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AUTUMN 2018

BAMRR news

THE NEWSLETTER OF
THE BRITISH ASSOCIATION OF MR RADIOGRAPHERS

IN THIS ISSUE:

BRITISH INSTITUTE OF RADIOGRAPHERS

BIR The British Institute of Radiology

welcome

from your BAMRR PRESIDENT

Welcome to the autumn edition, this will be the last printed version of the BAMRR Newsletter as from next year, we will be sending your newsletter to you via email for you to enjoy at your leisure.

As always the policy board have had a busy year with the re-launch of the BAMRR Further course which was held in London in March. A full and interesting UKRC session in Liverpool in July, and our upcoming annual conference, which is in Nottingham this year on Saturday 6th October. We also have the next Intro course already fully booked in November.

I would like to thank the members of the policy board for all their continuing hard work which is all done on a voluntary basis, to ensure that BAMRR goes from strength to strength each year. We now have more members than ever before. I would also like to thank our sponsors and in particular Guerbet, whose support ensures that this Newsletter is possible. And most importantly I would like to thank, you, our members for without you, BAMRR would not exist.

Helen Estall
BAMRR President

from your EDITOR

Welcome to the autumn 2018 edition of BAMRR News. Thank you again to all those who have submitted content – I can't do it without you! My aim was to get this edition off to print in time for the October conference in Leicester. Fingers crossed that we made it.

There has been a recent email conversation within the policy board members regarding whether we should move away from BAMRR News being a printed journal, to become an electronic publication instead. Whilst this is not definite yet, the general feeling was that it was the right thing to do. We plan to discuss it at the next Policy Board meeting in October and if agreed, this is how you would expect the next edition. It would therefore be important to ensure that BAMRR has your current, correct email address, as this is how the eMagazine would be distributed.

Other than that, please remember that if you have any content you would like to be considered for publishing, please just drop me a line, I would be very glad to hear from you and to chat through your idea.

See you in Leicester,

Matthew Benbow
BAMRR Editor

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WELCOME from our sponsor GUERBET

Guerbet wishes you a warm welcome to the Spring edition of BAMRR News.

Guerbet wishes you a warm welcome to the Autumn edition of BAMRR News.

Guerbet is a pioneer in the contrast-agent field, with more than 90 years' experience, and is a leader in medical imaging worldwide. It offers a comprehensive range of pharmaceutical products, medical devices and services for diagnostic and interventional imaging, to improve the diagnosis and treatment of patients. With 7% of revenue dedicated to R&D and more than 200 employees distributed amongst its three centers in France and the United States, Guerbet is a substantial investor in research and innovation.

We continue our committment to supporting continuous professional development for MR Radiographers. Throughout the year, in partnership with Radiologists/Radiographers who are passionate about sharing their knowledge, we organise and support teaching courses which are informative and relevant.

Please visit our website www.guerbet.co.uk to find out more about the events we hold or sponsor.

Do not hesitate to get in touch on 0121 733 8542 or uk.info@guerbet-group.com if there is something you would like to tell us. As always, we welcome your comments and suggestions as we are here because of you.

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Best Scientific Poster XVIII International Meeting of Interventional Radiography

Last May, in Palermo, the Italian Capital of Culture for 2018, held the XVIII International Meeting of Interventional Radiography, organized by the Italian Association of Interventional Radiographers (AITRI).

The congress involved different health professional from all across Europe working within the radiology environment using the most innovative interventional and angiography techniques.

During the meeting the best scientific poster was awarded and a special price assigned. The first place was given to an Italian Radiographer, Carlo Vitale, working at The Royal Bournemouth Hospital CT and MRI department. The poster discussed about the first experiences of using the new QISS Angio MRI sequence developed by Siemens, applied to the lower limbs

In addition to winning a typical Sicilian amphora, Carlo won free accommodation and registration for the European Congress of Radiology (ECR) 2019 in Vienna, where the poster will again be presented.

You can see the poster on pages (see pages 12 &13).

BAMRR Policy Board Members, Autumn 2018

The co-ordination of the Associations activities is overseen and undertaken by an elected Policy Board. BAMRR consists of up to 15 individuals who are full members of BAMRR and are working in different regions of the UK.

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FURTHER COURSE SATURDAY 10TH MARCH 2018

