HEALTHHELP®
A WNS COMPANY

2024 Computed Tomography Angiography/Venography (CTA/CTV) Abdomen and Pelvis

Diagnostic Imaging

CTA-ABDPelvis-HH

Last Review Date: 10/28/2024
Previous Review Date: 06/23/2024
Guideline Initiated: 06/30/2019

HEALTHHELP®

A WNS COMPANY

Table of Contents

Computed Tomography Angiography/Computed Tomography Venography (CTA/CTV) Abdomen and Pelvis 3

- CTA General Contraindications 3
- Preamble: Pediatric Diagnostic Imaging 3
- CTA/CTV Abdomen and Pelvis Guideline 3
- CTA Chest and CTA Abdomen or CTA Abdomen/Pelvis Combination 6
- CTA/CTV Abdomen and Pelvis Procedure Codes 7
- CTA Abdomen and Pelvis Summary of Changes 7

CTA/CTV Abdomen and Pelvis Definitions 7

CTA/CTV Abdomen and Pelvis References 12

Disclaimer & Legal Notice 14

Computed Tomography Angiography/Computed Tomography Venography (CTA/CTV) Abdomen and Pelvis

NCD 220.1
See also, **NCD 220.1**: Computed Tomography at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

CTA General Contraindications

Computed tomography angiography (CTA) may be contraindicated for **ANY** of the following:

- Contrast allergy
  References: [7] [35]
- Heart failure is decompensated.
  References: [7] [35]
- Hemodynamic instability (eg, abnormal laboratory values, blood pressure instability)
  References: [7] [35]
- Renal impairment
  References: [7] [35]
- Protocol can **NOT** be followed (eg, technical or related to individual).
  References: [7] [35]

Preamble: Pediatric Diagnostic Imaging

HealthHelp's clinical guidelines for the Diagnostic Imaging program, are intended to apply to both adults and pediatrics (21 years of age or younger), unless otherwise specified within the criteria.

CTA/CTV Abdomen and Pelvis Guideline

Computed tomography angiography/computed tomography venography (CTA/CTV) of the abdomen and pelvis is considered medically appropriate when the documentation demonstrates **ANY** of the following conditions:

1. Arterial disease is suspected or known with **ANY** of the following:
   a. Aneurysm, abdominal aorta, is suspected or known and **ANY** of the following:

1. Aneurysm is known **AND** complications are suspected.
2. Anatomy is known to be complex.
3. Aneurysm is suspected or known **AND** ultrasound is non-diagnostic or indeterminate.
4. Aortic aneurysm surveillance **AND** ultrasound is non-diagnostic or indeterminate for **ANY** of the following:
    a. 2.5 to 3.0 cm; follow-up every 10 years
    b. 3.0 cm to 3.9 cm; follow-up every 3 years
    c. 4.0 cm to 4.9 cm; follow-up annually
    d. 5.0 to 5.4; follow-up every 6 months

b. Hepatic vascular condition (eg, aneurysm, arteriovenous malformations [AVM], compression syndromes, dissection, fistulas, intramural hematoma, vasculitis) is known **AND** ultrasound is non-diagnostic or indeterminate.

c. Large vessel disease (aorta, iliac arteries/veins, mesenteric, renal, splenic, vena cava) is known (eg, aneurysm, dissection, fistulas).

d. Spontaneous coronary artery dissection (SCAD) is known based on prior imaging.

e. Tumor-related vascular invasion or displacement evaluation

f. Vascular abnormality risk is increased and **ANY** of the following:
    i. Connective tissue disease is known for **ANY** of the following:
        A. Ehlers-Danlos (vascular) or Marfan syndrome (*__NOTE__: *one-time vascular study*.)
        B. Loeys-Dietz syndrome; follow-up at least every 2 years.
    ii. Fibromuscular dysplasia (FMD) (*__NOTE__: *one-time vascular study*.)

g. Vascular ischemia or hemorrhage evaluation with **ANY** of the following:
    i. Hemodynamic instability
    ii. Hemorrhage evaluation in the lower gastrointestinal area with **ANY** of the following conditions:
        A. Active bleeding **AND** hemodynamically stable
        B. Bleeding is non-localized and intermittent, as an alternative to Technium-99m (Tc-99m) red blood cell (RBC) scan **AND EITHER** of the following:

I. Colonoscopy is **contraindicated or unavailable**.

II. Colonoscopy did **NOT** localize bleeding.

iii. Mesenteric ischemia/ischemic colitis is suspected or known.

iv. Post-partum hemorrhage evaluation **AND** ultrasound is non-diagnostic or indeterminate.

v. Retroperitoneal hematoma or hemorrhage is suspected **AND** CT is non-diagnostic or indeterminate.

h. Visceral vascular condition (eg, aneurysm, arteriovenous malformations [AVM], compression syndromes, dissection, fistulas, intramural hematoma, vasculitis) is known, for follow-up.

References: [34] [9] [10] [11] [8] [28] [4] [13] [1] [21] [27] [32] [33] [22] [5] [29] [17] [15]

2. Peri-procedural for abdominal/pelvic procedure care, for **ANY** of the following:

a. Peri-procedural imaging to guide pre-procedure planning or post-operative complications.

b. Pre-procedure evaluation for **ANY** of the following:

i. Abdominal aortic aneurysm (AAA) treatment planning

ii. Epigastric arteries, deep inferior, treatment planning

iii. Interventional vascular procedure planning, for luminal patency versus restenosis, due to conditions such as atherosclerosis, thromboembolism and/or intimal hyperplasia.

iv. Transcatheter aortic valve replacement (TAVR) treatment planning

v. Transplant of solid organ (eg, kidney, liver) treatment planning

c. Post-procedure evaluation for **ANY** of the following:

i. AAA or abdominal extent of iliac artery aneurysms, post-procedure follow-up. (*__NOTE__: *routine baseline follow-up after the procedure is usually in 1 to 3 months*.) If asymptomatic, every 6 months for one year, then annually.

ii. Complications (eg, pseudoaneurysms, related to surgical bypass grafts or vascular stents) are suspected.

iii. Endovascular or interventional abdominal vascular procedures, for the evaluation of luminal patency versus restenosis

iv. Inferior vena cava (IVC) filter complications are suspected.

References: [14] [30] [16] [31]

3. Prior CTA abdomen and pelvis imaging is non-diagnostic or indeterminate. (*__NOTE__: *One follow-up is appropriate to evaluate for changes since preceding imaging finding[s]. Further surveillance is appropriate when lesion is specified as "highly suspicious" or there is a change since last exam.*)
4. Venous disease with **ANY** of the following:
    a. Edema of the lower extremity that is diffuse, unexplained **AND** ultrasound is non-diagnostic or indeterminate.
    b. May-Thurner syndrome (iliac vein compression syndrome) is suspected or known.
    c. Pelvic vascular disease or pelvic congestion syndrome evaluation **AND** ultrasound is non-diagnostic or indeterminate.
    d. Tumor-related vascular invasion or displacement evaluation
    e. Venous thrombosis is suspected or known for **ANY** of the following:
        i. Inferior vena cava thrombosis evaluation
        ii. Prior imaging is non-diagnostic or indeterminate.

References: [12] [19]

CTA Chest and CTA Abdomen or CTA Abdomen/Pelvis Combination

A computed tomography angiography (CTA) chest **combined** with CTA abdomen **OR** CTA abdomen/pelvis is considered medically appropriate when the documentation demonstrates **ANY** of the following:

1. Acute aortic dissection
   References: [11] [18]
2. Lower extremity vascular disease evaluation of embolic source.
   Reference: [25]
3. Post-operative complications
4. Takayasu's arteritis
   References: [24] [23]
5. Transcatheter aortic valve replacement (TAVR) for pre-operative or pre-procedural planning
   References: [20]

CTA/CTV Abdomen and Pelvis Procedure Codes

Table 1. CTA/CTV Abdomen/Pelvis Associated Procedure Codes

CODE	DESCRIPTION
74174	Computed tomographic angiography, abdomen and pelvis, with contrast material(s), including noncontrast images, if performed, and image postprocessing

CTA Abdomen and Pelvis Summary of Changes

CTA Abdomen and Pelvis guideline had the following version changes from 2023 to 2024:

- Added the following to keep in line with current research:
  - "Pelvic vascular disease" under "Venous disease"
  - "Peri-procedural planning" under "Peri-procedural"
  - "Prior imaging"
  - "Spontaneous coronary artery dissection"
  - "Transplant of solid organ" under "Pre-procedural"
  - "Vascular ischemia or hemorrhage" indication
  - "Visceral vascular condition" under "Arterial"
- Removed the following as research does not support the indication:
  - "Aneurysm is known" under "Aneurysm
  - "Iliac aneurysm" under "Aneurysm"
  - "Screening" under Aneurysm"
- Mid-cycle update: added Pediatric Preamble

CTA/CTV Abdomen and Pelvis Definitions

Aneurysm occurs when part of an artery wall weakens, allowing it to abnormally balloon out or widen.
Ankle-brachial index (ABI) is a measure of the difference in the systolic blood pressure of the arm and ankle calculated by dividing the blood pressure of the ankle by that of the arm.
Atherosclerosis is plaque (fatty deposit) build-up in the arteries. The deposits are made up of cholesterol, fatty substances, cellular waste products, calcium and fibrin (a clotting material in the blood). As plaque builds up, the wall of the blood vessel thickens. This narrows the channel within the artery reducing blood flow and lessening the amount of oxygen and other nutrients reaching the body.

Arteriovenous malformation (AVM) is a tangle of abnormal blood vessels connecting arteries and veins.

Bypass graft is a procedure that takes a blood vessel from another part of the body and attaches it to the artery above and below the narrowed area or blockage to restore blood flow.

Claudication is a condition in which cramping pain in the leg is induced by exercise, typically caused by obstruction of the arteries.

Colonoscopy is an endoscopic examination of the part of the large intestine that extends from the cecum to the rectum.

Computed tomography angiography (CTA) is a medical test that combines a computed tomography (CT) scan with an injection of a special dye to produce pictures of blood vessels and tissues in a part of the body.

Computed tomography venography (CTV) is a technique targeted to assess venous anatomy, determine venous patency and delineate collateral circulation, often using contrast matierial.

Critical limb ischemia is a severe blockage in the arteries of the lower extremities. It's a serious form of peripheral arterial disease and can significantly increase the risk of heart problems and a shorter lifespan.

Dissection is the abnormal and usually abrupt formation of a tear or separation of the layers inside the wall of an artery.

Edema an abnormal infiltration and excess accumulation of serous fluid in connective tissue or in a serous cavity.

Ehlers-Danlos syndrome is a group of hereditary connective tissue disorders that manifests clinically with skin hyperelasticity, hypermobility of joints, atrophic scarring, and fragility of blood vessels.

Embolism is an obstruction of an artery, typically by a clot of blood or an air bubble.

Endovascular aneurysm repair (EVAR) is a minimally invasive surgery used to treat an aneurysm of the abdominal aorta by placing a device called a stent graft in the artery to reinforce the aneurysm.

Fibromuscular dysplasia is a rare blood vessel disorder that causes arteries to narrow and grow larger. FMD occurs when the strong, flexible cells in arteries are replaced with less strong, less flexible cells. This makes the arteries stiffer and more likely to be damaged.

Fistula is an abnormal connection that leads from an abscess, hollow organ or part to the body surface, or from one hollow organ or part to another, and may be surgically created to permit passage of fluids or secretions.

Gangrene is localized death of soft tissues due to loss of blood supply or serious bacterial infection.

Hematoma is a mass of usually clotted blood that forms in a tissue, organ or body space as a result of a broken blood vessel.

Hemodynamic stability is the term used to describe stable blood flow. When it is said that someone is hemodynamically stable, it means the blood pressure and heart rate of that person are stable or not changing.

Table 1. Hemodynamic Assessment

Hemodynamic Parameters	Stable Circulation	Compensated Shock	Hypotensive Shock
Conscious Level	Clear and lucid	Clear and lucid	Restless, combative
Capillary refill	Brisk (less than 2 seconds)	Prolonged (greater than 2 seconds)	Very prolonged, mottled skin
Extremities	Warm and pink	Cool peripheries	Cold, clammy
Peripheral pulse	Good volume	Weak and thready	Feeble or absent
Heart Rate	Normal heart rate for age	Tachycardia for age	Severe tachycardia or bradycardia in late shock
Blood Pressure	Normal blood pressure and pulse pressure for age	Normal systolic pressure but rising diastolic pressure; Narrowing pulse pressure; Postural hypertension	Narrow pulse pressure (greater than or equal to 20 mm/Hg; Hypotension for age; Unrecordable blood pressure
Respiratory Rate	Normal respiratory rate for age	Tachypnea	Hyerpnea or Kussmaul's breathing (metabolic acidosis)
Urine Output	Normal	Reducing trend	Oliguria or anuria

