Effective for dates of service on or after April 1, 2013, refer to: https://www.bcbsal.org/providers/policies/careCore.cfm

Name of Policy:
Magnetic Resonance Imaging (MRI) of the Brain

Policy #: 276  Latest Review Date: February 2013
Category: Radiology  Policy Grade: A

Background/Definitions:
As a general rule, benefits are payable under Blue Cross and Blue Shield of Alabama health plans only in cases of medical necessity and only if services or supplies are not investigational, provided the customer group contracts have such coverage.

The following Association Technology Evaluation Criteria must be met for a service/supply to be considered for coverage:

1. The technology must have final approval from the appropriate government regulatory bodies;
2. The scientific evidence must permit conclusions concerning the effect of the technology on health outcomes;
3. The technology must improve the net health outcome;
4. The technology must be as beneficial as any established alternatives;
5. The improvement must be attainable outside the investigational setting.

Medical Necessity means that health care services (e.g., procedures, treatments, supplies, devices, equipment, facilities or drugs) that a physician, exercising prudent clinical judgment, would provide to a patient for the purpose of preventing, evaluating, diagnosing or treating an illness, injury or disease or its symptoms, and that are:

1. In accordance with generally accepted standards of medical practice; and
2. Clinically appropriate in terms of type, frequency, extent, site and duration and considered effective for the patient’s illness, injury or disease; and
3. Not primarily for the convenience of the patient, physician or other health care provider; and
4. Not more costly than an alternative service or sequence of services at least as likely to produce equivalent therapeutic or diagnostic results as to the diagnosis or treatment of that patient’s illness, injury or disease.
**Description of Procedure or Service:**
Magnetic resonance imaging (MRI) is a technique that affords anatomic images in multiple planes and may provide information on tissue characterization. Lauterbur published the first magnetic resonance image in 1973. Since that time, major technological advances, together with increasing clinical and investigative interest in the method, have been accompanied by the development of equipment that is now clinically applicable to man, with potentially great benefits in assessing pathophysiologic states.

The MR images are obtained by placing the patient or area of interest within a powerful, highly uniform, static magnetic field. Magnetized protons (hydrogen nuclei) within the patient align like small magnets in this field. Radiofrequency pulses are then utilized to create an oscillating magnetic field perpendicular to the main field, from which the nuclei absorb energy and move out of alignment with the static field, in a state of excitation. As the nuclei return from excitation to the equilibrium state, a signal induced in the receiver coil of the instrument by the nuclear magnetization can then be transformed by a series of algorithms into diagnostic images. Images based on different tissue characteristics can be obtained by varying the number and sequence of pulsed radiofrequency fields in order to take advantage of magnetic relaxation properties of the tissues.

Magnetic resonance images differ from those produced by x-rays: the latter are associated with absorption of x-ray energy, while MR images are based on proton density and proton relaxation dynamics. These vary according to the tissue under examination and reflect its physical and chemical properties.

MRI is a superb method of studying brain tumors because of the excellent contrast resolution, easy multiplanar imaging, and absence of artifacts. MRI and CT are roughly equivalent for detection of most brain tumors. Because of the absence of bone artifacts, as seen on CT, MRI is superior at the vertex, in the posterior fossa, near the walls of the middle fossa, at the base of the skull, and in the orbit. CT is superior to MRI for detection of meningioma but requires contrast enhancement. MRI performance will be improved further by the use of contrast-enhancing agents.

**Policy:**
*Effective for dates of service on or after April 1, 2013, refer to:*
https://www.bcbsal.org/providers/policies/careCore.cfm

*Effective for dates of service on or after October 1, 2006 through March 31, 2013,*
**MRI of the brain meets** Blue Cross and Blue Shield of Alabama’s medical criteria for coverage for the following conditions *when medically necessary and supported by clinical and laboratory findings:*

- New Neurologic Signs or Symptoms that Suggest Stroke or TIA
- Follow-up study post stroke
- Headache
• Seizure
• Head trauma
• CNS infection or abscess
• Intracranial neoplasm
• Follow-up of AVM
• Post-intracranial procedure--cerebrospinal fluid (CSF) shunt, or craniotomy, or craniectomy
• Suspected CNS involvement with systemic disease
• Multiple sclerosis (MS)
• Suspected acoustic neuroma/cerebellar pontine angle tumor
• Vestibular neuronitis
• Chronic or Progressive mental status changes
• Suspected cerebral venous thrombosis
• Intracranial aneurysm
• Hydrocephalus
• Suspected Pseudotumor Cerebri
• Evaluation of tinnitus
• Suspected Pituitary Adenoma/Pathology [gadolinium]

