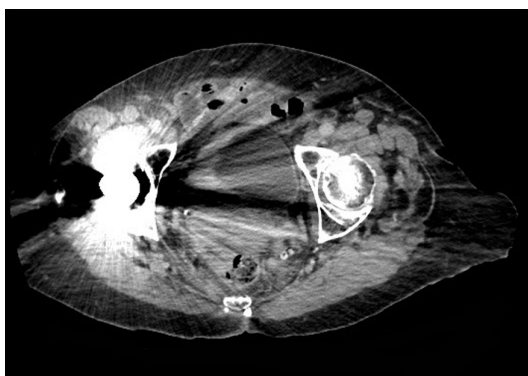


Clinical case

Smart MAR

Innovative projection based method
of reducing metal artifact in CT images



“ Smart MAR works wonders!! In a patient who presented with bladder malignancy and hip replacement it is clearly possible to assess the bladder tumour even with the metal. ”

Dr. Ajay Varghese, Consultant Radiologist
Dorset County Hospital



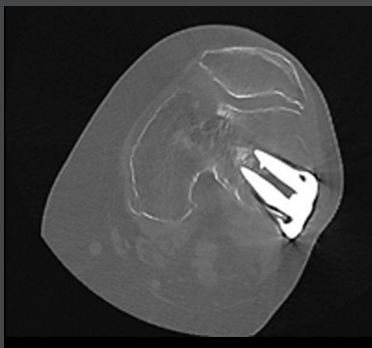
“Reducing metal artifact in CT imaging is a challenge. Metal artifact can impact the diagnostic accuracy and clinical confidence in the CT image. Artifact can manifest as dark shading or streaking which can obscure clinical detail within the image. GE Healthcare has developed Smart MAR to assist in overcoming the challenges presented by metal artifact, allowing for improved visualisation of areas of anatomy that in the past would have been obscured by the artifact. The benefit for the patient is a greater confidence by the clinician at diagnosis and an improvement in Radiotherapy Planning and the contouring of structures.”

Jackie Bye, GE Healthcare
Zone Clinical Leader UK & I



“Smart MAR was installed on the Revolution™ Evo CT at Dorset County Hospital in November 2015. It is easy to set up and use in protocols as part of routine scanning of patients with metal implants, clips and coils etc. without impacting workflow.”

Joyce Perry, CT Clinical Lead
Dorset County Hospital
Dorchester, United Kingdom



Smart MAR

MAR addresses the challenges posed by metal artifacts, helping clinicians utilise CT scans, diagnose disease and contour targets and critical organs with greater confidence.

- **Exceptional image quality.** MAR uses a three-stage, projection-based process to help deliver consistent, enhanced image quality.

- **Streamlined workflow.** Unlike some other approaches, the MAR solution requires only one scan, making the process of obtaining a corrected image fast and efficient.

- **Dose conscious.** MAR requires just a single scan to create an exceptionally clear image, helping you to deliver dose conscious care.

- **Increased patient comfort.** The efficient, single-scan process helps to reduce patient time inside the scanner.

- **Versatility.** MAR is designed to enhance clarity across a range of cases with metal including scans with hip implants, dental fillings, screws or other metal in the body.

- **Compatibility.** MAR is compatible with a wide range of GE CT scanners.

Innovative projection based method delivers exceptional CT image quality.

Stage One:
Corrupted samples in the projection that correspond to metallic objects are identified.

Stage Two:
Inpainted data is generated by replacing the metal corrupted projections with the corrected data. The corrected data is generated using the forward projection of the classified image.