Hemodynamic instability is a condition caused by abnormal or unstable blood pressure that results in improper circulation and organs of the body do not receive adequate blood flow. It is characterized by chest pain, confusion, abnormal heart rate, loss of consciousness, restlessness, shortness of breath, cold hands, arms, legs or feet, etc.

Hemorrhage is a copious or heavy discharge of blood from the blood vessels.

Iliac vein compression syndrome (May-Thurner syndrome) is a clinical syndrome of unilateral lower extremity swelling and pain due to venous hypertension caused by an iliac artery compressing an overlying iliac vein.

Indeterminate findings are inconclusive or insufficient for treatment planning.

Inferior vena cava filter is a small device that can stop blood clots from going up into the lungs. The inferior vena cava is a large vein in the middle of the body.

Intimal hyperplasia is an abnormal accumulation of cells in the vascular tunica intima; the cell number is increased because of proliferation and/or migration of vascular wall cells, predominantly smooth muscle cells, often in response to a traumatic stimulus.

Intramural hematoma (IMH) is a life-threatening aortic disease that occurs when blood leaks through the innermost layer of the aortic wall. The blood flows between the inner and outer walls of the aorta, but it doesn't happen because of a tear in the wall.

Ischemia is a deficient supply of blood to a body part (such as the heart or brain) due to obstruction of the inflow of arterial blood.

Ischemic rest pain is severe pain in the legs and feet while a person is not moving, or non-healing sores on the feet or legs.
Loeys-Dietz Syndrome (LDS) is a genetic disorder that affects the connective tissue in the body.
Marfan syndrome is a congenital connective tissue disorder that is primarily associated with cardiac pathology (eg, mitral valve prolapse, aortic root dilation), skeletal pathology (eg, lengthening of long bones, joint laxity) and ocular pathology (eg, ectopia lentis).
May-Thurner syndrome (iliac vein compression syndrome) is a clinical syndrome of unilateral lower extremity swelling and pain due to venous hypertension caused by an iliac artery compressing an overlying iliac vein.
Mesenteric is a fold of membrane that attaches the intestine to the abdominal wall and holds it in place.
Non-diagnostic is a result that does not lead to a confirmed diagnosis.
Occlusion is an obstruction or blockage of an anatomical passage.
Pediatric approximate ages are defined by the US Department of Health (USDH), the Food and Drug Administration (FDA), and the American Academy of Pediatrics (AAP) as the following:

- Infancy, between birth and 2 years of age
- Childhood, from 2 to 12 years of age
- Adolescence, from 12 to 21 years of age, further defined by the AAP into:
    1. Early (ages 11–14 years)
    2. Middle (ages 15–17 years),
    3. Late (ages 18–21 years)
    4. Older ages may be appropriate for children with special healthcare needs.

Pelvic congestion syndrome occurs when varicose veins develop around the ovaries, similar to varicose veins that occur in the legs. The valves in the veins no longer function normally, which causes blood to back up. The veins become engorged or "congested", which can be very painful.
Pseudoaneurysm, also called a false aneurysm, is a leakage of blood from an artery into the surrounding tissue. It occurs when there is a breach in the arterial wall.
Pulse volume recording (PVR) uses a blood pressure cuff and hand-held Doppler ultrasound device to determine the presence and severity of peripheral artery disease (PAD). The Doppler ultrasound records sound waves that bounce off moving objects, such as blood, to measure speed and flow.
Retroperitoneal describes the area behind the smooth transparent serous membrane that lines the cavity of the abdomen.
Retroperitoneal bleed occurs when blood enters into space immediately behind the posterior reflection of the abdominal peritoneum. The organs of this space include the esophagus, aorta,

inferior vena cava, kidneys, ureters, adrenals, rectum, parts of the duodenum, parts of the pancreas, and parts of the colon.

