GE Healthcare
Tomorrow Today

BodyWorks

SIGNA™Works
Fueling the future of MR

SIGNA™Works

The new standard is extraordinary

Our new SIGNA™Works productivity platform redefines productivity across the breadth of our core imaging techniques. It takes full advantage of Total Digital Imaging (TDI), further advancing diagnostics and quickening throughput, while improving patient outcomes and your ROI. It is upgradeable and customizable with additional applications to suit your growing practice.

Standard Applications

Energize your clinical capabilities with all the tools you need to complete an exam. Imaging solutions cover a variety of contrasts, 2D and 3D volumetric data and motion correction capabilities.

find out more

Innovative Applications

Expand your expertise to the next level, to deliver improved image quality, higher efficiency and a more streamlined workflow, so you perform better than ever before.

find out more

Not all Elective Applications come standard on every system. Please contact your GE Representative for the most current information.

SIGNA™Works

The new standard is extraordinary

- **Standard Applications**
- Innovative Applications

BodyWorks

One of the fastest growing areas in MR, BodyWorks allows you to image abdominal and pelvic anatomy with user flexibility to adapt to different patient types.

CVWorks

Gain crucial insights into vascular structure and flow dynamics and access morphology, flow, function and tissue viability with CVWorks.

NeuroWorks

This one-stop solution enables you to image brain, spine, vascular and peripheral nerve anatomy with exceptional tissue contrast.

OncoWorks

Delivers robust tissue contrast, motion-insensitive, high temporal and spatial resolution imaging techniques that capture anatomical and morphological data for oncological assessment.

OrthoWorks

This extensive library of musculoskeletal imaging techniques enables you to image bone, joint and soft tissue with remarkable tissue contrast.

PaedWorks

Delivers distinctive child-centered imaging techniques that provide ease of use for the user and clinical excellence for your smallest, most fragile patients.

SIGNA™Works

The new standard is extraordinary

Standard Applications

▶ **Innovative Applications**

HyperWorks

HyperWorks means hyper scanning with astonishing imaging and impressive speed. It includes HyperSense, which can deliver higher spatial resolution images or reduced scan times.

ImageWorks

ImageWorks boosts your overall MR performance. READYView visualization and MAGiC one-and-done scanning help ensure consistent and clear results.

SilentWorks

SilentWorks is GE's most advanced noise reducing technology. Traditional exams can be extremely loud. SilentWorks brings the sound level down to ambient noise.

ViosWorks

ViosWorks reduces the complexity and cost of cardiac imaging. For the first time, all 7 dimensions of information can be captured in a cardiovascular scan in 10 minutes or less.

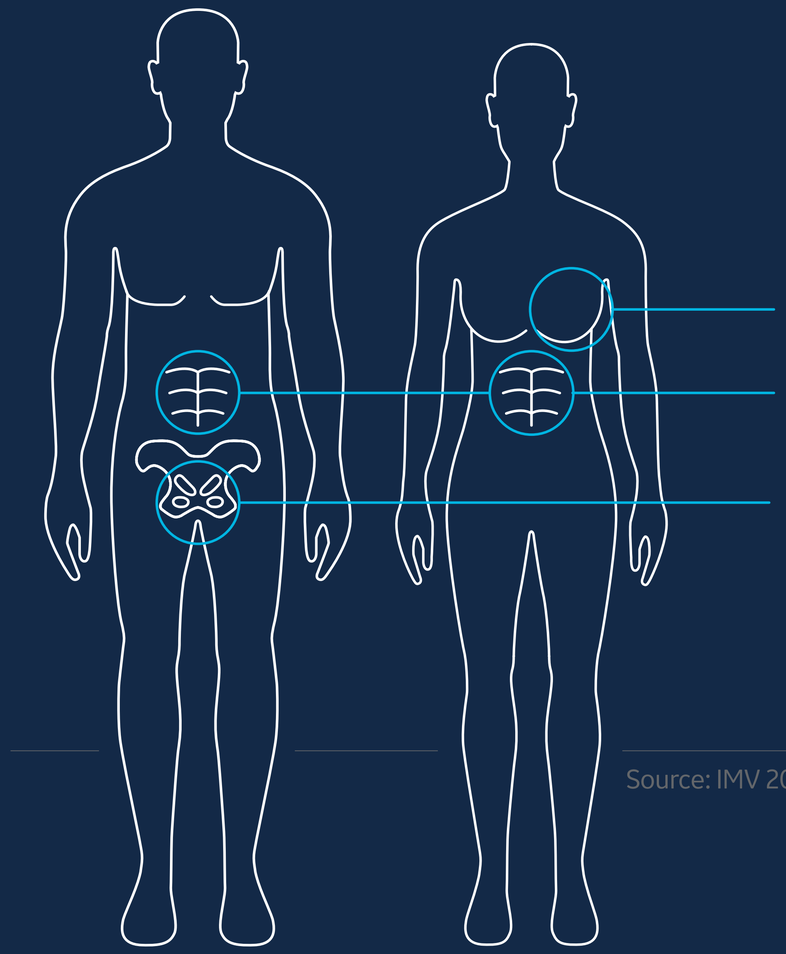
BodyWorks

BodyWorks is GE's solution for fast body scanning.

With more patients being scanned in the pelvis, abdomen, breast and prostate areas than ever before, body scanning is one of the fastest growing areas in MR. Our all-inclusive BodyWorks library allows you to image abdominal and pelvic anatomy with user flexibility that adapts to different patient types.

BodyWorks includes a range of applications designed to advance your body imaging capabilities.

- Standard Applications
- Elective Applications
- Innovative Applications



Percentage of sites performing specific MR procedures:

36% Breast

88% Abdomen and Pelvis

21% Prostate

Source: IMV 2016 MR Market Outlook Report

Not all Elective Applications come standard on every system. Please contact your GE Representative for the most current information.

BodyWorks

Standard Applications

LAVA

Liver Acquisition with Volume Acceleration (LAVA) is a rapidly accelerated, 3D T1 dynamic (DCE) body imaging technique that uses a unique PSD waveform to allow for a reduction of scan time needed for dynamic imaging.

