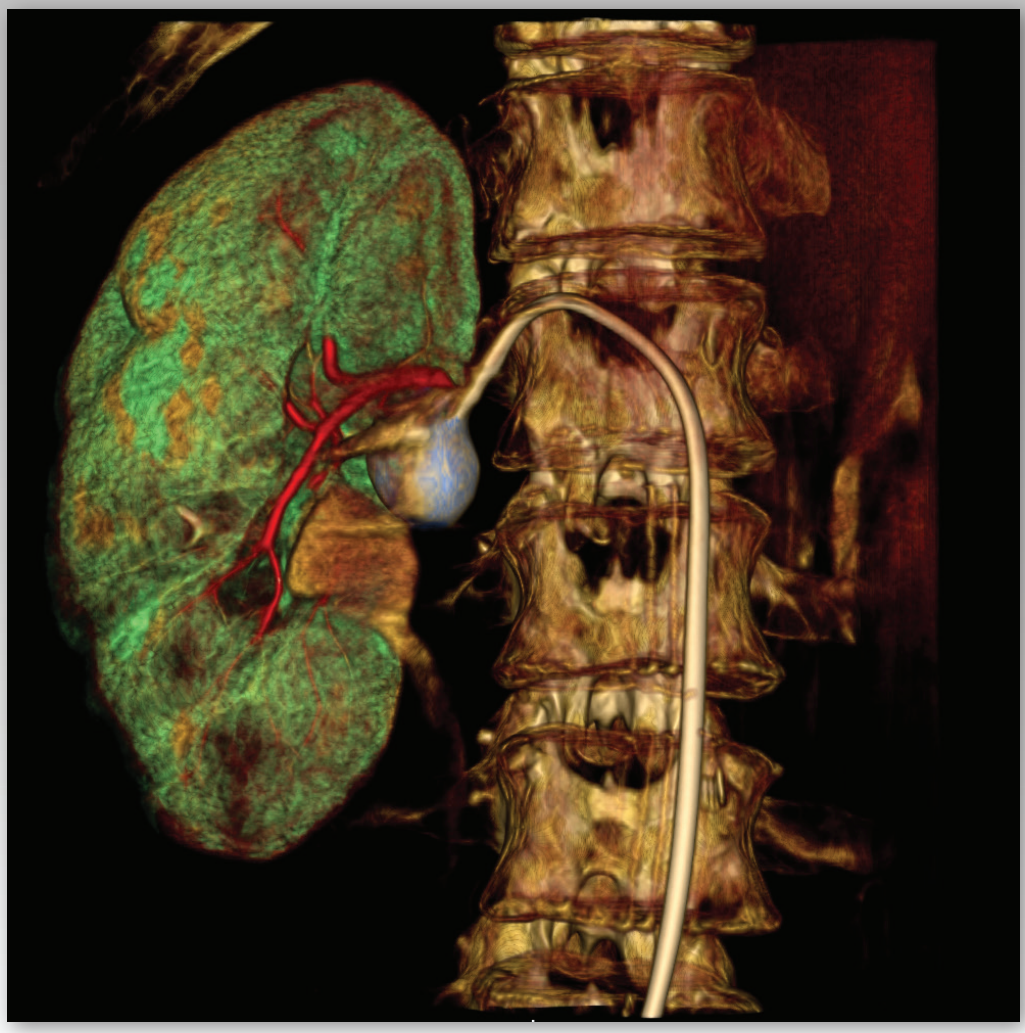
TOSHIBA
MEDICAL

Clinical Applications

ImagingRite

Interventional Radiology



ImagingRite, a comprehensive suite of imaging tools offered with Infinix™-i angiographic systems, was designed to assist clinicians in optimizing their workflow and image quality (IQ) during Interventional procedures. Interventional radiology procedures can be challenging due to the complexity of the vascular anatomy, the pathology of the underlying disease, the fine size of the vasculature, organ motion, and the required treatment accuracy. With our ImagingRite technology, Toshiba Medical offers optimum image quality at reduced dose. Our advanced imaging platform supports a wide range of procedures, from interventional oncology to peripheral vascular disease. Our advanced software enables clinicians to deliver treatment planning, visualization, and interventional guidance for a wide variety of procedures. Toshiba Medical's ImagingRite advanced applications give clinicians the tools they want to obtain the images they need during challenging interventional procedures.

