

news

THE NEWSLETTER OF
THE BRITISH ASSOCIATION OF MR RADIOGRAPHERS

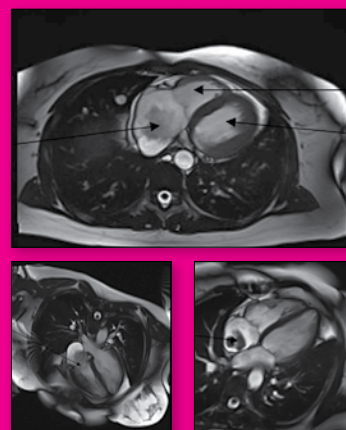
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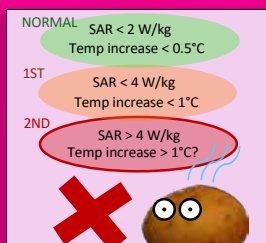
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welcome from your BAMRR PRESIDENT



Welcome to the Spring issue of the BAMRR newsletter. I would like to begin by expressing our gratitude to Cath for her dedicated service as President. Her efforts in collaboration with the Resus Council have been instrumental in developing the RCUK Best Practice Statement on Safety During Medical Emergencies in the Magnetic Resonance (MR) scanner, which is now available on our website.

I would also like to extend a warm welcome to our new board members, Nikki and Amir. It was a pleasure meeting both of you in person at the board meeting in January, and I look forward to working together. Nikki will focus on training and education, while Amir will lead the development of our website and BAMRR multimedia initiatives.

In October, we successfully held our annual conference in Manchester, supported by numerous sponsors from across the industry. Their contributions are invaluable, and we sincerely appreciate their assistance. The conference provided a wonderful opportunity to connect with MRI colleagues and industry partners. A heartfelt thank you to all our speakers for presenting a diverse array of topics, and special recognition goes to Trudi and Cath, our conference coordinators, for their hard work. I trust that attendees have found their BAMRR umbrellas to be useful.

In November, we hosted our popular MRI introductory course. This two-day program is designed for new MR Radiographers and includes hands-on experience with parameter manipulation, as well as sessions on MRI safety, fundamental physics, and clinical applications. This course is taught by our

esteemed BAMRR board members—Helen, Trudi, and Dave—alongside guest speakers. We appreciate everyone's involvement in this course, which will be held again on April 4th and 5th at the NCSEM in Loughborough.

We also represent BAMRR at the MR SIG meetings to discuss the latest recommendations and safety implications from the MHRA, IPEM, and ScoR, as well as upcoming courses and webinars.

This year, we aim to enhance our website further with Amir's assistance, incorporating interactive features for better user engagement.

Please remember that an education grant of £1,000 is available. For details on how to apply, please visit our website. Additionally, we offer compensation for educational articles published in the newsletter. For those of you with students, please inform them that student memberships in BAMRR are free.

Our session at the UKIO this year, titled "MRI in Contemporary Practice," is scheduled for the final day, June 4th, at 8:45 AM. Please note that on Wednesday, attendees will have full access to all sessions and the exhibition.

Looking ahead, this year's annual conference, will take place in London at the Holiday Inn Kensington High Street on Saturday, October 4th. If anyone is interested in presenting or highlighting a topic, please feel free to reach out.

We look forward to reconnecting with many of you at our courses, UKIO events, or the BAMRR conference.

Jill McKenna
BAMRR President
jill.mckenna99@gmail.com

from your EDITORS

Welcome to the Spring 2025 BAMRR News.

Welcome to the Spring Edition of the BAMRR newsletter! In this edition, we're excited to share updates on new policy board members, highlight some fantastic educational resources, and provide details about our upcoming conference you won't want to miss.

New Policy Board Members

We're thrilled to introduce the newest members of our policy board! Welcome Nicola and Amir. Their expertise and passion for advancing our skills and knowledge will be invaluable as we help educate the MRI workforce.

Safety Resources

Visit our website to explore the full range of resources, including updated safety guidelines and expert tips and advice on maintaining a secure and efficient MRI environment.

Upcoming Conference

Mark your calendars! We're excited to announce that our annual conference is set to take place October 4th in London! This event promises to be an enriching experience, bringing together MRI professionals, and educators from all over the UK. With a great lineup of speakers, interactive sessions, and plenty of opportunities to network. Keep your eyes peeled for the event registration opening in early summer!

Stay tuned for more updates

Best regards

Zoe and Matthew
BAMRR Editors



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WELCOME from our sponsor **Guerbet**

Exciting News: Elucirem™ (Gadopiclenol) is authorized in Great Britain (GB), for diagnostic use only.

Hello BAMRR community,

As we kick off 2025 we bring you exciting news: the next-generation MRI contrast media, Elucirem™ (Gadopiclenol), has been authorized for diagnostic use in Great Britain (GB). Gadopiclenol is the first half-dose nonspecific gadolinium-based contrast agent. It is indicated for adults and children aged 2 years and older; enhancing contrast-enhanced magnetic resonance imaging (MRI) to improve the detection and visualization of pathologies with disruption of the blood-brain-barrier (BBB) and/or abnormal vascularity of the brain, spine, and associated tissues of the central nervous system (CNS), as well as the liver, kidney, pancreas, breast, lung, prostate, and musculoskeletal system!

This significant milestone marks the beginning of an exciting journey with Elucirem™. For further details about Elucirem™, please reach out to your local Guerbet representative

or visit our official website: **Guerbet - Press Release - Elucirem Market Authorisation**

And of course, we're here to support you beyond just product updates. If you're interested in our educational programs or CPD accredited webinars, please don't hesitate to reach out to your local Guerbet representative or contact us at uk.office@guerbet.com

We look forward to continuing our partnership and providing you with the latest advancements in medical imaging. Stay tuned as we share more information throughout the year!