Effective for dates of service on or after September 1, 2007 through March 31, 2013:

• Arnold Chiari Malformation
• Dandy Walker Cyst
• Encephalocele
• Microcephaly
• Macrocephaly
• Developmental Delays
• Multiple Congenital Anomalies
• Suspicion of Trigeminal Neuralgia
• Neurofibromatosis
• Neurosarcomatosis
• Papilledema
• Short Stature when:
  o No evidence of the following
    ▪ Hypothyroidism; or
    ▪ Renal disease; or
    ▪ Malignancy; or
    ▪ Crohn's disease; and
  o Decreased growth hormone; and one of the following:
    o GH stimulation testing procedures peak GH concentration < 10 ng/dl; or
    o Bone age more than 2 standard deviations below the mean for age;
    o History of surgery or radiation in the pituitary or hypothalamus regions;
• Arachnoid Cyst
• Pierre Robin Syndrome
• Cerebral Hypotension
Individual case consideration will be given to patients with conditions not described above. Clinical notes will be required for review.

**MRI of the brain does not meet** Blue Cross and Blue Shield of Alabama’s medical criteria for coverage for patients with *stable dementia*.

**The use of gadolinium in MRI of the brain meets** Blue Cross and Blue Shield of Alabama’s medical criteria for coverage in such conditions as:
- Central nervous system (CNS) neoplasms
- Cranial nerve tumors
- Seizures
- Multiple sclerosis
- Intra or extradural mass on computed tomography (CT) or non contrast MRI

**The use of gadolinium in MRI of the brain does not meet** Blue Cross and Blue Shield of Alabama’s medical criteria for coverage for the following conditions:
- Transient ischemic attacks (TIA)
- Stroke
- Suspected AVM
- Aneurysms, vertebrobasilar insufficiency

_Bluex Cross and Blue Shield of Alabama does not approve or deny procedures, services, testing, or equipment for our members. Our decisions concern coverage only. The decision of whether or not to have a certain test, treatment or procedure is one made between the physician and his/her patient. Blue Cross and Blue Shield of Alabama administers benefits based on the members' contract and corporate medical policies. Physicians should always exercise their best medical judgment in providing the care they feel is most appropriate for their patients. Needed care should not be delayed or refused because of a coverage determination._

**Key Points:**
In general, owing to high tissue contrast between tissues and multiplanar imaging, MRI is the study of choice to evaluate all lesions in the brain and spine. CT, however, is more sensitive than MRI for the evaluation of calcifications, subtle fractures, and remains pivotal in the diagnosis of acute subarachnoid hemorrhage. Additionally, MRI cannot be performed in patients who have intraorbital foreign bodies, pacemakers, or non-MRI-compatible implants, such as artificial heart valves, vascular clips, cochlear implants, or ventilators.

MRI provides information that differs from other imaging modalities. Its major technological advantage is that it can characterize and discriminate among tissues using their physical and biochemical properties (water, iron, fat, and extravascular blood and its breakdown products). Blood flow, cerebrospinal fluid flow, and contraction and relaxation of organs, both physiologic and pathologic, can be evaluated. Because calcium emits no signal on spin echo images, tissues surrounded by bone, such as the contents of the posterior fossa and the spine, can be imaged, and beam hardening artifacts are avoided. MRI produces sectional images of equivalent resolution in
any projection without moving the patient. The ability to obtain images in multiple planes adds to its versatility and diagnostic utility and offers special advantages for radiation and/or surgical treatment planning. Excellent delineation of anatomic structures results from inherent high levels of contrast resolution.

MR image acquisition does not use ionizing radiation, nor does it require iodinated contrast agents. Because it requires little patient preparation and is noninvasive, patient acceptability is high.

The strong static magnetic field, which interferes with the proper function of the usual life-support equipment, and the small bore of the magnet make it difficult or impossible to examine some critically ill patients. Patients with pacemakers and ferromagnetic appliances cannot be studied. MRI units require careful siting and shielding.

While the appearance of calcium as a signal void provides some advantages, it also limits the ability to detect pathological calcification in soft tissues and tumors, and pathological changes in cortical bone are poorly depicted, using routine spin echo techniques. Other imaging sequences may permit visualization of some of these lesions.