Advanced Imaging Applications

A suite of tools, enables clinicians to plan, see and guide through the process of preparing for the patient intervention and during the procedure. Combined with Vital's Vitrea™ software, clinicians have the tools to help guide them through the intervention, including:

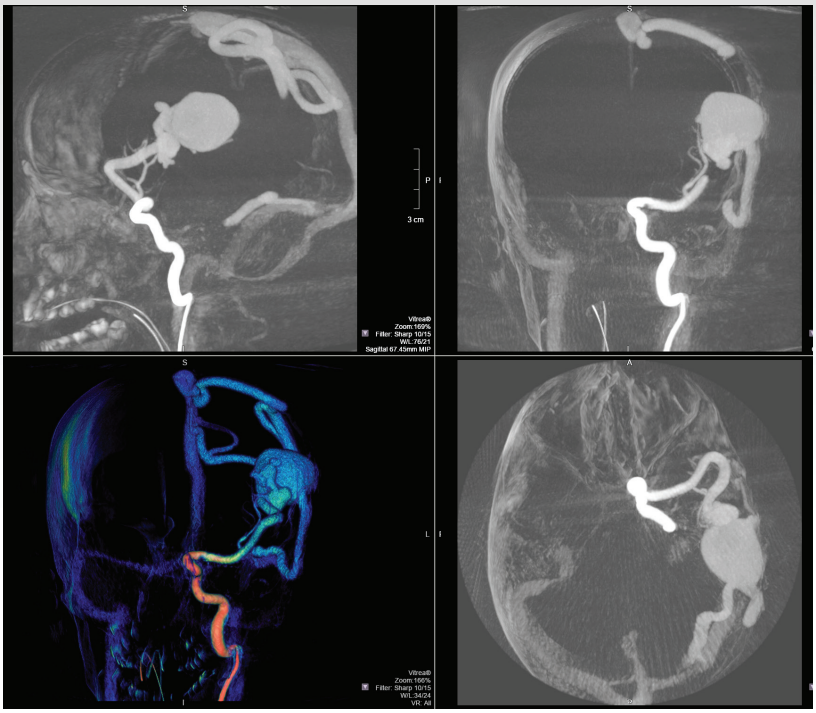
- Low Contrast Imaging (LCI- Cone-Beam CT)
- 3D Digital Angiography (3D DA) and 3D Digital Subtraction Angiography (3D DSA)
- 3D Roadmap (3DRM) and Multi-Modality Fusion (MMF)
- Needle Guidance
- Vascular and Organ Analysis software
- Parametric Imaging (PI)* and Color Coded Circulation (CCC)

Low Contrast Imaging (LCI)

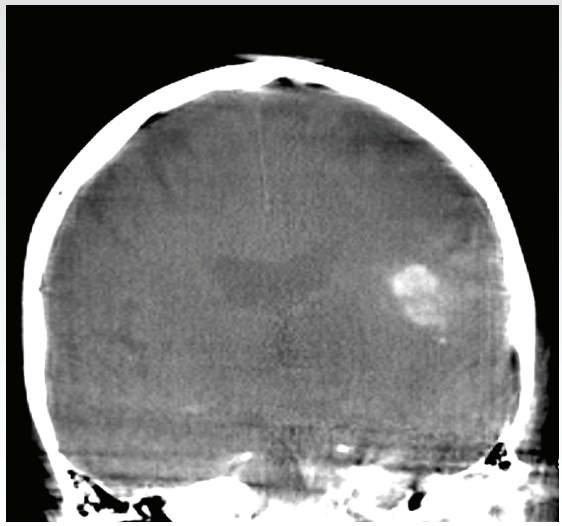
Cone-beam CT scans are derived from C-arm rotational acquisitions. The 3D reconstructed volumes can be transferred to viewing workstations. Volume Rendering (VR), Maximum Intensity Projection (MIP), Multi-Planar Reformations (MPR), axial, sagittal, and coronal views may be used to visualize the target anatomy/pathology during interventional radiology procedures. Compared to 2D images, cone-beam CT images provide 2D images, and 3D renderings of the vascular anatomy such as arteriovenous malformations (AVM), tumors and tumor feeder vessels, to aid clinicians during interventional procedures.