Warm regards,

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Avon House, 435 Stratford Road, Shirley,
Solihull B90 4AA UK

Tel: 00 44 (0) 121 733 8542

Fax: 00 44 (0) 121 733 3120

Email: uk.office@guerbet.com

Reference: 1. Elucirem. Summary of Product Characteristics. Available from: Microsoft Word - 2699428497857002463_spc-doc.doc (windows.net) and Microsoft Word - 1630177080970350954_spc-doc.doc (windows.net)
Accessed March 2024.

BAMRR Policy Board Members, Spring 2025

The co-ordination of the Associations activities is overseen and undertaken by an elected Policy Board. The board currently consists of the following who are members of BAMRR and working in different regions of the UK.

The Policy Board is composed of:



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Annual BAMRR Conference 2024

Manchester - Saturday 5th October 2024

We had a fantastic annual conference in Manchester where it had been planned for us to go before Covid hit and stopped face to face events. A huge thank you to the Holiday Inn for providing a great venue, support and food. We had a great turnout of delegates with a special thank you to Hull who managed to send eight members of staff!

The conference received great feedback both on the feedback forms and in person on the day with people loving the green BAMRR umbrella and USB freebies kindly gifted from BAMRR

We were delighted to have an opening address by our Chief Executive of The Society of Radiographers Richard Evans OBE.

This was followed by an interesting talk from Professor Tufail Patankar on The role of MRI in neurovascular pathologies.

Reporting Radiographer Luca Tolini gave a fascinating insight into Radiographer reporting of cardiac MRI of patients receiving Herceptin. We then had a very interesting proffered paper from Mafalda Susa Silva who had received the Educational Grant from BAMRR to support her MSC project and this was on MRI in soft tissue sarcoma – does gadolinium alter the patient pathway?



We were all delighted to have a safety presentation from Consultant Radiologist Dr Mark Radon on understanding MRI Safety and Active implants and how to scan them. It was really refreshing to have a radiologist taking such a keen interest with so much knowledge on this topic.

BAMRR members remained for the AGM and after a delicious lunch Steven Edwards gave a fascinating presentation on MRI in the small animals demonstrating how different the planes and orientations are for animals compared to humans!

Charlotte Swain gave a very informative presentation on Play therapy in Paediatric MRI and how they have managed to reduce the number of paediatric patients needing a general anaesthetic for the MRI.

The ever hot topic of cauda equina syndrome was presented by Dr Nav Subedi Consultant Radiologist from Lancashire.

After the final coffee break Raj Anup and Ruth Eatough gave a presentation on MR imaging of auditory implants.

To finish the agenda Dr Martin Graves did his legendary MRI Pub Quiz with some pretty tricky questions but great fun and educational as ever.

A huge thank you to the BAMRR board members who organised the day, the excellent presenters and all the delegates for attending. We will see you in London next year – save the date Saturday 4th October 2025.

**BAMRR
CONFERENCE**



Look forward to seeing you in
Kensington this Autumn
Registration opening soon!

**LONDON
4TH OCTOBER 2025**



SoR urges attention on revised contrast agent PGD templates

The SoR has collaborated with the Specialist Pharmacy Service to update Patient Group Direction (PDG) templates for gadolinium contrast agents for the third time

Version 3.0 of the PGD templates will be valid starting in April 2025. However, the society encourages organisations to begin evaluating them now to allow sufficient time for local governance processes before current PGDs run out.

The latest updates include enhanced guidance on the legal mechanisms for administering medicines and ensuring compliance with these requirements. Additionally, the supporting information on consent and record-keeping has been revised.

Providing consistent presentation

Contrast agent templates are published by the Specialist Pharmacy Service (SPS), NHS England, endorsed by the Royal College of Radiologists (RCR) and the Society of Radiographers and with input from specialists working within clinical practice, for contrast agents commonly used in NHS England-commissioned radiology services.

They are intended to be used in conjunction with the SPS' implementation advice.

Sue Johnson, the professional officer who leads this work at the SoR, added: "Although these templates are primarily aimed at the English NHS, they can be adapted for use by the independent sector and all the devolved nations with minor modifications to reflect specific governance requirements."

"The core content should remain unchanged. The templates help to reduce variation in practice and ensure compliance with medicines regulations and guidance, making services safer when radiographers move between organisations."

The templates provide a consistent presentation which meets regulatory and professional requirements and has been reviewed by specialists within the given area. They ensure that the legislative and clinical parameters have been fully considered. Organisations can tailor the content for some aspects of the templates to meet their own needs while ensuring they retain all the legally required content.

Advice and support

The six updated templates include:

Gadoxetate disodium contrast agent

Gadoteridol contrast agent

Gadobenate dimeglumine contrast agent

Gadoteric acid meglumine contrast agent

Gadobutrol contrast agent

Gadopixelol contrast agent

The previous templates will remain valid until the end of March 2025.

Updated guidance on consent and record keeping emphasises the importance of obtaining patient consent. The radiographer working under the PGD is responsible for evaluating the patient against the criteria and obtaining consent for the procedure.

It explains: "If the radiographer has any concerns about administering contrast under a PGD, they should refrain from proceeding and escalate the case to the appropriate clinician, such as the on-call radiologist or the referrer."



BAMRR Newsletter submissions

BAMRR encourages submissions for our newsletter from writers with any level of experience. Typical contributions including reflection of personal experiences in practice, research articles, audits, literature reviews, safety information, case studies, posters and any communication pieces reporting new developments within MRI.

The Society of Radiographers have an excellent article which may be of use to help. Insight submission guidelines for authors | SoR

All articles for consideration should be sent to BAMRR Newsletter editors zoe.lingham2@nuffieldhealth.com or matthew.benbow@uhd.nhs.uk

Any articles that are selected for publication and written by a registered BAMRR member will be awarded a £50 recognition payment.

