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Magnetic Resonance Imaging (MRI) Cervical Spine

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.

MRI Cervical Spine Guideline

Magnetic resonance imaging (MRI) of the cervical spine is considered medically appropriate when the documentation demonstrates ANY of the following:

I. Achondroplasia (dwarfism or significantly short stature) (*NOTE: A cervical spine MRI to assess the craniocervical junction should be completed as early as possible, even when asymptomatic.) [42]

II. Arnold-Chiari malformation is known. (*NOTE: Any combination of cervical/thoracic/lumbar MRI may be appropriate for initial imaging and pre-operatively, see below for combination study indications.) [44] [40]

III. Cancer, tumor or metastasis evaluation for ANY of the following: [6] [34] [17] [25]
   A. Primary tumor with new/progressing symptoms or new focal deficits, for initial staging or restaging.
   B. Prior imaging is non-diagnostic or indeterminate. (*NOTE: One follow-up is appropriate to evaluate for changes, since preceding imaging finding[s] and at least 12 months after previous exam, unless significant symptomatic changes have occurred. Further surveillance is appropriate when lesion is specified as highly suspicious or there is a change since last exam.)
   C. Recurrence or metastasis is suspected and ANY of the following:
      1. Cancer tumor prone to spinal metastases is known, with new or progressing symptoms.
      2. Metastasis is demonstrated on bone scan.
      3. Neurologic deficit (eg, abnormal gait or reflexes, bowel/bladder dysfunction, extremity weakness) is new and focal.
      4. Prior imaging is non-diagnostic or indeterminate.
   D. Staging evaluation
E. Surveillance following the National Comprehensive Cancer Network (NCCN) Guidelines recommended schedule

IV. Cerebrospinal fluid (CSF) leak is suspected (eg, cerebrospinal-venous fistula, orthostatic headache, otorrhea, post lumbar puncture headache, post spinal surgery headache, rhinorrhea, spontaneous idiopathic intracranial hypotension [SIH]). [24]

V. Compression fracture(s) are new, suspected or known, with worsening neck pain and ANY of the following: [25]
   A. Cancer history, for a follow-up MRI in 6 to 8 weeks AFTER initial imaging is non-diagnostic or indeterminate.
   B. Neurologic deficit (eg, abnormal gait or reflexes, bowel/bladder dysfunction, extremity weakness) is new and focal.
   C. Pre-procedure planning for invasive spinal treatment
   D. Results are needed for treatment planning.

VI. Cord compression (eg, spinal stenosis) is suspected or known, neck pain is worsening and ANY of the following: [43] [31]
   A. Cancer history with ANY of the following:
      1. Benign osteoporotic fractures, for differentiation from metastatic disease
      2. Initial imaging is non-diagnostic or indeterminate; MRI for follow-up in 6 to 8 weeks for differentiation of benign osteoporotic fractures and metastatic disease.
   B. Neurologic deficit (eg, abnormal gait or reflexes, bowel/bladder dysfunction, extremity weakness) is new and focal.
   C. Pre-procedure when results will change treatment planning.

VII. Immune system suppression-related (eg, human immunodeficiency virus [HIV], organ transplants, rheumatoid arthritis) spinal condition is suspected and ANY of the following:
   A. Prior imaging is non-diagnostic or indeterminate.
   B. Symptomatic (eg, abnormal white blood cell count, erythrocyte sedimentation rate [ESR], pain)

VIII. Infection (eg, abscess, discitis, osteomyelitis) is suspected or known, and individual is symptomatic (eg, chills, complete blood count [CBC], ESR, fever, c-reactive protein [CRP], prior imaging). [37] [27] [29]

IX. Inflammatory disease or atlantoaxial instability is suspected or known, and ANY of the following: [26] [15]
A. Atlantoaxial articulation disorder (e.g., Down syndrome, Marfan syndrome) with neurological symptoms, abnormal neurological exam AND/OR cervical spine X-ray(s) are abnormal, non-diagnostic or indeterminate. [19] [36]

B. Neuroinflammatory conditions (e.g., Behcet’s syndrome, sarcoidosis) are suspected when neurological exam AND rheumatology evaluation (e.g., CRP, ESR) are completed. [8]

C. Rheumatoid arthritis with neurologic symptoms (e.g., abnormal gait or reflexes, bowel/bladder dysfunction, extremity weakness) OR X-ray demonstrates subluxation. (*NOTE: Initial imaging should be a lateral X-ray in flexion and neutral. MRI is indicated with negative X-rays when neurological deficit is present or symptoms suggest cervical instability.*) [36] [26]

D. Spondyloarthropathies are suspected or known, when X-ray(s) are non-diagnostic or indeterminate AND rheumatology evaluation (e.g., CRP, ESR) is completed. [10] [2]

X. Multiple Sclerosis (MS) is suspected or known with ANY of the following: (*NOTE: Any combination of brain/cervical/thoracic/lumbar MRI may be appropriate, see below for the combination study indications.*) [32] [28] [47]

A. Brain MRI, baseline, is suspicious for MS.

B. Cervical spinal cord disease symptoms (e.g., focal neurologic deficit, Lhermitte sign [electric shock-like sensation that occurs with flexion of the neck]) are new or worsening.

