



Magnetic resonance imaging-induced burns: is the safety questionnaire enough? – a case report

Introduction

Magnetic Resonance Imaging (MRI) has established itself as a safe and the superior diagnostic modality for identifying soft tissue contrast without the use of ionizing radiation.

It is, however, well recognised that MRI scanning is not safe for patients with metal implants and foreign bodies, resulting in neurostimulation, burns and malfunction of implanted devices.

Despite this, well-defined safety criteria with a pre-procedural questionnaire has minimised deleterious harm from this undeniably useful radiologic tool. Here we describe a case report of an MRI –induced burn arising despite passing the safety questionnaire.

Case Summary

A 61-year-old female was referred to our institution's radiology department to better qualify a growing abdominal mass via diagnostic MR imaging. Her other comorbidities included Type 1 diabetes mellitus, reflux and significant weight gain with a BMI of 42. No previous surgical history.

Our patient had answered 'no' to our institution's MRI safety questionnaire (Figure 1) and was subsequent examined on a standard clinical 1.5-T MR imaging system with the patient positioned supine in the MR tube.

15 minutes into undergoing the MRI, the patient complained to radiographers of a burning sensation between her abdominal pannus and right thigh, leading to immediate termination of the MR procedure.

Following review by the plastic surgery team, a ~3% TBSA superficial burn was identified in the region the patient felt a burning sensation. The burn was located only in the area where the abdominal pannus made contact with the right thigh, with no erythema located in the intertriginous area.

The patient was managed conservatively, with analgesia and moisturiser. On follow-up in the outpatient clinic for a 1 week review, the patient's pain and erythema had improved.

Discussion

During magnetic resonance imaging, tissue heating can occur as a complication of the high radio-frequency field, often generated around metal objects (ECG leads, surface coils, implants, stents, etc.). On discussion with the radiologist, the burn was presumed to be caused by a fresh loop formation via tissue apposition of the abdominal pannus and the right thigh. 2 other cases have been reported of fresh loop formation in the literature and are thus extremely rare.

To reduce the risk of MRI-induced burns, our institution suggests an update to safety protocol to include using insulating material to reduce skin-to-skin contact and thus prevent direct tissue apposition from different body parts.

Figure 1: MRI Safety Questionnaire

MRI SAFETY SURVEY	
Previous Surgery in Region Requested	<input type="checkbox"/> Yes <input type="checkbox"/> No
Is the patient pregnant?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Is the patient breast feeding?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Has the patient EVER had any of the following? (please tick)	
Pacemaker +/- Pacing Wires	<input type="checkbox"/> Yes <input type="checkbox"/> No
Heart Valve Replacement / Coronary Stents	<input type="checkbox"/> Yes <input type="checkbox"/> No
Aneurysm Clip	<input type="checkbox"/> Yes <input type="checkbox"/> No
Metallic fragments in eyes (e.g. from welding or grinding)	<input type="checkbox"/> Yes <input type="checkbox"/> No
Insulin Infusion Pump	<input type="checkbox"/> Yes <input type="checkbox"/> No
Cochlear Implants	<input type="checkbox"/> Yes <input type="checkbox"/> No
VP Shunt	<input type="checkbox"/> Yes <input type="checkbox"/> No
Breast Tissue Expander	<input type="checkbox"/> Yes <input type="checkbox"/> No
Vascular Coil Stent or Filter	<input type="checkbox"/> Yes <input type="checkbox"/> No
Neurostimulator	<input type="checkbox"/> Yes <input type="checkbox"/> No
Eye Implants	<input type="checkbox"/> Yes <input type="checkbox"/> No
Metallic Foreign Body	<input type="checkbox"/> Yes <input type="checkbox"/> No
Endoscopic Haemostatic Clips	<input type="checkbox"/> Yes <input type="checkbox"/> No
If YES to any of the above please provide make and model and supporting documentation:	

References

- Shellock FG, Crues JV. MR procedures: biologic effects, safety, and patient care. *Radiology* 2004; **232**: 635– 652.
- Knopp MV, Essig M, Debus J, Zabel H-J, Van Kaick G. Unusual burns of the lower extremities caused by a closed conducting loop in a patient at MR imaging. *Radiology* 1996; **200**: 572– 575.