Clinical benefits:

- Produces 2D ARC parallel imaging for short scans
- Turbo mode further reduces scan time up to 50%
- Achieves higher spatial resolution in the same scan time as conventional LAVA/LAVA Flex imaging
- Provides adiabatic special fat suppression for robust imaging
- Compatible with Navigator for free-breathing acquisition

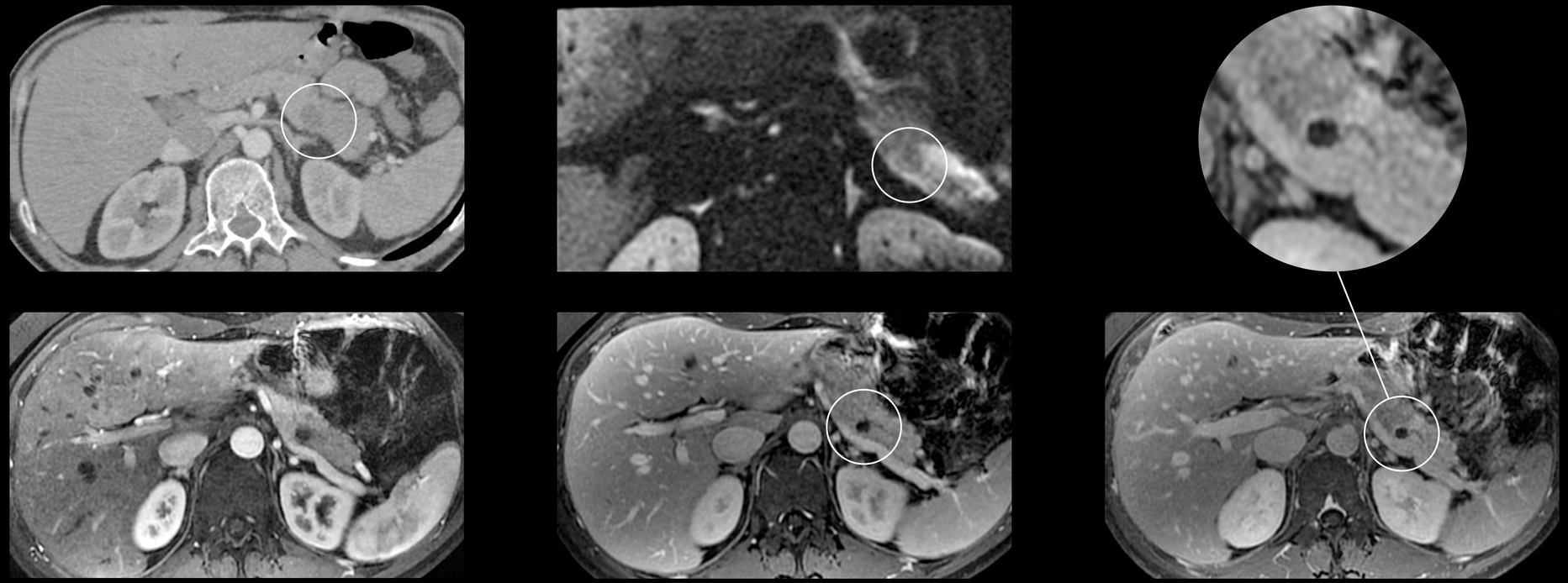
Free-breathing, enterography exam demonstrating extraordinary detail of the small bowel vascular structure

BodyWorks

Standard Applications

LAVA

Progressive contrast uptake of the tail of the pancreas and communication between nodular formation and dilation of pancreatic duct with comparison to CT (upper left) and FOCUS diffusion (upper middle)



Arterial phase

Intermediate phase

Venous phase

BodyWorks

Standard Applications

PROPELLER

PROPELLER Multi-Blade (MB) is a multi-shot approach that preserves tissue contrast regardless of weighting while also reducing motion artifacts and providing a more signal-rich image. Additionally, this technique allows for all contrasts for 2D FSE: T1, T2, STIR and PD weightings.

Clinical benefits:

- Delivers motion-artifact-free diagnostic images (respiration and peristalsis)
- Increases productivity and decreases the number of repeated scans
- Enables sedation-free scanning and increases patient tolerance

T2 PROPELLER MB
320 x 320
19 FOV/4mm
3:40 min

BodyWorks

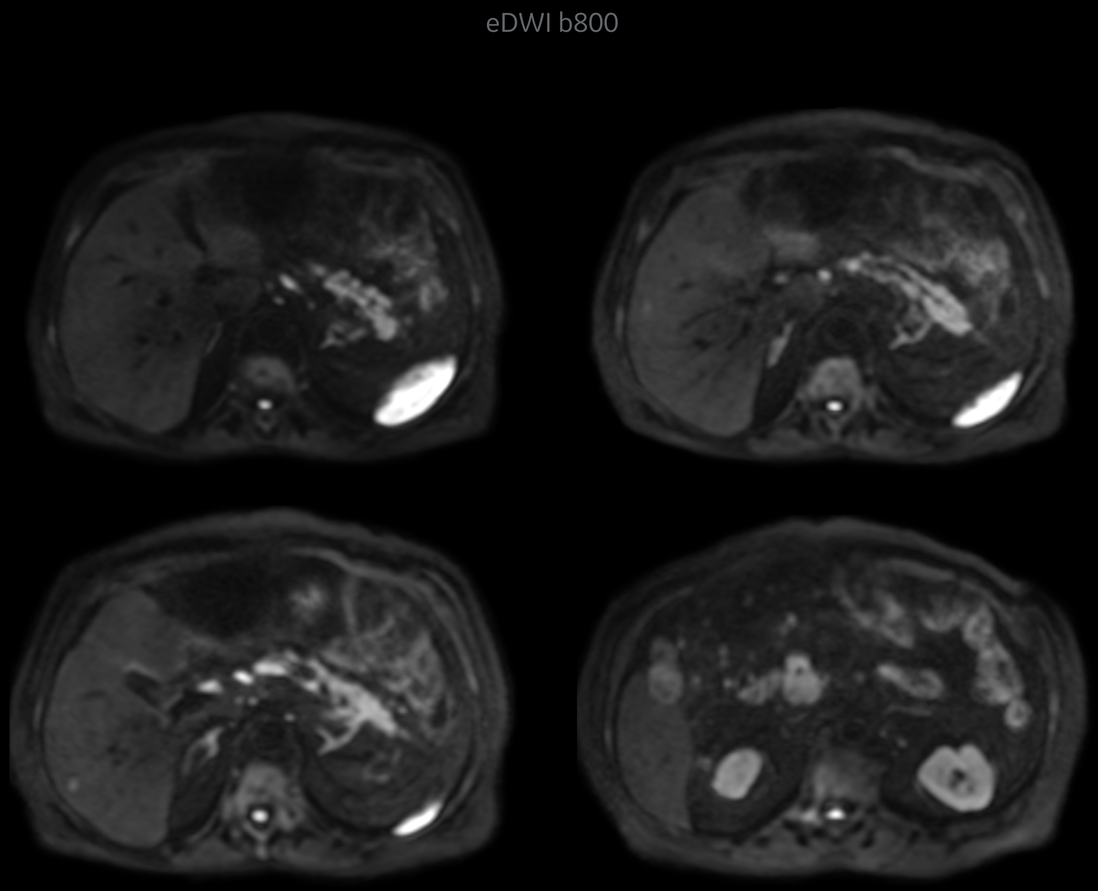
Standard Applications

eDWI

Diffusion Weighted Imaging (DWI) is used to image diffusivity of water molecules (Brownian motion). This enhanced Diffusion Weighted Imaging (eDWI) technique is designed to provide high signal-to-noise-ratio (SNR) diffusion images, with short-acquisition time and shortest possible echo time (TE). Its multi-b feature is designed to provide measurement of apparent diffusion coefficient (ADC) map with reduced effect of perfusion.

