BAMRR

news

THE NEWSLETTER OF
THE BRITISH ASSOCIATION OF MR RADIOGRAPHERS

ARTIFICIAL INTELLIGENCE, MACHINE LEARNING, DEEP LEARNING AND MRI
PAGES 10-11

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welcome from your BAMRRPRESIDENT

Welcome to the Spring edition of the BAMRR Newsletter. Well I think it's Spring, though looking at the daffodils currently covered in huge dollops of snow as I write this, it feels a little like winter is back with us. Hoping by the time you're reading this, that'll just be a blip in the past!

First and foremost, I want to say a big thank you to Zoe Lingham, past president for all her hard work in the 2021/2022 term. She has been a great role model for me and so I have big boots to fill (though anyone who knows me knows how small my feet are so that'll be a tough call!)

2022 was up and down with covid 19 restrictions but at our June board meeting, just four months before our 39th Annual Conference we had a lengthy discussion and decided to change our plans and return to face to face later that year in October. The team, with super-duper, extra special mention for Helen and Kath, got to work and arranged the conference in Leicester in record time. We were rewarded with a big turnout of over 80 delegates to listen to our fab speakers and meet and greet each other and sponsors. Virtual events have become a bigger part of all our lives now and are here to stay, and whilst the unquestionable benefits they bring allow us greater flexibility and access, there's nothing quite like being at an event in person and the value that can add to the experience. Not to mention a bonus in Bournemouth of a live band courtesy of our own editor in chief, Matthew!

November brought the welcome return of the BAMRR Introductory Course in Loughborough after being on hold during the pandemic. Once again this popular course was fully subscribed and we want to thank those members who had booked just as the pandemic took hold and waited patiently to be able to attend. We hope it lived up to the wait.

BAMRR and its board members continue to work with our colleagues at the Society of Radiographers, IPEM and the British Institute of Radiology (BIR) MR safety group and have been involved in several national projects and guidance. Some of these you may have seen released in the last few month including MRI for patients with implantable cardiac devices, and GIRFT pathway for Cauda Equina Syndrome

Full steam ahead into 2023, we are pleased to be offering not one but two Introduction to MRI courses in May and November. Plus, the 40th Annual Conference is set for Saturday 7th October (SAVE THE DAY!) and headed to the Southwest in the beautiful town of Chepstow. Kath and Zoe are already the proverbial busy bees working to bring us another fabulous meeting. Prizes of £300 are on offer for the best oral proffered paper for all the budding MRI radiographers who wish to present on the day. BAMRR are also 'made up' to have another session at UKIO in Liverpool on 7th June. We'd love to see you there!

I'd also just like to take the opportunity to remind you that it is MRI Safety Week in July. BAMRR will as usual, be providing a variety of MRI safety focussed pieces to promote this crucially important campaign.

Details of all our conference, courses and events and contact details can be found at our website www.bamrr.org

And as always a huge thank you to our newsletter editor Matthew who works tirelessly behind the scenes to produce this fantastic resource for us all.

We look forward to seeing as many of you as possible at our upcoming events.

Bring on Spring for real!

Trudi Whitehead
BAMRR President
trudi.whitehead@nhs.net

from your EDITOR

Welcome to the Spring 2023 BAMRR News.

I have been producing BAMRR News since Autumn 2012, my first being edition number 42. Now, just over 10 years later, we have reached edition number 60. But also, someone else has reached this milestone – BAMRR Past President and still current Policy Board member, Dave Reed.

I can't believe it……60!!.

When I qualified in 1990, vacant radiographer jobs were scarce - yes really! By word of mouth I found out of an upcoming vacancy at the Royal Sussex County in Brighton, so off I traipsed for a look round and was offered the job on the spot – no interview required in those days.

A month later I started work, and on my first day this guy came over from CT to say hello. A few hours later, when our shifts were done, we found ourselves supping of a couple of well-earned pints just down the hill in the Sudeley Arms - now called the St George's Inn for those of you Brightonians wondering where this is. Well, this was Dave, and now 23 years and just a few ales later, he is celebrating a significant birthday.

We have stayed close friends and meet up regularly for both social BAMRR and other MRI related occasions (let's face it they are usually the same thing). We have both had various jobs over the years of course and are still very much involved in MRI.

