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2024 Magnetic Resonance Angiography/ Magnetic Resonance Venography (MRA/ MRV) Brain/Head

Diagnostic Imaging

MRA-Brain-HH

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Magnetic Resonance Angiography/Magnetic Resonance Venography (MRA/MRV) Brain/Head

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: [5] [34] [23] [14] [2]
- Safety, related to contrast (eg, allergy, renal impairment)
  References: [5] [34] [23] [14] [2]
- Safety, related to implanted devices (aneurysm clip, cochlear implant, insulin pump, spinal cord stimulator)
  References: [5] [34] [23] [14] [2]

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/MRV Brain/Head Guideline

Magnetic resonance angiography/magnetic resonance venography (MRA/MRV) of the brain/head is considered medically appropriate when the documentation demonstrates **ANY** of the following:

1. Intracranial vascular disease is suspected for **ANY** of the following:

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a. Aneurysm screening and **ANY** of the following:
    i. Age is older than 30 years **AND** polycystic kidney disease (PKD).
    ii. Aortic coarctation is known.
    iii. Fibromuscular dysplasia (FMD) evaluation
    iv. First-degree relatives (child, parent, sibling) with a history of intracranial aneurysm **AND** when **EITHER**: (*__NOTE__: *repeat screening is recommended every 5 years.*)
        A. Asymptomatic, at least **TWO** first degree relatives with histories of an intracranial aneurysm.
        B. Symptomatic (eg, headache, nausea, vomiting), at least **ONE** first degree relative with a history of intracranial aneurysm.
    v. Loeys-Dietz syndrome initial evaluation **AND** if stable, every 2 years thereafter.
    vi. Spontaneous coronary artery dissection (SCAD)
b. Benign intracranial hypertension (pseudotumor cerebri) differentiation from dural sinus thrombosis
c. Cerebral intraparenchymal hemorrhage is known **AND** underlying vascular abnormality is suspected.
d. Giant cell arteritis with intracranial involvement is suspected.
e. Moyamoya disease is suspected or known.
f. Reversible cerebral vasoconstriction syndrome (RCVS) is suspected or known.
g. Sickle cell disease (hemorrhagic or ischemic) and **ANY** of the following:
    i. Neurological signs (eg, dizziness, numbness, pain)
    ii. Transcranial doppler velocity is more than 200 cm/second (increased stroke risk) and age is 2 years to 16 years.
h. Stroke, ischemic, or transient ischemic attack (TIA) occurred recently (within 6 months).
i. Subarachnoid hemorrhage (SAH) is known. (*__NOTE__: *Computed tomography angiography [CTA] is preferred*).
j. Vascular abnormalities are suspected or known with **ANY** of the following:
    i. Aneurysm is suspected with isolated 3rd nerve palsy (oculomotor) **AND** pupil involvement.

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ii. Headache and **ANY** of the following:

A. Associated with exercise, exertion, sexual activity or forced breathing through closed airways (Valsalva).

B. Thunderclap headache is known, underlying vascular abnormality issuspected **AND** inital brain imaging is negative. (*__NOTE__: *Negative brain CT, less than 6 hours after headache onset, excludes subarachnoid hemorrhage in neurologically intact patients*.)

iii. Pulsatile tinnitus is known and vascular etiology is suspected.

iv. Vascular malformation (arteriovenous malformation [AVM] or dural arteriovenous fistula) is suspected **AND** prior imaging is non-diagnostic or indeterminate.

k. Vasculitis (eg, giant cell arteritis, Takayasu's arteritis), primary or secondary, is suspected or known, with initial laboratory work up (eg, c-reactive protein [CRP], erythrocyte sedimentation rate [ESR] or serology) **AND** neurological signs (eg, dizziness, numbness, pain).

l. Venous thrombosis, central (dural sinus thrombosis), is suspected.

m. Vertebrobasilar insufficiency (VBI) is suspected or known **AND** there are new or worsening symptoms (eg, dizziness, headaches, vertigo).

