral cold painful hand
 - Finger discoloration or ulcer
 - Suspected positional arterial obstruction
 - Arm or hand trauma and a suspicion of vascular injury
 - Prior to planned harvest of the radial artery (e.g. for CABG)
 - Presence of pulsatile mass or hand ischemia after upper extremity vascular access
 - Presence of bruit after upper extremity access for intervention.
2. Member with established PAD who has not undergone revascularization and with any **ONE** of the following:
 - New or worsening exertional arm or hand symptoms (claudication)
 - Unilateral cold painful hand
 - Finger discoloration or ulcer
 - Arm or hand trauma and a suspicion of vascular injury
 - Prior to planned harvest of the radial artery (e.g. for CABG)
 - Presence of pulsatile mass or hand ischemia after upper extremity vascular access
 - Presence of bruit, thrill, hematoma or severe pain after upper extremity vascular access
 - To establish the level of disease when intervention is anticipated.
3. Member with established PAD who has undergone revascularization and with **ONE** of the following:
 - New or worsening exertional arm or hand symptoms (claudication)

- Arm or hand ulcers or gangrene
- Infection of the arm or hand with no palpable pulses
- Following trauma to the revascularized limb with suspected vascular injury
- A post procedure baseline surveillance (no new or worsening symptoms) study (usually performed within 6 months of the revascularization procedure)
- A follow-up surveillance (no new or worsening symptoms) study at 6-12 months following surgical revascularization using a vein bypass graft
- An annual follow-up surveillance study (no new or worsening symptoms) starting 1 year after revascularization following surgical revascularization using a vein bypass graft or a prosthetic bypass.

Duplex imaging and physiologic testing for peripheral arterial disease (PAD) of the upper and lower extremities **does not meet the definition of medical necessity** when the above criteria are not met and including but not limited to:

- Duplex imaging of the upper and lower extremities in asymptomatic member with suspected PAD
- Physiologic testing of the upper and lower extremities in asymptomatic member with suspected PAD.

BILLING/CODING INFORMATION:

CPT Coding:

93880	Duplex scan of extracranial arteries; complete bilateral study
93882	Duplex scan of extracranial arteries; unilateral or limited study
93922	Limited bilateral noninvasive physiologic studies of upper or lower extremity arteries, (e.g., for lower extremity: ankle/brachial indices at distal posterior tibial and anterior tibial/dorsalis pedis arteries plus bidirectional, Doppler waveform recording and analysis at 1-2 levels, or ankle/brachial indices at distal posterior tibial and anterior tibial/dorsalis pedis arteries plus volume plethysmography at 1-2 levels, or ankle/brachial indices at distal posterior tibial and anterior tibial/dorsalis pedis arteries with, transcutaneous oxygen tension measurement at 1-2 levels)

93923	Complete bilateral noninvasive physiologic studies of upper or lower extremity arteries, 3 or more levels (e.g., for lower extremity: ankle/brachial indices at distal posterior tibial and anterior tibial/dorsalis pedis arteries plus segmental blood pressure measurements with bidirectional Doppler waveform recording and analysis, at 3 or more levels, or ankle/brachial indices at distal posterior tibial and anterior tibial/dorsalis pedis arteries plus segmental volume plethysmography at 3 or more levels, or ankle/brachial indices at distal posterior tibial and anterior tibial/dorsalis pedis arteries plus segmental transcutaneous oxygen tension measurements at 3 or more levels), or single level study with provocative functional maneuvers (e.g., measurements with postural provocative tests, or measurements with reactive hyperemia)
93924	Noninvasive physiologic studies of lower extremity arteries, at rest and following treadmill stress testing, (i.e., bidirectional Doppler waveform or volume plethysmography recording and analysis at rest with ankle/brachial indices immediately after and at timed intervals following performance of a standardized protocol on a motorized treadmill plus recording of time of onset of claudication or other symptoms, maximal walking time, and time to recovery) complete bilateral study
93925	Duplex scan of lower extremity arteries or arterial bypass grafts; complete bilateral study
93926	Duplex scan of lower extremity arteries or arterial bypass grafts; unilateral or limited study
93930	Duplex scan of upper extremity arteries or arterial bypass grafts; complete bilateral study
93931	Duplex scan of upper extremity arteries or arterial bypass grafts; unilateral or limited study
93978	Duplex scan of aorta, inferior vena cava, iliac vasculature, or bypass grafts; complete study
93979	Duplex scan of aorta, inferior vena cava, iliac vasculature, or bypass grafts; unilateral or limited study

REIMBURSEMENT INFORMATION:

Refer to section entitled [POSITION STATEMENT](#).

PROGRAM EXCEPTIONS:

Federal Employee Program (FEP): Follow FEP guidelines. **State Account Organization (SAO):** Follow SAO guidelines.

Medicare Advantage products:

The following was reviewed on the last guideline reviewed date: Chapter 18-Preventive and Screening Services. Medicare Claims Processing Manual. Pub. 100-04. Section 110 – Ultrasound Screening for Abdominal Aortic Aneurysm (AAA); located at cms.gov.

The following Local Coverage Determinations (LCD) were reviewed on the last guideline reviewed date: Duplex Scan of Lower Extremity Arteries (L33667), Non-invasive Extracranial Arterial Studies (L33695), Noninvasive Physiologic Studies of Upper or Lower Extremity Arteries (L33696), and Duplex Scanning (L33674); located at fso.com.

DEFINITIONS:

Aorto-iliac: Buildup of plaque in the aorta or iliac vessels which may result in varying degrees of narrowing of those vessels.

Atheroembolic disease: Occurs when plaque breaks off and blocks small arteries such as the renal arteries.

Dysarthria: A speech disorder caused by muscle weakness.

Subclavian steal or vertebral syndrome: a collection of signs and symptoms that result from retrograde (reversed) blood flow in the vertebral artery or the internal thoracic artery, due to a proximal stenosis and/or occlusion.

Thoracic outlet syndrome: symptoms (such as numbness in fingers, pain in shoulder, arm, and neck) due to compression of nerves or blood vessels in the upper chest.

RELATED GUIDELINES:

[Advanced Imaging of the Heart, 06-0000-02](#)

[Diagnostic Coronary Angiography, 02-0000-03](#)

[Elective Percutaneous Coronary Intervention, 06-0000-04](#)

OTHER:

None applicable.

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American College of Radiology, American Institute of Ultrasound in Medicine, American Society of Echocardiography, American Society of Nephrology, Intersocietal Commission for the Accreditation of Vascular Laboratories, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Computed Tomography, Society for Interventional Radiology, Society for Vascular Medicine, Society for Vascular Surgery, and Society for Vascular Ultrasound. *J Am Coll Cardiol.* 2012;60(3):242-276.

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COMMITTEE APPROVAL:

This Medical Coverage Guideline (MCG) was approved by the Florida Blue Medical Policy & Coverage Committee on 10/24/19.

GUIDELINE UPDATE INFORMATION:

06/15/18	New Medical Coverage Guideline.
03/15/19	Revision; Duplex ultrasound imaging for extracranial arterial disease section updated; program exception and references updated.
06/29/19	Revision; Upper & lower extremity arterial duplex sections and references updated.
11/10/19	Revision; Position statements and references updated.