National Imaging Associates, Inc.	
Clinical guidelines **SPINAL CANAL MRA/MRV**	**Original Date: May 2008**
CPT Codes: 72159	**Last Revised Date: May 2023~~May 2022~~**
Guideline Number: NIA_CG_046	**Implementation Date: January 2024~~23~~**

GENERAL INFORMATION

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*

INDICATIONS FOR SPINAL CANAL MAGNETIC RESONANCE ANGIOGRAPHY (MRA)

- For the evaluation of spinal arteriovenous malformation (AVM)[1-5]
- Myelopathy when the suspected etiology is a compromise of blood flow or drainage to the spinal cord[6, 7]
- For the evaluation of a known cervical spine fracture, disc herniation, infection, or venous thrombosis where there is concern for vascular pathology (compression or thrombosis) compromising spinal cord blood flow or venous drainage[6, 7]
- For the evaluation of known or suspected vertebral artery injury when there is also concern for vascular compromise to the spinal canal and its contents (otherwise neck MRA or CTA is sufficient to evaluate vertebral artery injury)[8, 9]
- Preoperative evaluation (e.g., localization of the spinal arteries prior to complex spinal surgery, aortic aneurysm repair, or characterization of suspected vascular lesion of the spinal canal and its contents)[10-12]
- A follow-up study may be needed to help evaluate a patient's progress after treatment, procedure, intervention, or surgery. Documentation requires a medical reason that clearly indicates why additional imaging is needed for the type and area(s) requested.[2]

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Other Indications

Further evaluation of indeterminate findings on prior imaging (unless follow up is otherwise specified within the guideline):

- For initial evaluation of an inconclusive finding on a prior imaging report that requires further clarification
- One follow-up exam of a prior indeterminate MR/CT finding to ensure no suspicious interval change has occurred. (No further surveillance unless specified as highly suspicious or change was found on last follow-up exam.)

BACKGROUND

Application of spinal magnetic resonance angiography (MRA) allows for more effective and noninvasive screening for vascular lesions than magnetic resonance imaging (MRI) alone. It may improve characterization of normal and abnormal intradural vessels while maintaining good spatial resolution. Spinal MRA may be used for the evaluation of spinal arteriovenous malformations, as well as injuries to blood vessels supplying the spine and cord.

OVERVIEW

Spinal MR Angiography/MR Venography[13] - Typically, contrast-enhanced 3D time of flight techniques and contrast-enhanced CT angiography (CTA) are used for evaluation of the spinal arteries, veins, and related pathology as a non-invasive alternative to the gold standard catheter angiography. The detection rate of the Adamkiewicz artery (AKA) by MRA is in the range of 69-100%, but with modern equipment both MRA and CTA detection rates should approach 100%.[11] Magnetic resonance angiography is well suited to patients who cannot receive iodinated contrast and undergo CTA. CTA has the advantage over MRA of providing greater spatial resolution, can image the entire spine during one contrast bolus, and provides for a faster exam time that is less prone to motion artifact. MRA is limited by a finite field of view, typically ≤ 50 cm.[11] MRI has the advantage over CT of detecting areas of ischemia via diffusion weighted imaging. Mathur et al showed a 100% sensitivity in detecting recurrent spinal arteriovenous fistulas post-treatment.[2]

Spinal Arteriovenous Malformations (AVMs) – Spinal cord arteriovenous malformations are comprised of snarled tangles of arteries and veins that affect the spinal cord. They are fed by spinal cord arteries and drained by spinal cord veins. Spinal dural arteriovenous (AV) fistulas are the most encountered vascular malformation of the spinal cord and are a treatable cause of progressive paraparesis. Magnetic resonance angiography (MRA) can record the pattern and velocity of blood flow through vascular lesions as well as the flow of cerebrospinal fluid throughout the spinal cord. MRA can define the vascular malformation and may assist in determining treatment.[5]

Spinal Arteries/Veins - Vascular malformations, trauma, disc herniations, neoplasms, and coagulopathies or infection causing thrombosis can compromise the spinal cord blood supply and drainage. The spinal cord arterial supply is derived from the anterior spinal artery, posterolateral spinal artery, and the arteria radicularis magna or artery of Adamkiewicz (AKA). The anterior spinal artery supplies the anterior two-thirds of the cord and arises from the vertebral arteries. It receives contributions from the ascending cervical artery, the inferior thyroid artery, the intercostal arteries, the lumbar artery, the iliolumbar artery, lateral sacral arteries, and the AKA. The AKA arises on the left side of the aorta between the T8 and L1 segments, to anastomose with the anterior spinal artery and supply the lower two-thirds of the spinal cord. Two posterolateral spinal arteries arise from the posteroinferior cerebellar arteries and supply the posterior third (posterior columns, posterior roots, and dorsal horns) of the spinal cord. The spinal venous system is divided into intrinsic and extrinsic veins differentiated by their location within the spinal canal or extrinsic to the canal, respectively. They drain into the radiculomedullary veins, subsequently to paravertebral and intervertebral plexuses, then to the segmental veins that eventually drain into the ascending lumbar veins, azygos system, and pelvic venous plexuses.[6]

~~**POLICY HISTORY**~~

~~**Date**~~	~~**Summary**~~
~~February 2023~~	~~Updated references~~
~~May 2022~~	~~Updated references~~
~~February 2021~~	~~Updated background information and references~~
~~May 2020~~	~~• Reordered indications and background information~~ ~~• Updated references~~
~~June 2019~~	~~Updated background information and references~~

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POLICY HISTORY

Date	Summary
May 2023	• Updated references • General Information moved to beginning of guideline with added statement on clinical indications not addressed in this guideline • Added statement regarding further evaluation of indeterminate findings on prior imaging
May 2022	Updated references
~~February 2021~~	~~Updated background information and references~~
~~May 2020~~	~~• Reordered indications and background information~~ ~~• Updated references~~
~~June 2019~~	~~Updated background information and references~~

Reviewed / Approved by NIA Clinical Guideline Committee

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