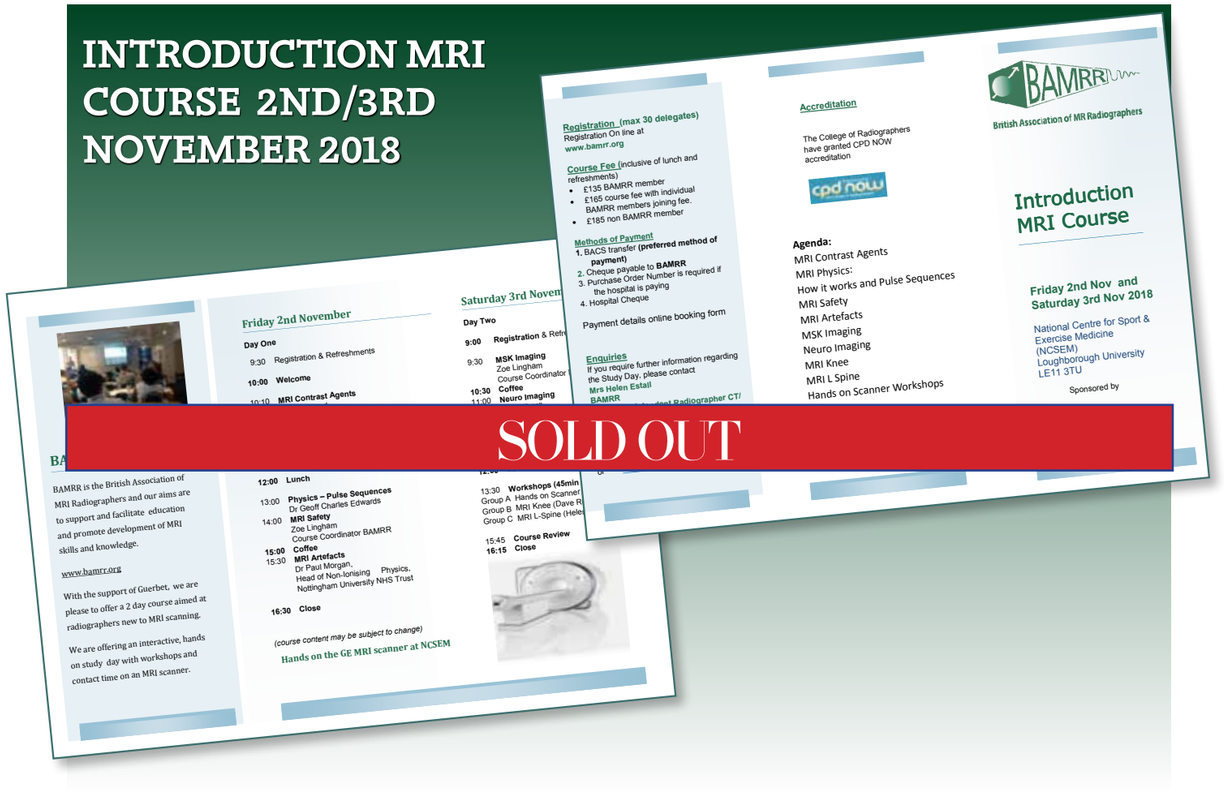
The BAMRR Further course which was kindly sponsored by Guerbet was held in London on Saturday 10th March this year with over 40 MRI radiographers attending from all over the country. It was a full day with Dr Geoff Charles-Edwards speaking on scanning implants without the manufacturer's approval, diffusion MRI and radial sequences. We then had an interesting talk on clinical cardiac application by our very own Matthew Benbow which included the use of a pink fluffy cushion! Dr Kevin Mulcahy talked on mp-MRI of the prostate and Dr Andrew Scott on the physics of cardiac MRI before a well-earned lunch break.

After lunch Dr Martin Graves spoke on parallel imaging and compressed sensing and the good, the bad and the ugly of 3T imaging. Dr Will McGuire spoke on whole body DWI and we then had a talk by Dr Shahid from Guerbet on gadolinium retention in the brain which provoked some lively discussion.

Feedback from the course was excellent and we are hoping to provide another course in either late 2019 or early 2020.

sponsored by Guerbet Contrast for Life

INTRODUCTION MRI COURSE 2ND/3RD NOVEMBER 2018



SOLD OUT

BAMRR meeting at UKRC

The BAMRR board hosted a successful session at UKRC with some excellent and informative speakers.

First up was Carolyn Costigan who is a Research Radiographer at Nottingham University Hospital. Carolyn presented an interesting talk on her PHD topic of MRI of coeliac disease looking at transit times through the intestine using capsules containing Dotarem . They are trying to find a more pleasant alternative to intestinal biopsies for Coeliac patients.

Next up was Rachel Watt our President Elect and Lead Radiographer at NHS Grampian. Rachel did a presentation on post mortem foetal MRI and their experience in Aberdeen of scanning techniques. This is obviously a hugely sensitive topic and Rachel gave us some useful information on how to approach these scans, the challenges they have faced and some examples of protocols.

Finally Martin Graves, a Consultant Clinical Scientist, gave an entertaining presentation on MR artefacts incorporating the 'Catchphrase' TV show! Hugely entertaining an excellent and informative explanation of what causes artefacts and how to rectify and stop them.

A huge thank you to all speakers involved and to everyone who attended.