XI. Myelopathy is suspected and ANY of the following: (*NOTE: Conservative care is NOT required prior to ordering imaging.*) [3] [16]

A. Neurological deficits (e.g., abnormal gait or reflexes, bowel/bladder dysfunction, extremity weakness) are demonstrated on physical exam.

B. Symptoms (e.g., balance, difficulty with ambulation, diffuse numbness in the hands, difficulty grasping and holding objects, hand clumsiness, pins and needles sensation) are progressing.

XII. Neurological deficits (e.g., abnormal gait or reflexes, bowel/bladder dysfunction, extremity weakness) are suspected or known and demonstrated on physical exam.

XIII. Pain in the neck, with ANY of the following: [29] [11] [5]

A. Conservative management (e.g., chiropractic treatments, physical therapy, physician-supervised exercise program) was attempted within the last 6 months, for at least 6 weeks AND symptoms persist.
B. Electromyography (EMG) demonstrates cervical radiculopathy. (*NOTE: An EMG is **NOT** recommended to determine the cause of axial lumbar, cervical or thoracic spine pain.)

C. Nerve conduction study demonstrates cervical radiculopathy.

D. Neurologic deficits (eg, abnormal gait or reflexes, bowel/bladder dysfunction, extremity weakness) are new or worsening.

XIV. Peri-procedural planning to guide invasive procedure and post-operative follow-up care and **ANY** of the following:

A. Infection is **suspected** (eg, elevated white blood cell count, fever, swelling).

B. Neurologic deficits (eg, abnormal gait or reflexes, bowel/bladder dysfunction, extremity weakness) are new or changing after spine procedure.

C. Post-procedural follow-up within 6 months after cervical spine surgery or intervention **OR** for suspected complications (*NOTE: Computed tomography [CT] is preferred to evaluate for hardware complications or extent of fusion. MRI is preferred for cord/nerve root compression, disc pathology or suspected infection.)*

D. Pre-operative planning for invasive spine procedure

XV. Syrinx or syringomyelia is suspected or known, and **ANY** of the following: [22]

A. Neurologic symptoms (eg, abnormal gait or reflexes, bowel/bladder dysfunction, extremity weakness) are new or progressing.

B. Predisposing conditions are **known** (eg, Arnold-Chiari malformation, neoplasm, prior trauma, severe spondylosis).

C. Prior imaging demonstrates an **abnormality**.

XVI. Tethered cord or spinal dysraphism is suspected or known, from preliminary imaging, neurological exam **AND/OR** high risk cutaneous stigmata. [30] [4]

XVII. Trauma or acute injury evaluation with **ANY** of the following: [21] [23] [5]

A. Conservative management (eg, chiropractic treatments, physical therapy, physician-supervised exercise program) was attempted within the last 6 months, for at least 6 weeks **AND** symptoms persist.

B. National Emergency X-Radiography Utilization Study (NEXUS) or Canadian Cervical Rules (CCR) criteria for imaging are met for **ANY** of the following: (*NOTE: CT and MRI provide complementary information. When indicated it is appropriate to perform both.*) [35]

1. Evaluation with CT for initial imaging
2. Spine is unstable, CT or MRI for treatment planning.

3. Spinal cord or nerve root injury is suspected OR when obtunded AND CT is negative.

C. Neurological deficits (eg, abnormal gait or reflexes, bowel/bladder dysfunction, extremity weakness) are present.

D. Prior imaging is non-diagnostic or indeterminate.

E. Spinal abnormalities (eg, ankylosing spondylitis, diffuse idiopathic skeletal hyperostosis) are known. (*NOTE: Both a MRI and CT are appropriate.)