So please raise a glass to both this edition of BAMRR News and to Dave, as both are now 60…..but mainly to Dave.

Happy birthday mate.

2008 - Dave at my 40th

Matthew Benbow
BAMRR Editor

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twitter.com/#!/BAMRR

2023 DATES FOR THE BAMRR INTRODUCTION TO MRI COURSE

Friday 19th and Saturday 20th May 2023 & Friday 17th and Saturday 18th November 2023

Course to be held at the
National Centre for Sports and Exercise Medicine (NCSEM) at Loughborough University

Topics include:

Hands on scanning ◆ 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

Cost:
£135 BAMRR member, £165 course and BAMRR membership, £185 non member

BAMRR
Policy Board
Members,
Spring 2023

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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BAMRR 39th Annual Conference
Leicester, 1st October 2022

The BAMRR 39th Annual Conference in October 2022 was held at the Holiday Inn, Leicester, home to foxes and tigers, a national treasure[1], royalty[2] and Pork Pie by royal appointment, in the shire. After two years of a pandemic driven online virtual conference, we made a late decision in June to return to a face-to-face event in 2022. The virtual events were a great success and did allow delegates to attend in those uncertain times, and from further climes, but the BAMRR team agreed that there is so much to be gained from being able to meet people in person. And the decision was made.

We were greeted with a bright day and over 80 delegates attending, we enjoyed a full day of very diverse topics and outstanding speakers. We were able to provide this educational opportunity as always with thanks to the support from our sponsors.

Zoe Lingham (BAMRR President 2021/2022) welcomed the delegates, speakers and sponsors and introduced the morning's speakers. **Ilse Patterson** (Lead Research & Development Radiographer in MRI, Addenbrookes Hospital) gave a welcome update on current work being undertaken in MRI safety. The comprehensive topics touched on potential changes to the 5 gauss line (9G is NOT the new 5G!) and the complicated relationships with SAR, SED and B1+RMS.

"9G is NOT the new 5G"

◆ Martin Graves, Ilse Patterson and Gabriel Zapata

Professor James Stephenson (Consultant Radiologist, University Hospitals of Leicester) followed with a useful insight into MRI in colon cancer and how MRI positioning and angulation is vital, and the impact on pathway and outcome The presentation was sprinkled with some amusing anecdotes that went down well, welcome during a serious subject.

Following a short coffee break, the day continued with more anatomy and clinical cases. **Dr Rebecca Gallagher** scrolled through several cases demonstrating Incidental findings during MRI neuro-imaging. The usage of PACS imaging to view all the images was particularly useful to refer to the different sequences, especially when questions were asked. Shout out to SWI/GRE sequences usefulness.

The morning then switched to the always contentious MRI in Cauda Equina Syndrome. **Helen Estall** (Consultant MRI Radiographer, University Hospitals of Leicester) updated the audience on the then upcoming new guidelines for a standardised national pathway for CES.

Collaboration between NHS England and GIRFT and what this means to the MRI service and 24/7 imaging.

More radiographer presentations followed, with **Erica Scurr** (Cross Site Lead Superintendent, Royal Marsden Hospital). She shared her experiences with Whole Body DWI and technical protocols. The practice of patient centred care was at the heart and was clear from the passionate speaker the importance of this.

Sophie Gallagher (Senior Lecturer, University of Derby) gave the morning's final presentation with her proffered paper 'Graduate Radiographers'

Experience of Learning MRI Practice'. She discussed the results of her research into MRI training for students and graduates and further MRI education available post graduation. There was a strong student delegate attendance this year and raised a lot of interest and discussion.

The morning session concluded with the BAMRR AGM, before taking time for lunch and allow delegates to mingle with the conference sponsors from a wide range of companies.

◆ Rebecca and Sophie Gallagher, definitely imaging in the genes!