Segmental pressures are measured by combining Doppler ultrasound with blood pressure measurements at various locations in the arms and legs. By detecting differences in blood pressure at specific locations in different limbs, this test helps to diagnose arterial blockages and other circulation problems.

Spontaneous coronary artery dissection (SCAD) is a tear in the wall of a coronary artery. It's an emergency condition that can slow or block blood flow to the heart. This can lead to a heart attack, heart rhythm problems, or sudden death.

Surveillance in cancer is the ongoing, timely and systematic collection and analysis of information on new cancer cases, extent of disease, screening tests, treatment, survival and cancer deaths.

Takayasu's arteritis is a chronic inflammatory disease especially of the aorta and its major branches (the brachiocephalic artery and left common carotid artery) that result in progressive stenosis, occlusion and aneurysm formation marked by diminution or loss of the pulse (as in the arm) and ischemic symptoms.

Technetium 99-m (Tc-99m) red blood cells (RBC) scan is a diagnostic radiopharmaceutical agent used for blood pool imaging, including cardiac first pass and gated equilibrium imaging and for detection of sites of gastrointestinal bleeding.

Thoracic outlet syndrome is a term that refers to three related syndromes involving compression of the nerves, arteries, and veins in the lower neck and upper chest area. This compression causes pain in the arm, shoulder, and neck.

Thrombosis is the formation of a blood clot (partial or complete blockage) within blood vessels, whether venous or arterial, limiting the natural flow of blood and resulting in clinical sequela.

Toe Brachial Index (TBI) is defined as the ratio between the systolic blood pressure in the right or left toe and the higher of the systolic pressure in the right or left arms.

Transcatheter Aortic Valve Implantation/Replacement (TAVI/TAVR) is a minimally invasive procedure that replaces a diseased aortic valve with a man-made or animal tissue valve. TAVR is for patients with severe aortic stenosis, which is a narrowing of the valve opening. The procedure only requires a small cut in the skin and does not require open-heart surgery.

Ulcerated is a break in the skin or mucous membrane with loss of surface tissue, disintegration and necrosis of epithelial tissue and often pus.

Ultrasound is the diagnostic or therapeutic use of ultrasound and especially a noninvasive technique involving the formation of a two-dimensional image used for the examination and measurement of internal body structures and the detection of bodily abnormalities.

Vasculitis is inflammation of a blood or lymph vessel.

Visceral artery is the major artery that supply the intestines, spleen and liver.

CTA/CTV Abdomen and Pelvis References

[1] Aghayev, A., Steigner, M.L., . . . Dill, K.E. (2021). ACR Appropriateness Criteria Noncerebral Vasculitis. *Journal of the American College of Radiology, 18*(11S), S380-S393.

[2] American College of Radiology. (2023). ACR Manual on Contrast Media. *American College of Radiology*. Retrieved: February 2024. https://www.acr.org/-/media/ACR/Files/Clinical-Resources/Contrast_Media.pdf

[3] Azene, E.M., Steigner, M.L., . . . Kalva, S.P. (2022). ACR Appropriateness Criteria Lower Extremity Arterial Claudication-Imaging Assessment for Revascularization: 2022 Update. *Journal of the American College of Radiology, 19*(11), S364-S373.

[4] Bolintineanu, L.A., Bolintineanu, S.L., . . . Zahoi, D. (2023). Clinical Consideration of Anatomical Variations in the Common Hepatic Arteries: An Analysis Using MDCT Angiography. *Diagnostics, 13*(9), 1636.

[5] Bowen, J.M., Hernandez, M., . . . Sobey, G.J. (2023). Diagnosis and management of vascular Ehlers-Danlos syndrome: Experience of the UK national diagnostic service, Sheffield. *European Journal of Human Genetics, 31*, 749-760.

[6] Browne, W.F., Sung, J., . . . Steigner, M.J. (2023). ACR Appropriateness Criteria Sudden Onset of Cold, Painful Leg: 2023 Update. *Journal of the American College of Radiology, 20*(11), S565-S573.

[7] Canan, A., Rajah, P. & Abbara, S. (2023). Cardiac computed tomography. G.N. Levine, (Ed.). *Cardiology Secrets* (6), (pp. 85-96). Philadelphia, PA: Elsevier.