Any keen speakers that would be interested in supporting BAMRR in our courses and/or conference are also encouraged to reach out to us.



**Fully booked for
4th and 5th April 2025**

**Keep an eye out for the
November course dates**

Course held at the National Centre for Sports and Exercise Medicine (NCSEM) at Loughborough University LE11 3TU

Topics include:

Parameter manipulation on a scanner or simulator

Contrast Agents

Physics – how it works and pulse sequences

Artefacts

Safety

Fat sat imaging

MSK

Neuro

Knee

Lumbar spine

Teaching by experienced MR radiographers and MR physicists

Registration is via
www.bamrr.org

**The cost is just £135 for BAMRR members and
£185 for non-members.**

**If you aren't a member and want to join, the course
and annual membership is £165.**

Details of our courses, including the full agenda and registration are on the website **www.bamrr.org**. For any queries please contact Helen Estall at courses@bamrr.org. Spaces do fill early so make sure you register soon!



All applicants must fulfil the following criteria:

- Be a member of BAMRR
- Be enrolled on a MSc course and progressing the research part of the course in MRI
- Present their study at the next BAMRR annual conference
- Provide an article for publication in the BAMRR Newsletter

Apply:

- Complete the application form available on the website under "About Us" -Education Grant
- Applications must include a brief outline of the intended project and justification for the grant (maximum 750 words)
- All applications will be reviewed by the BAMRR policy board

www.bamrr.org

Amir Akhtar



Amir qualified as a Diagnostic Radiographer in 2014, gaining extensive MRI experience within the NHS before completing a PGC in MRI. He joined Medispace in 2022 as an MRI Radiographer; and his role has since evolved into business development for managed equipment services. In this capacity, Amir combines technical expertise with strategic insight to support healthcare providers in delivering high-quality imaging solutions. With accreditations in project management and Lean principles, he drives efficiency and service improvement across healthcare settings.

Passionate about the future of healthcare, Amir is particularly focused on artificial intelligence and digital transformation. He works to bridge the gap between clinical practice, business strategy, and emerging technologies, remaining committed to advancing smarter, more efficient healthcare solutions.

Nicola Singh



MSc, BHSc (Hons), FHEA.

**Assistant Professor of
Diagnostic Radiography
University of Bradford**

Nicola joined academia in Nov 2022 at the University of Bradford, after working clinically as a Team leader/Senior MRI Radiographer in MSK MRI at the Leeds Teaching Hospitals Trust. Qualified as a Diagnostic Radiographer in 2003 from the University of Leeds, the majority of Nicola's career has been working within the hospitals around Leeds, gaining a vast amount of MRI experience in particular.

Nicola has always felt passionately about education and career progression, which lead her to embark upon a career path into academia, teaching both Undergraduate and Postgraduate students. Most recently, the role has progressed to become Postgraduate programme lead for MSc Medical Imaging, which includes the Postgraduate provision for MRI radiographers. Alongside this, Nicola also still does undertake clinical duties to keep ahead of recent advancements in imaging and service provision and be involved in delivering excellent patient care!

Help Required with AI Survey:

BAMRR is always keen to help and collaborate with organisations.

Please can you take a few minutes to participate in the following survey, thanks.

"The UK has the sixth lowest number of MRI scanners/person in the OECD [1]. MRI services have been under increasing pressure due to backlogs, increasing demand and staff shortages. To increase capacity on current scanners by reducing exam times, NHS England has centrally funded AI software for MR Image Reconstruction in 2023 [2]. However, manufacturers have given few details of their implementations (exact algorithms, training data) raising questions of efficacy and the potential for inequality within the MRI community. In the meantime, there is both enthusiasm and concern in the public and the press regarding the exponential rise of AI in all corners of society. While opening unexplored potentials, the use of AI in medicine is of particular concern.

Following a successful PPIE project with patient representatives, Barts Health MRI Department are keen to hear all stakeholders thoughts on and experiences of implementing AI in MRI Reconstruction. We have questionnaires for Physicists, Radiographers and Radiologists.

Radiographers: please use the following link:
<https://forms.gle/bNy549fhm9mohVSP8>



Thanks for any help you can provide and please share with colleagues,

Best Wishes,
Barts Health MRI

Key Refs: [1] OECD Data: MRI Units [<https://data.oecd.org/healtheq/magnetic-resonance-imaging-mri-units.htm>] [2] NHS Digital Diagnostic Digital Capability Programme, 2021 [Webinar], [Online]"



Implant Update:

Nasal septal prosthesis- Most nasal septal plugs in the past were non-magnetic/ non-metallic until recently, whereas now with the proliferation of small, strong, neodymium magnets these new devices have been released. There have been some recent cases where the magnets/implant actually dislodged. The significant magnetic forces could act in such a way to cause the implant to translate inwards causing trauma to the patient.

The instructions for use (IFU) say they should not be in situ during MRI examination'.

<https://inhealth.com/media/documents/pdf/37805-01E.pdf>

<https://nasalseptal.com/> or https://www.severnhealthcare.com/images/documents/inhealth/Nasal_Septal_PERFORATION_PROSTHESIS.pdf

Clinical case study of the role of cardiac MRI (CMRI) in the diagnosis of right atrial myxoma

Helen Dowler MRI Section Manager, Hull University Teaching Hospitals NHS Trust

Introduction

Cardiac myxomas are the most common type of primary cardiac tumour in adults (Griborio-Guzman et al, 2022) and can affect any chamber of the heart, with the majority (75%) located in the left atrium (Katiyar et al, 2020).