The afternoon session was introduced by the new BAMRR President (2022/2023) Trudi Whitehead and began with an entertaining talk from Matthew Benbow (CT/MRI Superintendent Radiographer, Royal Bournemouth Hospital) on 'The Magic Angle'. Described as 'a bit weird,' the angle of 54.7° is an incredibly specific angle and plays an important awareness in reporting and therefore imaging of tendons in knee and shoulders. He showed examples and how adapt to differentiate between pathology or artefact. Introducing some unexpected culture to his talk, he demonstrated how just by changing an angle can reveal completely different images, as seen by John V. Muntean Magic Angle sculptures.

https://blogs.20minutos.es/trasdos/tag/john-v-muntean/

Sarah Prescott (Lead MRI Clinical Scientist, University Hospital North Midlands) continued the varied presenter theme with insight into the current project being undertaken by IPEM. A multi-disciplinary group are working on Generic Implant Safety Procedures for England. She explained how roughly 25% of MRI patients have an implant of some type and the pressure and resources required to check many may be reduced by GISPs. Interest was raised for centralising information on a broader scale.

'Can I have a portable MRI?' Who would have thought it? **Pip Torelli** (Customer Success Specialist, Hyperfine) brought us a presentation on a new portable Hyperfine Swoop MRI scanner and its applications and benefits to paediatric or intensive care patients.

After a quick afternoon tea break, the last session resumed with an engaging talk from **Louise Jordan** (Senior Research Radiographer, Newcastle Upon Tyne Hospitals). Louise discussed MRI Radiotherapy planning scans and immobilisation masks and claustrophobia This proved to be an incredibly heart reaching talk, with powerful comments included from patients involved.

To bring the presentations to a close, Professor Martin Graves provided us with a challenging and interactive quiz to get the brains engaged before the journey home. An entertaining delivery, well received as a delegate commented 'informative as well as fun'. And to give a final quote from Martin to end 'Physicists are not just here to look good!'

All in all a great day back in person. BAMRR is hard at work bring 2023's educational program including:

MRI Introductory Course, Loughborough: 19/20 May and 17/18 November,

BAMRR session at UKIO, Liverpool.

And of course, this year's Annual Conference in the beautiful South West in Chepstow.

Details of BAMRR membership and all events can be found at www.bamrr.org or email courses@bamrr.org

We hope to see you there!

Trudi Whitehead
BAMRR President

1. *Sir David Attenborough grew up in Leicester, as his father was Principal of University College of Leicester.*

2. *Resting place of King Richard III*

Permissions asked of all attendees on the day to use photographs in media..

Advanced and Consultant Radiographer Practice

Helen Estall Consultant Radiographer, University Hospitals Leicester

What is Advanced and Consultant Radiographer Practice?

Both advanced and consultant practice are well defined by the College of Radiographers (CoR) and Health Education England (HEE) and it is a level of practice that covers four main pillars:

1. Expert Clinical Practice
2. Leadership and Management
3. Education, training and development
4. Research and Evaluation

The above are not only valid for advanced and consultant practice but can also be demonstrated in all levels of radiographer practice.

Why do we need it?

The main driver for the implementation of advanced practice in radiography was to enable radiographers to practice to their full potential and optimise their contribution to patient care through different models of service delivery and multidisciplinary working. New solutions were required to deliver healthcare that met the changing needs of the population which needed new ways of working, new roles and new behaviours. Radiographers should have career pathways open to them that enable them to expand their contribution to patient care and increase their personal job satisfaction in the management, research/academic, teaching and clinical arenas. Evidence demonstrates that multi-professional team working delivers better outcomes for patients and more effective and satisfying job satisfaction for the radiographer.

Skill levels

Currently within the UK there are five levels of practice:

Assistance Practitioner → Practitioner → Enhanced Practitioner → Advanced Practitioner → Consultant Practitioner

The assistant practitioner role was developed after a radiographer workforce study in 2002 to undertake specific tasks to improve patient flow and the delivery of effective and timely services. Assistant Practitioners are unregistered staff with a Foundation degree level of education that perform protocol-limited clinical tasks under the direct supervision of a radiographer. These include performing some MRI scans for example.

The practitioner is the post graduate radiographer working in MRI and an enhanced practitioner is usually a radiographer that has completed a post graduate qualification or training in a specific clinical area. Examples of this level of practice include those radiographers that provide a clinical report on a MRI scan or have other enhanced clinical practice such as administering adenosine for cardiac stress MRI.