References: [30] [20] [22] [18] [4] [10] [11] [19] [33] [31] [32] [25] [24] [16] [27] [9] [26] [13] [15] [31] [28] [21] [17] [29] [3]

2. Intracranial vascular disease is known and **ANY** of the following:

a. Aneurysm (intracranial), treated aneurysm or vascular malformation (AVM or dural arteriovenous fistula) are known.

b. Moyamoya disease, reversible cerebral vasoconstriction syndrome (RCVS) or vasculitis is known.

c. Vertebrobasilar insufficiency is known **AND** symptoms (eg, dizziness, numbness, pain) are new or worsening.

References: [20] [12] [27]

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

4. Prior MRA/MRV Brain 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.*)

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Combination MRA Brain and MRA Neck Guideline

Magnetic resonance angiography (MRA) brain/head **combined** with MRA neck is considered medically appropriate when the documentation demonstrates **ANY** of the following:

1. Asymptomatic, neck ultrasound or carotid duplex imaging is abnormal, non-diagnostic or indeterminate (eg, aberrant flow direction in the carotid or vertebral arteries, carotid stenosis 70% or more) **AND** surgical or angioplasty candidate.
   Reference: [1]
2. Carotid or vertebral artery dissection is suspected due to trauma **OR** spontaneous, due to weakness of a vessel wall.
   References: [11] [7]
3. Carotid or vertebral artery dissection is known, for evaluation of recanalization and/or to guide anticoagulant treatment: follow-up within 3 to 6 months.
4. Pulsatile tinnitus (subjective or objective) is known and arterial vascular etiology is suspected.
   References: [17] [8]
5. Stroke, ischemic, or transient ischemic attack (TIA) occurred recently.
   References: [30] [13]
6. Symptomatic (eg, blurred vision, confusion, memory loss), neck ultrasound or carotid duplex imaging is abnormal, non-diagnostic or indeterminate (eg, aberrant flow direction in the carotid or vertebral arteries, carotid stenosis 50% or more) **AND** surgical or angioplasty candidate.
   Reference: [1]
7. Vertebrobasilar insufficiency (VBI) is suspected or known **AND** symptoms (eg, dizziness, headaches, vertigo) are new or worsening.
   Reference: [3]

Combination MRA Brain and MRI Brain Guideline

A magnetic resonance angiography (MRA) of the brain **combined** with magnetic resonance imaging (MRI) of the brain is considered medically appropriate when the documentation demonstrates **ANY** of the following:

I. Headache is acute, with sudden onset, **AND** there is a history of a vascular abnormality or aneurysm history in a 1st degree relative (child, parent, sibling).
   Reference: [33]

II. Headache occurs with exercise or sexual activity.
   References: [33] [21]

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III. Sickle cell disease is known with neurological symptoms.
References: [9] [30]

IV. Stroke, ischemic, or transient ischemic attack (TIA) occurred recently (within last 6 months).
References: [30] [13]

V. Thunderclap headache, when a vascular abnormality is suspected.
Reference: [21]

VI. Venous thrombosis (dural sinus thrombosis) is suspected.
Reference: [29]

Combination MRA Brain/MRA Neck/MRI Brain Guideline

A magnetic resonance angiography (MRA) brain **combined** with MRA neck **AND/OR** magnetic resonance imaging (MRI) brain is considered medically appropriate when the documentation demonstrates **ANY** of the following:

1. Carotid or vertebral artery dissection is suspected, with focal or lateralizing neurological deficits.
Reference: [11]
2. Stroke, ischemic, or transient ischemic attack (TIA) occurred recently.
References: [30] [13]
3. Indications above are approvable, age is less than 8 years old, anesthesia is needed **AND** concurrent intracranial pathology is suspected.

Combination MRA Brain/MRA Neck/MRI Brain with IAC Guideline

A magnetic resonance angiography (MRA) brain **combined** with MRA neck **AND** magnetic resonance imaging (MRI) brain with internal auditory canal (IAC) is considered medically appropriate when the documentation demonstrates pulsatile tinnitus with suspected arterial vascular and/or intracranial etiology.
Reference: [17]

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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 04/23/2024 there is not criteria in LCD 34424 for magnetic resonance angiography*.

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*.

