ScanWise Implant

A users perspective

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Objectives

- Overview of ScanWise Implant
- Expert opinions
- Scanning conditional implants
- Why we wanted ScanWise Implant
- Step by step
- Our experience
- Summary
- Questions

Overview of ScanWise Implant

- A software option available on Philips scanners
- It was launched at RSNA in December 2015
- Allows the entry of the manufacturers acceptable scan parameters for MRI conditional metallic implants via a simple, step by step guided process that for staff is just as simple as entering the patient demographics.
- The software automatically restricts all scan sequences and pre-scans to the specified parameters
- It displays the restrictions in obvious yellow boxes and provides pictorial information about the areas within the scanner that the implant must avoid touching

Expert Opinions

Society & College of Radiographers

Safety in Magnetic Resonance Imaging (2016 & 2019)[4]

States within Section 10 - Implantable medical and non-medical objects that radiographers should be aware of manufacturers features that assist in meeting conditional specifications, such as Philips ScanWise Implant software [4].

Professor Emanuel Kanal

He spoke at ASNR in 2017 [5] about scanning conditional implants.

He reviewed the use of Philips ScanWise Implant software

At the time of the talk he was a non Philips user and gave an impartial opinion describing that ScanWise was a "No Brainer" solution that ensured that all scan restrictions were met accurately every time.

He described the benefits of this as:

Less patients being cancelled and shorter scan times

Less restrictions for radiologists on the scan sequences that can be acquired

Conditional Metallic Implants

- The numbers of patients with metallic implants is growing year on year and with this so does the challenge to the MRI team
- Studies have shown that the numbers of patients in Europe over 65 yrs with passive orthopaedic and spinal implants has risen in the last 10years from 13% to around 30% in.[1]
- Active implants such as pacemakers are also increasing in prevalence. 400,000 patients in the UK have a Pacemaker or Implantable Cardioverter Device (ICD) many of them frail with other comorbidities resulting in around 50,000 of this group having MRI scan requests/yr. [2]

Scanning patients with MRI conditional implants is a challenge

- The safety questionnaire is just the start…
- Identifying the specific implant
  - Patient records/enquiries to other hospitals
- Identify if the implant is compatible and if so under what specific scan conditions
  - Google, MRI safety 'The List', or direct enquiries on manufacturers websites or helplines
- All this takes time and often good old fashioned detective work

The implant restrictions

The manufacturer's scanning condition restrictions will identify:

- Scanner 1.5T or 3T
- Coils (Transmit/transmit-receive or receive only)
- Scan area restrictions
- SAR levels
- They can specify the need for pre-scan checks- reveal devices, pacemakers & ICDs

There may also be restrictions for:

- Maximum spatial gradient field value/static field gradient or a maximum gradient slew rate
- Ideally you need Physics support and a good knowledge of the field maps for the individual scanner, and knowledge of how to alter each sequence to keep within the set parameters

This can result in…

…For the MRI Team!!

Why we wanted ScanWise Implant

- No onsite physics support
- Large numbers of patients with conditional Metallic implants awaiting MRI scans
- Pressure to set up regular MRI sessions for patients with conditional active implants (pacemakers and ICDs)
- The need to provide a consistent robust system that assured compliance of the conditional implant restrictions.
- ScanWise Implant was recognised and recommended for MRI safety by the SCoR[4].
- MRI team had very mixed experience levels
- To reduce the stress and anxiety of the MRI team
- Finally we were having a second Philips scanner installed that gave us the option to have it!

How it works

- The operator inputs the usual patient demographics
- Implant YES option is selected
- Scanwise Implant software then prompts the user to enter the various implant restrictions:
- Field Strength (B_0), spatial Gradient (G/cm or T/m), SAR (W/kg) or B_{1+rms}, dB/dt or Gradient Slew rate T/m/s
- Once details are confirmed the scan can begin