Advanced Practice Radiographers

Advanced practice is a level of practice characterised by a high degree of autonomy and complex decision making, underpinned by a masters level award. Advanced practice is a level of practice rather than just a role and it is more than reporting images as it must encompass the four pillars of practice which will be discussed later. Advanced practitioner is not a protected title and there are concerns regarding its use within all healthcare disciplines including radiography. A survey by HEE last year showed that patients and the public welcomed advanced practice roles but that there was widespread and significant variation in the four pillar requirements. HEE have a dedicated website to oversee the workforce transformation, establish and monitor standards for education and training and to support and recognise practitioners including accreditation (https://advanced-practice.hee.nhs.uk/). There is evidence of advanced practice roles within all areas of diagnostic radiography, including MRI.

Consultant Practice Radiographers

Consultant radiographer practice was established in the UK over 20 years ago and was developed at a time of consultant radiologist shortages to enhance service delivery and provide better outcomes for patients. It was also designed as a new career opportunity to help retain experienced staff and recognise their clinical contribution and to strengthen professional leadership. Consultant radiographers should be working at a PhD level of education and will follow the four pillars of practice.

The Society of Radiographers defines a consultant radiographer as someone who has the ability to innovate, motivate and influence local, national and international agendas. A consultant radiographer is an individual who provides clinical leadership within a specialism, influencing strategic direction, innovation and influence through practice, research and education.

The Society of Radiographers have a Consultant Radiographer Advisory Group (CRAG) who provide advice and information, are a source of expertise and leadership, formulate the strategic direction for advanced practice in radiography and raise the profile of the profession.

As with advanced practice, consultant radiographer practice can be found in all modalities and specialities in imaging including MRI.

Advanced to Consultant Practice

Progression from advanced to consultant radiographer practice is about expansion of the four pillars of practice, with an increased level of responsibility and the highest level of autonomy in consultant practice. Consultant radiographers should be influencing both nationally and internationally, leadership should include consultancy with consultant practice more self-designed, self-managed and essentially without limitations or borders. Accreditation is the best 'proof' of level of practice for any radiographer.

4 Pillars of Advanced Practice

The above four pillars of practice should be encompassed at all levels of radiographer practice but for advanced and consultant radiographers, should be evidenced and be at the relevant level.

Expert clinical practice is about initiating, evaluating and/or modifying a range of interventions/imaging techniques and developing protocols of care and improving patient pathways. It is about working appropriately with a range of radiographic and inter-professional resources to manage risks across organisations and settings and providing expert clinical advice. It is about acting as a clinical role model, demonstrating receptiveness to challenge and preparedness to constructively challenge others and must demonstrate evidence based practice. It is about supporting and advising carers and families and enhancing the patient journey.

Leadership, management and consultancy is about initiating and developing relationships to encourage productive working, actively engaging in peer review to inform your own and other's practice, leading new practice and service redesign, demonstrating team leadership and continually developing your practice in response to patient and service requirements.

The research and evaluation/innovation pillar is about critically engaging in research and audit, evaluating and auditing one's own and others' clinical practice. It is about acting on and disseminating research and audit findings, developing and implementing robust governance systems and identifying and researching gaps in the evidence base.

The final pillar is education and training and this is about developing the current and future workforce, it includes sharing your own knowledge and skills both locally and with the wider healthcare community, it is about succession planning and educating the workforce so that new advanced practice roles become embedded. It is about creating, promoting and facilitating a learning environment to enable others to achieve their potential.

Principles and Governance

When developing advanced and consultant radiographer roles, consideration is required to determine where the roles are best placed to improve the service, the roles need a clear and defined purpose and objectives with well-defined evidence of the four pillars. An evaluation of the impact the role will have on service users' needs to be carried out ensuring there is clarity about the role and what the multi professional requirements are. There needs to be clear and unambiguous support of the roles from their initiation and throughout the process. The job description, job plan, succession planning, post qualification expectations and the governance processes for all of the above also need to be considered.

Some Tips from a Consultant Radiographer

Never say no to any opportunity that comes your way, you never know what or where it may lead. Do things that won't necessarily lead to a promotion, always ask questions and never stop learning. Put a poster abstract in, this is the easiest starting point to sharing your knowledge. If you want to do something, have a plan, get the supporting evidence and don't give up.

Conclusion

Advanced and consultant radiographer roles are well defined and encompass the four pillars of practice, they are not protected titles but there should be consistency in the job descriptions, job plans and pay scales. Accreditation ensures consistency and parity and it has been shown that these roles benefit the patient, the healthcare system and the individual.