ImagingRite includes several processing capabilities that can be used with LCI:

- ***Metal Artifact Reduction (MAR)****
  MAR reduces metal artifacts present in images.
- ***Sub Arachnoid Hemorrhage (SAH) De-Noising***
  SAH applies appropriate noise reduction filtering that is suitable for visualizing subarachnoid hemorrhage.

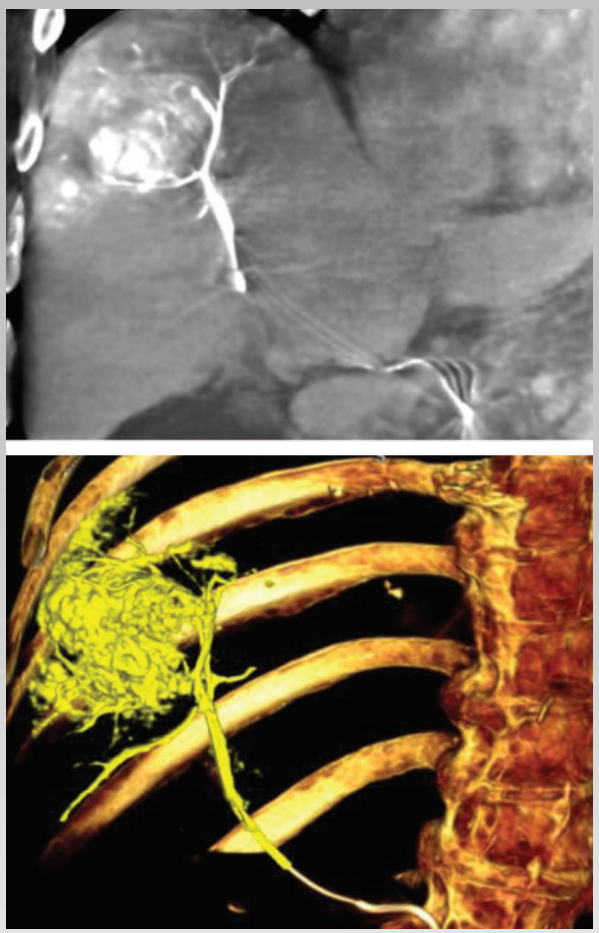


LCI of head for neuro AVM

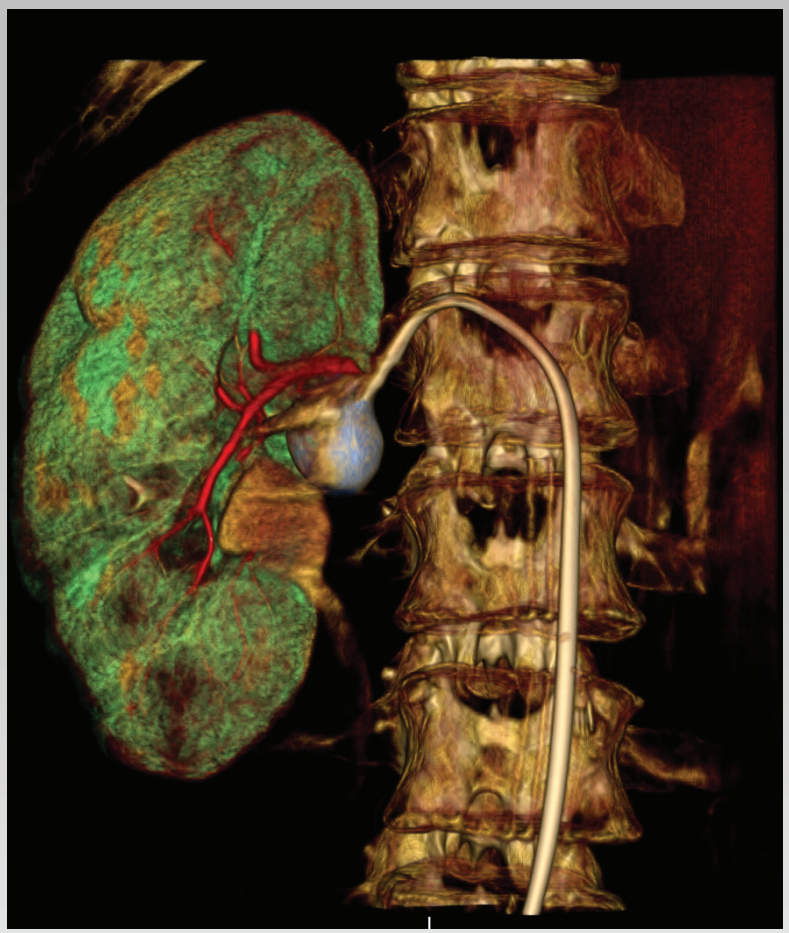


SAH processing for bleed

