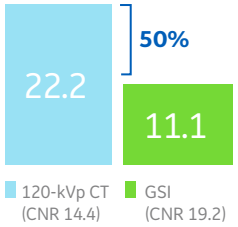
GSI: Delivering Value Based Care

*Example findings from peer reviewed GSI publications**

ANGIOGRAPHY

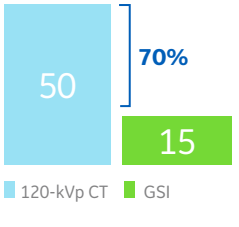
Low keV images can reduce iodine load by at least 50% → benefitting patients with compromised renal function[3,4,5]

Pulmonary Angiography Imaging, Total Iodine, g[4]



Dong, 2013

CT Aortography (no difference in CNR or SNR), Total Iodine, g[5]



Shuman, 2017

ABDOMEN – ONCOLOGY

Improves liver lesion detection 17% and kidney lesion characterization 12% → reducing unnecessary follow-ups[1,2]

Liver Lesion Detection after transarterial chemoembolization (TACE), Specificity[2]

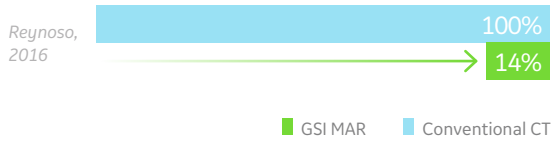
Kidney Lesion Characterization, Specificity[1]

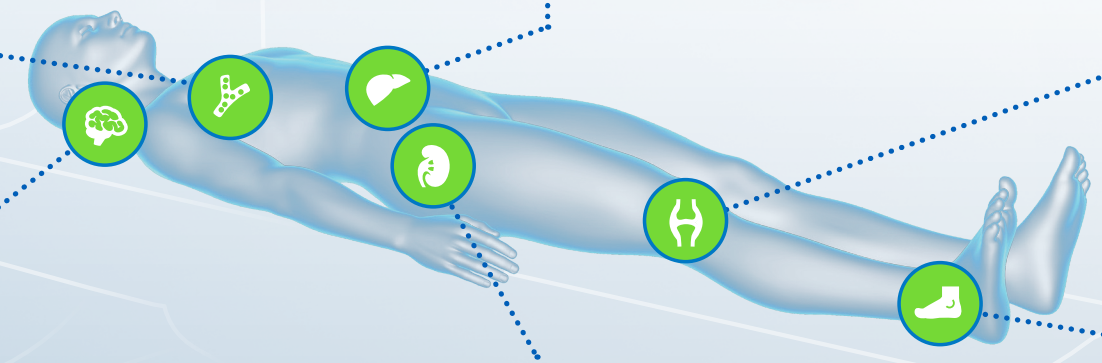
GSI Conventional CT

ORTHOPEDICS - REDUCED METAL ARTIFACT

6x reduction in non-diagnostic scans with GSI MAR → enhancing evaluation of metal implants and adjacent bone or tissue[6,7]

Periprosthetic Imaging, Rate of Non-Diagnostic Studies[6]





HEAD AND NECK TUMOR VISIBILITY

2.3x higher average tumor attenuation → for increased tumor conspicuity and improve tumor evaluation[10]

RENAL STONE CHARACTERIZATION

100% Sensitivity and 99.7% Specificity for uric acid stones,[8] & atomic number for stone composition → for faster and simplified diagnosis workflow

GOUT

100% detection by uric acid (calcium) mapping → for non-invasive diagnosis[9]

* The example findings cited are limited to the referenced studies only and may not be broadly applicable to your clinical practice.