**Key Words:**
Magnetic resonance imaging, MRI, MRI of the brain, brain MRI

**Approved by Governing Bodies:**
In 2006, the Food and Drug Administration (FDA) issued a Public Health Advisory to healthcare professionals regarding Nephrogenic Systemic Fibrosis or Nephrogenic Fibrosing Dermopathy (NSF/NFD) which may occur in patients with moderate to end-stage kidney disease after they have a MRI or Magnetic resonance angiography (MRA) with a gadolinium-based contrast agent.

First identified in 1997, NSF/NFD is almost exclusively found in patients with renal failure and acidosis. Patients with this condition develop fibrosis of the skin and connective tissues throughout the body. The skin thickening may inhibit flexion and extension of joints, resulting in contractures. In addition, patients may develop widespread fibrosis in other organs. A skin biopsy is necessary to make a definitive diagnosis. The disease is progressive and may be fatal. Its cause is unknown.

Patients who receive gadolinium-containing contrast agents should be aware of the following possible signs and symptoms of NSF/NFD and advised to seek medical attention if these occur: swelling and tightening of the skin; difficulty extending the joints of arms, hands, legs, and feet; weakness, reddened or darkened areas on the skin; burning or itching of the skin; and deep bone pain in the hips and ribs.

Physicians should be cautious regarding the use of gadolinium-containing contrast imaging agents, especially at high doses, in patients with moderate to end-stage renal failure.
**Benefit Application:**
Coverage is subject to member’s specific benefits. Group specific policy will supersede this policy when applicable.

ITS: Home Policy provisions apply
BellSouth/AT&T contracts: No special consideration
FEP contracts: Special benefit consideration may apply. Refer to member’s benefit plan.
Wal-Mart: Special benefit consideration may apply. Refer to member’s benefit plan.

**Pre-certification requirements:** Effective for dates of service on or after November 1, 2007, required when ordered by a provider in a Blue Cross and Blue Shield of Alabama’s Preferred or Participating Network for a patient covered by Blue Cross and Blue Shield of Alabama who will receive outpatient imaging services(s) from a Preferred Medical Doctor (PMD) or Preferred Radiology Participating (PRP) provider for dates of service on or after November 1, 2006.

**Exceptions to the Alabama PMD and PRP pre-certification requirement:** NASCO, Wal-Mart, Blue Advantage, Flowers Foods, Inc., FEP.

In addition to the above Blue Cross and Blue Shield of Alabama PMD/PRP Network requirement, some self-insured national account groups may require pre-certification for all MRIs effective for dates of service on or after January 1, 2009. Please confirm during your benefit verification process if a pre-certification is required.

Reviews to verify accuracy of pre-certification information will be conducted.

**Coding:**
CPT Codes:  
70551 Magnetic resonance (eg proton) imaging, brain (including brain stem); without contract material  
70552 ;with contrast material(s)  
70553 ;without contrast material, followed by contrast material(s) and further sequences

**References:**

Policy History:
Medical Policy Group, March 2006
Medical Policy Administration Committee, April 2006
Medical Policy Group, May 2006 (2)
Medical Policy Administration Committee, July 2006
Available for comment July 28-September 1, 2006
Medical Policy Group, September 2006 (2)
Medical Policy Administration Committee, September 2006
Available for comment September 2-October 5, 2006
Medical Policy Group, October 2006 (2)
Medical Policy Administration Committee, October 2006
Available for comment October 6-November 20, 2006
Medical Policy Group, January 2007 (2)
Medical Policy Group, September 2007 (2)
Medical Policy Administration Committee, October 2007
Available for comments October 23-December 6, 2007
Medical Policy Group, December 2008 (2)
Medical Policy Group, February 2009 (4)
This medical policy is not an authorization, certification, explanation of benefits, or a contract. Eligibility and benefits are determined on a case-by-case basis according to the terms of the member’s plan in effect as of the date services are rendered. All medical policies are based on (i) research of current medical literature and (ii) review of common medical practices in the treatment and diagnosis of disease as of the date hereof. Physicians and other providers are solely responsible for all aspects of medical care and treatment, including the type, quality, and levels of care and treatment.

This policy is intended to be used for adjudication of claims (including pre-admission certification, pre-determinations, and pre-procedure review) in Blue Cross and Blue Shield’s administration of plan contracts.