Early detection and treatment of myxoma is important as although they are biologically benign, they are described as "functionally malignant" because of potential life-threatening complications such as fragmentation and embolisation (Monwarul Islam, 2022). Sudden cardiac death is the most serious complication of myxoma occurring in 15% of patients, caused by embolisation or sudden obstruction of blood flow at the valves (Hasan et al, 2020). Timely diagnosis and surgical resection is crucial to long term prognosis.

Case study context

A 33 year old female attending A+E presented with painful breathing, fever, 6 day history of right sided pleuritic chest pain. At this stage there were many differentials including infection. The first diagnostic imaging was a chest x-ray which showed a nodular opacity in the right lower zone, but was otherwise normal.

Bloods were taken for analysis, which showed slightly raised inflammatory markers and known hepatitis but little else of note. This finding is highlighted by Griborio-Guzman et al (2022) who identified that laboratory findings can be non-specific in cases of cardiac myxoma and can include anaemia, polycythemia and high inflammatory markers like elevated erythrocyte sedimentation rate, C Reactive and globulins.

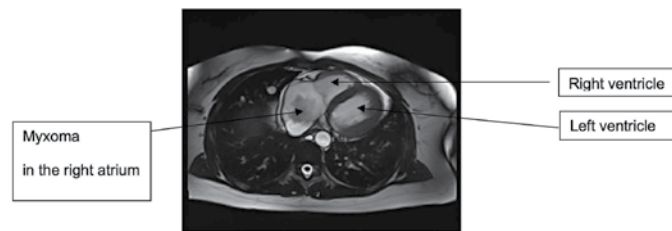
Clinical assessment highlighted constant pain, worse on inspiration and not relieved by analgesia, tachycardia and shortness of breath on exertion. The patient had a Wells Score of 4.5 indicating a moderate risk of pulmonary embolism (PE) (Wells et al, 1998) so a CT pulmonary angiogram (CTPA) was arranged to rule this out.

The primary conclusion of the CTPA was:

Right intracardiac (atrial) mass, a myxoma is at the top of the differential diagnosis. There is also a segmental pulmonary embolism. In the first instance, cardiac MRI and involvement of the cardiothoracic team is suggested.

(extract from report from author's own department)

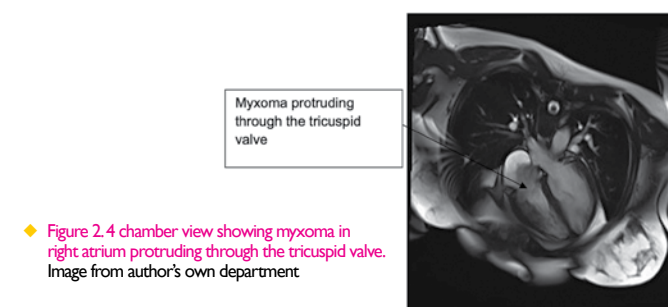
The following day a CMRI was requested. Although myxoma was top of the differential diagnosis, CMRI was used to exclude a thrombus or vascular tumour such as angio-sarcoma. If myxoma is confirmed, information about size, insertion site (where the myxoma attaches to) and other cardiac abnormalities would be beneficial ahead of surgical excision.



◆ Figure 1. Cine true axial showing myxoma in right atrium. Image from author's own department

The left and right atria are separated by the **inter-atrial septum**. The inferior aspect of the right interatrial septum is a thinner section of the septum called the **fossa ovalis**, which is a depressed structure, important in foetal circulation (Oduah, Sharma and Brown, 2022). It is close to this area that the stalk of the myxoma is attached to the endocardium. Myxoma can be classified in relation to how they attach to the heart wall. They can either be pedunculated with a narrow stalk and highly mobile or sessile and non-mobile (Katiyar et al, 2020)

The mass is highly mobile and can be seen in diastole protruding through the tricuspid valve (figure 2), compromising the effectiveness of the heart by restricting ventricular filling and contributing to the patients symptoms of tiredness and shortness of breath.



◆ Figure 2. 4 chamber view showing myxoma in right atrium protruding through the tricuspid valve. Image from author's own department

Any clots that form on the myxoma, may become dislodged and travel to the lungs resulting in a **pulmonary embolism**, as was the case for this patient (found on CTPA). Embolism occurs in 30-40% of patients with myxomas (Monwarul Islam, 2022). Embolisation depends on the location of the myxoma. Left atrial myxomas tend to embolise to the brain, causing ischaemic stroke, whereas right atrial myxomas are more likely to cause pulmonary embolism (Monwarul Islam, 2022).

Comparative Imaging elements

A chest x-ray is a useful first line examination to evaluate the chest and lung fields. It is quick, painless, readily available and non-invasive. It uses a low dose of ionizing radiation and although the chest x-ray was of limited value in the diagnosis of cardiac myxoma, it allowed other pulmonary conditions to be ruled out, e.g. infection.

The CTPA identified a segmental pulmonary embolism and a filling defect in the right atrium. CT is fast, readily available, low cost and is of particular value in evaluating calcified lesions, extracardiac tumour involvement and where CMRI is contraindicated but the limitations of CT compared to MRI are the lower temporal resolution and it involves ionizing radiation (Griborio-Guzman et al, 2022).

Transthoracic echocardiography (TTE) can accurately define location, size and mobility of the myxoma (Colin et al, 2018). It does not involve exposure to ionizing radiation but it can sometimes yield suboptimal image quality, especially in the right atrium myxoma (Colin et al, 2018) therefore the location of the attachment may not be visualized. TTE was not used pre-operatively in the case study but has been used post operatively at 6 weeks and 3 month follow up, with normal findings.

Other diagnostic tests

Histology

Cardiac myxoma are chained rings of stellated fusiform and polygonal cells around capillaries (Monwarul Islam, 2022). Histopathology examination of the specimen post-excision confirmed the mass to be a cardiac myxoma.

