Clinical Policy Bulletin:
Magnetic Resonance Imaging (MRI) and Computed Tomography (CT) of the Spine

Number: 0236

Policy

Aetna considers magnetic resonance imaging (MRI) and computed tomography (CT) of the spine medically necessary when *any* of the following criteria is met:

- Clinical evidence of spinal stenosis; *or*
- Clinical suspicion of a spinal cord or cauda equina compression syndrome; *or*
- Congenital anomalies or deformities of the spine; *or*
- Evaluation of recurrent symptoms after spinal surgery; *or*
- Evaluation prior to epidural injection to rule out tumor or infection and to delineate the optimal anatomical location for performing the injection; *or*
- Follow-up of evaluation for spinal malignancy or spinal infection; *or*
- Known or suspected myelopathy (e.g., multiple sclerosis) for initial diagnosis when MRI of the brain is negative or symptoms mimic those of other spinal or brainstem lesions; *or*
- Known or suspected primary spinal cord tumors (malignant or non-malignant); *or*
- Persistent back or neck pain with radiculopathy as evidenced by pain plus objective findings of motor or

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Definitions
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reflex changes in the specific nerve root distribution, and no improvement after 6 weeks of conservative therapy*; *or*
- Primary spinal bone tumors or suspected vertebral, paraspinal, or intraspinal metastases; *or*
- Progressively severe symptoms despite conservative management; *or*
- Rapidly progressing neurological deficit, or major motor weakness; *or*
- Severe back pain (e.g., requiring hospitalization); *or*
- Spondylolisthesis and degenerative disease of the spine that has not responded to 4 weeks of conservative therapy*; *or*
- Suspected infectious process (e.g., osteomyelitis epidural abscess of the spine or soft tissue); *or*
- Suspected spinal cord injury secondary to trauma; *or*
- Suspected spinal fracture and/or dislocation secondary to trauma (if plain films are not conclusive); *or*
- Suspected transverse myelitis.

Aetna considers MRI and CT of the spine experimental and investigational for all other indications because their clinical value for indications other than the ones listed above has not been established. Clinical guidelines, including those from the Agency for Healthcare Policy and Research, have consistently recommended against routine imaging studies for acute low back pain (Cho et al, 2009).

* Conservative therapy = moderate activity, analgesics, non-steroidal anti-inflammatory drugs, muscle relaxants.

See also CPB 0093 - Open Air, Low Field Strength, and Positional MRI Units and CPB 0202 - Magnetic Resonance Spectroscopy (MRS).

Background

Because of its complexity, the spine is probably the most difficult part of the skeletal system to evaluate radiologically. Improvement of computed tomography (CT) scanners and the advent of magnetic resonance imaging (MRI) have changed the approach to diagnostic imaging of the spine. Previously, invasive modalities were required to obtain information that is now available with non-invasive technologies.

The appropriate use of these new technologies is still somewhat unsettled. The focus is on which test will provide the most accurate and cost effective diagnostic information for each particular clinical situation. Computed tomographic scan, CT myelography, MRI and plain radiography all have their place in the diagnostic work-up of problems related to the spine.

Bulging intervertebral discs have been found in over half of all otherwise asymptomatic adults. It is therefore,

important to perform MRI or CT at the right time and to interpret the results in the context of the clinical findings to ensure an accurate diagnosis and avoid unnecessary treatment of conditions that may not be the cause of a patient's symptoms.

According to accepted guidelines, MRI is the preferred method of imaging for each of the medically necessary indications listed in the Policy section, with the exception of (i) suspected spinal fracture or dislocation due to trauma, where CT scan is the preferred method of imaging if plain films are inconclusive, and (ii) evaluation of a patient with signs or symptoms of spinal stenosis, where MRI or CT are equally appropriate. For evaluation of recurrent symptoms after spinal surgery, MRI with and without gadolinium enhancement, is the preferred method of imaging.