SMUG 2018 report

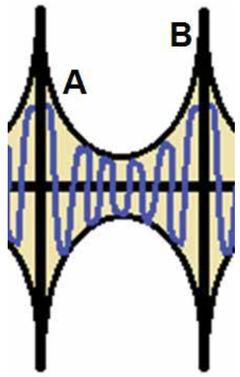
In June, The Royal Bournemouth Hospital held the 23rd meeting of the Southern Magnets User Group (SMUG). This was the 20th year of SMUG and was attended by over 80 delegates. Sponsorship was provided by Guerbet, Synapse Medical and Siemens Healthineers. Presentations included physics talks of Steady State and Echo Planar imaging, safety of metal impregnated sportswear and a series of presentations on liver pathologies and the options for getting liver contrast timings correct. Two local RDAs also presented, which was a first for SMUG. Finally, Rob Wilson from Siemens gave an insight into some exciting future developments. A lunchtime BBQ and evening out on the town made for a really social and lively day. Search for SMUG2018 on Facebook for more pictures from the day.

Next year watch this space, but possibly Plymouth may take up the baton…..

Steady State Sequences and Practical Applications

Matthew Benbow *Superintendent Radiographer, Royal Bournemouth Hospital*

Last month I wrote about Steady State Imaging and some basic physics about how the sequence functions. Now I would like to go in to more of the practical side of things and look at where it can be put in to practical use. The short TRs used mean that very short imaging times can be achieved with good signal, therefore many of these applications concern body areas where this is an advantage such as breath-hold imaging, cardiac imaging and contrast angiography.



◆ **Figure 2** - Section of the Steady State FID

With steady state imaging very short TR times are used, so short in fact that both longitudinal and transverse magnetisation coexist (have not had time to relax) before the next TR comes along. Gradient rephasing rather than spin echo is employed so as to not destroy the steady state. Flip angles are kept low to ensure signal is kept to a maximum (Ernst angle).

Signal from the FID can be sampled just after each excitation RF pulse (position A, commonly known as the FID signal) and / or before each excitation RF pulse (position B, commonly known as the Echo signal) to obtain some useful, and some not so useful image weightings.

The phase coherence of transverse magnetisation will persist between RF pulses and so naturally these sequence will offer some degree of T2(*) weighting. However, Steady State imaging can also be used to generate T1 only weighting by 'Spoiling' this transverse coherence. The first five sequences described below are all 'Coherent', the following two are 'Spoiled' or 'Incoherent'.

Option 1 – Sampling the FID signal only (position A)

Like in spin echo imaging, if the TE is kept short, spin differences can be minimised and so T2 contrast reduced. If this is combined with a small flip angle, then T1 recovery of all tissues will complete before each subsequent RF input, making images proton density weighted.

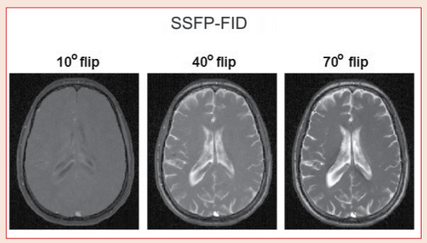
Increasing the flip angle however, both T2* and T1 effects come into play and both weightings can simultaneously exist making images somewhat unusual in appearance.

Uses:

T2* weighting demonstrates susceptibility effects makes this sequence possible for brain haemorrhage imaging.

Good contrast is also possible for meniscal imaging as bright signal from cartilage is seen well against low signal bone.

Example Images:



◆ **Figure 2** - Note how increasing the flip angle increases T2* weighting

Generic Name: *SSFP-FID*
Siemens: *FISP*
GE: *GRASS*
Phillips: *FFE*
Canon: *SSFP / Field Echo*

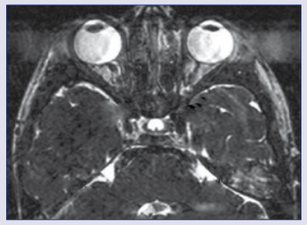
Option 2 – Sampling the Echo signal only (position B)

This time the FID signal is not required and so spoiled (or crushed) ensuring the gradient moments are dephased. This allows the echo signal alone to be sampled. As a result it is heavily T2 weighted, with negligible T2*. Fluid is bright, but soft tissue contrast is poor. The TE time is relatively long and so it can be liable to suffer from flow artifacts (Fig 3). In the early years of MRI it had a use in myelography but these days is not a commonly used sequence as a similar image weighting with more SNR and less artifacts can be achieved with the balanced FFE sequence.

Uses:

Not a lot!

Example Images:

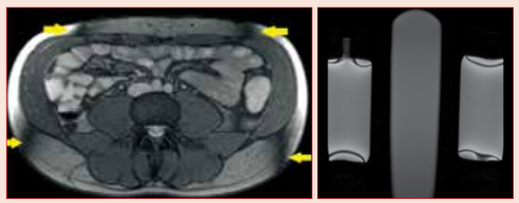


◆ **Figure 3**
Flow and motion artefacts

Generic Name: *SSFP-echo*
Siemens: *PSIF*
GE: *SSFP*
Phillips: *T2-FFE*
Canon: *N/A*

Option 3 – Sample both the FID and Echo signals (positions A & B)

Unlike the sequence above, this time the FID is not crushed, but is in fact fully re-phased before the next excitation pulse. This is done in all three axes and as such is less prone to motion artifacts. The net of these gradients is therefore zero (or balanced) but to achieve this high magnet homogeneity and good shimming is necessary. Where this is poorly achieved, e.g. near the edge of the field or areas of strong susceptibility, off resonances can cause signal voids or banding artifacts (Fig 4)



◆ **Figure 4** - Balanced FFE with banding artifacts - patient and phantom

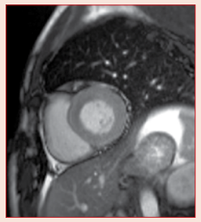
Uses:

The contrast weighting achieved is a ratio of the T1 and T2 times of the tissue. This makes is a very versatile sequence that can be used for breath-hold body imaging, dynamic studies and for post contrast imaging. Due to the high signal to noise available during a single breath-hold, this sequence is also very useful for localising scans during body MRI.

