2024 Magnetic Resonance Angiography/ Magnetic Resonance Venography (MRA/ MRV) Abdomen

Diagnostic Imaging

MRA-Abdomen-HH

Last Review Date: 10/28/2024
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Magnetic Resonance Angiography (MRA) Abdomen

NCD 220.2
See also, **NCD 220.2**: Magnetic Resonance Imaging at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

MRA Contraindications

An MRA may be contraindicated for **ANY** of the following:

- Safety, related to clinical status (eg, body mass index exceeds MR capability, intravascular stents within recent 6 weeks)
  References: [6] [35] [22] [16] [3]
- Safety, related to contrast (eg, allergy, renal impairment)
  References: [6] [35] [22] [16] [3]
- Safety, related to implanted devices (aneurysm clip, cochlear implant, insulin pump, spinal cord stimulator)
  References: [6] [35] [22] [16] [3]

IMPORTANT
Some implanted devices that were once absolute contraindications to a MRI, may now be accepted. Considerations include if the MRI is able to accommodate the device, or the device is deemed safe for MRI.

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.

MRA Abdomen Guideline

Magnetic resonance angiography (MRA) of the abdomen is considered medically appropriate when the documentation demonstrates **ANY** of the following:

1. Hepatic blood vessel (eg, aneurysm, hepatic vein thrombosis, stenosis post-transplant) evaluation when ultrasound is non-diagnostic or indeterminate.

References: [17] [11]

2. Large vessel disease (eg, arteriovenous malformation [AVM], dissection, fistulas, hematoma, hepatic vein stenosis, thrombosis), localized to the abdomen, for evaluation when ultrasound is non-diagnostic or indeterminate.
   References: [17] [11] [10] [9] [1] [2]
3. Mass, abdominal, with suspected vascular displacement or invasion
   References: [17] [11] [15] [34]
4. Peri-procedural care to guide invasive procedure planning or post-procedural follow-up.
   References: [17] [11]
5. Prior MRA abdomen 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.*)
   References: [17] [11]
6. Renal insufficiency or kidney failure when ultrasound is non-diagnostic or indeterminate, to evaluate for renal artery stenosis.
   References: [17] [11] [36]
7. Vascular disease, arterial, is suspected or known and **ANY** of the following:
   a. Aneurysm (eg, abdominal aorta, hepatic artery, iliac artery, renal artery, splenic artery, visceral) is suspected or known and **ANY** of the following: (*__NOTE:__ *Computed tomography angiogram (CTA) is preferred. MRA pelvis may be ordered with MRA abdomen under certain conditions.)*
      i. Abdominal aortic aneurysm (AAA) is suspected or known and **EITHER** of the following:
         A. Asymptomatic and ultrasound is non-diagnostic or indeterminate.
         B. Symptomatic (eg, recent-onset of abdominal or back pain, particularly in presence of pulsatile or epigastric mass, suspected dissection or risk factors for AAA)
      ii. Anatomy is known to be complex.
      iii. Routine post-surgical follow-up (endovascular repair [EVAR] or open repair of AAA) (*__NOTE:__ *Recommended baseline study performed between 1 to 3 months following intervention, followed by annual imaging. If abnormalities are noted, 6-month follow-up may be warranted. [CTA or MRA is preferred unless there is a known, documented contraindication.])*

iv. Surveillance of aortic aneurysm as follows when ultrasound is non-diagnostic or indeterminate **AND** CT is **contraindicated or unavailable**:

A. 2.5 cm to 2.9 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 cm to 5.4 cm: follow-up every 6 months

b. Renal artery stenosis and resistant hypertension is suspected with normal renal function unrelated to recent medication and **ANY** of the following: (*__NOTE__: *if renal function is impaired [glomerular filtration rate [GFR] is less than 30] use ultrasound*)

i. Control is **UNSUCCESSFUL** after treatment with **at least** 3 or more anti-hypertensive medications at optimal dosing.

ii. Creatinine elevation is acute after initiation of angiotensin converting enzyme inhibitor (ACE inhibitor) or angiotensin receptor blocker (ARB).

iii. Diagnosis of syndrome with higher risk of vascular disease (neurofibromatosis, tuberous sclerosis, William's syndrome)

iv. Flash pulmonary edema is idiopathic.

v. Hypertension is known and **ANY** of the following:

A. Acute, despite previously stable blood pressures

B. Hypertension is significant (diastolic blood pressure greater than 110 mm Hg) in a person younger than 35 years and fibromuscular dysplasia is suspected.