Stage Three:
The final corrected projection is generated using a combination of the original projection data and the inpainted projection, revealing anatomic details hidden beneath the artifacts.¹

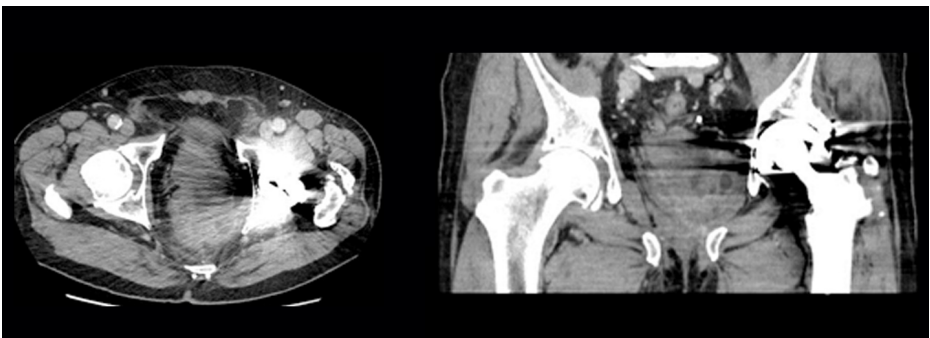


Figure. 1 Large Rectal Tumour. The complexity of the rectal tumour and the number of abscesses are much better appreciated on the MAR reconstruction in the axial and coronal views.

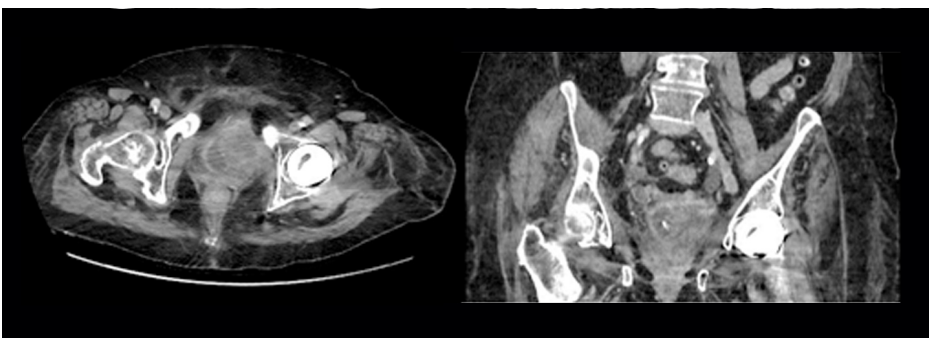
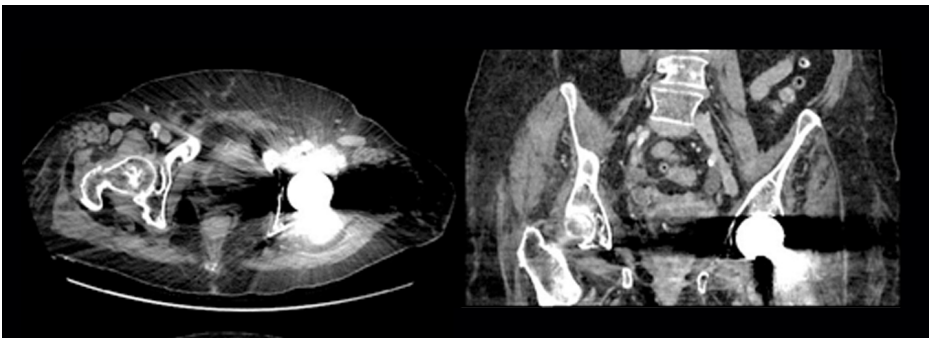


Figure. 2 Bladder Tumour. The extent and size of the large bladder tumour causing upper tract obstruction is much better demonstrated on the Smart MAR images. Without MAR there is a large black hole.



“Doing a lot of Cancer follow-up work I have found MAR very useful in the pelvis. The accompanying images are good examples.”

Figure 1 is a large rectal tumour complicated by multiple small pelvic abscesses adjacent to the pelvic sidewall. Their complexity and number are much better appreciated on the MAR reconstruction.

Figure 2 is similar, the extent and size of the large bladder tumour causing upper tract obstruction is much better demonstrated. The lateral pelvic side wall extension is much better appreciated; I suspect this must help in radiotherapy planning. Without MAR there is a large black hole.

Artifact from dental work on cervical spine and paranasal sinus imaging is much improved by MAR, as well as assessing arthrodeses, joint replacements and spinal surgery.”

