

2011 Imaging Criteria

Magnetic Resonance Imaging (MRI), Cervical Spine⁽¹⁾

ICD-9-CM: 88.93

CPT: 72141, 72142, 72156

I/O Setting: Outpatient

INDICATION(S)

-
- 100 Suspected nerve root compression by cervical disc herniation/spondylosis (spinal stenosis)
- 200 Myelopathy (spinal cord compression)
- 300 Suspected cervical cord injury with neurologic deficit at/distal to injury ♦
- 400 Suspected nerve root compression by tumor/metastasis (gadolinium contrast recommended) ♦
- 500 Suspected bone metastasis (gadolinium contrast recommended)
- 600 Follow-up bone metastasis after Rx
- 700 Preoperative evaluation of osteomyelitis (gadolinium contrast recommended)
- 800 Suspected osteomyelitis/disc space infection (gadolinium contrast recommended)
- 900 Follow-up epidural abscess (gadolinium contrast recommended)
- 1000 Multiple sclerosis (MS)
-
- 100 Suspected nerve root compression by cervical disc herniation/spondylosis (spinal stenosis) [One]^(2, 3)
- 110 Unilateral radiculopathy with motor deficit [One]^(4, 5)
- 111 Severe weakness/mild atrophy in nerve root distribution by PE⁽⁶⁾
- 112 Mild to moderate weakness in a nerve root distribution by PE [One]
- 1 Continued Sx/findings after Rx [Both]
- A) NSAID [One]⁽⁷⁾
- 1) Rx ≥ 3 wks
- 2) Contraindicated/not tolerated⁽⁸⁾
- B) Activity modification ≥ 6 wks⁽⁹⁾
- 2 Worsening weakness/motor deficit ♦⁽¹⁰⁾
- 120 Unilateral radiculopathy with sensory deficit [One]⁽¹¹⁾
- 121 Refractory severe pain in nerve root distribution [All]⁽¹²⁾
- 1 Pain unrelieved by change in body position
- 2 Interferes with ADLs⁽¹³⁾
- 3 Continued severe pain after Rx [Both]⁽¹⁴⁾
- A) NSAID [One]⁽⁷⁾
- 1) Rx ≥ 3 days
- 2) Contraindicated/not tolerated⁽⁸⁾
- B) Opiate [One]⁽¹⁵⁾
- 1) Rx ≥ 3 days
- 2) Contraindicated/not tolerated
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- 122 Mild to moderate pain/paresthesias/numbness in a nerve root distribution [**One**]⁽¹⁶⁾
- 1 Continued Sx/finding **after** Rx [**Both**]⁽⁷⁾
 - A) NSAID [**One**]⁽⁷⁾
 - 1) Rx ≥ 3 wks
 - 2) Contraindicated/not tolerated⁽⁸⁾
 - B) Activity modification ≥ 6 wks⁽⁹⁾
 - 2 Worsening Sx/findings ♦⁽¹⁷⁾
- 200 Myelopathy (spinal cord compression) [**One**]^(18*RIN, 19, 20)
- 210 Severe Sx/findings [**One**]⁽²¹⁾ ♦
- 211 Bilateral upper/lower extremity weakness/numbness/pain
 - 212 Bowel incontinence and other etiologies excluded
 - 213 Bladder dysfunction and other urologic etiologies excluded⁽²²⁾
 - 214 Spasticity by PE⁽²³⁾
 - 215 Loss of dexterity⁽²⁴⁾
- 220 Mild to moderate Sx/findings [**All**]⁽²⁵⁾
- 221 Sx/findings [**One**]⁽²⁶⁾
 - 1 Pain/paresthesias/numbness in neck/shoulder/arm
 - 2 Weakness in an extremity
 - 3 Unsteady gait⁽²⁷⁾
 - 222 Continued pain **after** Rx [**Both**]⁽⁷⁾
 - 1 NSAID [**One**]⁽⁷⁾
 - A) Rx ≥ 3 wks
 - B) Contraindicated/not tolerated⁽⁸⁾
 - 2 Activity modification ≥ 6 wks
 - 223 Spondylosis by x-ray⁽²⁸⁾
- 300 Suspected cervical cord injury with neurologic deficit at/distal to injury ♦⁽²⁹⁾
- 400 Suspected nerve root compression by tumor/metastasis (gadolinium contrast recommended) [**Both**]^(30, 31) ♦
- 410 Cervical spine Sx/findings [**One**]⁽³²⁾
 - 411 Cancer by Hx
 - 412 Pain by Hx
 - 413 Bone lesion by bone scan/x-ray
 - 420 Unilateral pain/weakness in nerve root distribution
- 500 Suspected bone metastasis (gadolinium contrast recommended) [**All**]^(31, 33)
- 510 Cancer by Hx
 - 520 No neurologic Sx/findings^(34*RIN)
 - 530 Cervical spine Sx/findings [**One**]