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 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 Brain/Head Procedure Codes

Table 1. MRA Brain/Head Associated Procedure Codes

CODE	DESCRIPTION
70544	Magnetic resonance angiography, head; without contrast material(s)
70545	Magnetic resonance angiography, head; with contrast material(s)
70546	Magnetic resonance angiography, head; without contrast material(s), followed by contrast material(s) and further sequences

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MRA/MRV Brain/Head Summary of Changes

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

- Added the following to keep in line with current research:
  - "Carotid or vertebral artery dissection is known"
- Removed the following as research no longer supports the indication:
  - "Aneurysm, intracranial"
  - "Vascular malformation is known"
- Mid-cycle update: added Pediatric Preamble

MRA/MRV Brain/Head Definitions

Aneurysm refers to weakness in an artery wall, allowing it to abnormally balloon out or widen.
Aortic Coarctation is a birth defect in which a part of the aorta is narrower than usual.
Arteriovenous malformation (AVM) is a tangle of abnormal blood vessels connecting arteries and veins.
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.
C-reactive protein (CRP) is a pentameric protein synthesized by the liver, whose level rises in response to inflammation.
Dissection is the abnormal and usually abrupt formation of a tear or separation of the layers inside the wall of an artery.
Dural venous sinuses are a group of sinuses or blood channels that drains venous blood circulating from the cranial cavity. It collectively returns deoxygenated blood from the head to the heart to maintain systemic circulation.
Erythrocyte sedimentation rate (ESR) is a commonly performed hematology test that may indicate and monitor an increase in inflammatory activity within the body caused by one or more conditions such as autoimmune disease, infections or tumors.
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.
Giant cell arteritis is arterial inflammation often involving the temporal arteries that may lead to blindness when the ophthalmic artery and its branches are affected, characterized by the formation of giant cells and can be accompanied by fever, malaise, fatigue, anorexia, weight loss and arthralgia.
Hemorrhage is a copious or heavy discharge of blood from the blood vessels.

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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.
Ischemic stroke occurs when the blood supply to part of the brain is interrupted or reduced, preventing brain tissue from getting oxygen and nutrients. Brain cells begin to die in minutes.
Loeys-Dietz syndrome is a disorder that affects the connective tissues of the body and increases the risk of aneurysm in arteries such as the aorta.
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.
Moyamoya disease is a rare, chronic, and progressive condition that causes the blood vessels that supply blood to the brain to narrow. The internal carotid arteries in the skull become blocked or narrowed.
Non-diagnostic is a result that does not lead to a confirmed diagnosis.
Parenchymal the essential and distinctive tissue of an organ or an abnormal growth as distinguished from its supportive framework.
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.

Polycystic kidney disease (PKD) is a genetic disorder that causes fluid-filled cysts to grow in the kidneys. The cysts can grow very large and cause the kidneys to enlarge and lose function. PKD cysts can reduce kidney function and lead to kidney failure.

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Pseudotumor cerebri is a disorder of elevated spinal fluid pressure in the brain that can lead to progressive loss of vision over time.
Pulsatile tinnitus is a rhythmic pulsing noise in one or both ears that occurs in the absence of external sound and tends to be synced with the heartbeat.
Reversible cerebral vasoconstriction syndrome (RCVS) is a group of disorders characterized by severe headaches and a narrowing of the blood vessels in the brain. RCVS is reversible and patients often recover within three months.
Screening does not diagnose the illness. The goal is early detection and lifestyle changes or surveillance, to reduce the risk of disease, or to detect it early enough to treat it most effectively.
Serology is the medical science dealing with blood serum especially in regard to its immunological reactions and properties.
Sickle cell disease is a chronic anemia that occurs in individuals who are homozygous for the gene controlling hemoglobin S (eg, African or Mediterranean descent). It is characterized by destruction of red blood cells and by episodic blocking of blood vessels by the adherence of sickle cells to the vascular endothelium. This causes the serious complications of the disease (such as organ failure).
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.
Stroke, sometimes called a brain attack, occurs when something blocks blood supply to part of the brain or when a blood vessel in the brain bursts. In either case, parts of the brain become damaged or die. A stroke can cause lasting brain damage, long-term disability, or even death.
Subarachnoid hemorrhage (SAH) is bleeding in the space that surrounds the brain.
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.
Third nerve palsy can impair eye movements, the response of pupils to light, or both. These palsies can occur when pressure is put on the nerve or the nerve does not get enough blood.
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.
Thunderclap headache is an uncommon type of headache that strikes suddenly, the pain peaks within 60 seconds and can warn of potentially life-threatening conditions (usually having to do with bleeding in and around the brain).
Transient ischemic attack (TIA) is a brief interruption of the blood supply to the brain that causes a temporary impairment of vision, speech or movement. The episode usually lasts for just a few moments but may be a warning sign of a full scale stroke.