Clinical benefits:

- Helps to improve patient tolerance with shortened breath-hold time or free-breathing Navigator
- Increases sensitivity and specificity of lesions
- Decreases overall exam sequences and time



BodyWorks

Standard Applications

Navigator

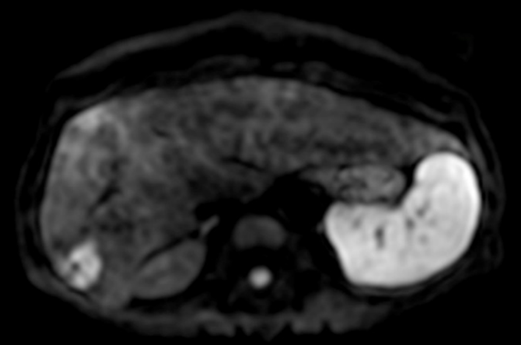
Navigator uses a tracker to detect the motion of the diaphragm which enables free-breathing body imaging acquisition. The navigator tracker is automatically placed over the right hemidiaphragm, the acquisition synchronizes the patient's breathing pattern and minimizes ghosting artifacts.

Clinical benefits:

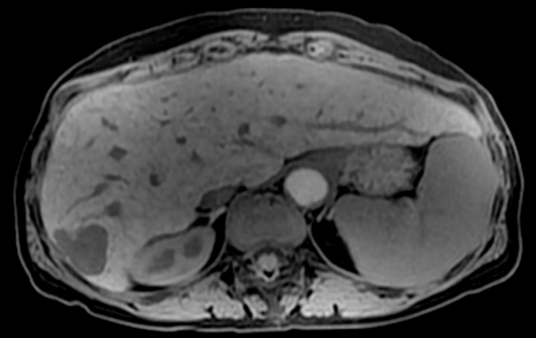
- Enhances workflow
- Eliminates need to use respiratory bellows
- Allows for adjustment of threshold and acceptance window in real time as the patient's respiration changes

T2 PROPELLER FatSat

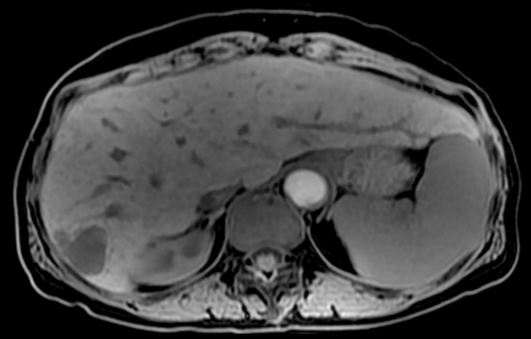
Diffusion EPI



LAVA ASPIR with Navigator



LAVA Flex with Navigator



BodyWorks

Elective Applications

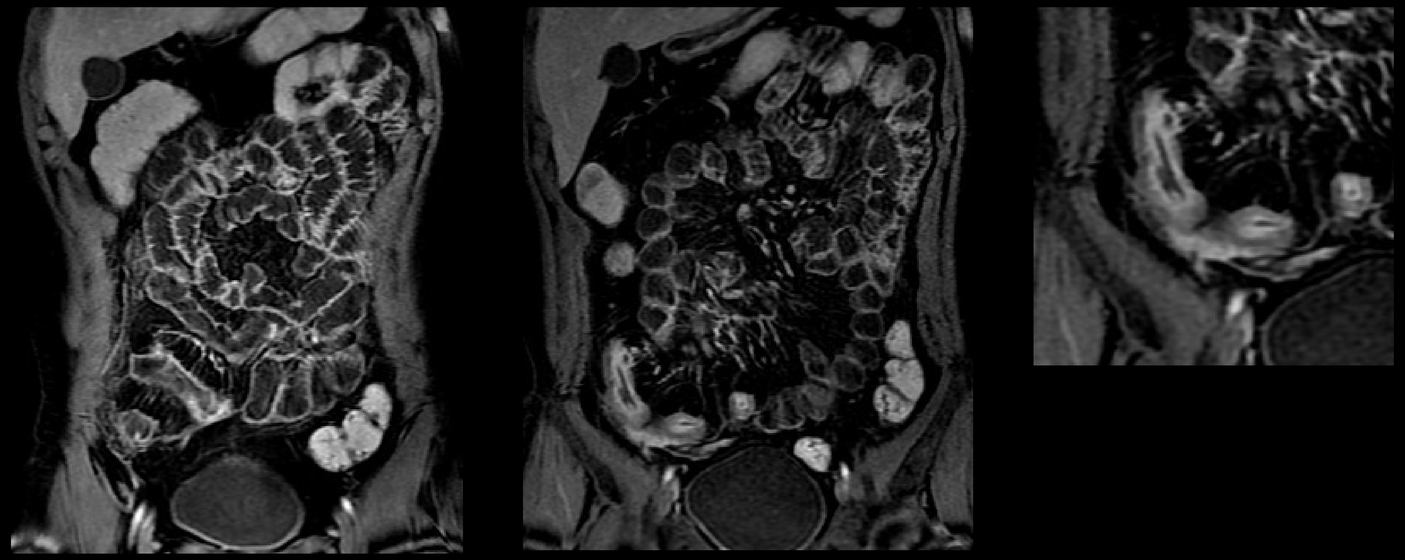
LAVA Flex

LAVA Flex is a T1-weighted 3D volume for body imaging that uses a Dixon-based fat separation technique that provides an unparalleled exclusion of fat and the ability to acquire 4 data sets from one acquisition.

Clinical benefits:

- Compatible with free-breathing Navigator
- Produces homogenous image quality in a large, full-coverage FOV
- Shortens exam time due to fewer rescans
- More comfortable for patients undergoing abdominal exams

LAVA Flex Coronal



case study

Not all Elective Applications come standard on every system. Please contact your GE Representative for the most current information.