- 531 Pain by Hx
- 532 Bone lesion by bone scan/x-ray
- 540 Bone scan **[One]**⁽³⁵⁾
 - 541 Negative/nondiagnostic for bone metastasis⁽³⁶⁾
 - 542 Positive site in cervical spine⁽³⁷⁾
- 600 Follow-up bone metastasis after Rx **[All]**⁽³⁸⁾
 - 610 No neurologic Sx/findings^(34*RIN)
 - 620 Initial cervical spine MRI positive
 - 630 Chemotherapy/radiation Rx completed⁽³⁹⁾
- 700 Preoperative evaluation of osteomyelitis (gadolinium contrast recommended)^(40, 41)
- 800 Suspected osteomyelitis/disc space infection (gadolinium contrast recommended) **[Both]**^(40, 42)
 - 810 Localized cervical spine pain by Hx
 - 820 Findings **[One]**^(43, 44)
 - 821 ESR > 30 mm/hr
 - 822 Temperature > 100.4 F(38.0 C)
 - 823 WBC > 10,000/cu.mm($10 \times 10^9/L$)
 - 824 Blood culture positive
 - 825 C-reactive protein > 10 mg/L
- 900 Follow-up epidural abscess (gadolinium contrast recommended) **[One]**^(31, 45, 46)
 - 910 New/worsening neurologic Sx/findings **[One]** ♦
 - 911 Muscle weakness/spasticity by Hx/PE
 - 912 Sensory deficit by Hx/PE
 - 913 Loss of bowel/bladder control by Hx
 - 920 New/worsening pain at site ♦
 - 930 Periodic evaluation of response to Rx w/o new/worsening Sx/findings⁽⁴⁷⁾
- 1000 Multiple sclerosis (MS) **[One]**^(48, 49, 50)
 - 1010 Suspected MS **[Both]**^(51, 52, 53)
 - 1011 MRI brain planned with/before spine study⁽⁵⁴⁾
 - 1012 Symptoms **[One]**
 - 1 Transverse myelitis by Hx/PE (gadolinium contrast recommended)^(55, 56)
 - 2 Neurologic Sx/findings not in dermatomal/peripheral nerve distribution and other etiologies excluded **[One]**
 - A) Sensory deficit
 - B) Motor dysfunction
 - 3 Loss of coordination and other etiologies excluded
 - 4 Bowel incontinence and other etiologies excluded⁽⁵⁷⁾

- 5 Bladder dysfunction and other urologic etiologies excluded⁽⁵⁸⁾
- 1020 Known MS with new/worsening spine symptoms (gadolinium contrast recommended)^(59*MDR)

Notes

(1)

The following are examples of relative and absolute contraindications to the use of magnetic resonance imaging:

- Implanted devices that are electrically or magnetically activated (e.g., cardiac pacemakers, automatic cardioverter defibrillators, drug infusion pumps, cochlear implants)
- Ferromagnetic metal objects (e.g., cerebral aneurysm clips, intraocular metallic foreign body, prostheses, screws)
- Pregnancy, first trimester
- Renal insufficiency in cases when magnetic resonance imaging is performed with gadolinium-based contrast

(2)

Compression usually affects the sensory neurons of the nerve root first, causing pain and paresthesias. Motor neurons are somewhat less vulnerable, and are usually affected later or in more severe compression. Neurologic findings of sensory loss and reflex loss are corroborative findings for compressive radiculopathy but are not substitutes for radicular pain or muscle weakness.

(3)

MRI is the imaging study of choice for suspected cervical radiculopathy (Ryan et al., Br J Radiol 2004; 77(915): 189-196).

(4)-DEF:

Cervical radiculopathy refers to a sensory or motor dysfunction in the distribution of an affected cervical nerve root. Most cases result from compression of the nerve root as it exits the spinal canal, by either a herniated disc or cervical spondylosis (a progressive degeneration of the intervertebral articulations). This impingement results in sensory and/or motor deficits, and can lead to local nerve inflammation that produces pain.