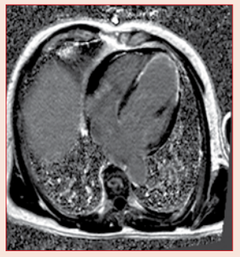
Cardiac MRI – both for dynamic cine imaging (Fig 5) and delayed contrast enhancement (Fig 6).

Small bowel breath-hold imaging – good contrast

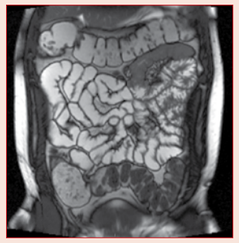
◆ **Figure 5**
Frame of a short axis BSSFP cine



◆ **Figure 6**
Cardiac gated delayed contrast enhancement BSSFP four chamber showing apical non-viable myocardium



◆ **Figure 7**
Breath-hold BSSFP of a fluid-prepared small bowel



Generic Name: *BSSFP*
Siemens: *TruFISP*
GE: *FIESTA / COSMIC*
Phillips: *Balanced FFE (BFFE)*
Canon: *True SSFP*

Option 4 - Sample both the FID and Echo signal separately, then combine them

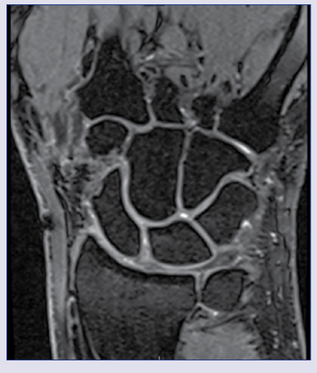
This option is similar to the BSSFP sequence, but employs a very long readout gradient to separate the FID and echo signal described above. The two individual echos are then combined to produce a single image, giving is very good signal to noise ratio. It is of course crucial that no patient movement occurs between the two data sets and as such the sequence is very sensitive to movement unsharpness. For this reason it is really only useful for imaging body parts that are easily immobilised, in particular orthopaedic applications.

Uses:

The image contrast benefits from both the FID signal which offers a very bright fluid signal, and also T2* from the echo component, resulting in dark bone. Adding water excitation to this sequence increases the contrast seen between articular fluid, cartilage and bone.

Orthopaedic MRI – particularly wrist (Fig 8), elbow, knee

Example Images:



◆ **Figure 5** - FADE wrist, in this case a water excitation DESS

Generic Name: *FADE (Fast Double Echo)*
Siemens: *DESS*
GE: *MENSA*
Phillips: *N/A*
Canon: *N/A*

Option 5 - Removing the banding artefact

Multi-acquisition SSFP is a trick that can be used to remove the banding artefact seen with BSSFP, however at the cost of doubling the scan time. Two sequential acquisitions are performed with differing RF pulses which shifts the location of any banding by a known amount. A maximum intensity projection (MIP) addition of the data sets is then automatically performed to remove the unwanted banding artefacts.

Uses:

Banding artefacts are particularly problematic in areas where susceptibility distortions are strong such as at the skull base. For this reason, this sequence is commonly used for imaging the internal auditory canal and other skull base cranial nerves (Fig 9).

Example Images:

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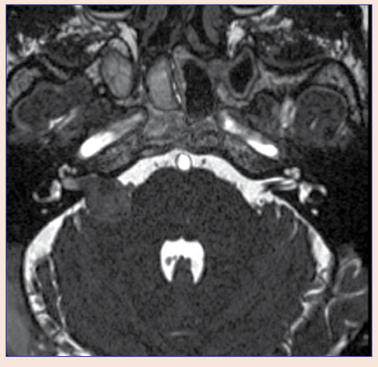


◆ **Figure 9** - IAMs image showing a large, right-sided acoustic neuroma

Generic Name: *Multi-Acquisition SSFP*
Siemens: *CISS*
GE: *FIESTA / COSMIC*
Phillips: *BTFFE*
Canon: *N/A*

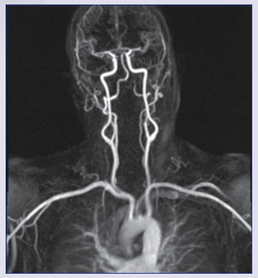
Option 6 - Spoiling the Transverse Coherence = T1 weighting only

Spoiling is a technique that is employed to remove T2 and T2* weighting and thereby allow steady state imaging to generate T1 only weighted images. Instead of waiting for transverse magnetisation of decay, RF and gradients are used to accelerate the dephasing and therefore destroy (or spoil) transverse magnetisation, leaving longitudinal magnetisation as the only imaging signal, and hence T1 produce weighting. These sequences are therefore described as being incoherent, spoiled or sometimes crushed.