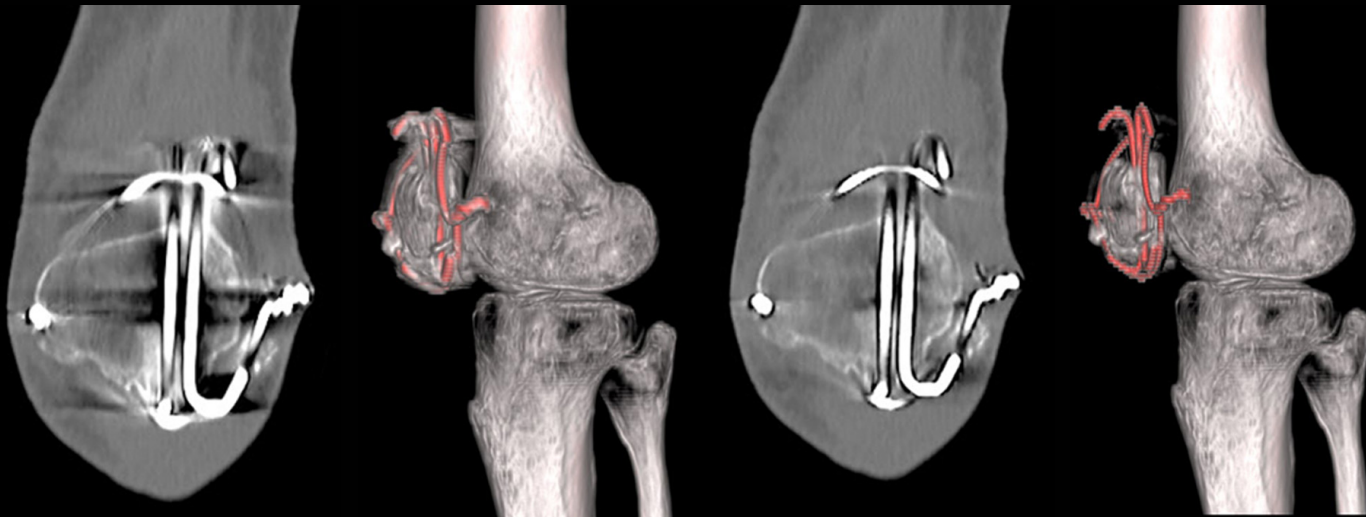
Dr Nicolas Smith
Consultant Radiologist
Dorset County Hospital
Dorchester, United Kingdom

”