Magnetic resonance imaging or CT evaluation of chronic mechanical low back pain (LBP) without radiculopathy or neurologic deficit, trauma, or clinical suspicion of systemic disorder (e.g., infectious process, metastatic disease) is not necessary unless back pain is severe (e.g., requiring hospitalization) or where symptoms are progressing despite conservative management (ICSI, 2002).

The American College of Physicians (2012) has recommended against obtaining imaging studies in patients with non-specific low back pain. In patients with back pain that cannot be attributed to a specific disease or spinal abnormality following a history and physical examination (e.g., non-specific low back pain), imaging with plain radiography, computed tomography (CT) scan, or magnetic resonance imaging (MRI) does not improve patient outcomes. The American Academy of Family Physicians (2012) recommends against do imaging for low back pain within the first six weeks, unless red flags are present. Red flags include, but are not limited to, severe or progressive neurological deficits or when serious underlying conditions such as osteomyelitis are suspected. Imaging of the lower spine before six weeks does not improve outcomes, but does increase costs. Low back pain is the fifth most common reason for all physician visits. The North American Spine Society (2013) has issued similar recommendations.

Cho et al (2009) reported the results of a systematic review and meta-analysis of imaging strategies for LBP without indications of serious underlying conditions. Inclusion criteria were randomized controlled trials that compared immediate, routine lumbar imaging (or routine provision of imaging findings) versus usual clinical care without immediate lumbar imaging (or not routinely providing results of imaging) for LBP without indications of serious underlying conditions. Primary outcomes were improvement in pain or function. Secondary outcomes were improvement in mental health, quality of life, patient satisfaction, and overall improvement. Outcomes were categorized as short-term (less than or equal to 3 months), long-term (greater than 6 months to less than or equal to 1 year), or extended (greater than 1 year). A total of 6 trials met the inclusion criteria: 4 assessed lumbar radiography and 2 assessed MRI or CT. Duration of follow-up ranged from 3 weeks to 2 years. One trial excluded patients with sciatica or other symptoms of radiculopathy, and 1 did not report the proportion of patients with such symptoms. In the other 4 trials, the proportion of patients with sciatica or radiculopathy ranged from 24 % to 44 %. Three trials compared immediate lumbar

radiography with usual clinical care without immediate lumbar radiography, and 1 compared immediate lumbar radiography with a brief education intervention plus lumbar radiography, if no improvement was seen by 3 weeks. Patients (n = 1,804) enrolled in these trials had mainly acute or subacute (less than 12 weeks) LBP, and all trials were done in primary-care or urgent-care settings. Two studies assessed advanced imaging modalities. One study compared immediate MRI or CT with usual clinical care without advanced imaging in patients with mainly chronic LBP (82 % had LBP for greater than 3 months) referred to a surgeon, whereas in the other study all patients with LBP for less than 3 weeks underwent MRI, with randomization to routine notification of results within 48 hours versus notification of results only if clinically indicated. Patients were recruited from various settings (primary care, spine clinic, or emergency room). In both trials, the proportion of patients who underwent lumbar radiography before enrollment was not reported. The most frequent methodological shortcoming was lack of (or unclear use of) blinded outcome assessment (5 of 6 trials), followed by inadequate description of randomization method (4 of 6 trials). All trials excluded patients with features suggestive of a serious underlying condition, but exclusion criteria varied and trials did not indicate the number of patients excluded because of such factors. The authors found no significant difference between routine, immediate lumbar imaging and usual clinical care without immediate imaging for improvement in pain or function at short-term or long-term follow-up. In the trial that reported extended (2-year) follow-up data, immediate MRI or CT was not better than usual clinical care without immediate imaging on either the EuroQol-5D (mean difference 0.02, 95 % confidence interval: -0.02 to 0.07, 0 to 1 scale) or the SF-36 mental health score (-1.50, -4.09 to 1.09, 0 to 100 scale) in unadjusted analyses. The authors concluded that lumbar imaging forLBP without indications of serious underlying conditions does not improve clinical outcomes and that clinicians should refrain from routine, immediate lumbar imaging in patients with acute or subacute LBP and without features suggesting a serious underlying condition.

