CASE REPORT

MRI-induced soft tissue pain: incidental finding of a 15-year-old foreign body

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ussamah.elkhani@doctors.org.uk**SUMMARY**

We present the case of an 82-year-old woman who developed intense right middle finger pain during MRI scan. This alerted the clinical team to the incidental finding of a 15-year-old metallic foreign body in the distal phalanx of the right middle finger. This case report is a reminder that the responsible clinician should be vigilant when screening for metallic foreign body on completion of the MRI checklist, and should adopt a low threshold for plain imaging prior to MRI.

BACKGROUND

The presence of foreign body in the gastrointestinal tract,¹ foot² and eye³ through ingestion or trauma is well reported in the literature. Foreign body in the digits without the patient being aware of it appears to be much rarer. A literature review of PubMed using keywords incidental findings, metallic, foreign body and finger/hand did not reveal a single case report. Findings due to traumatic injuries have been reported but involved prior suspicion with further referral. The presentation described here is rare and serves as a reminder that current MRI checklists are not perfect, and should alert the clinician to medical history or behaviour that may suggest a risk of metallic foreign body presence.

CASE PRESENTATION

A fully compos-mentis 82-year-old woman was being investigated with MRI for myelomatous deposits of the thoracic and lumbar vertebrae when she suddenly developed intense right middle finger pain during the scan. Prior to the scan, the patient filled out a routine MRI patient safety questionnaire which did not reveal any apparent contraindication

to MRI. Following the MRI scan, an examination of the finger was carried out. There was no obvious sensory-motor deficit, and no soft tissue or joint pathology was palpable. A plain radiograph of the right hand revealed a 2 cm metallic spike on the ulnar aspect of the right middle finger distal phalanx (figure 1). It is thought that the ferrous nature of the metallic spike caused it to vibrate under the influence of the MRI scan's magnetic field, leading to finger pain. The patient was then referred to the plastic surgery team who removed the foreign body under local anaesthetic. She made an uneventful recovery with no functional or tissue loss.

On subsequent questioning the patient recalled that she sustained a gardening injury 15 years ago when a metal spike broke off in her finger. She presented to the local general practitioner who prescribed antibiotics but she was not referred onwards for further management. The pain settled and the spike remained dormant and asymptomatic.

DISCUSSION

Current practises within the National Health Service (NHS) require patients to fill out an MRI screening questionnaire which asks patients about any prior surgery, foreign body injuries, the presence of a medical device or implant (aneurysm clips, pacemakers, mechanical valves) in addition to other contraindications related to pregnancy/breast feeding and anthropological factors.⁴

Screening questionnaires rely on the patient or carer's knowledge, but, as demonstrated in this case report, this is not always reliable. This becomes more problematic when considering groups of patients who may not be fully compliant with the screening process. Examples of these include

Figure 1 x-Ray scan demonstrating a linear metallic foreign body in the right middle finger of an 82-year-old woman.

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children with swallowed foreign bodies or objects placed in the nasal/ear canal without the parent or guardian being aware, or elderly patients with cognitive impairment whose medical history may not be available or known to the radiology department.

Metallic foreign bodies may present a hazard to the patient particularly if located in potentially dangerous areas of the body such as near viscous or neurovascular structure. The strong magnetic fields encountered in MRI may cause the object to migrate in an unpredictable manner.⁵ The seriousness of the risk depends on the ferromagnetic characteristics of the foreign body, its location and the strength of the MR magnetic fields.⁶ Most modern MRI system use static magnetic field strengths beyond 3.0 tesla which can have fatal effects on patients with contraindicating metallic foreign bodies. Previously reported incidents include intraocular metallic foreign bodies resulting in severe hyphema,⁷ blindness,⁸ death caused by torquing of an aneurysm clip,⁹ and five deaths related to inadvertent scanning of patients with cardiac pacemakers.¹⁰

This case report is a reminder that the responsible clinician should be vigilant when screening for metallic foreign body on completion of the MRI checklist, and should adopt a low threshold for plain radiography prior to MRI.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Schwartz GF, Polsky HS. Ingested foreign bodies of the gastrointestinal tract. *Am Surg* 1976;42:236–8.
- 2 Chaudhary OK, Trompeter A, Pal R. An incidental finding of an intraosseous metallic object within the Os Chalcis. *Foot Ankle Spec* 2012;5:330–3.
- 3 Murkowski J, Dziubdziela W, Gierek T, et al. Intraorbital foreign bodies—5 own cases and review of literature. *Otolaryngol Pol* 2012;66:295–300.
- 4 Shellock FG, ed. *Magnetic resonance procedures: health effects and safety*. CRC Press. Boca Raton, Florida, 2001.
- 5 Shailesh S, Shah S, Gopalkrishnan S, et al. Incidental finding of a metallic nasal foreign body during MRI. *Paediatric Anaesthesia* 2008;18:803–4.
- 6 Hunter TB, Taljanovic MS. Foreign bodies. *RadioGraphics* 2003;23:731–57.
- 7 Ta CN, Bowman RW. Hyphema caused by a metallic intraocular foreign body during magnetic resonance imaging. *Am J Ophthalmol* 2000;129:533–4.
- 8 Kelly WM, Paglen PG, Pearson JA, et al. Ferromagnetism of intraocular foreign body causes unilateral blindness after MR study. *AJNR* 1986;7:243–345.
- 9 Klucznik RP, Carrier DA, Pyka R, et al. Placement of a ferromagnetic intracerebral aneurysm clip in a magnetic field with a fatal outcome. *Radiology* 1993;187:855–6.
- 10 Schenck JF. Safety of strong, static magnetic fields. *J Magn Reson Imaging* 2000;12:2–19.

Learning points

- Incidental findings of metallic foreign body during MRI scan have been reported in the literature.
- The consequences of incidental foreign body detection during MRI scan can range from negligible to death.
- MRI checklists provide a reminder of the conditions that must be screened.
- It is the clinicians responsibility to ensure that the contraindications to MRI scanning has been adequately screened.
- A low threshold for plain radiography prior to MRI, particularly in the presence of behaviour that risks foreign body injury, should be adopted.

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