Image Gallery

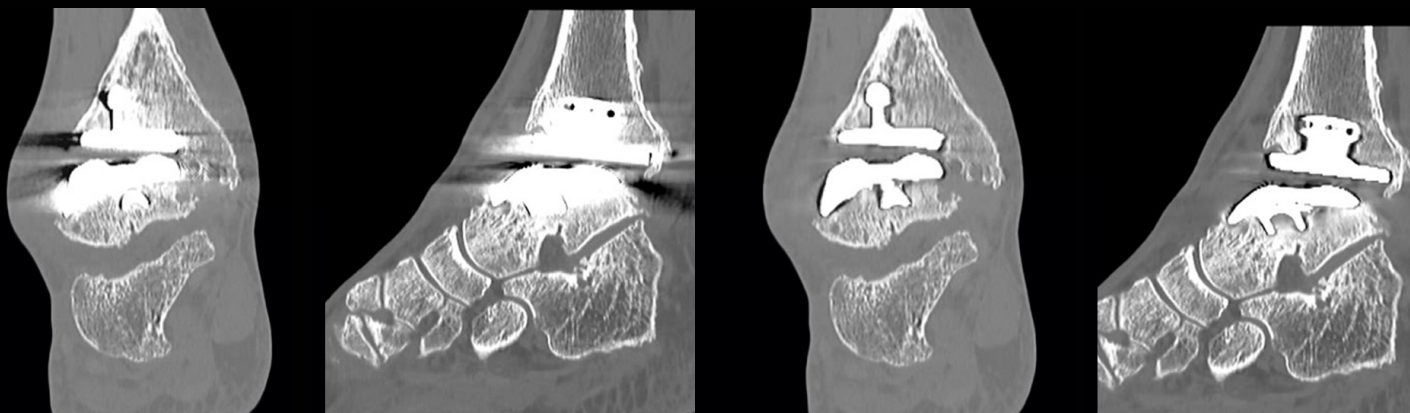
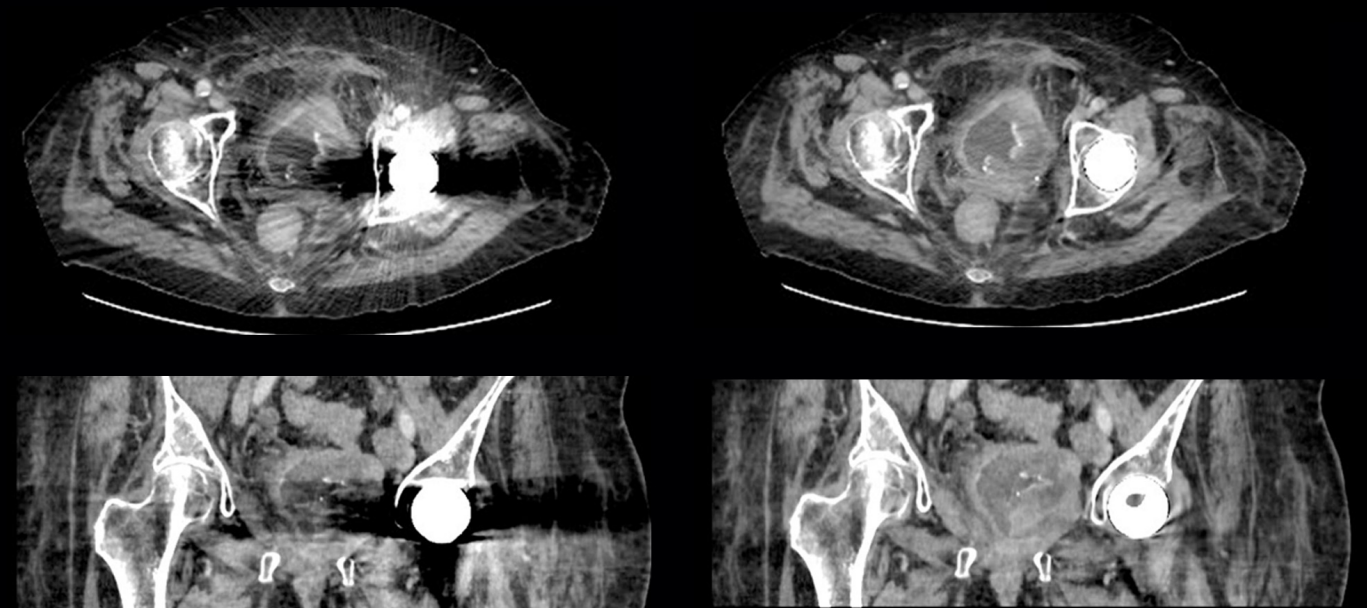
Without Smart MAR

With Smart MAR



Without Smart MAR

With Smart MAR





About GE Healthcare

GE Healthcare provides transformational medical technologies and services to meet the demand for increased access, enhanced quality and more affordable healthcare around the world.

GE (NYSE: GE) works on things that matter - great people and technologies taking on tough challenges. From medical imaging, software & IT, patient monitoring and diagnostics to drug discovery, biopharmaceutical manufacturing technologies and performance improvement solutions, GE Healthcare helps medical professionals deliver great healthcare to their patients.

GE Healthcare
3000 N. Grandview Blvd.
Waukesha, WI 53188
U.S.A
gehealthcare.com

GE imagination at work

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¹ DOC 1381483.

Further Reading
Smart Metal Artifact Reduction (MAR),

JB40354GB