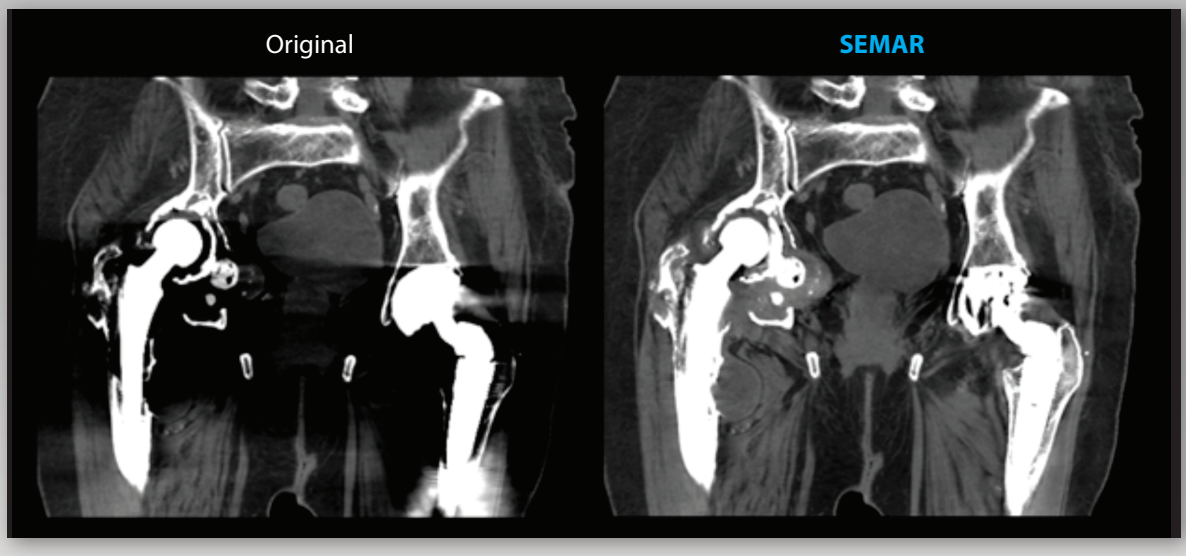
CT Clinical Case Study

Bilateral Hip Replacement

Evaluation with SEMAR



HISTORY

94-year-old female patient underwent Bilateral Total Hip Arthroplasty due to severe pain and disability from osteoarthritis (OA). A pelvic CT was requested for post-surgery evaluation. Patients with bilateral hip replacements represent a challenge for CT examinations due to the metal implants causing beam hardening effects and photon starvation resulting in severe streak artifacts.

TECHNOLOGY

A 0.5 mm wide volume acquisition with SUREExposure™, AIDR 3D (Adaptive Iterative Dose Reduction) and SEMAR™ (Single Energy Metal Artifact Reduction) was performed on the Aquilion ONE™ Vision, 320-detector row CT scanner. SEMAR was turned on the scan protocol generating automatic reconstruction.