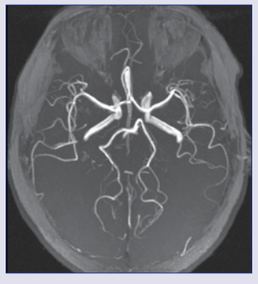
Uses:

Spoiling means we can still benefit from the rapid scan times offered by steady state imaging, but use it for applications where contrast enhancement is important. This includes dynamic contrast angiography (Fig 11), but also time of flight angiography (Fig 12)and in/out of phase body imaging (Fig 13).

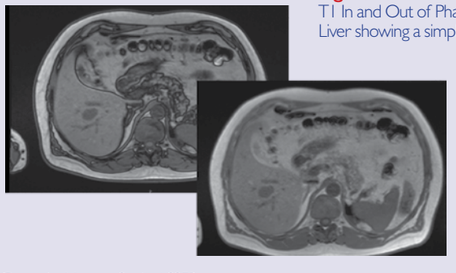
Example Images:



◆ **Figure 11**
Dynamic Contrast Enhanced Carotid Angiogram



◆ **Figure 12**
Time of Flight CoW



◆ **Figure 13**
T1 In and Out of Phase Liver showing a simple cyst

Generic Name: *Spoiled SSFP*
Siemens: *FLASH*
GE: *SPGR*
Phillips: *T1-FFE*
Toshiba (Canon): *T1-FFE*

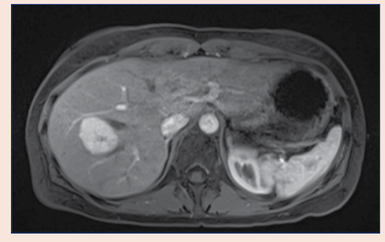
Option 7 – 3D Spoiled Steady State

3D versions are also available, but simply speaking these are simply three dimensional versions of the sequences described above that have for some reason developed their own acronyms. Usually undertaken with fat saturation, these are employed to acquire high resolution rapid series' through body areas where contrast media passes through quickly.

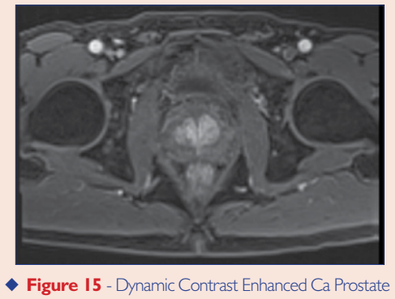
Uses:

Dynamic liver series (Fig 14), multiparametric dynamic contrast of the prostate (Fig 15).

Images:



◆ **Figure 14** - Liver with local Nodular Hyperplasia (FNH)



◆ **Figure 15** - Dynamic Contrast Enhanced Ca Prostate

Generic Name: *3D Spoiled SSFP*
Siemens: *VIBE*
GE: *LAVA / FAME*
Phillips: *THRIVE*
Toshiba (Canon): *3D Quick*

Quiescent-Interval Single Shot (QISS) MR Peripheral Angiography - Our first application

Vitale Carlo, Senior Radiographer - CT/MRI Department, The Royal Bournemouth and Christchurch Hospitals, Bournemouth, UK

The Royal Bournemouth and Christchurch Hospitals
NHS Foundation Trust

Introduction

Quiescent-Interval Single-Shot Magnetic Resonance Angiography (QISS-MRA) developed by SIEMENS, is a promising non-contrast-enhanced (NE) imaging technique for assessment of Peripheral Arterial Disease (PAD). PAD symptoms can often be improved by intervention therapy or surgery, but it is important that anatomic localization and stenosis degree assessment is performed before proceeding with a PAD management (Fig 1). Contrast-Enhanced MRI (CE-MRA) and Computed Tomography Angiography (CTA) offer a good accuracy for these pretreatment studies. However, many patients with PAD suffer from several comorbidities such as renal insufficiency and the administration of either iodinated or gadolinium media may be of concern given the increased risk of contrast-induced nephropathy or Nephrogenic Systemic Fibrosis (NSF). To avoid these risks, it is preferable that such patients instead, be examined with NE-MRA techniques. The additional benefit is potentially a shorter examination time and less consumable costs due to not needing to prepare the injector pump.