[8] Chaer, R.A., Abularrage, C.J., . . . Murad, M.H. (2020). The Society for Vascular Surgery clinical practice guidelines on the management of visceral aneurysms. *Journal of Vascular Surgery, 72*(1S), 3S-39S.

[9] Chaikof, E.L., Dalman, R.L., . . . Starnes, B.W. (2018). The Society for Vascular Surgery practice guidelines on the care of patients with an abdominal aortic aneurysm. *Journal of Vascular Surgery, 67*(1), 2-77.

[10] Collard, M., Sutphin, P.D., . . . Dill, K.E. (2019). ACR Appropriateness Criteria Abdominal Aortic Aneurysm Follow-up (Without Repair). *Journal of the American College of Radiology, 16*(5S), S2-S6.

[11] Contrella, B.N., Minhajuddin, S.K., ... Steigner, M.L. (2023). ACR Appropriateness Criteria Thoracoabdominal Aortic Aneurysm or Dissection: Treatment Planning and Follow-Up. *Journal of the American College of Radiology, 20*(5), S265-S284.

[12] Copelan, A.Z., Kapoor, B.S., . . . Lorenz, J.M. (2017). ACR Appropriateness Criteria Iliac Artery Occlusive Disease. *Journal of the American College of Radiology, 14*(11S), S530-S539.

[13] Firat, A., Abbasoglu, T.T., . . . Balaban, Y.H. (2023). Clinical anatomy of hepatic vessels by computed tomography angiography: A minireview. *World Journal of Radiology, 15*(1), 1-9.

[14] Francois, C.J., Skulborstad, E.P., . . . Kalva, S.P. (2018). ACR Appropriateness Criteria Abdominal Aortic Aneurysm: Interventional Planning and Follow-Up. *Journal of the American College of Radiology, 15*(5S), S2-S12.

[15] Ginsburg, M., Obara, P., . . . Dill, K.E. (2018). ACR Appropriateness Criteria Imaging of Mesenteric Ischemia. *Journal of the American College of Radiology, 15*(11), S332-S340.

[16] Hedgire, S.S., Saboo, S.S., . . . Steigner, M.L. (2023). ACR Appropriateness Criteria Preprocedural Planning for Transcatheter Aortic Valve Replacement: 2023 Update. *Journal of the American College of Radiology, 20*(11), S501-S512.

[17] Karuppasamy, K., Kapoor, B.S., . . . Lorenz, J.M. (2021). ACR Appropriateness Criteria Radiologic Management of Lower Gastrointestinal Tract Bleeding: 2021 Update. *Journal of the American College of Radiology, 18*(5S), S139-S152.

[18] Kicska, G.A., Koweek, L.M.H., . . . Abbara, S. (2021). ACR Appropriateness Criteria Suspected Acute Aortic Syndrome. *Journal of the American College of Radiology18*(11S), S474-S481.

[19] Kim, H., Labropoulos, N., . . . Desai, K. (2022). Prevalence of Inferior Vena Cava Anomalies and Their Significance and Impact in Clinical Practice. *European Journal of Vascular and Endovascular Surgery, 64*(4), 388-394.

[20] Leipsic, J.A., Blanke, P., . . . Dill, K.E. (2017). ACR Appropriateness Criteria Imaging for Transcatheter Aortic Valve Replacement. *Journal of the American College of Radiology, 14*(11S), S449-S455.

[21] Lewey, J., El Hajj, S.C. & Hayes, S.N. (2022). Spontaneous coronary artery dissection: new insights into this not-so-rare condition. *Annual Review of Medicine, 73*, 339-354.

[22] Lopez-Sainz, A., Mila, L., . . . Teizido-Tira. G. (2021). Aortic Branch Aneurysms and Vascular Risk in Patients With Marfan Syndrome. *Journal of the American College of Cardiology, 77*(24), 3005-3012.

[23] Maz, M., Chung, S.A., . . . Mustafa, R.A. (2021). 2021 American College of Rheumatology/ Vasculitis Foundation Guideline for the Management of Giant Cell Arteritis and Takayasu Arteritis. *Arthritis & Rheumatology, 73*(8), 1349-1365.

[24] Oura, K., Oura, M.Y., . . . Maeda, T. (2021). Vascular Imaging Techniques to Diagnose and Monitor Patients with Takayasu Arteritis: A Review of the Literature. *Diagnostics, 11*(11), 1993.