BodyWorks
Elective Applications

Case Study: Free-breathing Pediatric Kidney Exam with Turbo LAVA

Clinical solutions

System: Discovery™ MR750 3.0T
Coil: 32 channel Cardiac

Protocols used

Axial DWI b50/1000 with RT, Coronal LAVA post IV arterial, venous and late phases with Navigator, Coronal LAVA Flex High Resolution with Navigator

Patient history

Ultrasound at 22 weeks of pregnancy showed an intra-uterine cyst, diagnosed as multicystic renal dysplasia (both kidneys). MR was performed on 9-month-old infant to characterize the inter renal-splenic lesion.

Procedure

Complete free-breathing examination with Body Navigator and Respiratory Trigger is useful for pediatric patients. Turbo LAVA Flex with Navigator allows for correct timing without breath-hold. This is crucial to detect the arterial phase for lesion characterization. DWI with high b-value shows clear delineation between the cyst and the lesion.

MR findings

The MR exam confirmed the presence of bilateral renal dysplasia and showed a lesion at the level of the left adrenal gland which was not seen on the previous ultrasound exam. Visual was enhanced after gadolinium injection at arterial phase; suspicious of a neuroblastoma.

Turbo LAVA Flex with Nav
3.6mm FOV30cm matrix
204x204 4 phases
1:22 min

Turbo LAVA Flex high res
with Nav 2.8mm FOV30cm
matrix 224x300
1:58 min

back to app

BodyWorks

Elective Applications

FOCUS DWI

FOV Optimized & Constrained Undistorted Single-shot (FOCUS), a 2D Spatially Selective RF Excitation method for DW-EPI and DTI, reduces geometric distortion, eliminates phase wrap artifacts and increases image sharpness. Available for both 1.5T and 3.0T, it provides high resolution DWI scans, especially useful when the region of interest is small in the phase encode direction.

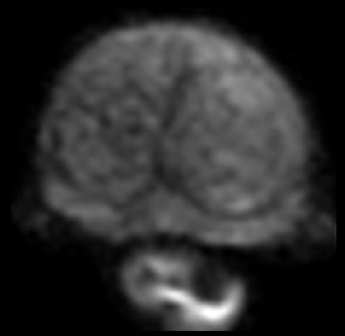
Clinical benefits:

- Reduces distortion at air/tissue interfaces, e.g., bowel
- Provides a higher spatial resolution diffusion via smaller FOV
- Helps detect and evaluate small lesions that maybe obscured by distortion
- Reduces motion contamination outside the region of interest

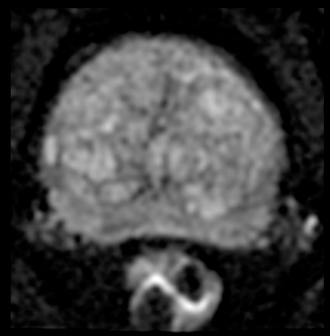
case study

FOCUS DWI helped to more clearly define the structures within the prostate

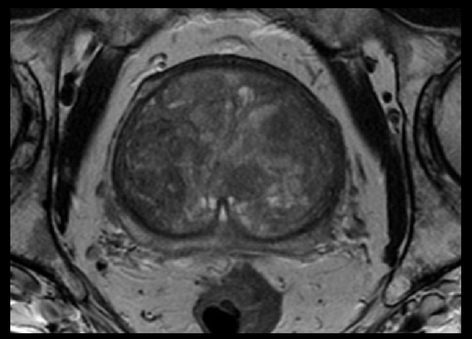
Routine DWI b1000



FOCUS DWI b1000

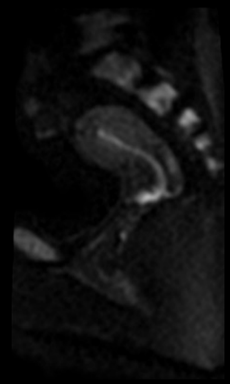


T2 PROPELLER



PROPELLER T2

FOCUS DWI



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BodyWorks
Elective Applications

Case Study: High Resolution Pancreas Imaging with FOCUS DWI

Clinical solutions

System: Discovery™ MR750 3.0T
Coil used: 32 channel Torso

Patient history

41-year-old patient presented with severe abdominal pain. CT exam revealed an enlarged corporeo-caudal portion of the pancreas. Patient was referred to MR to check for pancreatitis.

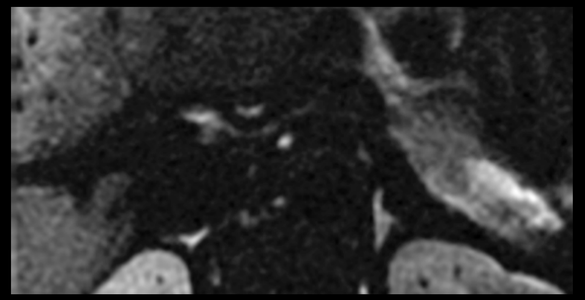
Procedure

The eDWI image showed an increased signal in the tail of the pancreas. The FOCUS eDWI b500 image did not exhibit a hypersignal of the nodular lesion. FOCUS with increased spatial resolution helped clearly depict the pancreas from the nodular lesion. Progressive contrast uptake of the tail of the pancreas served as a fibrosis indicator and suggested autoimmune pancreatitis with no risk factor for a 41 year old.

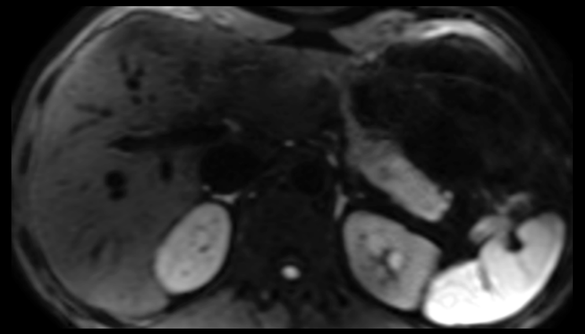
MR findings

The hyposignal of the pancreas tail on the LAVA Flex series suggests pancreatitis and MRCP revealed a discrete dilatation of the Wirsung canal upstream the lesion. The clinician's final diagnosis was suspicion of a pancreatitis autoimmune type II, with a focal lesion in the tail of the pancreas.