F. Unexaminable condition (eg, distracting injury, Glasgow coma scale is less than 15)

**Combination CT and/or MRI for Metastases Evaluation**

Combination CT/MRI studies (5 or less concurrent studies, with a CT or MRI appropriate for cancer location: abdomen, brain, cervical spine, chest, lumbar spine, neck, pelvis and/or thoracic spine) for ANY of the following situations:

I. Cancer recurrence or metastasis is suspected.

II. Staging evaluation, for baseline pre-therapy

III. Surveillance following the NCCN Guidelines recommended schedule (see Surveillance section)

**Combination MRI Brain and MRI Cervical Spine Guideline**

Magnetic resonance imaging (MRI) brain combined with MRI cervical spine is considered medically appropriate when the documentation demonstrates Arnold Chiari malformation is known, for evaluation. [44] [40]

**Combination MRI Brain/MRI Cervical Spine/MRI Thoracic Spine Guideline**

A magnetic resonance imaging (MRI) brain combined with MRI cervical spine AND/OR MRI thoracic spine (any combination) is considered medically appropriate when the documentation demonstrates evaluation is needed for ANY of the following:

I. Multiple Sclerosis (MS) combination studies based on suspicious physical exam, history and prior imaging [47] [20] [18] [13]

II. MS is known, prior to initiation or change of disease modification treatment OR to establish new baseline. [47] [20] [18] [13]
III. Neuromyelitis optica spectrum disorders (eg, recurrent or bilateral optic neuritis, recurrent transverse myelitis) [12]

IV. Spine disease for follow-up:
   A. 6 to 12 months after starting or changing a treatment
   B. Every 1 to 2 years while on disease modifying therapy, less frequently when stable for 2 to 3 years

**Combination MRI Brain/MRI Cervical Spine/MRI Lumbar Spine/MRI Thoracic Spine (any combination) Guideline**

A magnetic resonance imaging (MRI) of the brain *combined* with MRI cervical spine, MRI lumbar spine AND/OR MRI thoracic spine, in ANY combination, is considered medically appropriate when the documentation demonstrates ANY of the following:

I. Arnold Chiari malformation is *suspected*, for initial evaluation. [2019 Chiari malformations: principles of diagnosis and management]

II. Arnold Chiari is known. [2019 Chiari malformations: principles of diagnosis and management]

III. Cerebrospinal fluid (CSF) leak is *suspected* (eg, cerebrospinal-venous fistula, orthostatic headache, otorrhea, post lumbar puncture headache, post spinal surgery headache, rhinorrhea, spontaneous idiopathic intracranial hypotension [SIH]). [24]

IV. Leptomeningial carcinomatosis is *suspected*. [39]

V. Metastasis from the brain or spine

VI. Neurocutaneous syndrome tumor evaluation and monitoring [45]

**Combination MRI Brain and MRI Spine Studies Guideline**

Magnetic resonance imaging (MRI) brain *combined* with MRI cervical spine, lumbar spine AND thoracic spine is considered medically appropriate when the documentation demonstrates known Multiple Sclerosis (MS), for follow-up and ANY of the following: [13] [47] [20] [18]

I. 6 to 12 months after starting or changing treatment

II. Every 1 to 2 years while on disease modifying treatment to assess for subclinical disease activity; less frequently if stable.

III. Prior to initiation of disease modifying treatment, for baseline
Combination MRI Cervical Spine/MRI Thoracic Spine Guideline

Magnetic resonance imaging (MRI) cervical spine combined with MRI thoracic spine is considered medically appropriate when the documentation demonstrates ANY of the following:

I. Multiple Sclerosis (MS) is suspected when brain MRI is non-diagnostic or indeterminate AND/OR McDonald criteria to diagnose MS is NOT met. [47] [20] [18] [13]

II. Syrinx or syringomyelia is known, for initial evaluation with ANY of the following: [22]
   A. Neurologic symptoms (eg, abnormal gait or reflexes, bowel/bladder dysfunction, extremity weakness) are new or progressing.
   B. Predisposing conditions are known (eg, Arnold-Chiari malformation, neoplasm, prior trauma, spondylodisc).  
   C. Prior imaging demonstrates an abnormality.

III. Transverse myelitis is suspected when symptoms (eg, autonomic dysfunction, bilateral weakness, sensory disturbance) are present.

Combination CT and/or MRI Cervical, Thoracic, Lumbar Spine, ANY Combination Guideline

Combination imaging with computed tomography (CT) or magnetic resonance imaging (MRI) of the cervical, thoracic, and/or lumbar spine, in any combination, when MRI is contraindicated or unavailable (NOTE: ONLY if CT is ordered), is considered medically appropriate when the documentation demonstrates ANY of the following:

I. Arnold Chiari syndrome is known. [40] [44]

II. Cancer is known and ANY of the following:
   A. Drop metastasis from brain or spine
   B. Leptomeningeal carcinomatosis is suspected. [39]
   C. Neurocutaneous syndrome tumor, for evaluation and monitoring. [45]
   D. Spinal survey with metastases