1. Marin, D. et al. “Characterization of Small Focal Renal Lesions: Diagnostic Accuracy with Single-Phase Contrast-enhanced Dual-Energy CT with Material Attenuation Analysis Compared with Conventional Attenuation Measurements.” Radiology. 284, no. 3 (2017).
2. Liu, Qi-Yu, et al. “Application of gemstone spectral imaging for efficacy evaluation in hepatocellular carcinoma after transarterial chemoembolization.” World Journal of Gastroenterology 22, no. 11 (2016): 3242.
3. White Paper of the Society of Computed Body Tomography and Magnetic Resonance on Dual-Energy CT, Part 2: Radiation Dose and Iodine Sensitivity; Part 3: Vascular, Cardiac, Pulmonary and Musculoskeletal Applications; Part 4: Abdominal and Pelvic Applications. Journal of Computer Assisted Tomography (2016).
4. Dong, Jian, et al. “Low-contrast agent dose dual-energy CT monochromatic imaging in pulmonary angiography versus routine CT.” Journal of Computer Assisted Tomography 37, no. 4 (2013): 618-625.
5. Shuman, William P., et al. “Prospective comparison of dual-energy CT aortography using 70% reduced iodine dose versus single-energy CT aortography using standard iodine dose in the same patient.” Abdominal Radiology 42, no. 3 (2017): 759-765.
6. Reynoso, Exequiel, et al. “Periprosthetic Artifact Reduction Using Virtual Monochromatic Imaging Derived From Gemstone Dual-Energy Computed Tomography and Dedicated Software.” Journal of Computer Assisted Tomography. 2016; 40 (4): 649-657.
7. Pessis, Eric, et al. “Virtual Monochromatic Spectral Imaging with Fast Kilovoltage Switching: Reduction of Metal Artifacts at CT” RadioGraphics 2013; 33: 573–583.
8. Stolzman P. Urol Res 2008, Graser A. Invest Radiol 2008, Matlaga B. Urology 2008, Graser A . Eur Radiol 2009, Thomas C. Eur Radiol 2009, Boll D. Radiology 2009, Hidas G. Radiology 2010, Manglaviti G. AJR 2011, Kulkarni N. Journal of Computer Assisted Tomography. 2013.
9. Li, Xiaohu, et al. “Detection of uric acid depositing in tophaceous gout using a new dual energy spectral CT technology.” Journal of X-ray science and technology 22, no. 4 (2014): 541-549.
10. Forghani, R.K., et al. “Low-Energy Virtual Monochromatic Dual-Energy Computed Tomography Images for the Evaluation of Head and Neck Squamous Cell Carcinoma: A Study of Tumor Visibility Compared With Single-Energy Computed Tomography and User Acceptance.” Journal of Computer Assisted Tomography. 2017; 41: 565–571.

GE imagination at work

STUDY	# OF PATIENTS	ARTICLE CONCLUSION
Marin[1], 2017	136	The results of our study demonstrate that analysis of contrast-enhanced dual-energy material attenuation significantly improves the specificity for characterization of small (1–4 cm) renal lesions compared with that of conventional attenuation measurements. This improvement in specificity may decrease the frequency of unnecessary work-up for small indeterminate renal lesions.
Liu[2], 2016	30	Compared with conventional CT, GSI could significantly improve the detection of small and multiple lesions without increasing the radiation dose. Based on spectrum features, GSI could assess tumor homogeneity and more accurately identify residual tumors and recurrent or metastatic lesions during efficacy evaluation and follow-up in HCC after TACE treatment.
Dong[4], 2013	86	Low-contrast agent dose DECT monochromatic imaging in pulmonary angiography accommodates superior intravascular enhancement and contrast in pulmonary arteries, and improves diagnostic confidence with compatible radiation dose.
Shuman[5], 2017	21	70% reduced iodine DECT aortography may result in similar aortic attenuation, CNR, SNR, and lower although acceptable subjective image scores when compared to standard iodine SECT aortography in the same patient.
Reynoso[6], 2016	80	GSI-MARS technology demonstrated the ability to reduce periprosthetic artifacts, improving image quality and diagnostic interpretability particularly when associated with virtual monochromatic spectral images at high energy levels.
Pessis[7], 2013	Review clinical experience	The ability to obtain VMS images gives dual-energy CT potential advantages over conventional CT in reducing metal artifacts and improving image quality and diagnostic value. Evaluation of metal implants and adjacent bone or tissue is enhanced with VMS images reconstructed from dual-energy CT datasets. However, understanding principles of dual-energy CT data processing and image generation is necessary to derive maximum benefit from the dual-energy CT datasets.
Li[9], 2014	31	Dual-energy spectral CT can detect gout tophi within the peripheral joints of the patients. The quantitative measurement of the tophi concentration provides a new imaging method for quantitatively monitoring clinical outcomes of tophi.
Forghani[10], 2017	120	Using multiple lines of evidence, our results suggest that 40 keV VMIs objectively improve tumor visibility compared with SECT and, furthermore despite the increased noise levels, are preferred for targeted tumor evaluation subjectively. These conclusions seem suitable both for specialized centers as well as in general practice settings where head and neck cancer imaging is performed.