DWI FOCUS b500



eDWI b500



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BodyWorks

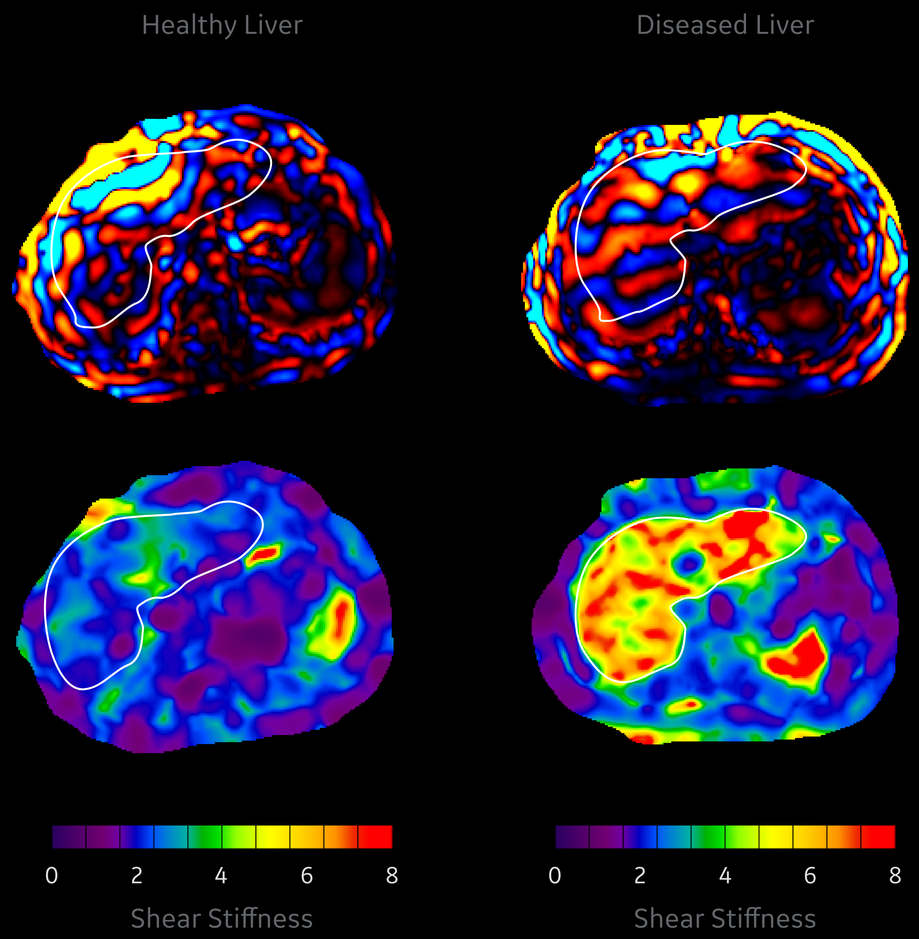
Elective Applications

MR Touch

MR Touch is a combination of hardware and software that uses sound waves to identify variations in liver stiffness. It uses low frequency mechanical waves produced by the Active Driver that are transferred to the patient via the Passive Driver and pneumatic pulses. These pulses probe the elastic properties of the tissue.

Clinical benefits:

- Can assess the stiffness of the patient's liver, especially valuable in evaluating and treating cirrhosis
- Enables patient-friendly exam with short breath-hold scan
- Provides non-contrast, non-invasive evaluation of liver disease
- Automatic inline task generates quantitative parametric maps directly on console



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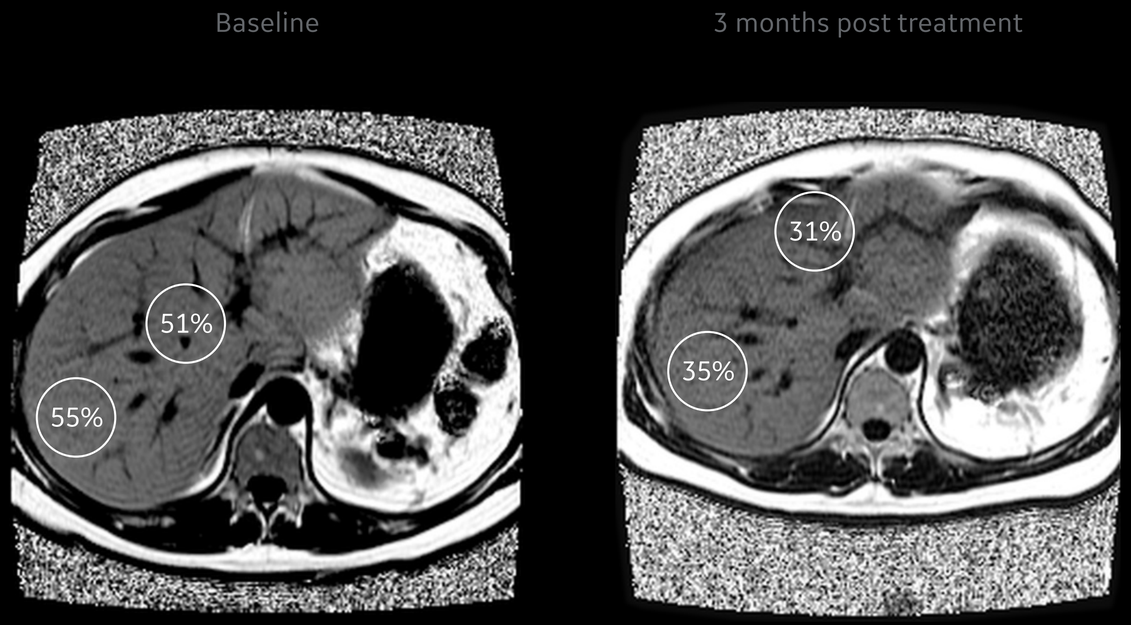
BodyWorks
Elective Applications

IDEAL IQ

IDEAL IQ provides volumetric whole-liver coverage in a single breath-hold and generates estimated T2* and triglyceride fat fraction maps in a non-invasive manner. It is intended for breath-held abdominal imaging to evaluate diffuse liver diseases such as hepatic steatosis of the liver.

Clinical benefits:

- Corrects for confounding factors from short T2* pathologies
- Delivers liver fat percentage with short breath-holds
- Generates 6 contrasts with a single scan: fat-only, water-only, in-phase, out-of-phase, fat fraction and T2* (iron)
- Provides non-contrast, non-invasive evaluation of liver disease
- Delivers automatic quantitative, fat fraction results
- Compatible with parallel imaging (ARC)



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BodyWorks

Elective Applications

DISCO

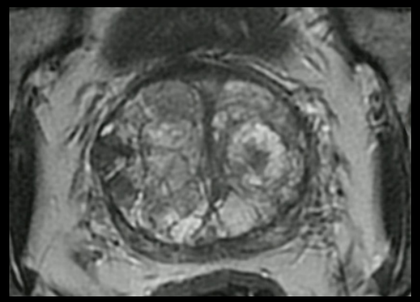
DynamIc Scan Optimization (DISCO) combines 3D DCEMRI + 2 pt Dixon + Parallel Imaging + Temporal Acceleration to drastically reduce scan time. DISCO uses novel techniques to disperse motion and view sharing to improve temporal resolution.