Advantages and limitations of CMRI

The advantages of CMRI are that it does not use ionizing radiation, it is good at tumour detection, can characterize tissues and therefore lesions, it can exclude vascular lesion and thrombus, and is useful in preoperative planning from information about attachment location of the mass. CMRI gives an overview of the thorax and great vessels including assessing for pericardial effusion – that would be present in malignant mass. Myxomas are non-invasive so do not reach the epicardial part of the heart wall, therefore pericardial involvement (e.g. effusion) is not usually seen in myxoma (Colin et al, 2018)

The main limitations of CMRI are length of scan time and managing to lying flat and breath hold consistently. Other limitations include MRI contraindications and claustrophobia.

MRI Imaging of the heart is challenging due to variations in anatomy, orientation and position with the thorax. CMRI has its own imaging planes that best demonstrate the chambers of the heart, outflow tracts and valves, as well as providing an overview of the thorax and great vessels. It is therefore essential for the radiographer to have a good understanding of anatomy of the heart and great vessels and pathologies that can affect it.

Optimising the CMRI Protocol

The patient was scanned on a 1.5T Siemens Sola MRI scanner. Using a mass protocol based on the Standardized cardiovascular magnetic resonance imaging (CMR) protocols: 2020 update (Kramer et al, 2020).

The patient in the case study presented to A+E with shortness of breath. This was exacerbated when lying supine for MRI. Patients struggling for breath require lots more reassurance. The sequences were optimized to reduce breath hold time. It is also possible to optimize technique to held inspiration or a free breathe protocol depending on the patient's condition/ability to tolerate the scan. Inspiratory breath-hold may be more comfortable and easier to manage for some patients (Kramer et al, 2020).

Evaluation of the role of CMRI in the diagnosis and management of the patient.

CMRI played an important role in the diagnosis and management of the patient. CT had identified an abnormality in the right atrium but CMRI gave a much more accurate diagnosis and excluded thrombus or a highly vascular malignant cardiac mass.

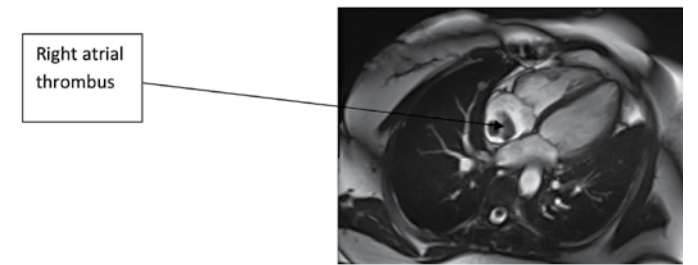
There is a mass (48x34mm) attached to the IAS that prolapses through the tricuspid valve. It does not appear to be vascular. There are inhomogeneities consistent with elements of thrombus (note the pulmonary embolism history). This is highly suggestive of a right atrial myxoma.

(extract from report from author's own department)

The patient was referred to and accepted by cardiothoracic surgery team who removed the atrial myxoma the following day. The patient was discharged from hospital at day 7 post-op.

The surgical notes described the tumour as very friable, making it a higher risk myxoma, which is more prone to fragmentation, erosion and embolization. However, with early surgery, prognosis is excellent with a low recurrence rate (between 2-3%) (Griborio-Guzman et al, 2022).

The patient had a follow up CMRI at 9 months post-op. There was no recurrence of the atrial myxoma. But the report described a filling defect in the right atrium, which did not demonstrate enhancement or perfusion (figure 3), the MRI appearances were of a right atrial thrombus. The patient was started on apixaban, an anticoagulant, the same day.



◆ Figure 3. 4 chamber view 9 months post resection showing a thrombus in right atrium. Image from author's own department

Potential improvements to the Imaging protocol.

4D flow heart and Q flow of tricuspid valve– tumour prolapse through the valve is frequently reported. A 4D flow heart and Q flow of tricuspid valve may have been helpful to assess in flow obstruction and calculate reduction in the valve orifice (Colin et al, 2018)

Conclusion

This case study has demonstrated the value of CMRI in cases of suspected atrial myxoma. CMRI enabled the differentials of thrombus and angiosarcoma to be excluded. Despite the imaging challenges in this particular patient, CMRI was used to confirm the presence of cardiac myxoma and give more detail about location, size, point of attachment and any associated thrombi to aid surgical resection. This resulted in a successful outcome for the patient with no recurrence reported at follow up and good post operative recovery.

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MR Safety Update

Rachel Watt MR Safety Co-ordinator for BAMRR

Hello BAMRR members, hope you are all enjoying the lighter mornings and extra daylight.

Here are some safety snippets....

Contrast Update - Background

The Pharmaceutical Price Regulation Scheme (PPRS) (formerly the Voluntary Price Regulation Scheme) has been running since 1956. It is a voluntary arrangement between the Department of Health and individual drug companies, which determines the prices companies can charge the NHS for their drugs which are branded.

The current rate for 2024/2025 is **22.9%**.

The following website provides an overview of PPRS.

<https://www.abpi.org.uk/value-and-access/uk-medicine-pricing/what-was-the-prpr/>

Or the government website for more specific information

[https://www.gov.uk/government/publications/the-2024-voluntary-scheme-for-branded-medicines-pricing-access-and-growth-payment-percentage-for-2025#:~:text=level%20was%20set%20The%202024%20voluntary%20scheme%20for%20branded%20medicines%20pricing%2C%20access%20and,British%20Pharmaceutical%20Industry%20\(ABPI\).](https://www.gov.uk/government/publications/the-2024-voluntary-scheme-for-branded-medicines-pricing-access-and-growth-payment-percentage-for-2025#:~:text=level%20was%20set%20The%202024%20voluntary%20scheme%20for%20branded%20medicines%20pricing%2C%20access%20and,British%20Pharmaceutical%20Industry%20(ABPI).)