(5)

Weakness in radiculopathy affects muscles innervated in a specific nerve root distribution:

- Deltoid and biceps (C5)
- Biceps and brachioradialis (C6)
- Triceps and wrist extensors (C7)
- Intrinsic hand muscles (C8)

Anatomic variation can exist in these nerve root distributions. Early on in the disease process the entire nerve root distribution may not be affected.

(6)

Muscle strength can be graded on a 0 to 5 scale (0 is no visible or palpable muscle contraction and 5 is normal strength) (Braddom and Buschbacher, Physical medicine and rehabilitation, 2nd ed. 2000). For the purposes of these criteria, severe muscle weakness is defined as "less than 2 out of 5" muscle strength by PE (less than full ROM with gravity eliminated) or the inability to ambulate.

(7)-POL:

NSAIDs are preferred for the treatment of this condition because of their anti-inflammatory effect. It is a matter of local medical policy whether to accept acetaminophen or other analgesics as alternatives for NSAIDs.

(8)

Contraindications to NSAIDs may be absolute (e.g., pregnancy, history of allergic reaction) or relative (e.g., anticoagulant use, history of PUD).

(9)

Activity modification involves limiting activities that provoke or aggravate symptoms, such as repetitive head turning or twisting, or holding the head in an awkward position. PT with exercises to improve posture and strengthen the neck muscles may be beneficial in some patients.

(10)

Urgent imaging should be considered for patients with progressive motor weakness.

(11)

Pain in radiculopathy is present in a specific nerve root distribution:

- Neck, shoulder, and upper arm pain (C5)
- Neck, shoulder, and radial forearm pain (C6)
- Neck, shoulder, and dorsal forearm pain (C7)
- Neck, shoulder, and ulnar forearm pain (C8)

Anatomic variation can exist in these nerve root distributions. Early on in the disease process the entire nerve root distribution may not be affected.

(12)

Early evaluation for patients with refractory pain is reasonable, including those patients with excruciating symptoms that are unremitting, totally unresponsive to treatment, and interfere significantly with ADLs. This is an unusual circumstance, as most patients are able to achieve some relief with rest and analgesics. Early evaluation is to verify the diagnosis, to exclude other causes of severe pain, and for consideration of interventions such as epidural steroid injection and surgery. Assessment should also include psychosocial issues, since nonphysical factors can complicate treatment.

(13)

Activities of daily living (ADLs) are frequently divided into those simple activities relating to basic self-care and those that involve more complex interactions with others and the environment (called instrumental activities of daily living or IADLs). This criterion includes both types of activity. Whether a condition is of sufficient severity to interfere with ADLs or IADLs is somewhat subjective. There should be an indication that symptoms impede the patient's ability to effectively work, shop, manage at home, care for family members, or tend to personal hygiene.

(14)

Muscle relaxants (e.g., cyclobenzaprine) may be effective within the first 4 days of treatment when muscle spasm is present; their benefits, however, must be weighed against their sedative properties (Chou and Huffman, *Ann Intern Med* 2007; 147(7): 505-514).

(15)

The short-term effectiveness of opioids has been documented for a variety of pain syndromes; prolonged use is generally not recommended because of the potential for sedation and physical dependence (Douglass and Bope, *J Am Board Fam Pract* 2004; 17 Suppl: S13-22).

(16)

Treatment of radiculopathy primarily involves NSAIDs and activity modification. Opiates are sometimes useful for short-term pain control, and some patients find relief using muscle relaxants as well.

(17)

Worsening symptoms includes pain that is intensifying or extending to a more distal site.

(18)-RIN:

MRI is useful in the evaluation of nonacute myelopathy such as occurs in MS or transverse myelitis. For symptoms and findings of MS, see indication 1000 within this criteria subset.

(19)-DEF:

Myelopathy is any disease or injury to the spinal cord. Spondylitic myelopathy is spinal cord impingement or compression due to progressive degeneration of the intervertebral articulations.

Spinal cord compression may also occur as a result of an acute central herniated disc and it is important to differentiate this from the more chronic spondylitic myelopathy.

(20)

Acute myelopathy requires urgent imaging and surgery. MRI is the preferred imaging procedure since it will demonstrate the cause and extent of the cord compression and may also demonstrate cord edema (Emery, *J Am Acad Orthop Surg* 2001; 9(6): 376-388).