Clinical benefits:

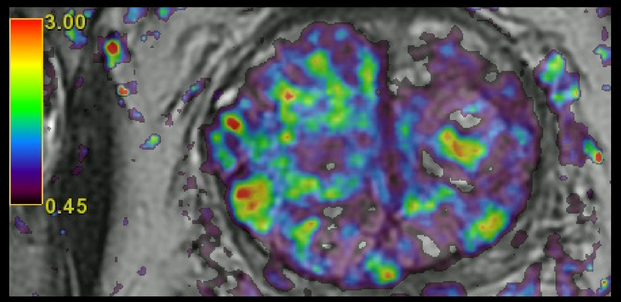
- Generates extreme, high resolution for 3D dynamic imaging
- Detects smaller lesions with higher spatial resolution and less blurring
- Shortens patient breath-holds
- Compatible with Navigator for free-breathing dynamic scans
- Has the potential to eliminate bolus timing

case study

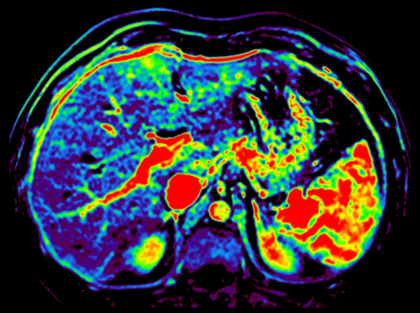
T2 PROPELLER



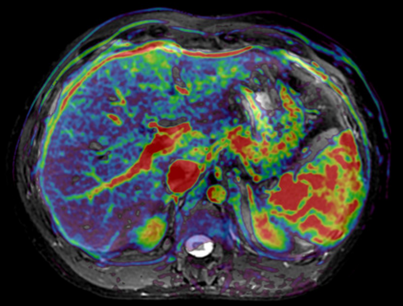
Ktrans Fused



Positive enhancement map



Positive enhancement map fused to T2w images using Integrated Registration on READYView



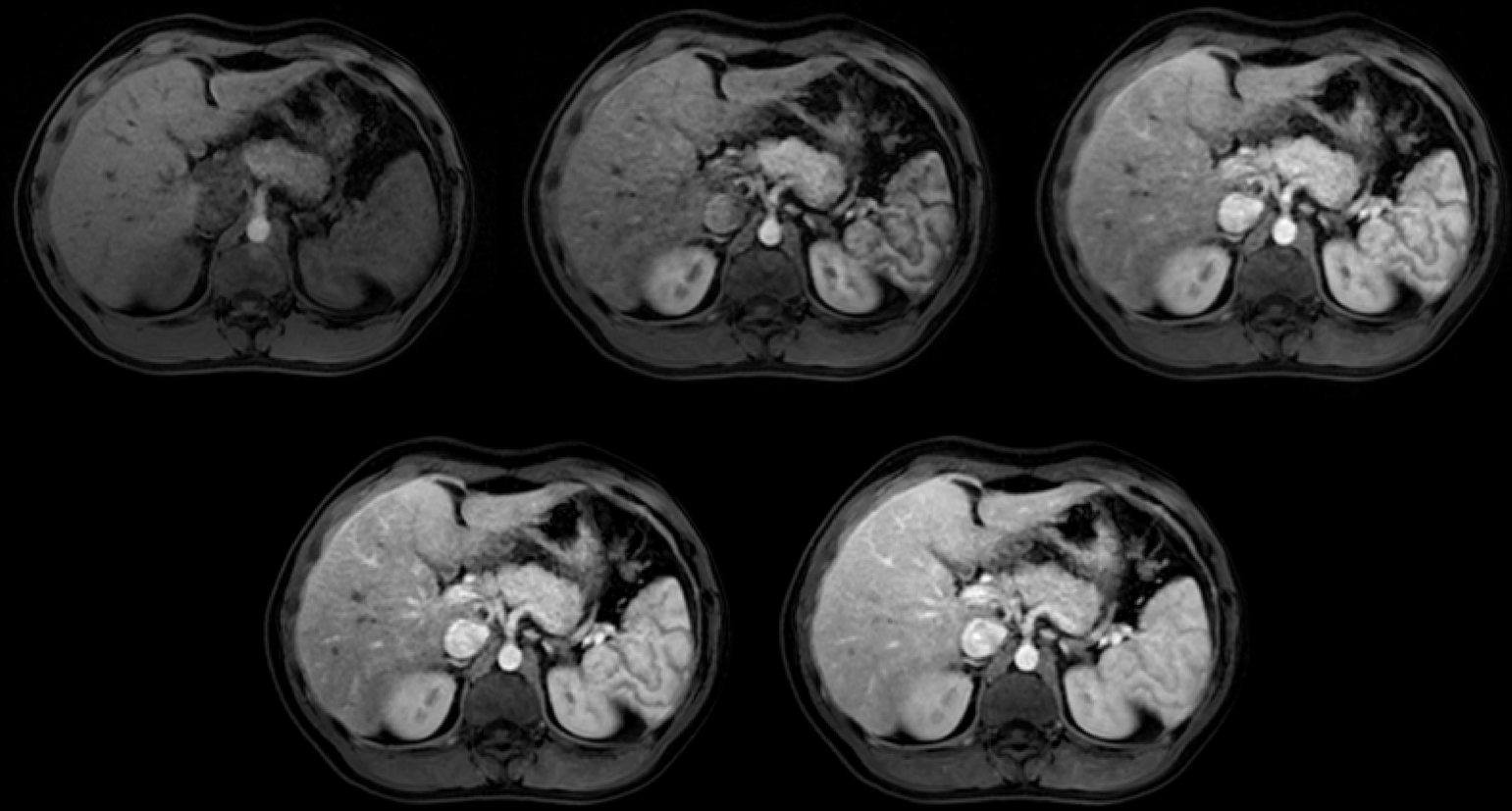
Not all Elective Applications come standard on every system. Please contact your GE Representative for the most current information.

BodyWorks

Elective Applications

DISCO

Contrast enhanced DISCO with high temporal resolution demonstrating perihepatitis
4s/phase



case study

Not all Elective Applications come standard on every system. Please contact your GE Representative for the most current information.