What has changed?

There has been a change for some companies in the way branded medicines are now packaged, so contrast boxes, vials and pre-filled syringes (PFS) have now stopped being produced with the 'traditional brand names' as we knew them (eg Gadovist).

This allows the company to prevent passing price increases to the customer.

What this means for your department:

As older stock in warehouses depletes, the new production line will have the generic names for contrast instead. Some frameworks might have older stock but this change will be filtering its way through to your departments now.

Letters have been sent to all customer to inform them of the rebranding; however, if there are any queries, please contact your local Company Representative or Customer Services.

Brand name	Generic name	Structure	Manufacturer
Clariscan	Gadoterate meglumine	Macrocylic, Ionic	GE
Dotarem	Gadoterate meglumine	Macrocylic, Ionic	Guerbet
Elucirem	Gadopichlenol	Macrocylic, Non-Ionic	Guerbet
Gadovist	Gadobutrol	Macrocylic, Non-Ionic	Bayer
Multihance	Gadobenate Dimeglumine	Linear, Ionic	Bracco
Primovist	Gadoxetate Disodium	Linear, Ionic	Bayer
Prohance	Gadoteridol	Macrocylic, Non-Ionic	Bracco
Vueway	Gadopichlenol	Macrocylic, Non-Ionic	Bracco

Unusual cardiac device - Ventrica magnetic vascular positioner (MVP) series 6000.

Following a CABG procedure, a patient declared they had a small magnet in their heart. The implant below lying on the LIMA to LAD graft and creating significant streak artefact on CT.



The device is used for creating vascular anastomoses without suturing. During the intervention, an incision is made in a vessel and an oval magnetic clip placed in the vessel wall. Two additional magnetic clips are placed on the outside of

Incidents Update

https://www.auntminnieeurope.com/clinical-news/mri/article/15682346/mri-scanner-explosion-in-south-africa-injures-3?braze_int_id=64e75f9d6f54f0001f606ed&braze_ext_id=6430336619ef38833c5e1146

https://www.auntminnieeurope.com/clinical-news/mri/article/15709411/mri-safety-how-japan-deals-with-it?braze_int_id=64e75f9d6f54f0001f606ed&braze_ext_id=6430336619ef38833c5e1146

Fire Risk Assessments:

The British Institute of Radiology (BIR) MR SIG have just updated their fire risk assessment.

Please see the link below

https://www.bir.org.uk/media/291814/amended_ra_5_fire_updated_january_2025.pdf

GISP

(Generic Implant Safety Procedure) Update:

Our paper 'A framework for developing generic implant safety procedures for scanning patients with medical implants and devices in MRI' has been published in BJR Open

<https://academic.oup.com/bjr/article/98/11/67/336/7899859>

There is a national GISP on IUD's in process.

The next 4 GISPs to be developed would be:

- Artificial heart valves
- Non-vascular stents
- Gastric bands
- Passive middle ear implants

If anyone already has GISPs in use for these in their departments and would like to be involved with evidence reviews, please contact Sarah Prescott, Sarah.Prescott@uhn.nhs.uk

It is hoped the GISPs will be stored on IPEM website.

<https://www.ipem.ac.uk/resources/mri/generic-implant-safety-procedures-gisps-task-and-finish-group/>

MR Safety Week

Plans are afoot for this year- watch this space....

<https://www.bamm.org/>

the vessel, these are attracted to the interior clip to create a fixed port. The same thing is done to the second vessel, and the two ports brought together to create a sutureless connection made of six small magnets. There is no formal MRI safety labelling.



Help Required with MR Safety Screening Form:

Patients who 'do not arrive' (DNA) for their Magnetic resonance Imaging (MRI) appointment and /or have unanticipated contraindications/special requirements result in significant lost imaging resource. This directly affects waiting times and the management of patients.

Studies have shown that whilst telephone and postal reminders appear effective in increasing attendance, (particularly if received within a day of the scheduled appointment), ^{(1),(2),(3)} up to 21% of patients present to MRI with an implanted medical device. ⁽⁴⁾

Historically, patients were sent an appointment letter in the post or were phoned regarding their MRI scan appointment and they received their MRI safety form on the day. This often resulted in patients arriving with unexpected implants and potentially being turned away on the day of their scan.

Now it is commonplace for the MR safety form to be included with appointment letters and patient information leaflets, which are ideally sent to the patient in advance.

Some departments are even looking at 'paperless' or 'paper lite' systems.

Without sounding like a relic, I am still a little bit of a fan of a piece of paper, as:

1. Paper helps with record keeping
2. People often prefer to work with paper in some form
3. Going completely digital leaves you vulnerable

However, digital safety and consent forms have been used via portals in the healthcare setting in the UK for a number of years now.

<https://www.bupa.co.uk/dental/dental-care/patient-portal>

Dentists use Concentric digital consent system for pre-op checks

<https://concentric.health>

and systems like EPIC <https://www.epic.com/software/health-systems-and-clinics/> are being introduced in Radiology departments.

There are various NHS trusts using them now too.

<https://transform.england.nhs.uk/key-tools-and-info/digital-playbooks/perioperative-digital-playbook/i-want-to-provide-digital-consent-to-treatment/> and <https://www.mse.nhs.uk/digital-patient-consent-system/>

Using a digital system for patient consent offers patients more convenience and flexibility.