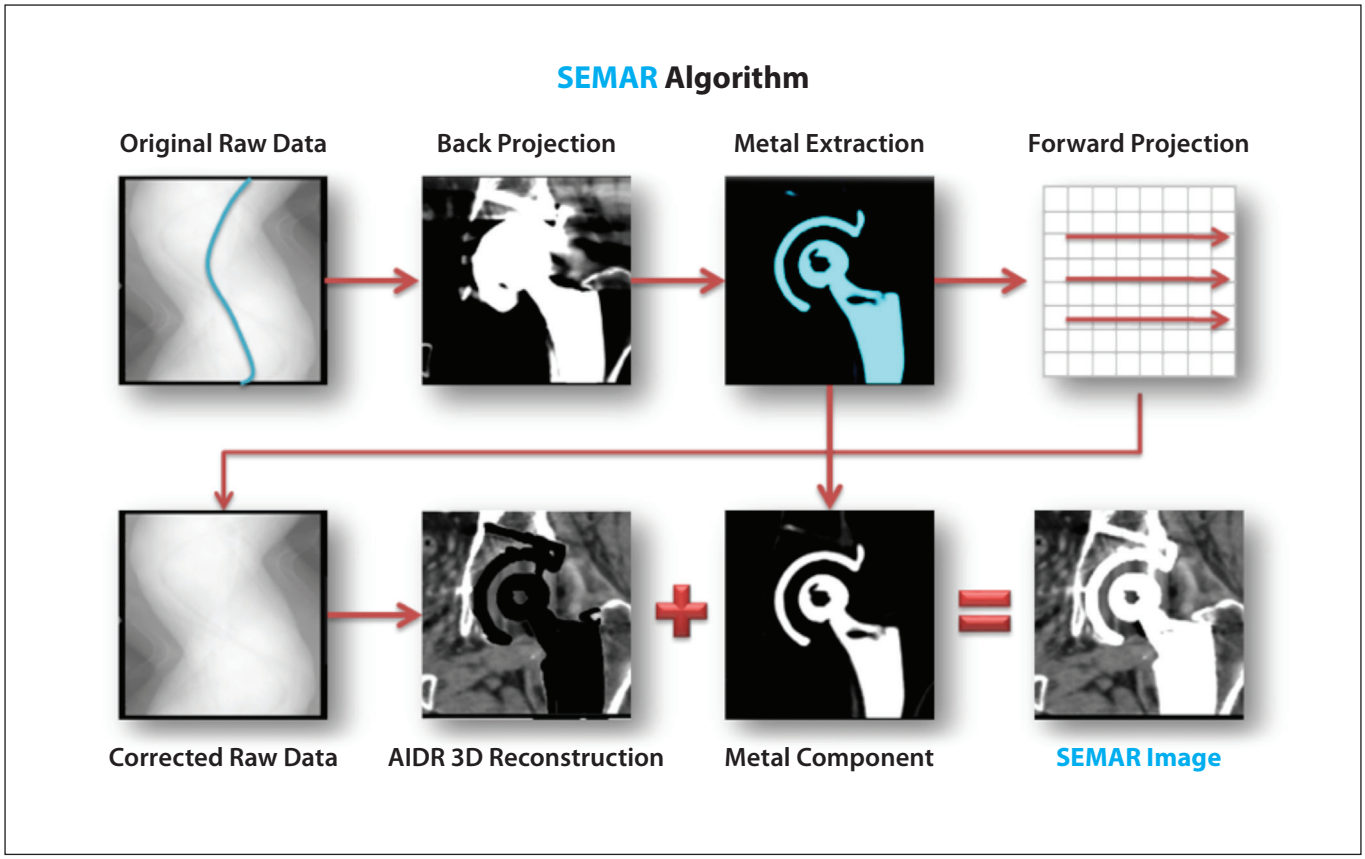
FINDINGS

With SEMAR technology, the pelvic CT coronal view demonstrated metal artifact reduction allowing physicians to evaluate the prosthesis positioning, and the surrounding tissues in greater detail. The soft tissue mass can be seen adjacent to the right lesser trochanter with SEMAR, providing better diagnostic imaging for the physician to ensure a thorough post-surgery evaluation.

CONCLUSION

SEMAR provides visualization of the soft tissue and bone structures surrounding metallic implants, allowing fully diagnostic evaluation and overall improved patient care.

Scan Mode	Collimation	kVp	mAs	HP	Rotation Time	Scan Range	Dose Reduction	Metal Artifact Reduction	CTDIvol	DLP
Wide Volume	0.5 mm x 320	120	SUREExposure	N/A	0.75 s	300 mm	AIDR 3D integrated	SEMAR	12.2 mGy	370.8 mGy•cm



Single Energy Metal Artifact Reduction (SEMAR) is a new raw data based iterative reconstruction technique that can be applied to any routine scan or retrospectively in raw data. Streak artifacts from metallic implants are minimized, resulting in drastic artifact reduction.

SEMAR can be set in the scan protocol so the reconstructions are fully automatic, requiring no additional operator input.

The SEMAR algorithm reconstructs the original raw data using filtered back-projection. The metallic components are then identified within the image and extracted. This extracted data is then forward-projected to ultimately obtain corrected raw data without the metallic components. The corrected raw data is reconstructed using AIDR 3D and the previously extracted metallic components are added.

With the use of SEMAR, the presence of a metallic prosthesis is no longer a barrier to a successful CT examination and a definitive diagnosis.

SEMAR has the ability to improve diagnostic accuracy and patient care.

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