MRI Reporting Radiographer Survey Preview

A few years ago a UK wide survey was carried out to determine the number and scope of practice of MRI reporting radiographers which was published in 2020 (MRI Reporting Radiographers – A survey assessment of number and areas of practice within the UK DOI: 10.1016/j.radi.2020.11.017). I am now resurveying to determine whether the number of reporters and their scope of practice has improved, remained the same or regressed. If you are a MRI reporting radiographer, started training or trained and no longer report or know of anyone else in these categories then please complete or forward the details of this short questionnaire (https://www.smartsurvey.co.uk/s/51OELD/) so that we can try and get a full picture of all practice within the UK, this will hopefully be published again.

If you have any questions then please feel free to contact me at helen.estall@uhl-tr.nhs.uk. Thank you in advance for your help.

ANNUAL BAMRR CONFERENCE 2023

Saturday 7th October 2023

St Pierre Marriott Hotel & Country Club Chepstow

Call for
Oral Proffered Papers

Proffered paper prize
£300

Abstracts to be received by:
1st Sept 2023

Send your proposals/abstracts for

MRI related Scientific oral papers to:

Rachel Watt
rachelwatt@nhs.net

# Artificial intelligence, Machine Learning Deep Learning and MRI

Robert Wilson *MRI Education Lead. Siemens Healthineers*

Artificial intelligence has the potential to completely transform MRI as we know it. This article will outline how this new disruptive technique works and some of the implications for the future.

One of the fundamental principles in MRI is that of inherent trade-offs. To increase SNR, reduce acquisition durations or improve resolution a compromise would be required from at least one of the other two. For example, increasing SNR could be achieved by adding an average or NEX thereby compromising on acquisition duration.

Artificial Intelligence (AI) is set to disrupt this principle allowing significant reductions in scan times whilst improving image quality and SNR. This article will discuss what AI is and the potential it has for transforming MRI as we know it.

Firstly lets start by defining artificial intelligence (AI). AI is a type of computer program which can perform tasks previously only possible with humans as the task required a degree of intelligent decision making. Machine learning is a sub-type of artificial intelligence and is a program which has been trained on known data sets to be able to perform a complex task without being explicitly programmed to do so. One example of machine learning is facial would be incredibly complex and prone to error to manually program a system to be able to recognise all facial types, orientations and coverings and then have these cross referenced against a data base of known faces. However, machine learning can be trained how to do this using large known data sets much more efficiently and accurately than explicit programming.
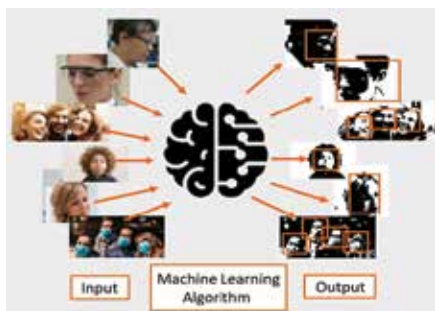
Googles AI 'FaceNet' program exceeded humans' ability to recognise faces with an accuracy rate over 99%[1]. Other examples of machine learning in everyday use include

- Voice assistants like Alexa who can recognise and interpret voice commands

- Suggested programs on streaming services such as Netflix

Now let's consider neural networks and Deep Learning. Neural networks are a subtype of machine learning in which the learning process mimics the learning process in the brain. A biological neuron is demonstrated in Fig2. The neuron receives signal through a dendritic network from other neurons and directs this signal to the nucleus. The signals received are aggregated in the nucleus and if the signal exceeds a threshold potential the axon passes a signal down to the other neurons. A biological neural system learns by reinforcing useful connections between neurons.
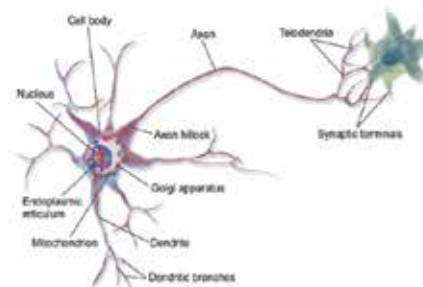
An artificial neural network works in a roughly similar fashion with groups of neurons receiving inputs, aggregating, and processing this input and producing output. These networks can consist of a single layer of neurons or multiple layers. Multi-layered neural networks are also called 'deep neural networks' (Fig3). Artificial neural networks are trained by feeding the network known data sets for a specific task and the system will modify the connections between its artificial neurons to