C. Malignant hypertension

D. New onset **AND** age is over 50 years.

E. Onset younger than age 30 years **WITHOUT** other risk factors including family history

F. Renal artery bruit

vi. Kidney size is asymmetric as seen on prior ultrasound.

vii. Renal ultrasound is abnormal, non-diagnostic or indeterminate.

c. Spontaneous coronary artery dissection (SCAD), for assessment

d. Vascular abnormality risk is increased and **ANY** of the following:

i. Ehlers-Danlos, vascular, or Marfan syndrome: one-time study of the abdomen and pelvis

ii. Fibromuscular dysplasia: one-time vascular study of the abdomen and pelvis

iii. Loeys-Dietz syndrome: imaging at diagnosis and then every 2 years, more frequently if abnormalities are found

e. Vascular abnormalities visualized on prior imaging and **EITHER** of the following:

i. Prior imaging is non-diagnostic or indeterminate.

ii. Visceral vascular conditions (eg, aneurysm, arteriovenous malformations, compression syndromes, dissection, fistulas) are known, for follow-up. (*__NOTE__: *Hepatic vascular abnormalities after ultrasound is completed*.)

f. Vascular ischemia or hemorrhage, when CTA is **contraindicated or unavailable** and **EITHER** of the following: [30]

i. Mesenteric ischemia/ischemic colitis is suspected or known, for evaluation.

ii. Retroperitoneal hematoma or hemorrhage is known, to determine source of vascular source **AND** CT is non-diagnostic or indeterminate.

References: [17] [11] [18] [19] [8] [12] [34] [28] [32] [37] [31] [14] [13]

8. Vascular disease, venous, is suspected or known and **ANY** of the following:

a. Edema in the lower extremities is diffuse, unexplained and ultrasound is non-diagnostic or indeterminate.

b. May-Thurner syndrome (iliac vein compression) is suspected or known. (***NOTE:** *Should include pelvic imaging*)

c. Pelvic vascular disease or pelvic congestion syndrome is suspected and ultrasound is non-diagnostic or indeterminate.

d. Portal venous system (hepatic venous portal) when ultrasound is non-diagnostic or indeterminate.

e. Venous thrombosis or venous malformation is suspected or known and **ANY** of the following:

i. Deep vein thrombosis (DVT) is suspected in a pregnant woman (***NOTE**: *include MRV pelvis for iliac veins*).

ii. Renal vein thrombosis is suspected and renal mass (from other causes) is known.

iii. Venous thrombosis is suspected and prior imaging is non-diagnostic or indeterminate.

References: [17] [11] [7] [27] [29] [4] [30] [24]

Combination MRA Chest, MRA Abdomen and/or MRA Pelvis

Magnetic resonance angiography (MRA) of the chest combined with MRA of the abdomen and/or pelvis are considered medically appropriate when the documentation demonstrates **ANY** of the following:

1. Acute aortic syndrome is suspected.
   References: [19] [5]
2. Arterial occlusion is known in the mesenteric or renal system or multiple organ systems, embolic source is suspected, to evaluate for embolic source.
   Reference: [26]
3. Connective tissue disease (eg, Loeys Dietz, Marfan's syndrome, vascular Ehlers-Danlos syndrome)
   References: [33] [25] [20]
4. Lower extremity vascular disease is known, echocardiogram is completed, to evaluate for embolic source.
   Reference: [26]
5. Spontaneous coronary artery dissection (SCAD)
   References: [19] [5]
6. Takayasu's arteritis
   References: [2] [23]
7. Transcatheter aortic valve replacement (TAVR) for pre-operative or pre-procedural planning
   Reference: [21]
8. Vascular complications are post-traumatic, post-procedural or post-operative.
9. Vascular disease involving the chest and abdominal cavities is extensive (eg, intestinal ischemic syndrome, thoracic outlet syndrome), for evaluation.