In a meta-analysis, Schoenfeld et al (2010) examined if adding an MRI would provide useful information that alters treatment when a CT scan reveals no evidence of injury in obtunded blunt trauma patients. Published studies from 2000 to 2008 involving patients undergoing MRI for the purposes of further cervical spine evaluation after a "negative" CT scan were identified via a literature search of online databases. Data from eligible studies were pooled and original scale meta-analyses were performed to calculate overall sensitivity, specificity, positive and negative predictive values, likelihood ratios, and relative risk. The Q-statistic p value was used to evaluate heterogeneity. A total of 11 studies met the inclusion criteria, yielding data on 1,550 patients with a negative CT scan after blunt trauma subsequently evaluated with a MRI. The MRI detected abnormalities in 182 patients (12 %). Ninety traumatic injuries were identified, including ligamentous injuries (86/182), fractures and dislocations (4/182). In 96 cases (6 % of the cohort), the MRI identified an injury that altered management. Eighty-four patients (5 %) required continued collar immobilization and 12 (1 %) required surgical stabilization. The Q-statistic p value for heterogeneity was 0.99, indicating the absence of heterogeneity among the individual study populations. The authors concluded that reliance on CT imaging alone to "clear the cervical spine" after blunt trauma can lead to missed injuries. The findings of this study supported the addition of MRI in evaluating patients who are obtunded, or unexaminable, despite a negative

CT scan.

Callaghan et al (2012) examined diagnostic practice patterns as an early step in identifying opportunities to improve efficiency of care of patients with peripheral neuropathy. The 1996 to 2007 Health and Retirement Study Medicare claims-linked database was used to identify individuals with an incident diagnosis of peripheral neuropathy using International Classification of Diseases, Ninth Revision, codes and required no previous neuropathy diagnosis during the preceding 30 months. Focusing on 15 relevant tests, these investigators examined the number and patterns of tests and specific test utilization 6 months before and after the incident neuropathy diagnosis. Medicare expenditures were assessed during the baseline, diagnostic, and follow-up periods. Of the 12,673 patients, 1,031 (8.1 %) received a new International Classification of Diseases, Ninth Revision, diagnosis of neuropathy and met the study inclusion criteria. Of the 15 tests considered, a median of 4 (interquartile range, 2 to 5) tests were performed, with more than 400 patterns of testing. Magnetic resonance imaging of the brain or spine was ordered in 23.2 % of patients, whereas a glucose tolerance test was rarely obtained (1.0 %). Mean Medicare expenditures were significantly higher in the diagnostic period than in the baseline period ($14,362 versus $8,067, $p < 0.001$). The authors concluded that patients diagnosed as having peripheral neuropathy typically undergo many tests, but testing patterns are highly variable. Almost 25 % of patients receiving neuropathy diagnoses undergo high-cost, low-yield MRI, whereas few receive low-cost, high-yield glucose tolerance tests. Expenditures increase substantially in the diagnostic period. The authors stated that more research is needed to define effective and efficient strategies for the diagnostic evaluation of peripheral neuropathy.

Also, an UpToDate review on "Overview of polyneuropathy" (Rutkove, 2012) does not mention the use of MRI or CT in the diagnostic evaluation of individuals with polyneuropathy.