be able to achieve the task. Crucially once trained, the network can then perform the same task on unknown new data sets. Examples of deep learning networks include the in development self-driving cars which must be capable of recognising a huge range of objects and classify them very rapidly for potential risks.
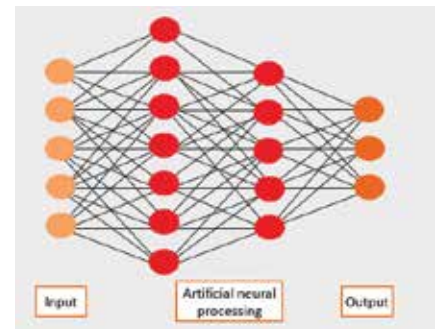
So, what are deep learning networks capable of in MRI? The first Deep Learning neural networks in MRI have been trained in how to increase SNR and improve resolution for turbo-spin echo sequences.

Initial studies2 into the potential of these networks have shown a reduction of sequence duration of around 40-70% coupled with an improvement in image quality.

Examples of the disruptive nature of these techniques are shown below. The first neural network (Deep Resolve Boost) increased SNR significantly allowing very high acceleration factors whilst the second neural network (Deep Resolve Sharp) improved the resolution and sharpness of the images resulting in a faster higher quality acquisition thereby breaking the fundamental trade off principle of MRI.

The AI revolution of MRI has only just begun and is already demonstrating that it has the potential to be as disruptive to MRI as previous advancements such as parallel imaging and the development of turbo spin echo acquisitions.

Routine sequence
Scan time 3.30

AI Deep Resolve Boost (+SNR)
AI Deep Resolve Sharp (+Resolution)
Scan time 1:10

Routine sequence
Scan time 4:29

AI Deep Resolve Boost (+SNR)
AI Deep Resolve Sharp (+Resolution
Scan time 1:32

References:

1. F. Schroff, D. Kalenichenko and J. Philbin,(2015) FaceNet: A unified embedding for face recognition and clustering. 2015 IEEE Conference on Computer Vision and Pattern Recognition (CVPR), pp. 815-823, doi: 10.1109/CVPR.2015.7298682.

2. Gassenmaier S., Afat S., Nickel D., Mostapha M., Herrmann J., Othman A.E. (2020). Deep learning-accelerated T2-weighted imaging of the prostate: Reduction of acquisition time and improvement of image quality. Eur. J. Radiol. ;137:109600.

3. Gassenmaier S, Küstner T, Nickel D, Herrmann J, Hoffmann R, Almansour H, Afat S, Nikolaou K, Othman AE. (2021) Deep Learning Applications in Magnetic Resonance Imaging: Has the Future Become Present? Diagnostics (Basel). 24;11(12):2181.

4. Nicolas Behl, Ph.D (2021). Mobilizing the Power of Networks. MAGNETOM Flash (78)1

BAMRR grant aids project

for investigating the use of 'fast' MRI head scan to improve patient experience and waiting time for investigation of headaches

Laura Walker *NHS Lothian Edinburgh*

I am currently undertaking a masters in MRI at QMU, Edinburgh in conjunction with working as a full time radiographer at the Royal Hospital for Children and Young People (RHCYP) in Edinburgh. At this time I am undertaking my dissertation entitled 'Using 'fast' MRI head scans to improve patient experience and waiting times for investigation of headaches: A radiology quality improvement project'. BAMRR have kindly funded a large portion of my university fees through their education grant which has helped to ensure I can complete my masters degree. As the cost of living has increase so dramatically recently I was unsure whether I was going to be able to afford pay for my dissertation, this grant played a major role in enabling me to finish my masters degree.

