

Introduction:

Magnetic Resonance Imaging (MRI) scanners are powerful diagnostic tools used for an increasing variety of clinical conditions. The powerful magnet in the scanners, however, can cause risk to patients and staff. These risks include:

- Metal within the body such as pacemakers or aneurysm clips becoming displaced or malfunctioning
- Loose metal objects becoming projectiles, with potential for fatal injury if a patient or member of staff is in the pathway of a large metallic object like an oxygen cylinder.

MRI units have to manage risks related to safety and follow strict protocols and screening policies before allowing individuals into the facility. Despite this accidents and near misses happen frequently and both the Medicines and Healthcare products Regulatory Agency (MHRA) in the UK, and American College of Radiology (ACR) have introduced revised guidelines on safety practice and equipment in clinical use for all magnetic resonance facilities.

Russell's Hall Hospital, part of the Dudley Group of Hospitals NHS Trust is looking to expand their current MRI service with the provision of an additional scanner on the unit. In line with their safety policy review, the unit recently undertook a demonstration of the latest Ferromagnetic Detection technology provided by British Company, Metrasens Ltd. Conventional metal detectors are not appropriate for use in MRI facilities, however ferromagnetic detection systems (FMD's) have been recommended by the ACR as an ***"adjunct to thorough and conscientious screening of persons and devices"***. In addition, FMD's ***"have been demonstrated to be highly effective as a quality assurance tool, verifying the successful screening and identifying ferromagnetic objects which were not discovered by conventional screening methods"***. These two statements were clearly underlined in an incident which took place during the recent demonstration at Russells Hall Hospital.

Case Study Incident

Metrasens Ltd (based in Malvern, Worcestershire, UK with offices in Chicago, IL) were asked to provide a demonstration of their Ferroguard Beacon System as part of a safety update and review of safety technologies ahead of a decision to purchase a second MRI scanner for the unit.

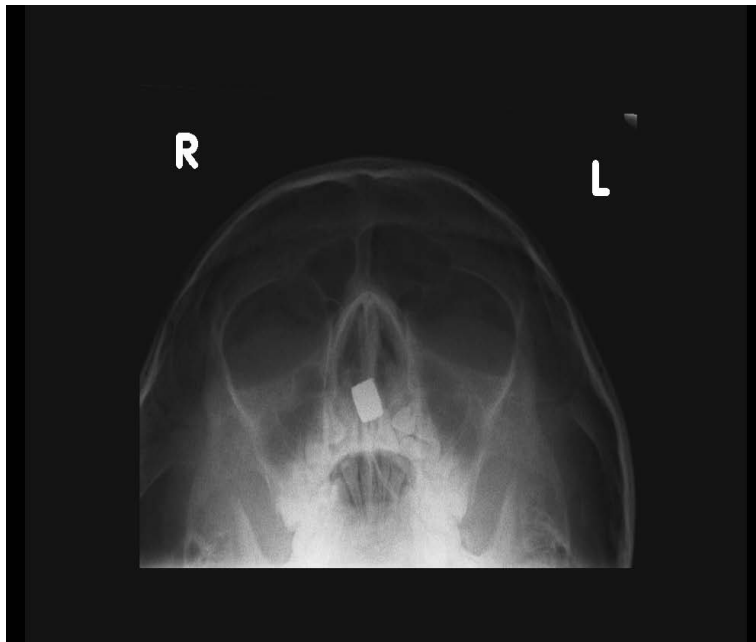
During the product demonstration, a 9 year old child presented to the unit for a head scan. Following existing screening procedures including a full clinical history check with her mother, the child was taken into the MRI room for her scan. After a short while and before a scan could begin the child became very distressed and agitated. Fighting through the tears, she complained to the staff of pain in her nose and around her face. Further gentle questioning raised the potential of a foreign object from a child's toy "hidden" up each nostril.

It was decided to screen the child using the Ferroguard Beacon system which incorporates a series of illuminated lights and audible alarm to indicate the presence of ferrous material to varying levels of sensitivity. The child was asked to approach the portal created by the systems two independent sensing poles from a distance of approximately 10 feet. As the child got to within 6 feet of both poles the lights changed colour from Green (indicating no moving ferrous material present) very quickly through Amber

(indicating a small ferrous signal) to Red (indicating a strong ferrous signal which would be dangerous if ignored). The results were conclusive indicating the presence of a very strong ferrous signal at a distance of 6 feet from the sensing pole. As conventional screening had failed to identify the presence of this object it was decided an x-ray would be needed to confirm the findings of the Ferroguard Pre-screen test.

Case Study Results

Results from the x-ray later confirmed the presence of two small magnets stuck either side of the nasal septum. These had apparently been placed there by the child some six months earlier. It later emerged the child had removed them from a toy she received at Christmas. Having attracted and stuck up the nasal passage, the child had become too frightened to tell her parents of the event.



Following the incident, Mr Tim Wicker, Superintendent Radiographer MR at Russell's Hall Hospital stated.. ***"If this site had the Metrasens units installed then we would have detected the presence of the magnets BEFORE the patient entered the scan room and would have prevented the pain caused to the patient by being in the scan room"***.

Russell's Hall Hospital has an exemplary safety record however on this occasion normal screening methods failed to identify the presence of potentially dangerous ferrous material. The use of the Ferroguard Beacon System clearly demonstrates how helpful this new technology can be as an adjunct to normal screening practice where foreign objects may be hidden from view, or a clear clinical history is difficult to obtain.

Metrasens Ltd are now working with Russell's Hall Hospital to ensure it maintains its exemplary MRI safety record and indeed hope by integrating both Pre-screen and Door Entryway operational modes of its Ferroguard Beacon technology into the unit make it the safest MRI facility in the country.

A growing number of UK and US facilities have already installed Ferroguard systems either as a door Entryway Systems or Patient Pre-Screen units. Many more hospitals and MR facilities are now actively considering taking advantage of this flexible technology.

Metrasens Ltd are global leaders in ferromagnetic detection technology, having won a UK National Medical Technology Award in 2006 for Business Start-Up and in May 2008 were awarded the UKTI Innovative Exporter Award.



Ferroguard Beacon Freestanding systems