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Vasculitis involves inflammation of the blood vessels. The inflammation can cause the walls of the blood vessels to thicken, which reduces the width of the passageway through the vessel. If blood flow is restricted, it can result in organ and tissue damage.

Vertebrobasilar insufficiency (VBI) is defined by inadequate blood flow through the posterior circulation of the brain, supplied by the 2 vertebral arteries that merge to form the basilar artery. VBI affects the parts of the brain that control movement and balance.

MRA/MRV Brain/Head References

[1] AbuRahma, A.F., Avgerinos, E.D., . . . Zhou, W. (2022). Society for Vascular Surgery clinical practice guidelines for management of extracranial cerebrovascular disease. *Journal of Vascular Surgery, 75*(1S), 4S-22S.

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

[3] Ballout, A.A., Libman, R.B., . . . Katz, J.M. (2022). Vertebrobasilar Stroke: Association Between Infarction Patterns and Quantitative Magnetic Resonance Angiography Flow State. *Journal of the American Heart Association, 11*(5), e023991.

[4] Buckley, A.D., Um, K.Y.H., . . . Karbassi, A. (2023). Prevalence of Intracranial Aneurysms in Patients With Coarctation of the Aorta: A Systematic Review and Meta-Analysis. *JACC: Advances, 2*(5), 100394.

[5] Carpenter, J.P., Litt, H. & Gowda, M. (2023). Magnetic Resonance Imaging and Arteriography. A.N. Sidawy (Eds.). *Rutherford's Vascular Surgery and Endovascular Therapy* (30). (pp. 336-394.e4). Philadelphia, PA: Elsevier.

[6] Chen, X., Ge, L., . . . Zhang, X. (2022). Overview of multimodal MRI of intracranial Dural arteriovenous fistulas. *Journal of Interventional Medicine, 5*(4), 173-179.

[7] Clark, M., Unnam, S. & Ghosh, S. (2022). A review of carotid and vertebral artery dissection. *British Journal of Hospital Medicine, 83*(4), 1-11.

[8] Cummins, D.D., Caton, M.T., . . . Amans, M.R. (2022). MRI and MR angiography evaluation of pulsatile tinnitus: A focused, physiology-based protocol. *Journal of Neuroimaging, 32*(2), 253-263.

[9] DeBaun, M.R., Jordan, L.C., . . . Murad, M.H. (2020). American Society of Hematology 2020 guidelines for sickle cell disease: prevention, diagnosis, and treatment of cerebrovascular disease in children and adults. *Blood Advances, 4*(8), 1554-1588.

[10] Dekker, S., Thijssen, C.G.E., . . . Roos-Hesselink, J. (2022). Neurovascular abnormalities in patients with Loeys-Dietz syndrome type III. *European Journal of Medical Genetics, 65*(2), 104424.

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[11] Feldbaum, E., Thompson, E.W., . . . Lewey, J. (2023). Management of spontaneous coronary artery dissection: Trends over time. *Vascular Medicine, 28*(2), 131-138.

[12] Fukushima, Y., Fushimi, Y., . . . Nakamoto, Y. (2022). Evaluation of moyamoya disease in CT angiography using ultra-high-resolution computed tomography: Application of deep learning reconstruction. *European Journal of Radiology, 151*, 110294.

[13] Gladstone, D.J., Lindsay, M.P., . . . Poppe, A.Y. (2022). Canadian Stroke Best Practice Recommendations: Secondary Prevention of Stroke Update 2020. *Canadian Journal of Neurological Sciences, 49*(3), 315-337.

[14] Gupta, S.K., Ya'qoub, L., . . . Saeed, I.M. (2020). Safety and Clinical Impact of MRI in Patients with Non–MRI-conditional Cardiac Devices. *Radiology: Cardiothoracic Imaging, 2*(5), e200086.

