

Tissue perfusion has classically been measured using exogenously administered tracers. The measurement of true perfusion requires a diffusible tracer and results in a measure of blood flow per unit tissue per unit time, though non-diffusible tracers can be used to measure flow related parameters. The dynamic measurement of the first passage of iv Gad-DPTA or its static distribution provided the earliest means of determining perfusion effects in humans using MRI. More recently, the use of magnetically labeled proximal arterial water as an endogenous diffusible tracer has allowed true tissue perfusion to be measured totally noninvasively using MRI. Several technical advances in arterial spin labeling now allow perfusion to be reliably imaged in a clinical setting. Clinical applications of perfusion imaging of the brain include assessment of cerebrovascular disease, degenerative disease, and epilepsy as well as the detection of functional or pharmacological changes in regional cerebral blood flow.

Educational objectives are to:

1. Contrast measurements of classical perfusion with other hemodynamic parameter
2. Review recent technical advances in perfusion imaging with MRI
3. Understand the rationale for common clinical applications of brain MRI perfusion