(21)

Severe neurologic deterioration, as evidenced by loss of bowel or bladder control, and motor and sensory deficits, implies significant cord compression and require urgent evaluation and treatment.

(22)

Symptoms of urinary dysfunction due to spinal cord compression include retention, frequency, hesitancy, urgency, or incontinence

(23)

Spasticity is often accompanied by other sensory and motor deficits such as the loss of fine motor dexterity, lower extremity weakness or numbness, and gait disturbances. Spasticity implies significant cord compression and requires urgent evaluation and treatment.

(24)

Decreased fine motor control in the hands is a common finding in patients with cervical myelopathy.

(25)

Cervical myelopathy is often caused by cervical spondylosis, which is age-related degeneration of the cervical spine. Since the natural history of cervical myelopathy is usually one of persistent or stepwise deterioration over time, mild to moderate symptoms that do not respond to medical treatment warrant further evaluation.

(26)

Sensory symptoms of cervical spondylosis are variable, often causing pain and paresthesias. Symptoms may be unilateral or bilateral, and can involve the neck, shoulder, arm, or hand.

(27)

Many patients with myelopathy have a broad-based, hesitant, and jerky gait.

(28)

Radiographic evidence of cervical spondylosis involves degenerative changes of the intervertebral joints.

(29)

MRI is the preferred test for imaging cord injuries, with its ability to differentiate cord contusion from cord compression (Daffner and Hackney, *J Am Coll Radiol* 2007; 4(11): 762-775). Cord injuries include cases with fracture and those without fracture (SCIWORA - spinal cord injury without radiologic abnormality). Often both CT and MRI are performed in this setting.

(30)

Nerve root compression by tumor should be suspected for patients with a history of cancer and new extremity pain. Most commonly this refers to metastatic cancer, although primary bone tumors may also cause nerve root compression.

(31)

Gadolinium-enhanced MRI (GdMRI) is the preferred imaging method for evaluating patients with suspected or confirmed primary tumor or metastatic intraspinal extension, suspected or confirmed disc space infection, or an epidural abscess (Chin, *Semin Neurol* 2002; 22(2): 205-220; Runge et al., *Top Magn Reson Imaging* 2001; 12(4): 231-263). Contrast improves lesion delineation, localizes regions likely to provide positive biopsy, and identifies active disease (Jacobs et al., *NeuroRx* 2005; 2(2): 333-347).

(32)

The weakness with nerve root compression affects muscles innervated in a specific nerve root distribution:

- Deltoids and biceps (C5)
- Biceps and brachioradialis (C6)
- Triceps and wrist extensors (C7)
- Intrinsic hand muscles (C8)

The pain with nerve root compression is present in a specific nerve root distribution:

- Neck, shoulder, upper arm pain (C5)
- Neck, shoulder, and radial forearm pain (C6)
- Neck, shoulder, dorsal forearm pain (C7)
- Neck, shoulder, ulnar forearm pain (C8)

Anatomic variation can exist in these nerve root distributions. Early on the entire nerve root distribution may not be affected.

(33)

Metastases from primary breast, lung, and prostate cancer are the most common neoplasms of the spine (Ratliff and Cooper, *South Med J* 2004; 97(3): 246-253).

(34)-RIN:

For neurologic symptoms or findings, see indication 100, 200, 300, or 400 within this criteria subset.

(35)

In patients with known cancer and bone pain, a bone scan is appropriate for initial staging.

(36)

Although a bone scan is positive in the vast majority of patients with spinal metastasis, it can be negative or nondiagnostic in some tumors, such as myeloma, lymphoma, and anaplastic tumors.

(37)

MRI is appropriate for single or multiple positive sites on bone scan to allow for accurate assessment of soft tissue extension or for preoperative planning.

(38)

MRI is an appropriate study if symptoms of bone pain return (Ratliff and Cooper, *South Med J* 2004; 97(3): 246-253). Gadolinium enhanced MRI (GdMRI) is used when epidural or soft tissue extension is not clearly visible on noncontrast MRI (Runge et al., *Top*

Magn Reson Imaging 2001; 12(4): 231-263).

(39)

The assessment is generally performed about 6 weeks after radiation is completed or after the chemotherapy is completed.

