

Volumetric Imaging Magnetizes Radiology

GE Healthcare presents a paradigm shift
by re-imagining volumetric MR

The History of Volume Imaging

GE Healthcare has long been a leader in bringing volumetric imaging to clinical practice. In fact, GE launched one of the world's first volumetric ultrasound systems in the late 1980's. Subsequent introductions of the LOGIQ™ 9, Voluson™ E8 and Vivid™ 7 Dimension products have helped redefine ultrasound with new volume acquisition capabilities. GE's LightSpeed® VCT brought volume imaging to the forefront of CT with advanced applications that enabled clinicians to view the body as never seen before. Building upon this platform, GE Healthcare brought together innovative, advanced cardiac and neurology applications with the introduction of the LightSpeed VCT XT configuration, further extending the clinical capability of volume imaging.

GE continues to exhibit leadership in volumetric imaging with the introduction of a new dimension to MR.

High resolution, isotropic volume imaging changes the way image data is acquired and reviewed, such as providing new clinical benefits for visualizing small lesions and improving workflow efficiency with the ability to reconstruct the 3D volume data into any plane or slice at a later time while maintaining the same high image resolution as the native plane.

Just as high definition (HD) has transformed television (TV), HD MR is enabling new clinical capabilities by capturing higher resolution and consistently clear images for increased diagnostic confidence. Today, GE Healthcare introduces the Signa® HDxT and the concept of HD isotropic, volumetric imaging.

Volumetric imaging is not new to MR. GE introduced MR volume applications in the 1990s. While the concept was very attractive, MR platforms, gradient technology and computational processing power for acquiring and postprocessing these images were not yet ready from a technical standpoint. At the time, 3D MR was hindered by low resolution, long scan times and slow image reconstruction/post-processing.

Since the turn of the decade, advancements in information technology created an environment suitable for handling the large data sets generated by HD volumetric imaging. Specialized coils for certain anatomic areas and faster, more powerful MR platforms enabled rapid acquisition of signal-rich data, which led to the first break-through, clinically-relevant volumetric applications such as TRICKS™, LAVA™ and VIBRANT®. However, until now these volumetric MR applications were mostly applied for a specific use and considered complementary to standard 2D MR acquisitions.

A New Dimension to MR

Today, with the Signa HDxT and several new 3D applications, GE builds on the promise of HD to add a new dimension to MR imaging. Clinicians will now have access to a solution that makes it possible to conduct the entire MR exam by exclusively applying volumetric MR techniques. HD volume MR delivers sub-millimeter resolution with gapless data volume and point-and-shoot simplicity to improve diagnostic confidence and reduce exam time.

The HD Volume Revolution

The new volumetric HD MR sequence Cube™ provides sub-millimeter isotropic resolution and enhanced tissue contrast for high definition detail to help clinicians detect small lesions earlier. The complete volume of data can be reconstructed in any view or plane without compromising spatial resolution. In comparison, conventional 2D image acquisitions typically provide discrete slices with gaps in one plane only. Since 2D images are acquired in one sagittal, coronal, axial or oblique plane, critical data vertical to the acquired plane or contained within the gap between the acquired slices could be missed.

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Flexible, clinical region-of-interest optimized sequence protocols simplify and speed up acquisition while generating consistent, high definition diagnostic quality images. This is accomplished independent of the patient for reliable image acquisition by the MR technologist.

With the addition of Cube, Signa HDxt boasts a complete portfolio of dedicated volumetric MR applications for a vast array of clinical areas, which is likely to change the paradigm of MR imaging. GE is leading the charge with new automated, optimized MR protocols such as Cube, IDEAL and 3D Dual Echo. These join the ranks of GE's other volumetric MR sequences, including: LAVA and VIBRANT-XV™ for anatomy; TRICKS for flow; 3D PROBE/PROSE for MR spectroscopy; and BRAVO and BrainWave™ Fusion for fMRI/DTI brain mapping. ■

The advantages of the 3D HD Volumetric MR include:

- Helps detect small lesions
- No missing planes, slices or gaps in data, which can minimize retakes
- High tissue contrast for conspicuous lesions
- Consistent IQ through automated and ROI-optimized protocols
- Reduced exam time due to a single volume acquisition replacing several discrete slice-by-slice/plane-after-plane acquisitions

