

Open MRI

Policy

NHS NWL CCGs will fund Open MRI of greater than 0.5T as an alternative to conventional MRI in the following circumstances:

- Patients who suffer from claustrophobia where an oral, prescription sedative has not been effective (GPs are expected to support Extended Scope Practitioners (ESPs) in prescription of sedatives in this situation)
- In patients who are obese and therefore cannot fit comfortably in a conventional MRI

These policies have been approved by the eight Clinical Commissioning Groups in North West London (NHS Brent CCG, NHS Central London CCG, NHS Ealing CCG, NHS Hammersmith and Fulham CCG, NHS Harrow CCG, NHS Hillingdon CCG, NHS Hounslow CCG and NHS West London CCG).

Background

MRI is a widely used diagnostic imaging technology and is particularly useful in detecting soft tissue damage and disease. The patient undergoing imaging is placed in a gradient magnetic field delivering radiofrequency pulses to the patient and processing the resulting electromagnetic signals emitted from the region being examined (CADTH)¹. The standard (closed/high-field) method of MRI requires the patient to be in a supine or recumbent position. The orientation of standard MRI requires the patient to be horizontal and stationary. For most scanners, the patient examination table is positioned in a long, narrow tube. Some patients may experience claustrophobic reactions which might be effectively controlled by sedation or anaesthesia. Obese individuals may be unable to fit into the tube. Open MRIs in which patients lie, sit or stand between two plates overcome these difficulties. They are also used for intraoperative imaging or image-guided interventions where easy access to the patient is required¹.

The technology

The quality of MRI images is partly dependent on the field strength of the magnet which is measured in Tesla (T). Above 1T is considered high field strength. Closed MRIs have magnet field strengths of ≥ 1.5 tesla whereas open MRIs have medium strength magnets of 0.5-1.0T. The lower field strength of open MRIs results in poorer quality images in comparison to closed MRIs, with lower signal-to-noise ratios and more motion artefacts. The length of time required to obtain an image is also longer.

Generally low field strength is below 0.5T, mid-field strength is 0.5 T, up to 0.9 T or 1 T; and high-field strength is at/and or above 1 T.¹ High-field strength devices are usually closed-bore magnets due to the fact that the stronger magnetic fields (1–3 T) require more robust shielding and gradient structure to maintain field homogeneity. The open magnet's field strength usually varies from 0.2–1.0 T.

Evidence Base

MRI studies reported in the literature are generally based on intermediate or high-field MRI. There is insufficient evidence in the published peer-reviewed literature to support the use of low-field strength MRI for any diagnostic indication². The Washington State Health Technology Assessment on standing, weight-bearing, positional, or upright MRI in 2006³ concluded that there is insufficient evidence for the diagnostic accuracy or diagnostic utility of standard MRI for these situations. Open MRI (i.e., extremity, upright, and positional) allows for imaging without the patient being placed within an enclosed space. Open-design MRI has become the standard of care when conventional design is contraindicated. Specifically, this includes patients with pulmonary and/or cerebrovascular disease as well as patients who would require sedation for a conventional MRI such as severely claustrophobic or paediatric patients.

A review on the impact of obesity on medical imaging⁴ suggested an industry weight and maximum aperture diameter for closed (cylindrical bore) MRI's as;

Wt – 350 lb (159kg) and Aperture diameter of 60cm (minus 15-18cm for table thickness).

References

Patient information

<http://www.mhra.gov.uk/home/groups/dts-iac/documents/publication/con2033065.pdf>

References

1. CADTH. Open Magnetic Resonance Scanner. Issue 92. November 2006
2. CIGNA. Magnetic Resonance Imaging- low field. CIGNA coverage policy 0444
3. Washington State Department of Labor and Industries, Office of the Medical Director. Standing, weight-bearing, positional or upright MRI. Health Technology Assessment. Olympia Washington State Department of Labor and Industries; May 31 2006
4. Upport, et al; Impact of obesity on Radiology. Radiologic clinics of North America. 2007: 45(2);231-246