[15] Hartman, J., Goiney, C., . . . Mossa-Basha, M. (2020). ACR Appropriateness Criteria Facilitate Judicious Use of CT Angiography for Stroke Workup in the Emergency Department *Journal of the American College of Radiology, 17*(10), 1230-1236.

[16] Ihara, M., Yamamoto, Y., . . . Koizumi, A. (2022). Moyamoya disease: diagnosis and interventions. *The Lancet Neurology, 21*(8), 747-758.

[17] Jain, V., Policeni, B., . . . Burns, J. (2023). ACR Appropriateness Criteria Tinnitus: 2023 Update. *Journal of the American College of Radiology, 20*(11), S574-S591.

[18] Kelly, D.M., Ademi, Z., . . . Sood, M.M. (2021). Chronic Kidney Disease and Cerebrovascular Disease Consensus and Guidance From a KDIGO Controversies Conference. *Stroke, 52*(7), e328-e346.

[19] Kesav, P., Manesh Raj, D. & John, S. (2023). Cerebrovascular Fibromuscular Dysplasia–A Practical Review. *Vascular Health and Risk Management*, (19), 543-556.

[20] Ledbetter, L.N., Burns, J., . . . Corey, A.S. (2021). ACR Appropriateness Criteria Cerebrovascular Diseases-Aneurysm, Vascular Malformation, and Subarachnoid Hemorrhage. *Journal of the American College of Radiology, 18*(11S), S283-S304.

[21] Lin, P., Chen, S. & Wang, S. (2023). Update on primary headache associated with sexual activity and primary thunderclap headache. *Cephalalgia, 43*(3), 1-10.

[22] Lyerly, M & Chow, D. (2021). Neuroimaging Considerations in Patients with Chronic Kidney Disease. *Journal of Stroke and Cerebrovascular Diseases, 30*(9), 105930.

[23] Maralani, P.J., Schieda, N., . . . Weinreb, J. (2020). MRI safety and devices: An update and expert consensus. *Journal of Magnetic Resonance Imaging, 51*(3), 657-674.

[24] 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 Care & Research, 73*(8), 1071-1087.

[25] Owen, C.E., Yates, M., . . . Mackle, S.L. (2023). Imaging of giant cell arteritis – recent advances. *Best Practice & Research: Clinical Rheumatology, Article in Press*, Article: 101827.

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[26] Padilha, I.G., Guilbert, F., . . . Soulieres, D. (2022). Should Magnetic Resonance Angiography Be Used for Screening of Intracranial Aneurysm in Adults with Sickle Cell Disease?. *Journal of Clinical Medicine, 11*(24), 7463.
[27] Perillo, T., Paolella, C., . . . Manto, A. (2022). Reversible cerebral vasoconstriction syndrome: Review of neuroimaging findings. *La Radiologia Medica, 127*(9), 981-990.
[28] Rath, T.J., Policeni, B., . . . Corey, A.S. (2022). ACR Appropriateness Criteria Cranial Neuropathy: 2022 Update. *Journal of the American College of Radiology, 19*(11), S266-303.
[29] Sadik, J., Jianu, D.C., . . . Savatovsky, J. (2022). Imaging of Cerebral Venous Thrombosis. *Life, 12*(8), 1215.
[30] Salmela, M.B., Mortazavi, S., . . . Corey, A.S. (2017). ACR Appropriateness Criteria Cerebrovascular Disease. *Journal of the American College of Radiology, 14*(5S), S34-S61.
[31] Shih, R.Y., Burns, J., . . . Corey, A.S. (2021). ACR Appropriateness Criteria Head Trauma: 2021 Update. *Journal of the American College of Radiology, 18*(5S), S13-S36.
[32] Sporns, P.B., Psychogios, M., . . . Morotti, A. (2021). Neuroimaging of Acute Intracerebral Hemorrhage. *Journal of Clinical Medicine, 10*(5), 1086.
[33] Utukuri, P.S., Shih, R.Y., . . . Burns, J. (2023). ACR Appropriateness Criteria Headache: 2022 Update. *Journal of the American College of Radiology, 20*(5), S70-S93.
[34] 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.

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