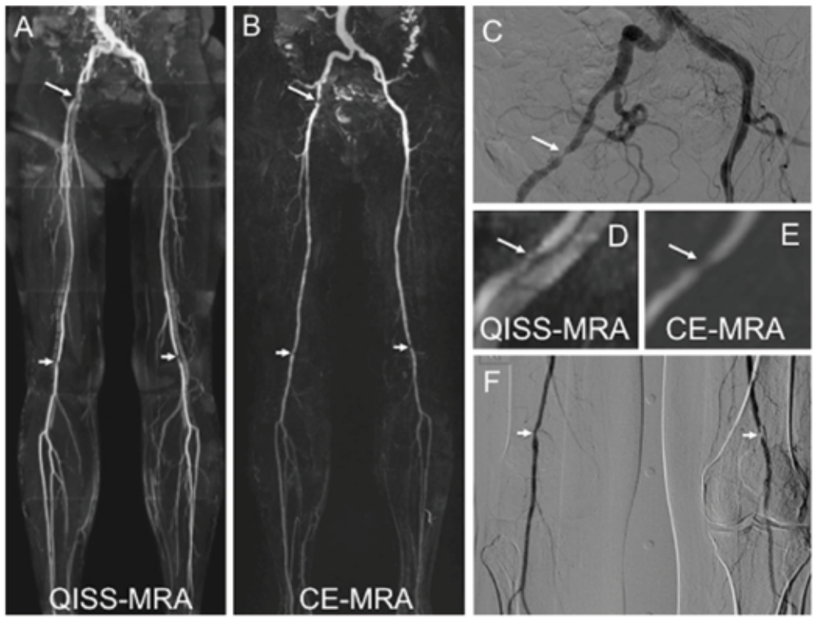


Fig. 1 Patient with significant stenosis of the right external iliac artery (long arrow) and of the right and left popliteal artery (short arrow). The stenosis were demonstrated on QISS-MRA (a, d), CE-MRA (b, e) and DSA (c, f). Note the venous overlay on QISS-MRA, which did not interfere with stenosis assessment on source images and MPRs.

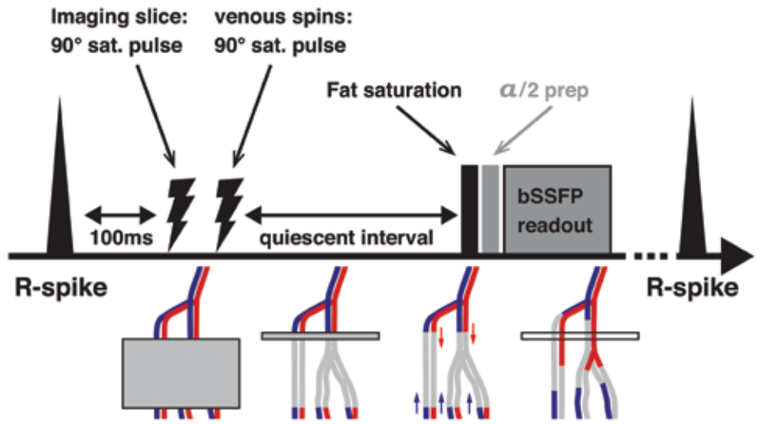


Fig. 2 Pulse sequence diagram of the QISS sequence. Saturation of imaging slice and tracking saturation of venous signal are applied 100 ms after the R-spike. The subsequent quiescent interval allows for inflow of non-saturated blood spins before a single-shot 2D image is acquired.

Methods

At the Royal Bournemouth Hospital we have recently introduced the QISS sequence into our practice. This poster discusses our early experience with reference to supporting literature.

Patients were scanned on MRI systems 1.5T Siemens Aera and Avantofit, using a Peripheral Angio 36 coil, spine array and 2 Body 18 coils for extended coverage, positioning feet-first. Breath holding was used to reduce respiratory artefact in the abdomen and pelvis areas and ECG gating employed to ensure optimum timing of the data acquisition (Fig.3). Radial k-space is also utilized to further reduce motion artefacts.

After each R wave, a 90° slice selective saturation pulse is used to suppress the background signal, then a subsequent 90° pulse is applied inferior to the tracking slice saturation pulse for venous suppression. Next a quiescent interval to allow inflow of non-saturated arterial blood is followed by a fat saturation module, an $\alpha/2$ pulse preparation pulse and finally a 2D single-shot balanced steady-state free precession readout (Fig 2).

Our experience has shown us that an understanding of the effect of artefacts that can be caused by irregular heart rates or poor triggering due to poor ECG box and lead position is crucial as appearances can mimic non-patent vessels (Fig. 4).

Fig. 3 Proper patient positioning, peripheral coil and ECG-stickers set for an optimization of the signal and the gated for QISS sequence.

Conclusion

QISS is a robust NE-MRA technique and is well tolerated. It seems to be a feasible alternative for patient with kidney dysfunction, as other studies have confirmed and compared with CT there is the advantage of no radiation dose. It may inform disease management and potentially obviate Digital Subtraction Angiography (DSA) where conservative management, or open surgery, are indicated.