(40)

Although relatively uncommon, vertebral osteomyelitis can occur in patients with recent spine surgery, or in those with DM, immunosuppression, IV drug use, or alcohol dependence. Early diagnosis and treatment can prevent serious complications that may include vertebral instability or collapse, or the development of an epidural abscess (Patel, J Neurol Neurosurg Psychiatry 2002; 73 Suppl 1: i42-48; Tay et al., J Am Acad Orthop Surg 2002; 10(3): 188-197). MRI is the imaging modality of choice with 96% sensitivity and 93% specificity for diagnosing osteomyelitis compared with the 90% sensitivity and 78% specificity for bone scan (Jarvik and Deyo, Ann Intern Med 2002; 137(7): 586-597). Gadolinium-enhanced MRI is crucial in the evaluation of vertebral collapse due to osteomyelitis (Tehranzadeh and Tao, Semin Ultrasound CT MR 2004; 25(6): 440-460).

(41)

CT and MRI can both be used to image osteomyelitis. CT is used to reveal the location and amount of bone destruction, but it is less sensitive for detecting early marrow changes not associated with cortical bone abnormalities (Tay et al., J Am Acad Orthop Surg 2002; 10(3): 188-197). MRI is superior for assessment of bone marrow involvement, vertebral end plate destruction, and the spread of infection into the spinal canal, nerve roots, and soft tissue (Nikkanen et al., J Emerg Med 2002; 22(3): 279-283; Stabler and Reiser, Radiol Clin North Am 2001; 39(1): 115-135).

(42)

Disc space infection is most common in patients with prior spine surgery, and is often difficult to diagnose because the MRI changes seen in the disc space are often assumed to be normal postsurgical changes. TB may involve the disc space in patients without prior surgery; this occurs most frequently in the thoracic spine. Patients with DM are also prone to disc space infection.

(43)

If the patient is immunocompromised, fever may not be present and the WBC may be unchanged or low.

(44)

Although x-rays are commonly performed for suspected osteomyelitis or discitis and may be highly suggestive, MRI remains the definitive test to determine the extent of disease. In addition, vertebral osteomyelitis may not be found on initial x-ray, as infection is often present 2 to 3 weeks before radiologic changes are evident (Nikkanen et al., J Emerg Med 2002; 22(3): 279-283).

(45)

Spinal epidural abscess is rare and, without treatment, can result in CNS dysfunction and death. Symptoms and findings are nonspecific and range from low back pain to sepsis. Risk factors include immunocompromised states (e.g., AIDS, chronic renal failure), recent spinal surgery, or vertebral trauma (Tay et al., J Am Acad Orthop Surg 2002; 10(3): 188-197).

(46)

A high index of suspicion is warranted for patients who present with spinal pain or a neurologic deficit in conjunction with a fever or elevated ESR. Gadolinium-enhanced MRI should be performed in known or suspected cases to localize and define the spinal epidural abscess (Bluman et al., J Am Acad Orthop Surg 2004; 12(3): 155-163).

(47)

The frequency of assessment is a matter of clinical judgment, but in a patient with stable symptoms and findings, it is rarely necessary to perform a study more frequently than weekly. MRI is performed to monitor resolution of the abscess in response to antibiotic therapy. If there is no progress, surgical drainage may be necessary.

(48)

Multiple sclerosis (MS) is a chronic inflammatory disease of the CNS. The natural history of MS is characterized by the relapse and remission of various focal symptoms; some patients experience a chronic progressive pattern of disability (Courtney et al., Med Clin North Am 2009; 93(2): 451-476; Birnbaum, Adv Neurol 2006; 98: 111-124). Sites of autoimmune mediated demyelination cause focal neurologic impairment, which may correlate with MRI signal intensity changes within the white matter. The hallmark of MS lesions is their bright appearance on T2-weighted images in the brain; lesions are also commonly seen in the spinal cord (Simon, Radiol Clin North Am 2006; 44(1): 79-100; Bakshi et al., Neurology 2004; 63(11 Suppl 5): S3-11). The use of MRI has allowed earlier confirmation of the diagnosis, resulting in earlier medical intervention and improved management of the disease. LP results and visual evoked potentials can suggest the diagnosis.

(49)

MRI is primarily used for the evaluation of suspected MS, as well as for following new or worsening symptoms. MRI can exclude other conditions that would account for the patient's symptoms and exam findings, can establish the presence of clinically silent lesions, and can demonstrate new lesions (Royal College of Physicians, Multiple Sclerosis. National clinical guideline for diagnosis and management in primary and secondary care. 2004, 197). CT is not indicated as a diagnostic test for suspected MS.