III. Cerebrospinal fluid (CSF) leak is suspected (eg, cerebrospinal-venous fistula, orthostatic headache, otorrhea, post lumbar puncture headache, post spinal surgery headache, rhinorrhea, spontaneous idiopathic intracranial hypotension [SIH]). [24]

IV. Neurologic deficits (eg, abnormal gait or reflexes, bowel/bladder dysfunction, extremity weakness). are known.

V. Peri-procedural planning for spinal procedure including ANY of the following:
A. CT myelogram, (when myelogram indications are met), for procedural planning and MRI is contraindicated or unavailable. [1]

B. Post-procedure follow-up

C. Pre-spinal procedural planning

VI. Scoliosis with ANY of the following: [46] [33]

A. Age of onset is early (before age 12 years).

B. Atypical curve (eg, Kyphosis more than 30 degrees, left thoracic curve, short segment)

C. Treatment planning depends on imaging

VII. Spinal deformity is progressing and symptomatic.

VIII. Tethered cord or spinal dysraphism is suspected or known, based on prior imaging, neurological exam findings and/or high risk cutaneous stigmata, AND anesthesia is required for imaging. [30] [4]

**MRI General Contraindications and Exclusions**

MRI contraindications and exclusions may include ANY of the following: [41] [48] [9] [2023 Magnetic Resonance Imaging and Arteriography]

- Safety, related to clinical status (eg, first-trimester pregnancy, recent intravascular stents [within 6 weeks])

- Safety, related to implanted devices (eg, cochlear implant, insulin pump)

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**LCD 37373**

*See also, LCD 37373: MRI and CT Scans of Head and Neck at https://www.cms.gov/medicare-coverage-database/search.aspx if applicable to individual’s healthplan membership.*

**LCD 35175**

*See also, LCD 35175: MRI and CT Scans of the Head and Neck at https://www.cms.gov/medicare-coverage-database/search.aspx if applicable to individual’s healthplan membership.*
Spine Surveillance

Bone Cancer Surveillance

NCCN Bone Cancer Version 1.2024

Bone cancer surveillance includes ANY of the following:

I. Chondrosarcoma surveillance for ANY of the following:
   A. Atypical cartilaginous tumor surveillance with ALL of the following:
      1. Chest imaging every 6 to 12 months for 2 years, then annually as clinically indicated
      2. Primary site X-rays and/or cross-sectional imaging magnetic resonance imaging (MRI) (with and without contrast) or computed tomography (CT) (with contrast) every 6 to 12 months for 2 years, then annually as clinically indicated
   B. High grade (grade II or III, clear cell or extracompartamental) surveillance with ALL of the following:
      1. Chest imaging every 3 to 6 months, may include CT at least every 6 months for 5 years, then annually for at least 10 years, as clinically indicated
      2. Primary site X-rays and/or cross-sectional imaging MRI (with and without contrast) or CT (with contrast) as clinically indicated.

II. Chordoma surveillance with ALL of the following:
   A. Chest imaging every 6 months, with CT included, annually for 5 years, then annually thereafter as clinically indicated
   B. Imaging of primary site, timing and modality (eg, MRI ± CT [both with contrast], X-ray) as clinically indicated up to 10 years

III. Ewing Sarcoma after primary treatment completed and stable/improved disease, surveillance with ALL of the following:
A. Chest imaging with X-ray or CT: every 2 to 3 months
B. Primary site imaging with MRI ± CT (both with contrast) and X-ray, increase intervals after 24 months and after 5 years, annually as clinically indicated (indefinitely) (*NOTE: Consider PET/CT [head-to-toe] and/or bone scan.)

IV. Giant cell tumor of the bone surveillance with ALL of the following:
   A. Chest imaging every 6 to 12 months for 4 years, then annually thereafter as clinically indicated
   B. Surgical site imaging as clinically indicated (eg, CT +/- MRI, both with contrast, X-ray)

V. Osteosarcoma surveillance with primary site and chest imaging (using same imaging that was done for initial work-up) for ANY of the following: (*NOTE: Consider PET/CT [head-to-toe] and/or bone scan.)
   A. Image every 3 months for years 1 and 2
   B. Image every 4 months for year 3
   C. Image every 6 months for years 4 and 5
   D. Image annually for year 6 and thereafter, as clinically indicated

Central Nervous System (CNS) Cancer Surveillance

NCCN Central Nervous System Cancer Version 1.2023

Central nervous system (CNS) cancer surveillance includes ANY of the following:

I. Brain metastasis, limited OR extensive, image with brain magnetic resonance imaging (MRI) every 2 to 3 months for 2 years, then every 4 to 6 months indefinitely

II. Glioma and ANY of the following:
   A. Low-grade glioma, image with brain MRI every 3 to 6 months for years 3 through 5, then at least annually as clinically indicated
   B. High grade glioma, image with brain MRI 2 to 8 weeks after radiation therapy, then every 2 to 4 months for 3 years, then every 3 to 6 months indefinitely

III. Medulloblastoma, image with brain MRI every 3 months for 2 years, then every 6 to 12 months for years 5 through 10, then every 1 to 2 years as clinically indicated.