The Institute for Clinical Systems Improvement clinical practice guideline on “Adult acute and subacute low back pain” (ICSI, 2012) stated that imaging (CT, MRI, or x-ray) is not recommended for non-specific low-back pain [strong recommendation, moderate quality evidence].

el Barzouhi et al (2013) noted that MRI is frequently performed during follow-up in patients with known lumbar-disk herniation and persistent symptoms of sciatica. The association between findings on MRI and clinical outcome is controversial. These investigators studied 283 patients in a randomized trial comparing surgery and prolonged conservative care for sciatica and lumbar-disk herniation. Patients underwent MRI at baseline and after 1 year. These researchers used a 4-point scale to assess disk herniation on MRI, ranging from 1 for "definitely present" to 4 for "definitely absent". A favorable clinical outcome was defined as complete or nearly complete disappearance of symptoms at 1 year. These investigators compared proportions of patients with a favorable outcome among those with a definite absence of disk herniation and those with a definite, probable, or possible presence of disk herniation at 1 year. The area under the receiver-operating-characteristic (ROC) curve was used to assess the prognostic accuracy of the 4-point scores regarding a favorable or unfavorable outcome, with 1 indicating “perfect discriminatory value” and 0.5 or less indicating

"no discriminatory value". At 1 year, 84 % of the patients reported having a favorable outcome. Disk herniation was visible in 35 % with a favorable outcome and in 33 % with an unfavorable outcome (p = 0.70). A favorable outcome was reported in 85 % of patients with disk herniation and 83 % without disk herniation (p = 0.70). Assessment of disk herniation by means of MRI did not distinguish between patients with a favorable outcome and those with an unfavorable outcome (area under ROC curve, 0.48). The authors concluded that MRI performed at 1-year follow-up in patients who had been treated for sciatica and lumbar-disk herniation did not distinguish between those with a favorable outcome and those with an unfavorable outcome. Moreover, they stated that further research is needed to evaluate the value of MRI in clinical decision-making for patients with persistent or recurrent sciatica.

Steffens et al (2013) systematically reviewed whether MRI findings of the lumbar spine predict future LBP in different samples with and without LBP. MEDLINE, CINAHL and EMBASE databases were searched. Included were prospective cohort studies investigating the relationship between baseline MRI abnormalities of the lumbar spine and clinically important LBP outcome at follow-up. These researchers excluded cohorts with specific diseases as the cause of their LBP. Associations between MRI findings and LBP pain outcomes were extracted from eligible studies. A total of 12 studies met the inclusion criteria; 6 studies presented data on participants with current LBP; 1 included a sample with no current LBP, 3 included a sample with no history of LBP and 2 included mixed samples. Due to small sample size, poor overall quality and the heterogeneity between studies in terms of participants, MRI findings and clinical outcomes investigated, it was not possible to pool findings. No consistent associations between MRI findings and outcomes were identified. Single studies reported significant associations for Modic changes type 1 with pain, disc degeneration with disability in samples with current LBP and disc herniation with pain in a mixed sample. The authors concluded that the limited number, heterogeneity and overall quality of the studies do not permit definite conclusions on the association of MRI findings of the lumbar spine with future LBP

Weber et al (2014) evaluated the incremental diagnostic value of spine MRI evaluated separately from and combined with sacroiliac joint (SIJ) MRI in non-radiographic axial spondyloarthritis (nr-axSpA) compared with SIJ MRI alone. The study sample comprised 2 independent cohorts A/B of 130 consecutive patients aged less than or equal to 50 years with back pain, newly referred to 2 university clinics, and 20 healthy controls. Patients were classified according to clinical examination and pelvic radiographs as having nr-axSpA (n = 50), ankylosing spondylitis (n = 33), or non-specific back pain (n = 47). Four readers assessed SIJ and spine MRI separately 6 months apart, and 1 to 12 months later both scans simultaneously using standardized modules. Readers recorded presence/absence of SpA and their level of confidence in this conclusion on a 0 to 10 scale (0 = definitely not; 10 = definite). These researchers analyzed differences between SIJ MRI versus spine MRI alone, and SIJ MRI alone versus combined MRI, descriptively by the number/percentage of subjects according to the mean of 4 readers. In cohorts A/B, 15.8 %/24.2 % of patients with nr-axSpA having a negative SIJ MRI were re-classified as being positive for SpA by global evaluation of combined scans. However, 26.8 %/11.4 % of non-specific back pain controls and 17.5 % of healthy volunteers with a negative SIJ MRI were falsely re-

classified as having SpA by combined MRI. Low confidence in a diagnosis of SpA by SIJ MRI increased to high confidence by combined MRI in 6.6 %/7.3 % of patients with nr-axSpA. The authors concluded that combined spine and SIJ MRI added little incremental value compared with SIJ MRI alone for diagnosing patients with nr-axSpA and enhancing confidence in this diagnosis.