LCD 33633
See also, **LCD 33633**: Magnetic Resonance Angiography (MRA) at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

LCD 34372
See also, **LCD 34372**: Magnetic Resonance Angiography (MRA) at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.
(*__NOTE__: *as of 04/15/2025 there is not criteria in LCD 34372 for magnetic resonance angiography*

LCD 34424
See also, **LCD 34424**: Magnetic Resonance Angiography at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.
*__NOTE__: *As of 04/16/2025 there is not criteria in LCD 34424 for magnetic resonance angiography*.

LCD 34865
See also, **LCD 34865**: Magnetic Resonance Angiography (MRA) at https://www.cms.gov/medicare-coverage-database/search.aspx *if applicable to individual's healthplan membership*.

MRA/MRV Abdomen Procedure Codes

Table 1. MRA Abdomen Associated Procedure Codes

CODE	DESCRIPTION
74185	Magnetic resonance angiography, abdomen, with or without contrast material(s)
C8900	Magnetic resonance angiography with contrast, abdomen
C8901	Magnetic resonance angiography without contrast, abdomen
C8902	Magnetic resonance angiography without contrast followed by with contrast, abdomen

MRA/MRV Abdomen Summary of Changes

MRA/MRV Abdomen guideline had the following version changes from 2023 to 2024:

- Added the following to keep in line with current research:
  - "Asymptomatic" and "symptomatic" indications under Aneurysm indication

  - "Anatomy is known" indication
  - "Pelvic vascular disease" indication under "Vascular disease venous"
  - "Vascular abnormalities visualized" indication
- Removed the following as the indication is no longer supported by research:
  - "AAA is suspected or known" from under "Vascular disease, arterial"
  - "Endovascular procedure planning" from under "Vascular disease, arterial"
  - "Known and new onset" from under "Vascular disease, arterial"
  - "Renal vein thrombosis" from under "Vascular disease, venous"
  - "Visceral artery aneurysm" from under "Vascular disease, arterial"
- Mid-cycle update: added Pediatric Preamble
- Mid-cycle update: Added LCD 34424 per CMS website

MRA/MRV Abdomen Definitions

Aneurysm refers to weakness in an artery wall, allowing it to abnormally balloon out or widen.
Angiotensin-converting enzyme (ACE) inhibitors are medications that block the conversion of angiotensin I to angiotensin II, leading to decreased blood pressure and reduced sodium and water retention.
Angiotensin receptor blockers (ARBs) is a medication that selectively blocks the binding of angiotensin II to the angiotensin II type 1 (AT1) receptor, primarily found in vascular smooth muscle and the adrenal gland, thereby reducing vasoconstriction and aldosterone secretion, which lowers blood pressure and decreases systemic vascular resistance without significantly affecting heart rate.
Arteriovenous malformation (AVM) are congenital high-flow vascular malformations characterized by abnormal shunting of blood from high-flow feeding arteries to low-resistance veins via a cluster of aberrant blood vessels termed a central nidus, bypassing the normal capillary bed.
Bruit is a sound heard over an artery or vascular channel, indicating turbulent blood flow, often due to an abnormal narrowing of the vessel.
Colitis is a chronic digestive disease that causes inflammation of the large intestine, or colon.
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.
Compression is reducing in size, quantity or volume, as if by squeezing.

Creatinine is a waste product that comes from the digestion of protein in food and the normal breakdown of muscle tissue. It is removed from the blood through the kidneys.
Dissection refers to the separation of the layers within the wall of an artery, most commonly the aorta, due to a tear in the intimal layer, leading to the formation of a false lumen.
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.
Endovascular aneurysm repair (EVAR) is a minimally invasive procedure that treats abdominal aortic aneurysms (AAAs). The procedure involves placing a stent-graft within the aorta to reduce the risk of rupture.
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 between two epithelialized surfaces, often involving organs such as the gut, bladder, vagina, or skin, and can result from various causes including surgery, trauma, Crohn's disease, diverticular disease, or malignancy.
Flash pulmonary edema is a sudden and severe accumulation of fluid in the lungs, often due to abrupt increases in afterload or left atrial pressure, leading to life-threatening respiratory distress.
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.
Hemorrhage is a copious or heavy discharge of blood from the blood vessels.
Hepatic portal system is the system of veins that transports blood from the digestive tract to the liver. It consists of the hepatic portal vein and other veins that drain into the hepatic portal vein, viz. the superior mesenteric vein, the inferior mesenteric vein and the splenic vein.
Iliac vein compression syndrome (May-Thurner syndrome) also known as May-Thurner syndrome, is a condition where the left common iliac vein is compressed by the overlying right common iliac artery and the underlying vertebral body, leading to venous congestion and stasis, which predisposes to venous thromboembolism (VTE).
Indeterminate findings are inconclusive or insufficient for treatment planning.
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.
Loeys-Dietz syndrome is a rare autosomal dominant connective tissue disorder characterized by aggressive aortic aneurysms, arterial tortuosity, and distinctive craniofacial and skeletal features.
Magnetic resonance angiogram (MRA) is a test that uses a magnetic field and pulses of radio wave energy to provide images of blood vessels inside the body, allowing for evaluation of blood flow and blood vessel wall condition. MRA is used to look for aneurysms, clots, tears in the aorta,