IV. Meningiomas, WHO Grade 1 or 2 OR unresectable, image with brain MRI at months 3, 6 and 12, then every 6 to 12 months for 5 years, then every 1 to 3 years as clinically indicated

V. Primary CNS lymphoma, image with brain MRI every 3 months for 1 year, then every 6 months for years 2 through 5, then annually indefinitely (*NOTE: for individuals with
previous spine disease, concurrent spine imaging and cerebrospinal fluid (CSF) sampling as clinically indicated

VI. Primary spinal cord tumors and ANY of the following:
   A. Low-grade tumors, image with spine MRI every 3 to 6 months until year 5, then at least annually indefinitely
   B. High-grade tumors, image with spine MRI every 2 to 6 weeks after treatment, then every 2 to 4 months until year 3, then every 3 to 6 months until year 5, then every 6 to 12 months indefinitely

VII. Spine metastasis, image with spine MRI or computed tomography (CT) 1 to 3 months after treatment, then every 3 to 4 months for 1 year, then clinically as indicated

**Neuroendocrine and Adrenal Cancer Surveillance**

**NCCN Neuroendocrine and Adrenal Tumors Version 1.2023**

Neuroendocrine and adrenal cancer surveillance includes ANY of the following:

I. Adrenal gland tumors surveillance imaging includes ANY of the following:
   A. Localized disease: chest computed tomography (CT) (± contrast) and abdominal CT or magnetic resonance imaging (MRI) (+ contrast) every 12 weeks to 12 months up to 5 years, then clinically as indicated
   B. Locoregional unresectable or metastatic disease; chest CT (± contrast) and abdominal/pelvic CT or MRI (+ contrast) or FDG positron emission tomography (PET)/CT every 12 weeks to 12 months up to 5 years, then clinically as indicated

II. Carcinoid syndrome surveillance imaging includes BOTH of the following:
   A. Abdominal/pelvic multiphasic CT or MRI every 12 weeks to 12 months and chest CT (± contrast) as clinically indicated
   B. Echocardiogram every 1 to 3 years or as clinically indicated

III. Gastrointestinal (GI) tract (jejunum/ileum/colon, duodenum, rectum), lung and/or thymus neuroendocrine tumor (NET) surveillance includes imaging post-resection with ANY of the following:
   A. Jejunum/ilium/colon, duodenum, rectum and thymus, surveillance imaging with abdominal ± pelvic multiphasic CT or MRI according to ONE of the following levels of frequency:

1. No surveillance is indicated for appendiceal tumors 2 cm or smaller without aggressive features.
2. High-grade tumors may be appropriate for more frequent monitoring.
1. Within 12 weeks to 12 months postoperatively
2. After 12 months, image every 12 to 24 months for 10 years
3. After 10 years as clinically indicated

B. Lung/thymus tumors surveillance chest CT (± contrast) for primary tumors, (as clinically indicated for primary GI tumors) according to ONE of the following levels of frequency:
   1. Within 12 weeks to 12 months postoperatively
   2. After 12 months, image every 12 to 24 months for 10 years
   3. After 10 years as clinically indicated

IV. Grade 3, well-differentiated neuroendocrine surveillance includes chest CT (± contrast) as clinically indicated for ANY of the following:

A. Locally advanced/metastatic disease with favorable biology (low Ki-67 [eg, less than 55%], positive somastatin receptor [SSTR] based PET imaging) includes abdominal/pelvic MRI (+ contrast) or abdominal/pelvic multiphasic CT for surveillance with ANY of the following:
   1. Resectable disease surveillance every 12 weeks to 24 weeks for 2 years, then every 6 to 12 months for up to 10 years and chest CT as clinically indicated
   2. Unresectable disease surveillance every 12 weeks to 24 weeks (depending on tumor biology) AND chest CT (± contrast); if clinically indicated.