CPT Codes / HCPCS Codes / ICD-9 Codes

CPT codes covered if selection criteria are met:

72125

72126

72127

72128

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72132

72133

72141

72142

72146

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72158

Other CPT codes related to the CPB:

76390

HCPCS codes covered if selection criteria are met:

A9575	Injection, gadoterate meglumine, 0.1 ml
A9576	Injection, gadoteridol, (ProHance multipack), per ml
A9577	Injection, gadobenate dimeglumine (MultiHance), per ml
A9578	Injection, gadobenate dimeglumine (MultiHance multipack), per ml
A9579	Injection, gadolinium based magnetic resonance contrast agent, not otherwise specified, per ml
Q9953	Injection, iron-based magnetic resonance contrast agent, per ml
Q9954	Oral magnetic resonance contrast agent, per 100 ml

ICD-9 codes covered if selection criteria are met:

170.2	Malignant neoplasm of vertebral column, excluding sacrum and coccyx
170.6	Malignant neoplasm of pelvic bones, sacrum, and coccyx
192.2	Malignant neoplasm of spinal cord
192.3	Malignant neoplasm of spinal meninges
198.5	Secondary malignant neoplasm of bone and bone marrow
213.2	Benign neoplasm of vertebral column, excluding sacrum and coccyx
213.6	Benign neoplasm of pelvic bones, sacrum and coccyx
225.3	Benign neoplasm of spinal cord
225.4	Benign neoplasm of spinal meninges
237.5	Neoplasm of uncertain behavior of brain and spinal cord
237.6	Neoplasm of uncertain behavior of meninges
238.0	Neoplasm of uncertain behavior of bone and articular cartilage
238.1	Neoplasm of uncertain behavior of connective and soft tissue
320.0 - 322.9	Meningitis

323.0 - 323.9	Encephalitis, myelitis, and encephalomyelitis
324.1	Intraspinal abscess
334.0 - 336.9	Spinocerebellar disease, anterior horn cell disease, and other diseases of spinal cord
340	Multiple sclerosis
344.60 - 344.61	Cauda equina syndrome
354.0 - 354.9	Mononeuritis of upper limb and mononeuritis multiplex
355.0 - 355.9	Mononeuritis of lower limb and unspecified site
722.0 - 722.2	Displacement of intervertebral disc without myelopathy
722.70 - 722.73	Intervertebral disc disorder with myelopathy
723.4	Brachial neuritis or radiculitis NOS
724.2	Lumbago
724.3	Sciatica
724.4	Thoracic or lumbosacral neuritis or radiculitis, unspecified
724.5	Backache, unspecified
729.2	Neuralgia, neuritis, and radiculitis, unspecified
730.08, 730.18, 730.28, 730.38, 730.78, 730.88, 730.98	Osteomyelitis, periostitis, and other infections involving bone, other specified sites
737.0 - 737.9	Curvature of spine
741.00 - 741.93	Spina bifida
742.51 - 742.59	Other specified anomalies of spinal cord
742.8	Other specified anomalies of nervous system
742.9	Unspecified anomaly of brain, spinal cord, and nervous system
747.82	Spinal vessel anomaly
756.10 - 756.19	Anomalies of spine

805.00 - 806.9	Fracture of vertebral column
839.00 - 839.9	Dislocation of vertebra
952.00 - 952.9	Spinal cord injury without evidence of spinal bone injury
953.0 - 953.9	Injury to nerve roots and spinal plexus

The above policy is based on the following references:

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