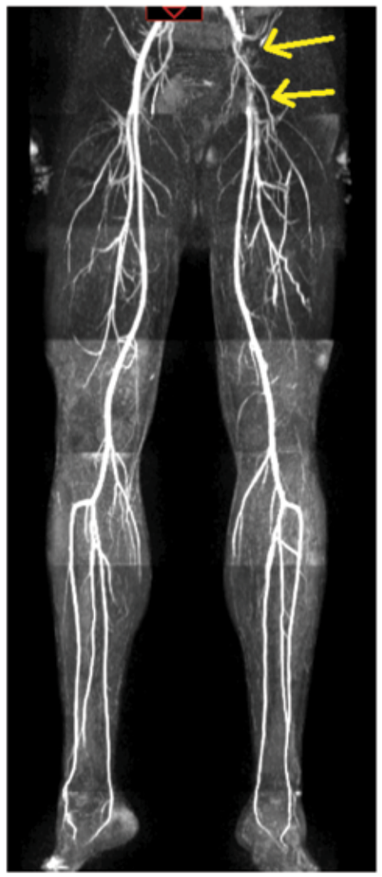


Fig. 4 The yellow arrows show a false stenosis of the left femoral artery. Artefact due to irregular/ ectopic heart rate. To fix it, can repeat one step over the desired area if needed.

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Welcoming radiographers at the British Institute of Radiology

If you attend a British Institute of Radiology (BIR) event, expect to sit alongside radiographers, radiologists, physicists and technicians because the one thing that sets the BIR aside from other societies is that it is for everyone working in radiology and radiation oncology. This multidisciplinary ethos reaches right back to our origins in 1897.

Nowadays there is a great deal for radiographers at the BIR. Not only do radiographers benefit from reduced rates to events, there are member-only videos on MR topics ranging from Small Bowel MRI to dementia imaging. There are useful recorded webinars on regulations and guidelines, for example Professor Stephen Keevil speaks on the impact on MR practice of the Electromagnetic Fields at Work (EFW) regulations. And a recent addition is a webinar on an issue which affects all radiographers, a valuable insight by Sue Johnson and Dianne Hogg on Medicines Management.

BIR events are a great way to meet others, network and share best practice. This November our Annual Congress offers an Advanced Clinical Practice and Leadership Management stream as well as useful MR sessions on GI, GU and trauma imaging. Coming up in January 2019, there is a fascinating event on Whole Body MRI in myeloma and bone disease.

Many radiographers get their first step on the research ladder and add to their CV by submitting to one of the BIR journals, BJR, BJR|Open or BJR|case reports.

Darren Hudson, MRI Clinical Lead at InHealth admits that before InHealth provided BIR membership for their staff as a company staff benefit, he hadn't really come across the BIR. "I thought it was more a radiologist organisation" he says, "but have since found many benefits to being a member as a radiographer and the resources it allows access to. The webinars I have watched have all been relevant and current to clinical practice, as well as being informative and engaging. We are starting to use our access to the various BJR journals more to support our internal training within MRI, as well as better utilising our access to Primal Pictures anatomy software in our teaching."

Darren is now a member of the MR Special Interest Group which is a multidisciplinary group that discusses current issues in MRI and works together to promote activities within the modality such as MR Safety Week guidelines included in this issue of BAMRR News.

Darren says "being a member has also increased my awareness of such journals as the BJR, and encouraged me to submit an article which I would have otherwise not considered. I'm really pleased that my first paper has now been accepted by BJR|case reports. At InHealth, we try to encourage active use of our membership to all staff as it is a useful resource to support continuing professional development."

BIR membership for radiographers starts at £70 per annum. To join visit **www.bir.org.uk/join**

BIR The British Institute of Radiology

◆ **Darren Hudson**

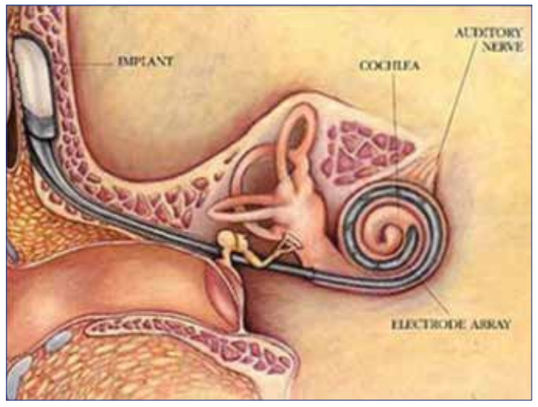
◆ **Students**

All BAMRR members are entitled to a **15% discount** on BIR membership. Simply enter the discount code BAMR18R at the checkout.

Scanning Cochlear Implants and Auditory Brainstem Implants in MRI

Author: Cath Mills

Traditionally cochlear implants (CI) and auditory brainstem implants (ABI) have been a contraindication to MRI because of the risk of injury to the patient or damage of the device due to the presence of an implanted magnet. However with advances in technology this is no longer the case. One of the safety updates given by Dr Frank Shellock at the Edinburgh MRI Safety conference in 2017 was about how most types of CI and ABI are now MR Conditional and can be scanned without the need to remove the magnet by following strict manufacturer guidelines.



◆ **Internal components**
Source: texasent.com

◆ **External components**
Source: hopkinsmedical.org

What is the difference between a cochlear implant, auditory brainstem implant and a bone anchored implant?