arteriovenous malformations and stenosis caused by plaque in the carotid arteries (neck) or blood vessels leading to the lungs, kidneys or legs.

Magnetic resonance venogram (MRV) is a diagnostic procedure that uses a combination of a large magnet, radiofrequencies, and a computer to produce detailed images of organs and structures within the body. An MRV uses magnetic resonance technology and intravenous (IV) contrast dye to visualize the veins. Contrast dye causes the blood vessels to appear opaque on the X-ray image, allowing the visualization the blood vessels being evaluated. MRV is useful in some cases because it can help detect causes of leg pain other than vein problems.

Malignant hypertension is severe hypertension characterized by acute onset, causing necrosis (tissue death) of arteriolar walls in kidney and retinal hemorrhages and is rapidly progressive with poor prognosis.

Marfan syndrome is a disorder of connective tissue inherited as a dominant trait, characterized by abnormal elongation of the long bones and often with ocular and circulatory defects.

May-Thurner syndrome (iliac vein compression syndrome) is a condition where the left common iliac vein is compressed by the overlying right common iliac artery and the underlying vertebral body, leading to venous congestion and stasis, which predisposes to venous thromboembolism (VTE).

Mesenteric is a fold of membrane that attaches the intestine to the abdominal wall and holds it in place.

Neurofibromatosis is a rare genetic disorder that causes benign tumors to grow on nerves and other parts of the body. There are three types of neurofibromatosis: neurofibromatosis 1 (NF1), neurofibromatosis 2 (NF2) and schwannomatosis.

Non-diagnostic is a result that does not lead to a confirmed diagnosis.

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.

Renal insufficiency is poor function of the kidneys that may be due to a reduction in blood-flow to the kidneys caused by renal artery disease.

Resistant hypertension is defined as a blood pressure that remains above goal despite concurrent use of three antihypertensive agents of different classes taken at maximally tolerated

doses, one of which should be a diuretic (the diuretic should be selected based upon kidney function).

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.

Screening is the systematic application of a test or inquiry to identify individuals at sufficient risk of a specific disorder to warrant further investigation or direct preventive action, among persons who have not sought medical attention for symptoms of that disorder.

Stenosis is a narrowing or constriction of the diameter of a bodily passage or orifice.

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.

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.

Transcatheter aortic valve replacement (TAVR), also known as transcatheter aortic valve implantation (TAVI), is a minimally invasive catheter-based procedure to replace a narrowed aortic valve that fails to open properly (aortic valve stenosis). A bioprosthetic valve is inserted percutaneously using a catheter and implanted in the orifice of the aortic valve.

Tuberous sclerosis is a genetic disorder of the skin and nervous system that is characterized by the formation of small benign tumors in various organs (such as the brain, kidney, eye and heart), is accompanied by variable symptoms including seizures, developmental delay or intellectual disability, skin lesions (as hypopigmented macules of the trunk and limbs or telangiectatic facial papules) and is inherited as an autosomal dominant trait or results from spontaneous mutation.

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

Williams syndrome is a developmental disorder that affects many parts of the body. This condition is characterized by mild to moderate intellectual disability or learning problems, unique personality characteristics, distinctive facial features and heart and blood vessel (cardiovascular) problems.

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MRA Abdomen References

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