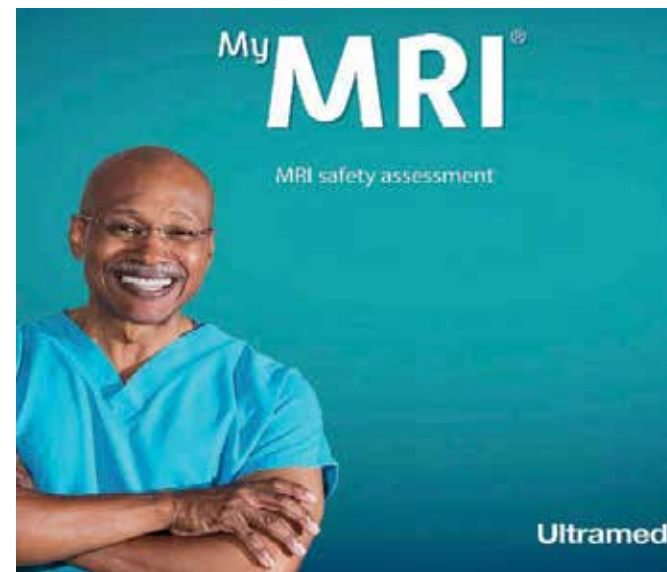
Accessing procedure information at home or remotely, gives time to make an informed decision and could reduce any unnecessary anxiety or pressure felt during a hospital appointment.

How can moving from paper based patient safety assessments to digital improve services?

As mentioned earlier, currently most MRI patient safety assessments are done on paper. Sometimes this is sent out in advance of the patient's scan date and sometimes only on the day of the scan. This results in a poor compliance rate in responding to posted paper questionnaires and the risk of cancellation on the day of scan if there are safety concerns. Patients often need to contact the MRI unit interrupting the service and creating a large admin workload.

As shown above, pre-procedure assessments are being done in other areas of the hospital and are part of patient pathways. These are being increasingly done using digital solutions particularly in preoperative assessments. This allows the patient to be 'approved for operation' in advance of their attending for their surgical procedure. Similarly digital solutions are available for pre-procedure assessment before an endoscopy.

What would be the potential benefits of digitalising MRI patient safety assessments?



Potential benefits could include: -

- **Enhance Patient Experience:** Provide patients with a seamless, informed, and less stressful journey knowing they were 'approved' for their scan in advance of attending.
- **Decrease cancellations** on the day by identifying patients who cannot have an MRI scan or are discovered to 'conditional' on the day with further information needed.
- **Decrease the DNA rate** by automatically sending reminders to attend on a digital solution.
- **Save Time and Money:** Reduce last-minute cancellations and time spent completing paper forms.
- **Quicker assessment** of patients with implants: collecting information from the patient about their implant or contraindications so these can be investigated efficiently.

An innovative digital pre-procedure assessment platform has been developed with 600,000 patient uses contracted for use in 2025. The platform has won a King's Award for Enterprise in the Innovate Category which is recognised as the most prestigious business award in the UK. The company behind this is 'Ultramed' which gained B Corp certification in 2024 demonstrating high standards of environmental and social performance. Led by a former anaesthetist who had regular GA lists in the MRI scanner; Ultramed has developed a digital solution for MRI patient safety assessments.

This allows the automatic sending of an online digital MRI safety assessment questionnaire when a scan is booked. The patient receives up to 3 automatic reminders if they do not submit their information. The patient entered data is processed so any issues are flagged up to the reviewing member of the MRI team. In addition, information can be collected about metal work, implants etc to facilitate the assessment of the issue for safety to scan, or whether it is conditional or if a scan is contra-indicated.

Please feel free to contact Ultramed if you would like to be a pilot site or are willing to join a cohort of testers.

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SAR

The Heat of the Moment

Rosie Goodburn

MRI Clinical Scientist, The Royal Marsden Hospital

What is SAR?

Radiofrequency (RF) electromagnetic (EM) fields are the main cause of tissue heating in MRI. This heating arises from electric current loops (eddy currents) induced in the body by the oscillating RF field (Faraday's law) that are dissipated as heat due to tissues' resistance.

Faraday's Law:

A changing magnetic field induces an electric field in a conductor

Temperature rises in the body depend on various factors, including heat diffusion and bio-responses, and are very difficult to predict. Due to these challenges, the **Specific Absorption Rate (SAR)** is used as a substitute metric for patient heating, where **SAR** is defined as the dissipated RF power in watts per kilogram of tissue [W/kg].

$$\text{SAR: Specific Absorption Rate} = \frac{\text{Energy}}{\text{Time} \times \text{Mass}}$$

Why Care? Heat Stress

A key reason for limiting SAR in MRI is to mitigate heat stress, which is a concern in patients with hypertension, pregnancy, or those taking vasodilators, diuretics, etc., who have compromised thermoregulation.

Why Care? Burns

RF-induced burns are one of the most common MRI-related injuries. Preventing limbs forming large loops with the body is standard in MRI to reduce SAR, where burns can appear at contact points. It's also essential to check whether anything conductive, including implants, ECG leads, or even clothing with metallic fibers might form part of a current loop and create SAR hotspots with significant burns at tissue interfaces.

How SAR is Estimated

SAR can be defined for specific regions of the body (e.g. whole body, head) or over a peak local region (e.g. 10 g of tissue). It is based on:

- RF frequency / coil type
- Scan parameters
 - Type and number of RF pulses
 - Repetition Time (TR)
 - Number of slices / TRs
 - Patient weight (possibly height too)
- The body part being imaged
- Assumed tissue conductivity characteristics

The estimated SAR will also vary between MR system vendors, where models of the tissue conductivity and density values are assumed. There is no standard for SAR estimation algorithms.

SAR-casm Aside: Bug Not a Feature

Three types of EM fields generated by MRI are the:

- 1) static magnetic field (B_0)
- 2) pulsed gradient fields (dB/dt), and
- 3) time-varying RF fields (B_1).

These EM fields are all needed for MR image generation, but each comes with associated hazards, including (not limited to) twisting forces on elongated implants, loud acoustic noises, and patient heating that could lead to cardiovascular stress or even burns.