A bone anchored implant (often called a BAHA implant) is a middle ear implant used to treat mild to severe sensorineural hearing loss. It attaches externally onto the skull and there is no magnet.

A CI or ABI is a surgically implanted electronic device that provides a sense of sound to a person who has a severe or profound hearing loss. ABI is similar to a CI but the electrode terminates at the brainstem. They contain an implanted magnet which allows the external and internal devices to connect.

Nice guidelines recommend using MRI for audiology assessment. In the past if an MRI was deemed essential for diagnosis in a patient with a CI or ABI the only option was to remove the magnet in a surgical procedure, if this is possible, and replace it after the scan. It may not be desirable to remove the magnet, for example in Neurofibromatosis Type 2 patients who require regular MR scans, and so being able to safely scan patients with the magnet in-situ is important. The risks involved in removing the magnet must be weighed up against the risk of performing the MR with the magnet in situ. For patients who require magnet removal the Clinician should carefully consider factors such as build-up of surgical scar tissue over several operations to remove the magnet, and risk of damage to the implant each time the magnet is removed. For patients with devices where the magnet can be left in situ for MRI the Clinician should carefully consider factors such as patient discomfort due to the effects of torque, soft tissue damage, risk of magnet displacement and implant damage, and image artefact.

◆ **Risk: magnet dislocation during MRI**
(source: Brazilian Journal of Otorhinolaryngology)

If the decision is made to proceed with MRI in an MR Conditional system that allows the magnet to be removed, the external components such as the speech processor and other accessories are MR Unsafe and should be removed prior to scan. For the remaining device specific scanning conditions differ depending on the manufacturer make and model. These conditions relate to static magnetic field strength, spatial gradient field, recommended maximum slew rates and SAR, specific patient positioning where a tight bandage or 'headwrap' may need to be applied, and there may be specific requirements for how the patient's head is positioned in relation to the z axis. Some examples of these specific manufacturer conditions: CIs with removable magnets such as the Nucleus Freedom (made by Cochlear Ltd) and Clarion HiRes 90K (made by Advanced Bionics AG) were approved for use with MRI systems up to 1.5 T following removal of the internal magnet. CIs such as Sonata, Pulsar and Concerto (made by MED-EL) have approval for use with MRI systems with internal magnets in situ involving field strengths up to 1.5 T as long as head dressings are used. The Synchrony (made by MED-EL) has a self-aligning magnet which rotates freely inside the magnet housing, eliminating the need for the patient to wear a head wrap. Torque effect is therefore reduced, and patient comfort is considerably improved.

Manufacturers recommend counselling the patient prior to, during, and after the procedure. A full explanation of the procedure and the risks should be given prior to booking the scan appointment. Good communication should be maintained throughout the scan, with extra consideration given to the fact that the patient will no longer be able to hear once the external sound processor has been removed. Aftercare should include assessing that the magnet has not been displaced or dislocated during the scan, that the implant is working and sound perceived by the patient is normal.

MRI in patients with CIs and ABIs is achievable safely in controlled conditions where highly specific manufacturer guidelines are followed. Close patient monitoring and cooperation between the Radiology and Audiology teams and the Clinician is essential to achieving this. Detailed written procedures should be developed and implemented locally based on manufacturer guidelines..

'in general individuals with cochlear implants should be prevented from entering the MR environment unless specific guidelines exist to ensure safety' (mrisafety.com).

Information on cochlear implants can be found in section 4.11 'Implanted medical devices and other contraindications to scanning'.
MHRA Safety Guidelines for Magnetic Resonance Imaging Equipment in Clinical Use.

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MED_EL website
Link-https://www.medel.com/uk/cochlear-implants/

Cochlear Ltd
Link: https://www.cochlear.com/intl/home

Advanced Bionics Ltd
Link- https://advancedbionics.com/content/advancedbionics/uk/en/home.html

Patient Burns

The Joint Commission report of 2008 acknowledged burns as one of the most common injuries in the MRI suite

There has been news of an MR safety incident in New Zealand where two patients experienced RF burns from permanent tattoos.

Tattoos can contain iron oxide or other ferrous material that are conductive. When scanning patients who have tattoos relevant safety information should be given to the patient before the scan starts, asking them to report any discomfort immediately.

The ACR recommends that cold compresses or ice packs be placed on the tattooed areas and kept in place throughout the MRI process if these tattoos are within the volume in which the body coil is being used for RF transmission.
(MHRA section 4.11.6)

Diabetic Patches

◆ source: FreeStyle Libre patch, Abbott Diabetes Care: MR

This type of patch is now available to patients in the UK and allows them to use a smartphone to measure glucose levels in the interstitial fluid between the cells under the skin.

Currently under research:
A patch the size of a penny that has hundreds of tiny needles the size of eyelashes that automatically releases insulin.

We at BAMRR have heard about a new type of piercing - EYEBALL!

The piercing is placed under the thin membrane covering the eye during a surgical procedure. This picture was taken from the world wide web, where there are references as far back as 2013. If anyone comes across one of these in the UK let us know at BAMRR…

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