BodyWorks
Elective Applications

Case Study: High Resolution Breast Imaging with DISCO

Clinical solutions

System: Optima™ MR450w GEM 1.5T

Protocols used

T2w PROPELLER, DISCO Flex,
DISCO Single Echo, 3D MIP of DISCO

Patient history

An elderly patient was referred for an MR exam of a left breast lesion after mammography and ultrasound. The lesion appeared to be markedly hypoechoic on the ultrasound exam.

Procedure

The DISCO sequence improved spatial resolution compared to standard DCE imaging. The DISCO Flex or Single Echo options provided tailored CNR.

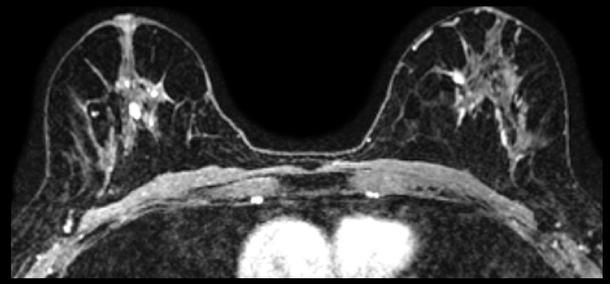
MR findings

A 9mm spiculated lesion was noticed in the infero external quadrant of the left breast, corresponding to the lesion seen at mammography and ultrasound. Clinician suspects a high grade ductal carcinoma. Also noticed two additional small lesions, located in the upper breast, at the junction of external quadrants.

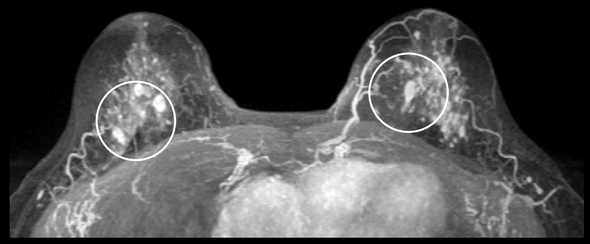
Confirmatory imaging results

Ultrasound-guided biopsy confirmed three locations of invasive ductal carcinoma.

DISCO 512x512 1.2mm/-0.6mm
1:12 min/phase



MIP of DISCO phase 7



back to app

BodyWorks

Elective Applications

Inhance Suite

The Inhance Suite improves your workflow with easy setup by allowing visualization of blood flow in diverse anatomies with an advanced array of powerful pulse sequences – with no need for gadolinium.

The Suite includes:

- 3D IFIR
- 3D Velocity
- 2D InFlow
- 3D DeltaFlow

Clinical benefits:

- No injection needed, which eliminates potential contrast reaction
- Eliminates bolus timing
- Enhances evaluation of renal conditions and lower extremities
- Uses peripheral gating instead of full cardiac gating

case study

Inhance Inflow IR

Not all Elective Applications come standard on every system. Please contact your GE Representative for the most current information.

BodyWorks
Elective Applications

Case Study: Accessing Renal Arteries with Inhance Suite

Clinical solutions

Applications: CE MRA
System: SIGNA™ Explorer 1.5T

Patient history

A 27-year-old patient complained of hypertension. MR was advised for renal artery evaluation due to lowered eGFR of 47 mL/min/1.73m^2. Patient underwent renal ultrasonography examination which revealed small-sized right kidney.

Procedure

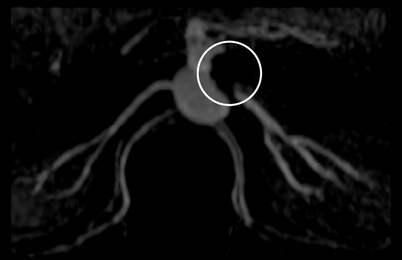
Non-contrast Inhance InFlow Inversion Recovery (IFIR) and contrast enhanced (CE) magnetic resonance angiography (MRA) were used to assess renal artery patency.

MR findings

Renal artery stenosis confirmed with both non-contrast IFIR and CE MRA.

IFIR

CE MRA



back to app

HyperWorks

Innovative Applications

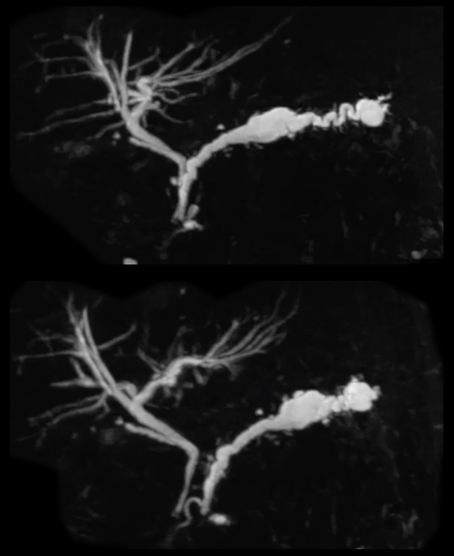
HyperSense

HyperSense is an acceleration technique based on sparse data sampling and iterative reconstruction, that delivers higher image resolution or reduced scan time, without the typical penalties of conventional parallel imaging. It is combined with ARC acceleration to maintain high SNR with shorter acquisition times.

Clinical benefits:

- Lowers scan time, without reducing SNR
- Achieve outstanding resolution in the same amount of time
- Provides faster 3D imaging acquisitions