B. Locally advanced/metastatic disease with unfavorable biology (high Ki-67 [eg 55% or higher], rapid growth rate, FDG avid tumors, negative SSTR-based PET imaging), includes surveillance imaging, every 8 weeks to 12 weeks (depending on tumor biology) with ALL of the following:
   1. Abdominal/pelvic MRI (+ contrast) or abdominal/pelvic multiphasic CT and FDG PET/CT as clinically indicated
   2. Chest CT (± contrast) as clinically indicated

C. Locoregional disease (resectable) abdominal/pelvic MRI (+ contrast) or abdominal/pelvic multiphasic CT with frequency of ONE of the following:
   1. Every 12 weeks to 24 weeks for 2 years (depending on tumor biology, Ki-67) and chest CT as clinically indicated
   2. Every 6 months to 12 months for up to 10 years (depending on tumor biology, Ki-67) and chest CT as clinically indicated
D. Multiple endocrine neoplasia, type 1 (MEN1) screening surveillance for ANY of the following tumor types: (*NOTE: For prolonged surveillance, imaging studies without radiation are preferred.)

1. Bronchial/thymic NETs: chest CT or MRI (+ contrast) every 1 to 3 years
2. PanNET: abdominal/pelvic CT or MRI (+ contrast) every 1 to 3 years and consider serial endoscopic ultrasound (EUS)
3. Parathyroid: if calcium rises, re-image with neck ultrasound and/or parathyroid sestamibi with single-photon emission computed tomography (SPECT) scan (SPECT-CT preferred) or 4D-CT
4. Pituitary: pituitary or sella MRI (+ contrast) of the pituitary every 3 to 5 years

E. Poorly differentiated large or small cell carcinoma and/or mixed neuroendocrine/non-neuroendocrine neoplasm or unknown primary, imaging surveillance includes ALL of the following:

1. Resectable surveillance imaging includes EITHER chest CT (± contrast) with abdominal/pelvic MRI (+ contrast) OR chest/abdominal/pelvic multiphasic CT; every 12 weeks for the 1st year, and every 6 months thereafter
2. Locoregional unresectable or metastatic disease surveillance imaging includes EITHER chest CT (± contrast) with abdominal/pelvic MRI (+ contrast) OR chest/abdominal/pelvic multiphasic CT; every 6 weeks to 16 weeks

F. Postoperative from potentially curative surgery surveillance for at least 10 years (longer if high-risk)

V. Pancreatic neuroendocrine tumor surveillance imaging, post-resection, includes chest CT (± contrast) as clinically indicated and abdominal multiphasic CT or MRI with imaging frequency of ONE of the following:

A. Within 3 to 12 months postoperatively
B. After 12 months, image every 6 to 12 months for 10 years
C. After 10 years as clinically indicated

VI. Pheochromocytoma/Paranganglioma surveillance imaging and ANY of the following:

A. Resectable disease, post-resection includes chest CT (± contrast) and abdominal/pelvic CT or MRI (+contrast), if clinically indicated with imaging frequency of ONE of the following:
   1. 12 weeks to 12 months after resection
2. Every 6 to 12 months for the 1st 3 years
3. Annually up to 10 years, then as clinically indicated

B. Locally unresectable disease or distant metastases includes ANY of the following:
   1. Chest/abdominal/pelvic CT with contrast
   2. Chest CT (± contrast) and abdominal/pelvic MRI without contrast (if risk for hypertensive episode)
   3. FDG-PET/CT for bone dominant disease
   4. MIBG (meta-iodobenzylguanidine) with single-photon emission computerized tomography/CT (SPECT) (if previous MIBG-positive or concern for disease progression) prior to considering radionuclide therapy
   5. SSTR-PET/CT or SSTR-PET/MRI (if previous SSTR-positive or concern for disease progression) prior to considering radionuclide therapy

TIP
NCCN recommends following the surveillance protocols from designated guidelines for the following hereditary endocrine neoplasia syndromes:

- Thyroid cancer guideline, use for: Multiple endocrine neoplasia, type 2 (MEN2) with genetic evaluation of inherited syndromes
- Kidney cancer, use for:
  - Hereditary paraganglioma/pheochromocytoma syndrome
  - Tuberous sclerosis complex (TSC1 and TSC2)
  - von Hippel Lindau syndrome (VHL)
- Genetic/Familial High-Risk Assessment: Breast, Ovarian, and Pancreatic, use for:
  - Neurofibromatosis type 1 (NF1)
  - Li-Fraumeni syndrome (TP53)
  - Lynch syndrome (MLH1, EPCAM/MSH2, MSH6, PMS2)
- Genetic/Familial High-Risk Assessment: Colorectal, use for:
  - Lynch syndrome (MLH1, EPCAM/MSH2, MSH6, PMS2)
  - Familial adenomatous polyposis (APC)
Occult Primary Cancer Surveillance

NCCN Occult Primary Cancer Version 1.2024
Occult primary cancer surveillance imaging for long-term surveillance includes diagnostic tests based on symptomatology

MRI Cervical Spine Summary of Changes
MRI Cervical Spine guideline from 2022 to 2023 had the following changes:

• Added the following to keep in line with current research:
  ▪ Indications under "Infection"
  ▪ Indications under "Myelopathy"
  ▪ "Symptoms are progressing" under "Myelopathy"
  ▪ "Unexaminnable" under "Trauma"

• Removed the following as the indication is not supported by current research:
  ▪ "Brain MRI findings are inconclusive"
  ▪ "Brain MRI is normal"
  ▪ "Cancer is suspected" from under "Pain"
  ▪ "Inflammation" from under "Pain" as it is redundant.
  ▪ MR Myelogram
  ▪ NOTE from "Multiple Sclerosis" indication
  ▪ "Pediatric population" from under "Pain" as Health Help does not cover pediatric indications.
  ▪ "Primary progressive MS"
  ▪ "Prior imaging" from under "Pain"

MRI Cervical Spine Procedure Codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>72141</td>
<td>Magnetic resonance (eg, proton) imaging, spinal canal and contents, cervical; without contrast material</td>
</tr>
<tr>
<td>72142</td>
<td>Magnetic resonance (eg, proton) imaging, spinal canal and contents, cervical; with contrast material(s)</td>
</tr>
<tr>
<td>72156</td>
<td>Magnetic resonance (eg, proton) imaging, spinal canal and contents, without contrast material, followed by contrast material(s) and further sequences; cervical</td>
</tr>
</tbody>
</table>
MRI Cervical Spine Definitions/Key Terms

**Abscess** is a swollen area within body tissue, containing an accumulation of pus.

**Achondroplasia** is the most common cause of dwarfism, or significantly abnormal short stature.

**Ankylosing spondylitis (spondylitis)** is a chronic inflammatory disease that affects the spine, sacroiliac joints and often other joints (such as the shoulder), and is marked by pain and stiffness.

**Atlantoaxial** are the anatomical structures that connect the atlas and the axis.

**Behcet's disease** a rare disease of unknown cause that is marked by chronic inflammation of blood vessels with symptoms including ulcerative sores especially of the mouth and genitals, inflammation of the eye, and joint swelling and pain.

**Benign** means not cancer. Benign tumors may grow larger but do not spread to other parts of the body. Also called nonmalignant.

**Canadian Cervical Rules (CCR)** are a set of guidelines that help clinicians decide if cervical spine imaging is needed for trauma patients in the emergency department. The CCR are used to rule out cervical spine injuries in low-risk patients. An example can be found at: [https://www.physio-pedia.com/Canadian_C-Spine_Rule](https://www.physio-pedia.com/Canadian_C-Spine_Rule)

**Cerebrospinal fluid (CSF) leak** is a leak of cerebrospinal fluid that results from a hole or tear in the dura (the outermost layer of the meninges).

**Cerebrospinal fluid (CSF) rhinorrhea** is a condition where the fluid that surrounds the brain leaks into the nose and sinuses.

**Chiari malformation (Arnold-Chiari syndrome)** is a congenital abnormality in which the lower surface of the cerebellum and the lower brain stem protrude into the spinal canal through the foramen magnum.

**Compression fracture** is a break in the vertebrae ad can cause the vertebrae to collapse, making them shorter.

**Computed tomography (CT)** refers to a computerized X-ray imaging procedure in which a three-dimensional image of a body structure is revealed through a series of cross-sectional images or "slices."

**Conservative therapy** attempted that includes physician supervised management with at least 6 weeks participation; therapeutic pain management (medication, heat/ice, etc.); and activity modifications (exercises, weight-limits, splints, etc.)

**C-reactive protein (CRP)** is a protein present in blood serum in various abnormal states (such as inflammation or neoplasia).

**Diffuse idiopathic skeletal hyperostosis (DISH)** is a condition that causes ligaments to become calcified and hard. It usually affects the ligament around the spine, but it can also affect other areas of the body where ligaments join to bone.

**Discitis** is an infection of the discs between the vertebra of the spine.
Down syndrome is a congenital condition characterized especially by developmental delays, usually mild to moderate impairment in cognitive functioning, short stature, upward slanting eyes, a flattened nasal bridge, broad hands with short fingers and decreased muscle tone caused by trisomy of the human chromosome numbered 21.

Electromyogram (EMG) is a test that converts the electrical activity associated with functioning skeletal muscle into a visual record or into sound used to diagnose neuromuscular disorders and in biofeedback training.

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.

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.

Glasgow Coma Scale (GCS) is a scale used to assess the severity of a brain injury. It consists of values from 3 to 15, obtained by summing the ratings that depend on whether and how the patient responds to certain standard stimuli.

Human Immunodeficiency Virus (HIV) damages the immune system and interferes with the body's ability to fight infection and disease.