At RHCYP we get roughly 650 requests for paediatric head scans per year. Out of these around 50% are for investigation of headaches and around 95% of those have normal findings. Currently our standard head protocol, to investigate headaches, is 13 minutes long. We have developed a fast head imaging protocol which has similar images as in the standard head protocol but only takes 3 minutes 40 seconds and all images are motion corrected (single shot , Philips). Although the fast head images are of lesser quality compared to the standard head imaging I am hoping to prove that they offer sufficient diagnostic quality to enable us to move away from our standard head imaging and use the fast head protocol instead for headaches. By undertaking the QI project I hope with the help of the department to be able to:

- Reduce the time patients are on the MRI scanner which will help with compliance and patient experience.
- Reduce waiting times (waiting lists) for scans as more can be scanned quicker and more scan time slots may be generated.
- To reduce the number of patients needing GA for MRI scans because they are unable to lie still for the longer scans.
- To enhance the patient experience.

Presently, I have completed and submitted the literature review portion, collected all the data needed for the project and I am in the process of working with our PACS team to split the images into separate folders and anonymising in preparation for the radiologists to blindly report. My aim is to have the dissertation completed and submitted by summer 2023.

Breast implants with Radio Frequency ID tags

Cath Mills *BAMRR Safety Co-ordinator*

In the UK an estimated 25,000 women a year have saline or silicone filled breast implants fitted during cosmetic augmentation or reconstructive surgery [1]. The poly implant prosthesis (PIP); faulty and leaking implants scandal of 2010, is well documented and resulted in extensive work being carried out by government health departments and manufacturers to improve safety for patients and restore confidence [2,3]. Today the average lifespan of a breast prosthesis is 10-15 years [4] but within this time problems may manifest after implantation that require investigation, that may lead to a decision by surgical teams to remove and possibly replace an implant.

Implants with the RFID technology are now being used in the UK. They contain a micro transponder chip that contains metallic components. This allows doctors to use a hand held scanner to obtain instant information about the prosthesis; for example the date of implantation, manufacturer information and serial number, all of which will help in making clinical decisions for patient management. Future developments in this technology may allow status and integrity of the implant to be monitored also. For patients this offers reassurance to aid their wellbeing and reduce anxiety, and provides accurate implant information for surgical teams when they are investigating problems or planning replacement [5].
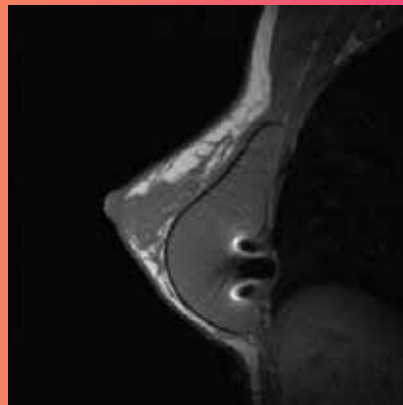

(6)

MR

This type of implant is MR Conditional and implant safety checks should be carried out as per local departmental safety policy.

(7)

For patients who have implants with RFID tags and are undergoing MRI Breast imaging there will be notable susceptibility artefact at the posterior margin of the implant on images.

References:

1. Have 100000 women poisoned breast implants worrying scandal new evidence emerging (Aug 2019) www.dailymail.co.uk/health article-7390437

2. The PIP scandal: an analysis of the process of quality control that failed to safeguard women from the health risks Martindale and Menache (2013)

3. Smarter breast implants microchip tracking www.droliviahutchinson.com

4. RFID technology to be used in next generation breast implant for better health and safety www.rfidworld.ca

5. Keeping A Breast of Safety www.aestheticbeautycentre.co.uk

6. Image courtesy of Dr J.Murphy, Consultant Breast Surgeon, University Hospital of South Manchester

7. Motiva website https://www.motivaimplantaty.cz

8. Artifacts on Magnetic Resonance Imaging from Electronic Identification Enablement in Silicone Gel Implants Are Not Negligible Kurz et al (2021) https://www.ncbi.nlm.nih.gov/pmc articles/PMC8604027/

9. Usefulness of Radio Frequency Identification Device in Diagnosing Rotation of Motiva SmoothSilk Implants after Augmentation Mammoplasty Munhoz et al (2019) https://www.ncbi.nlm.nih.gov/pmc/articles PMC6908342/

Further reading

- Artefacts on Magnetic Resonance Imaging from Electronic Identification Enablement in Silicone Gel Implants Are Not Negligible Kurz et al (2021) [8]

- Usefulness of Radio Frequency Identification Device in Diagnosing Rotation of Motiva SmoothSilk Implants after Augmentation Mammoplasty Munhoz et al (2019) [9]

MRI Safety
Limb Lengthening Nails

Jessica Folley *Senior MRI RadiographerABMRS exam organiser*

Limb lengthening nails, such as Nuvasive PRECICE and Orthofix FITBONE, are intramedullary telescoping metal rods with a magnetic motor which allows for slow bone lengthening. The motor is controlled externally via a remote control containing a rotating magnet. When the remote control is applied to a marked area on the patient's skin, the telescopic metal rod will extend up to 1mm. This 1mm increase can be carried out daily for up to 80 days.