**Parametric Imaging is not intended for stand-alone use or diagnosis.*
***MAR software is not intended for stand-alone use or diagnosis.*

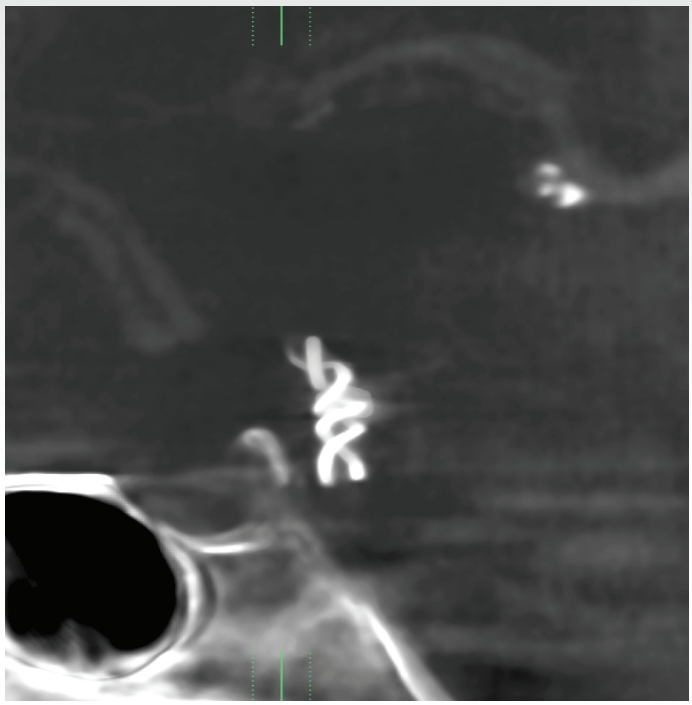


LCI of abdomen post TACE



LCI of abdomen for renal aneurysm

LCI for neuro coils without MAR



LCI with MAR for neuro coils

- ***Stent Imaging Filter***
  Another filter that is suitable for visualizing intracranial stents.
- ***Device Fusion***
  Device Fusion allows superimposition of a differently post-processed device within the blood vessel to aid clinicians during interventional procedures.

