# Emergency brain imaging: CT or MRI?

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Together with a clinical assessment, neuroimaging increases diagnostic accuracy of detecting neuropathology. Direct patient benefit from scanning is best documented in those with overt, new clinical signs and symptoms of neurologic or psychiatric disease.[1,2]

Computerized tomography (CT) and magnetic resonance imaging (MRI) are the most common head scanning techniques used in emergency medicine.[3] CT is quicker and cheaper, has less movement artifact, and is excellent at delineating acute hemorrhage, calcification, and bony anatomy.[3,4] Unfortunately, CT exposes patients to radiation and poorly visualizes white matter or posterior fossa pathology.[4]

MRI is outstanding for well-defined tissue contrast in multiplanar views and excellent for identifying demyelination or metastatic processes,[5] but may be contraindicated for patients with implanted metallic objects such as pacemakers, certain vascular clips or stents, and certain orthopedic devices.[3-5] Some patients cannot tolerate the narrow space surrounding them during an MRI.[4,5]

Safety concerns with CT during pregnancy are well established, but are less clear with MRI. The opposite is true of contrast enhancement; gadolinium with MRI is better tolerated than CT procedures, for which contrast risks include allergy and renal dysfunction. When scanning for a hemorrhage, select a CT scan for patients in whom you suspect bleeding developed within the past 3 days; MRI may be better at screening for older bleeds.

For a list of indications for which a patient should undergo a CT or MRI, see the ***Table***.[1-5]

**Table**

## Indications for CT or MRI

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| New or first-onset psychiatric illness |
| Recent head trauma |
| Recent or advancing cognitive dysfunction |
| New or worsening instances of syncope, vertigo, loss of consciousness, etc. |
| New, worsening, or altered pattern headaches |
| New signs of brain pathology, eg, seizure, paresis, or brain-related visual alteration |
| New neurologic examination abnormalities |
| Concerns about intracranial infection, inflammation, metastases, or increased pressure |
| Change in mental status in persons age >50 |
| Prescreening patients who are candidates for electroconvulsive therapy |

**Source:** References 1-5


**References**

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**Disclosure**

Dr. Lippmann reports no financial relationship with any company whose products are mentioned in this article or with manufacturers of competing products.

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