[25] Parenti, V.G., Vijay, K., . . . Dill, K.E. (2023). ACR Appropriateness Criteria Workup of Noncerebral Systemic Arterial Embolic Source. *Journal of the American College of Radiology, 20*(5), S285-S300.

[26] Rezaei-Kalantari, K., Fahrni, G., . . . Qanadli, S.D. (2023). Insights into Pelvic Venous Disorders. *Frontiers in Cardiovascular Medicine, 10*, 1102063.

[27] Shah, K.P., Peruri, A., . . . Sharma, A.M. (2021). Fibromuscular dysplasia: A comprehensive review on evaluation and management and role for multidisciplinary comprehensive care and patient input model. *Seminars in Vascular Surgery, 34*(1), 89-96.

[28] Sharbidre, K.G., Aziz, M.U. & Mohd, Z. (2022). Review of Abdominal Vascular Variations: Imaging and Clinical Implications. *Radiographics, 42*, E27-E28.
[29] Shyu, J.Y., Khurana, B., . . . Lockhart, M.E. (2020). ACR Appropriateness Criteria Major Blunt Trauma *Journal of the American College of Radiology, 17*(5S), S160-S174.
[30] Singh, N., Aghayev, A., . . . Steigner, M.L. (2022). ACR Appropriateness Criteria Imaging of Deep Inferior Epigastric Arteries for Surgical Planning (Breast Reconstruction Surgery): 2022 Update. *Journal of the American College of Radiology, 19*(11), S357-S363.
[31] Taffel, M.T., Nikolaidis, P., . . . Lockhart, M.E. (2017). ACR Appropriateness Criteria Renal Transplant Dysfunction. *Journal of the American College of Radiology, 14*(5S), S272-S281.
[32] Uyeda, J.W., George, E., . . . Glanc, P. (2020). ACR Appropriateness Criteria Postpartum Hemorrhage. *Journal of the American College of Radiology, 17*(11S), S459-S471.
[33] Verma, N., Steigner, M.L., . . . Dill, K.E. (2021). ACR Appropriateness Criteria Suspected Retroperitoneal Bleed. *Journal of the American College of Radiology, 18*(11S), S482-S487.
[34] Wang, D.S., Shen, J., . . . Steigner, M.L. (2023). ACR Appropriateness Criteria Pulsatile Abdominal Mass, Suspected Abdominal Aortic Aneurysm: 2023 Update. *Journal of the American College of Radiology, 20*(5), S513-S520.
[35] Witte, D.H. (2021). Advanced Imaging in Orthopaedics. F.M. Azar & J.H. Beaty (Eds.). *Campbell's Operative Orthopaedics* (14), (pp. 141-176). Philadelphia, PA: Elsevier.

Disclaimer & Legal Notice

Purpose

The purpose of the HealthHelp's clinical guidelines is to assist healthcare professionals in selecting the medical service that may be appropriate and supported by evidence to safely improve outcomes. Medical information is constantly evolving, and HealthHelp reserves the right to review and update these clinical guidelines periodically. HealthHelp reserves the right to include in these guidelines the clinical indications as appropriate for the organization's program objectives. Therefore the guidelines are not a list of all the clinical indications for a stated procedure, and associated Procedure Code Tables may not represent all codes available for that state procedure or that are managed by a specific client-organization.

Clinician Review

These clinical guidelines neither preempt clinical judgment of trained professionals nor advise anyone on how to practice medicine. Healthcare professionals using these clinical guidelines are responsible for all clinical decisions based on their assessment. All Clinical Reviewers are instructed to apply clinical indications based on individual patient assessment and documentation, within the scope of their clinical license.

Payment

The use of these clinical guidelines does not provide authorization, certification, explanation of benefits, or guarantee of payment; nor do the guidelines substitute for, or constitute, medical advice. Federal and State law, as well as member benefit contract language (including definitions and specific contract provisions/exclusions) take precedence over clinical guidelines and must be considered first when determining eligibility for coverage. All final determinations on coverage and payment are the responsibility of the health plan. Nothing contained within this document can be interpreted to mean otherwise.

Registered Trademarks (®/™) and Copyright (©)