3D Digital Angiography (3D DA)

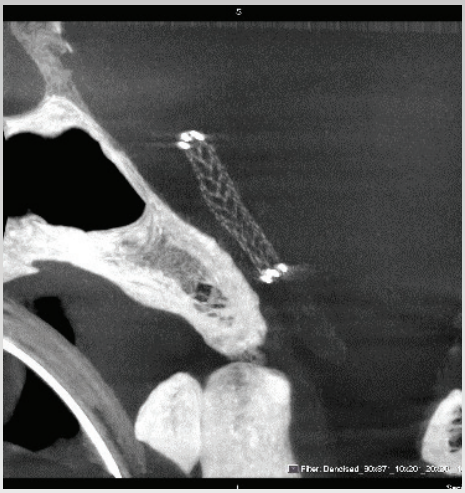
C-arm rotation with high acquisition rates can be used to generate reconstructed volumes of vascular anatomy. The 3D vessel can be rotated in any direction to aid clinicians in their diagnosis and treatment planning during an interventional procedure

3D Digital Subtraction Angiography (3D DSA)

The C-arm rotates around the patient twice for 3D DSA acquisition protocols. The first spin is acquired without contrast, and the second one with the injection of contrast. The data acquired from the two spins are automatically subtracted, removing bones throughout the entire rotation. As a result, the 3D DSA reconstructed volumes depict only the contrast filled vascular anatomy.

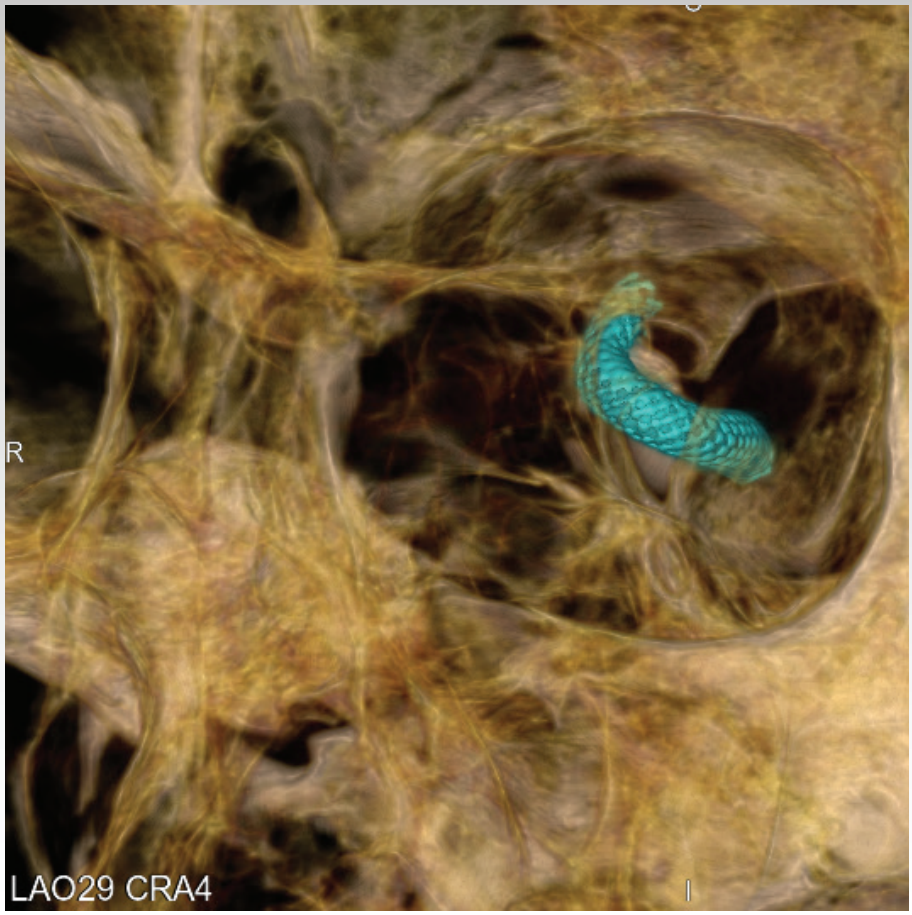
Volume Navigation

Real-time volume navigation 3DRM with the Infinix-i system links every movement of the C-arm and table position with the 3D fused volume and fluoroscopic display. Regardless of changes in table position, Source-Image-Distance (SID), Field-