3D MRCP with HyperSense reformats
HyperSense Factor = 3 2:24 min



T2 Cube with HyperSense and
free-breathing with Navigator 4:38 min

Oblique view

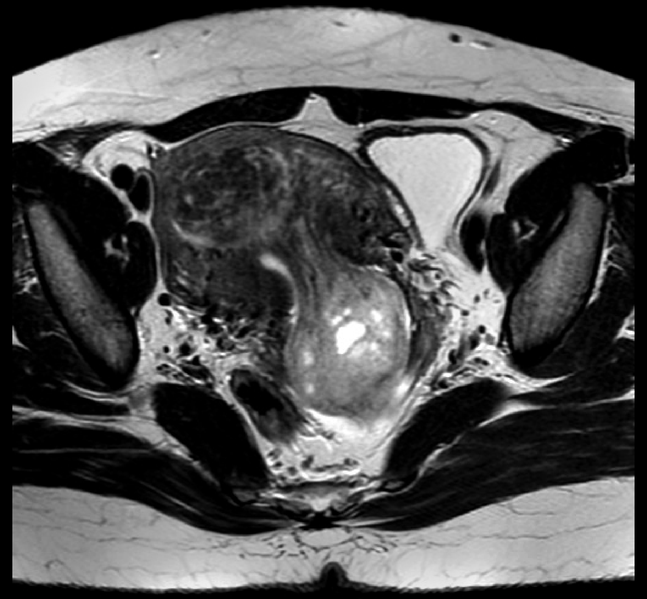
HyperWorks

Innovative Applications

HyperSense

HyperCube with HyperSense female pelvis

Sagittal reformat 4mm



Axial reformat 4mm

Coronal reformat 4mm

ImageWorks
Innovative Applications

MAGiC DWI

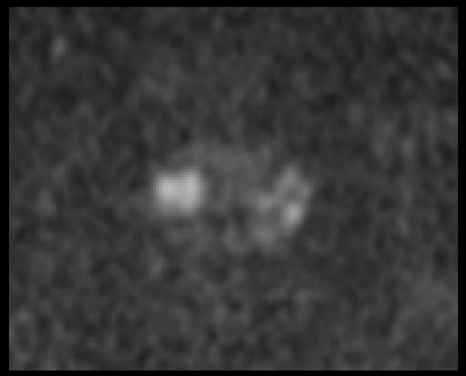
MAGnetic resonance image Compilation Diffusion Weighted Imaging (MAGiC DWI) generates multiple synthetic b-values from one DWI scanned series so you can view diffusion contrast changes in real time after acquisition. It delivers high b-values without stressing protocol parameters, and shorter scan times without sacrificing contrast or anatomy coverage. It also allows shorter TE, improving SNR and sharpness.

Clinical benefits:

- Multiple synthetic b-values from a single DWI scan
- High b-values in shorter scan times
- Compatible with FOCUS diffusion
- Calculates high b-value as recommended by PIRADS for prostate

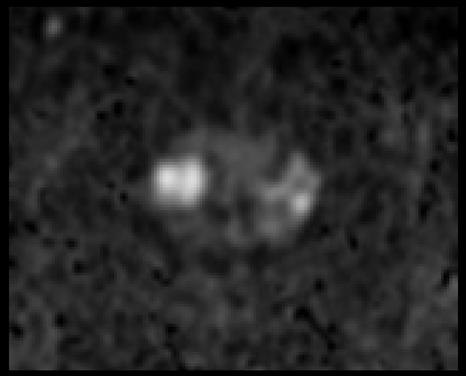
3.4mm FOV 40cm, matrix 128x128 3:52 min

DWI b1000

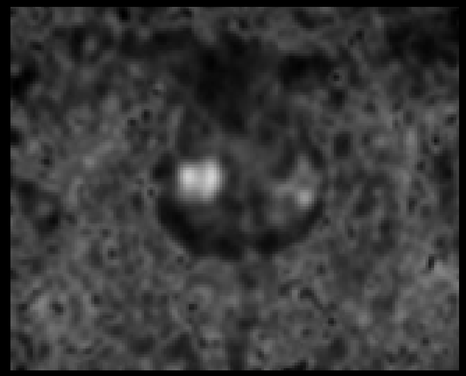


MAGIC DWI b1000

MAGIC DWI b2000



MAGIC DWI b2500



HyperWorks
Innovative Applications

HyperCube

HyperCube reduces scan time and limits artifacts such as motion and aliasing by reducing the phase FOV. It can be applied with or without fat suppression and significantly lowers imaging time without sacrificing contrast quality.
It focuses on the area of interest, can be used on the entire body and is compatible with HyperSense.

Clinical benefits:

- Lowers scan time without SNR loss, reducing the potential for patient motion and repeats
- Eliminates time-consuming parameters
- Provides high-resolution small FOV imaging
- Helps with large FOV robust fat suppression when combined with FSE Flex

case study

T2 Cube Coronal, HyperCube, 320 x 256, 2mm slice 4:38 min

Oblique T2 Cube Coronal MIP

HyperWorks
Innovative Applications

Case Study: Detecting Nodules in Prostate Imaging with HyperWorks

Clinical solutions

System: SIGNA™ Architect

Protocols used

Axial HyperCube T2 with HyperSense, Axial T2 FSE High resolution (only for comparison with the cube), Axial MAGiC FOCUS DWI, Axial DISCO dynamic series

Patient history

58-year-old patient with elevated Prostate-specific antigen (PSA) (10ng/mL). MR exam 6 years prior was normal. Patient was referred for follow-up and search of suspect target.

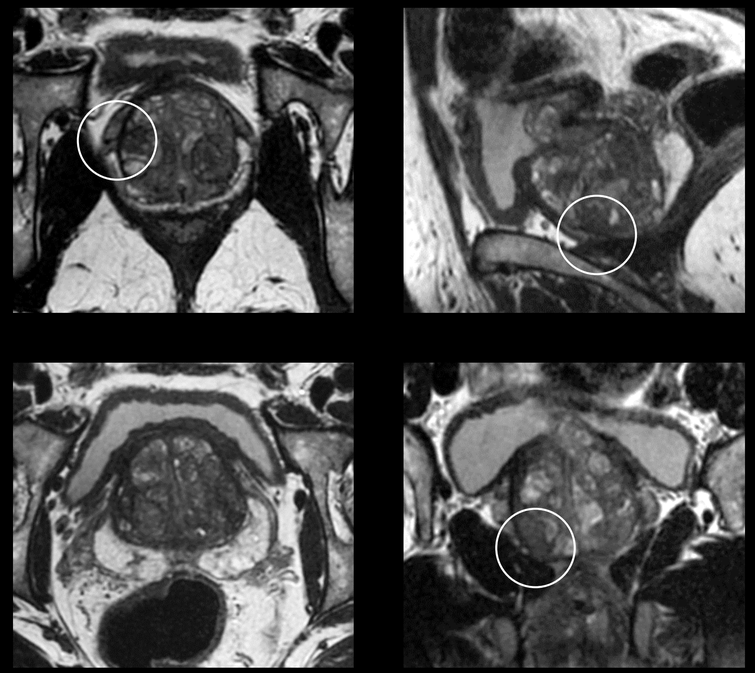
Procedure

HyperCube T2 with HyperSense improved the spatial resolution to study the lesion in 3D compared to standard FSE T2 planes. 3D T2 in 5:32 min instead of 3 x 2D planes in 10 minutes. With MAGiC FOCUS DWI, we increased the b2000 DWI resolution (3mm instead of 4mm slice thickness) in lower scan time. The improvements in resolution and SNR facilitate diagnosis on the b2000 with shorter scan times.

MR findings

Prostate of 68 cc. Nodule in the transitional area with hyposignal T2, restricted diffusion, low ADC of 0.9x10-3 mm²/s. The vascularization of the nodule is slightly higher than the rest of the prostate.

HyperCube T2 Axial 0.8mm slice



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