In terms of each EM field and its hazards, the physical mechanisms are somewhat like the scanner acting as, respectively, a very large:

- 1) magnet (B_0)
- 2) hi-fi speaker (dB/dt), and
- 3) microwave oven (B_1).

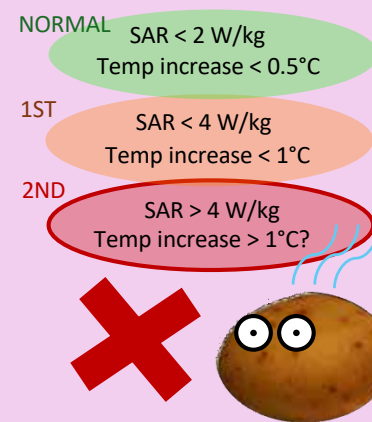
But, in contrast to hi-fis and microwaves, a lot is done to mitigate loud noises and patient heating that can come with an MRI scan: these effects are bugs and not features.

MRI controlled modes (normal, 1st-level, and 2nd-level) are analogous to power levels on a microwave (low, medium, and high).



According to MHRA guidelines,¹ normal operating mode should prevent a whole-body rise of $>0.5^\circ\text{C}$, 1st controlled operating level mode should prevent a whole-body rise of $>1^\circ\text{C}$, and 2nd level controlled mode should be used with caution, with "exposure restricted to avoid **tissue damage at 2°C** ".

IEC/ICNIRP whole-body SAR limits:¹



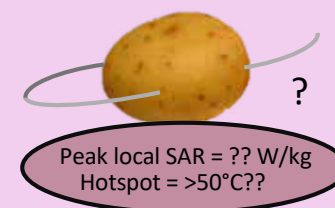
Dual SAR Control Mechanism

Two-fold control mechanisms are used to monitor SAR based on the entered patient weight and scan parameters. Before scanning, SAR is estimated and during scanning the applied RF power is monitored for a second SAR estimate. If a SAR limit is exceeded during scanning, RF power is switched off.² In theory, a patient weight that is very wrong may cause the power to trip based on a poorly calculated scan. Conversely, the prediction may over-estimate RF, resulting in an under-powered scan.³

Don't Forget the Fork

Microwave ovens operate at 2.5 GHz, a frequency that matches the resonance of water molecules, to heat by strongly vibrating water. Fortunately, the RF fields in MRI are nowhere near that frequency: 64 MHz (or 128 MHz) for 1.5 T (or 3 T) scanners.

Rather than vibrating water molecules, patient heating is attributed to eddy currents induced in the body by the oscillating B_1 field, which are dissipated as heat due to resistive losses. But eddy currents can also be induced in a microwave, which is why we don't want to forget about the fork!



What about metal in the patient? How could this affect SAR hotspots?

We are mainly concerned that the implant might form part of a large current loop in the patient. Because of the reduced resistance and increased current in metal compared to tissues, maximum heating is at the points in the loop where the implant and the conducting tissues meet, e.g., for a hip implant:



Another effect is that wires can act as electrical antennas, where the wire length is resonant with the RF of the scanner. This resonance happens at 1.5-T systems for 26-cm wires, and for 1.3-cm wires at 3 T. This effect can cause burns along the entire length of the wire and is an example of when **choosing a 1.5-T system may not reduce the risk of heating or burns**.

Minimising SAR

Approximately:²

$$\text{SAR} \propto B_0^2 \times \text{flip angle}^2 \times \text{RF duty cycle}$$

where the RF duty cycle is the fraction of total time the RF is on. Factors that can minimise SAR are:

- Using a scanner a 1.5-T rather than 3-T scanner
- Scanning in Normal Operating Mode
- Reducing flip angles, e.g., replacing T1-weighted fast spine echo sequences with 3D spoiled gradient echo sequences
- Using sequences with fewer spin-echo refocusing pulses
- Increasing TR for T2 or proton-density weighted sequences
- Using fewer slices
- Reducing echo train length in fast spin echo sequences

Other Factors Affecting SAR

Peak local SAR: In addition to region-averaged SAR, peak local SAR should be considered. SAR hotspots arise around narrow points in the eddy-current pathways, which may either occur inside the body or at points of skin-to-skin contact. In general, RF heating is largely peripheral, with very little deep-body heating.

Choice of transmit coil: Using a local transmit coil instead of a body coil can significantly reduce SAR by focusing RF energy on the region of interest, minimising overall power deposition.

Temperature and humidity: Manufacturer SAR limits assume e.g., $<24^\circ\text{C}$, $<60\%$ humidity, and dressing the patient in light clothing.

Body size: Because larger current loops can be made with increasing body size, SAR increases with patient weight.⁴ However, in practice, conductivity of adipose tissue is $\sim 20\times$ smaller than muscle,⁵ so these models aren't perfect. Larger patient size can also reduce B_1 homogeneity leading to higher peak local SAR and B_1^+ efficiency, leading to higher regional SAR.

Patients with implants: Before scanning a patient with an implant, manufacturer's recommendations are considered, where there may be limits on dB/dt and SAR. (Increasingly, B_1^+ limits are preferred over SAR.) Primarily, we are concerned with the generation of SAR hotspots due to large metallic implants as well the "antenna effect" of wire lengths that match the resonant wavelength of the RF field.

Piercings/tattoos/transdermal patches: If it's not possible to remove metallic piercings, tape can be used to insulate the skin. Tattoos can contain substances that cause RF heating. Patients should be made aware of the risks and asked to report any discomfort immediately. Patches containing metal should be removed and replaced after scanning if this can be done without affecting treatment.

Non-communicative patients: The most severe RF burns have occurred on non-communicative patients, such as foetal, paediatric, and adults under general aesthetic.

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