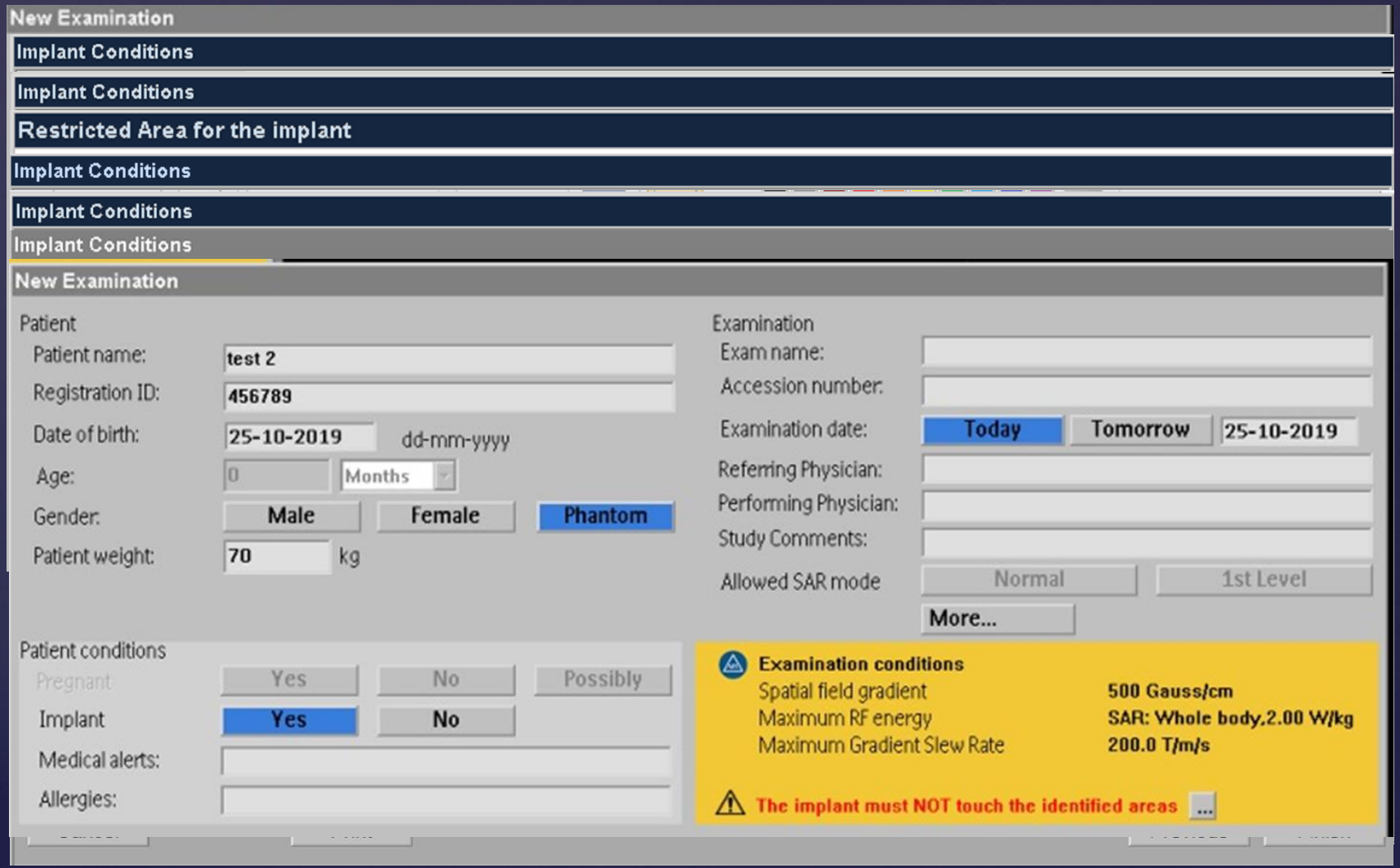
B1+rms

Is a measure of a time-weighted average RF magnetic field exposure, calculated over 10 second intervals, measured in micro-tesla (μT). It is independent of the patient characteristics, but depends upon flip angle, pulse type, number of echoes, slices, and TR.[3]

dB/dt

Is the rate of change of a magnetic field, which is defined by the ratio between the amount of change in the amplitude of a magnetic field (dB) and the time required to make that change (dt), and is measured in Tesla/second (T/s).

ScanWise Implant– Step by Step



A Learning Point

A Note of Caution:

- It is only as good as the values entered.
- Accuracy is the key to success

- A staff member entered the scan details onto the scanner prior to the patients final safety check
- This check uncovered the presence of a conditional implant
- The patient was re-entered onto the system with the restriction parameters but the operator noticed that the information didn't appear in the normal yellow warning box
- The scanner had defaulted to the first entry of the patient in the data base
- So we learned that if the details are entered incorrectly – delete the entire encounter from the database and start again to ensure that the restriction information is applied and appears in the usual yellow warning box indicating that the scan sequences will be restricted appropriately.

Our Experience

- ScanWise Implant user since 2016
- Increasing numbers of implants means we can no longer simply reject patient with complex conditional implants
- Identifying the make/model of implants is still challenging
- We now only reject active implants deemed to need specialist neuro support e.g. neuro-stimulators and the magnetic cochlear implants
- ScanWise + cardiology support + compatible monitoring has enabled us to set up monthly conditional pacemaker and ICD lists since 2016.
- It has provided additional assurances to all parties & a robust safety system that ensures compliance of all entered scan restrictions
- 3 of the 4 scanners within my department now have the ScanWise Implant
- Conditional pacemaker imaging now takes place across 3 sites of the Trust
- Staff have found it easy to use and are more confident when scanning conditional implant cases.

Summary

- ScanWise Implant has helped us to provide a robust but simple process for the MRI team no matter what their level of experience to follow when scanning conditional implants.
- In our case it forms part of the safety procedure and has added assurance to the Radiologists, Radiographers, Cardiology & Referrers that patients with passive or complex active implants can be safely scanned providing that the relevant scanning factors are entered correctly.
- This has created a more streamlined scanning experience which benefits both the patient and the service.

References

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2. " Should we be scanning pacemakers in MRI?;Getting to the heart of the issue" August 2019, **Synergy News** p.24-26
3. "SAR and B1+rms: what are they?" MRI safety Standards and Guidance, Dr Donald W McRobbie Posted on March 20, 2018April 16, 2018 by drdblogs Available at https://drdonaldmcrobbie.com/2018/03/20/sar-and-b1rms-what-are-they/
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5. "How-to Session: Philips MRI Neuro Imaging & ScanWise Updates - Part II on Vimeo" (2017) Emanual Kanal, **American Society of Neuroradiology (ASNR).** Available at: https://vimeo.com/218967620

Other Useful Information

1. "Simplify scanning of patients with MR Conditional implants" Johan van den Brink et al. Available at: https://www.philips.co.uk/c-dam/b2bhc/master/events/ISMRM2016/philips-scanwise-implant-whitepaper.pdf

1. "How to perform MRI of patients with MR conditional cardiac devices" **Field Strength MRI Magazine** August 2017. Available at : https://www.philips.co.uk/c-dam/b2bhc/master/education/publications/fieldstrength/mri-cardiac-devices/mri-of-patients-with-mr-conditional-cardiac-devices-global-2017-Jul.pdf

Questions?