Hydrocephalus is an abnormal increase in the amount of cerebrospinal fluid within the cranial cavity (as from obstructed flow, excess production, or defective absorption) that is accompanied by expansion of the cerebral ventricles and often increased intracranial pressure, skull enlargement, and cognitive decline.

Indeterminate findings are inconclusive or insufficient for treatment planning.

Kyphosis is the exaggerated outward curvature of the thoracic region of the spine resulting in a rounded upper back.

Lhermitte's sign describes an electric shock-like sensation that occurs on flexion of the neck. This sensation radiates down the spine, often into the legs, arms, and sometimes to the trunk.

Leptomeningeal carcinomatosis is cancer involving the pia mater and arachnoid mater. It occurs when cancer cells spread to the leptomeninges, which are the thin tissue layers that cover the brain and spinal cord.

Magnetic resonance imaging (MRI) is a non-invasive diagnostic technique that produces computerized images of internal body tissues and is based on nuclear magnetic resonance of atoms within the body induced by the application of radio waves.

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).

McDonald criteria is a tool that incorporates clinical criteria with features of the magnetic resonance imaging (MRI), spinal fluid, and evoked potentials to confirm a definite diagnosis of Multiple Sclerosis.
Metastasis is the spread of a disease-producing agency (such as cancer cells) from the initial or primary site of disease to another part of the body.

Multiple sclerosis (MS) is a demyelinating disease marked by patches of hardened tissue in the brain or the spinal cord and associated especially with partial or complete paralysis and jerking muscle tremor.

Myelopathy is a disease or disorder of the spinal cord or bone marrow.

National Emergency X-ray Utilization Study (NEXUS) is a very large, federally supported, multi-center, prospective study designed to define the sensitivity, for detecting significant cervical spine injury, of criteria previously shown to have high negative predictive value. Trauma patients who DO NOT require cervical spine imaging require ALL of the following:

- Alert and stable
- NO altered level of consciousness
- NO distracting injury
- NO focal neurological deficit
- NOT intoxicated
- NO midline spinal tenderness

Website for more information: https://www.mdcalc.com/calc/703/nexus-criteria-c-spine-imaging#:%3Avoided%20in%20appropriate%20patients.

Nerve conduction study (NCS) is a test that measures how fast an electrical impulse moves through the nerve and can identify nerve damage.

Neurocutaneous disorders are disorders that affect the brain, spinal cord, organs, skin, and bones. The diseases are lifelong conditions that can cause tumors to grow in these areas.

Neuromyelitis optica spectrum disorder (NMOSD) is an inflammatory disorder of the central nervous system characterized by severe, immune-mediated demyelination and axonal damage predominantly targeting optic nerves and the spinal cord.

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

Optic neuritis is inflammation of the optic nerve.

Orthostatic headache is a headache while upright, that is relieved by lying down.

Osteomyelitis is an infectious, inflammatory disease of bone. It is often painful, bacterial in origin and may result in the death of bone tissue.

Osteoporosis is a condition that is characterized by a decrease in bone mass, with decreased density and enlargement of bone spaces, producing porosity and fragility.

Otorrhea is drainage of liquid from the ear.

Radiculopathy describes a range of symptoms, including pain, numbness and weakness, produced by the pinching of a nerve root in the spinal column.
Rheumatoid arthritis (RA) is an autoimmune disease (usually chronic) that is characterized by pain, stiffness, inflammation, swelling and sometimes destruction of the joints. Sarcoidosis is a chronic disease of unknown cause, that is characterized by the formation of nodules, especially in the lymph nodes, lungs, bones and skin. Scoliosis is a sideways curvature of the spine that most often is diagnosed in adolescents. Spinal dysraphism is a congenital abnormality that results in an abnormal structure in the spine, including the bony structure, the spinal cord, and the nerve roots. Spondylarthropathy is an inflammatory arthritis affecting the spine. Spontaneous intracranial hypotension (SIH) is a condition in which the fluid pressure inside the skull is lower than normal.

Subluxation is a partial or incomplete dislocation. Surveillance is ongoing systematic collection and analysis of data and the provision of information which leads to action being taken to prevent and control a disease. Syringomyelia is a chronic progressive disease of the spinal cord associated with sensory disturbances, muscle atrophy and spasticity. Syrinx is a cerebrospinal fluid-filled cyst which collects inside of the spinal cord or brain stem. A syrinx in the spinal cord is called syringomyelia, and a syrinx in the brain stem is called syringobulbia.

Tethered spinal cord syndrome (TSCS) is a disorder of the nervous system caused by tissue that attaches itself to the spinal cord and limits the movement of the spinal cord. Transverse myelitis is an inflammation of part of the spinal cord.

MRI Cervical Spine References


## Disclaimer & Legal Notice

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