(50)

Functional, magnetization transfer, diffusion tensor, and spectroscopy MRI are now being used outside clinical trials as adjunctive measures for diagnosing and monitoring disease progression and treatment response (Ali and Buckle, *Neurol Clin* 2009; 27(1): 203-219, ix; Bakshi et al., *Lancet Neurol* 2008; 7(7): 615-625; Rovira and Leon, *Eur J Radiol* 2008; 67(3): 409-414; Fazekas et al., *J Neuroimaging* 2007; 17 Suppl 1: 50S-55S).

(51)

MS can present with sensory deficits, motor dysfunction, or cerebellar or brainstem dysfunction. There is usually no set pattern to the symptoms (Lublin, *Neurol Clin* 2005; 23(1): 1-15).

(52)

There are a number of diseases that may present in a similar manner to MS. These include acute disseminated encephalomyelitis, CNS vasculitis, migraine, tumor, sarcoidosis, Lyme disease, Sjogren's syndrome, SLE, and vitamin B₁₂ deficiency (Courtney et al., *Med Clin North Am* 2009; 93(2): 451-476; Miller et al., *Mult Scler* 2008; 14(9): 1157-1174; Krupp et al., *Neurology* 2007; 68(16 Suppl 2): S7-12; Birnbaum, *Adv Neurol* 2006; 98: 111-124). Many of these diagnoses can be ruled out with laboratory testing (e.g., CBC, ANA, ESR, vitamin B₁₂, TSH).

(53)

Gadolinium contrast is used to identify any disruption of the blood-brain barrier secondary to active inflammation. The number of enhancing lesions is the most clinically relevant measure of ongoing disease activity (Simon, *Radiol Clin North Am* 2006; 44(1): 79-100, viii; Bakshi et al., *Neurology* 2004; 63(11 Suppl 5): S3-11).

(54)

MRI of the brain is performed for most cases of suspected MS, even when symptoms suggest a spinal lesion. MRI of the spinal cord is performed for patients with signs and symptoms of spinal pathology, such as bladder dysfunction and impaired coordination or balance (Bot et al., *Neurology* 2004; 62(2): 226-233; Calabresi, *Am Fam Physician* 2004; 70(10): 1935-1944). Spinal cord lesions of MS typically involve no more than 1 to 2 contiguous spinal levels and less than half the cord cross-sectional area (Ali and Buckle, *Neurol Clin* 2009; 27(1): 203-219, ix). The McDonald criteria, which are used for making a diagnosis of MS, require a certain number of lesions be documented on MRI. Since there are usually only a few lesions seen in the spine in patients with MS, it becomes difficult to make the diagnosis of MS based purely on spine MRI results; MRI of the brain is, therefore, needed.

(55)-DEF:

Transverse myelitis is inflammation (leading to demyelination) involving the full diameter of the spinal cord but limited in longitudinal extent.

(56)

The risk of developing subsequent MS is highest when the patient presents with asymmetric, incomplete transverse myelitis (Miller et al., *Mult Scler* 2008; 14(9): 1157-1174; Thrower, *Neurology* 2007; 68(24 Suppl 4): S12-15).

(57)

Fecal incontinence and associated constipation result from the reduced gut motility seen with MS (Royal College of Physicians, Multiple Sclerosis. National clinical guideline for diagnosis and management in primary and secondary care. 2004, 197).

(58)

Incontinence, urgency, and nocturia are common troublesome bladder conditions seen in patients with MS (Royal College of Physicians, Multiple Sclerosis. National clinical guideline for diagnosis and management in primary and secondary care. 2004, 197).

(59)-MDR:

Because conventional MRI does not show remyelination or the pathophysiology of lesions well, there is a mismatch between symptomatology and MRI findings (Zivadinov et al., *J Neurol* 2008; 255 Suppl 1: 61-74). Currently, conventional MRI is not indicated for routine follow-up of patients with known MS unless the patient exhibits a clinical change. A new lesion by imaging may not reflect treatment failure but may be a manifestation of the natural history of the disease (Simon, *Radiol Clin North Am* 2006; 44(1): 79-100, viii; Filippi et al., *Eur J Neurol* 2006; 13(4): 313-325). Studies are ongoing regarding the correlation of MRI activity with relapse rate. The evidence varies as to whether MRI should be used to monitor treatment, rather than waiting for relapses and changes in clinical symptomatology (Sormani et al., *Ann Neurol* 2009; 65(3): 268-275). Until solid results point to the use of MRI for routine follow-up,

requests for MRI without a clinical change require secondary medical review.