◆ Orthofix FITBONE

The primary use of limb lengthening nails is to treat anisomelia caused by congenital or acquired conditions. The cosmetic use of this procedure has been documented as far back as 2004 in the Independent. In 2020, BBC News found that the procedure was being carried out around 15 times per year, with most clinics reporting an increase year-on-year.

The Instructions For Use (IFU) booklet of three limb lengthening systems (see table) all state that they are MRI Unsafe. All IFU's reviewed also state that the nail should be removed approximately a year after implantation. If the nail and all of its components are removed, the patient would then be able to proceed with an MRI scan as long as no other contraindications were present. It would be best for patient operation notes to be reviewed prior to booking the patient for their MRI scan for confirmation that the device had been removed in its entirety.

◆ PRECICE STRYDE limb lengthening nail at full extension

Brand	Name	MRI Safety Status	Is nail removed?e
NuVasive	PRECICE STRYDE Intramedullary Limb Lengthening System	Unsafe	IFU states device should be removed
NuVasive	PRECICE UNYTE Intramedullary Limb Lengthening System	Unsafe	IFU states device should be removed
Orthofix	FITBONE	Unsafe	IFU states the FITBONE is not a permanent implant and must be removed,

References (if you want/need them): IFU's

- Artefacts on Magnetic Resonance Imaging from Electronic Identification Enablement in Silicone Gel Implants Are Not Negligible Kurz et al (2021) [8]

- Usefulness of Radio Frequency Identification Device in Diagnosing Rotation of Motiva SmoothSilk Implants after Augmentation Mammoplasty Munhoz et al (2019) [9]

60 Not Out

This is the 60th edition of BAMRR News and the number sixty is also of significance to me this May - for unspeakable reasons of course! Since 1991 and for over three quarters of my career I have been involved in MRI and it would be good to hear from fellow "mature" MRI radiographers of those early years of the modality who may be wishing to share their experiences. Most people wish they had taken more photos in earlier years and I am no exception to that. There seems to be limited evidence online of early MRI equipment and images.

Some of you may remember wooden MRI tables, manual tuning of extremity coils and a double-echo brain sequence taking over 10 minutes! Three patients booked in a session also rings a bell, as well as a 300mm long spine coil in a bucky tray-like contraption.

If you have any memories, images or photos to share, please email the Newsletter Editor,

David Reed

BAMRR Treasurer
Senior MRI Radiographer, Cobalt Health

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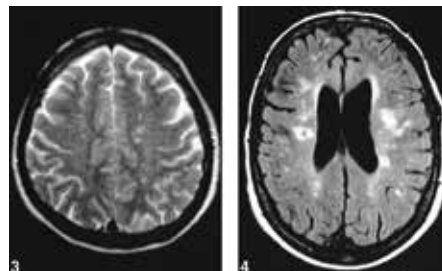
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from the British Association of MRI Radiographers

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All applicants should meet the following criteria:

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- Be enrolled on MSc course at present and currently progressing the research in the field of MRI.
- Outline use of the grant and provide an audit trail on completion
- Give a presentation at next BAMRR annual conference
- Provide an article for publication in the BAMRR Newsletter

How to apply:

- Go to the 'Resources' section of the BAMRR website and look for 'Education Grant'
- Applications must submit a brief outline of the intended project (maximum 750 words)

"The BAMRR Education Grant supports the education and professional development of MR Radiographers in the UK. It was an essential resource on pursuing the MSc Dissertation module, while providing financial support towards tuition fees, which enabled me to conduct high-quality research and achieve my academic goals.

I am researching the use of gadolinium-based contrast agents in MR imaging of soft-tissue sarcomas. I hope to share my project with you soon!"

Mafalda Sousa
University Hospitals Leicester

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