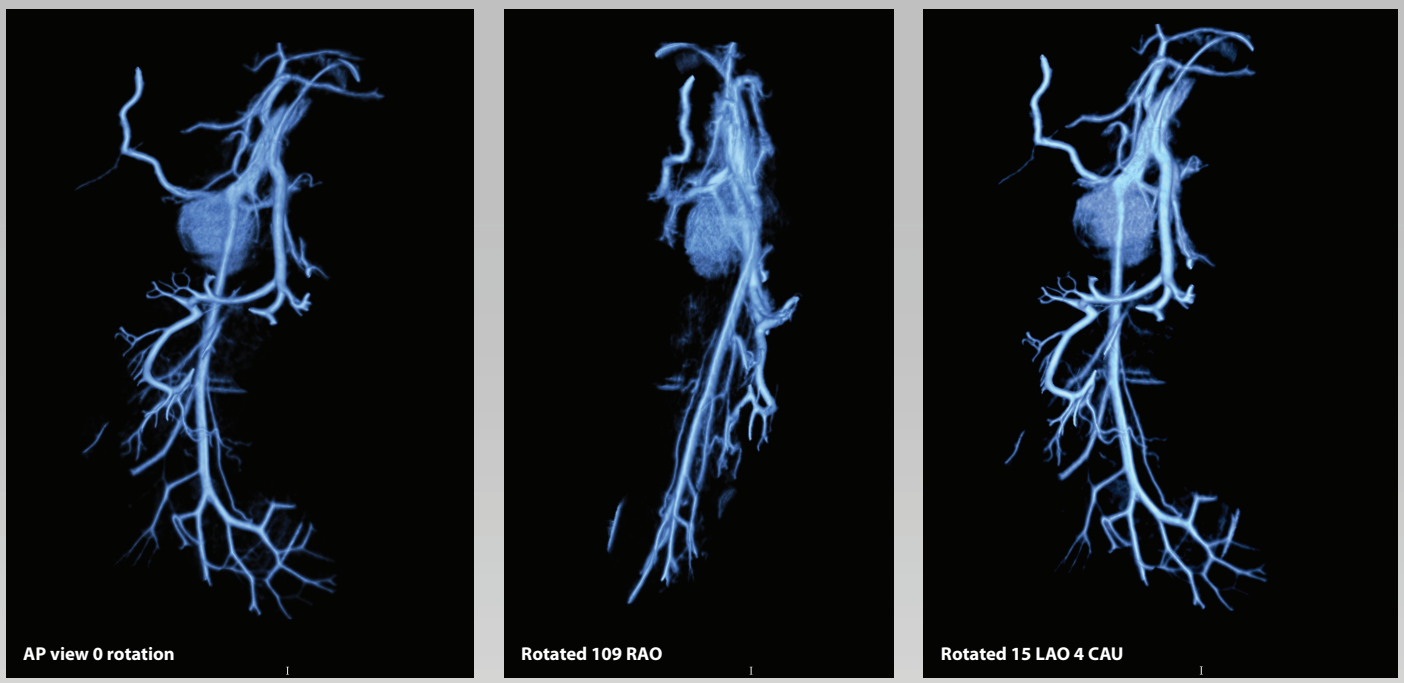


Stent LCI for neuro imaging

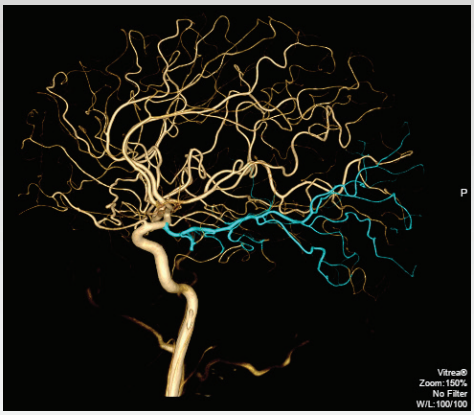
Device fusion shows coil placement



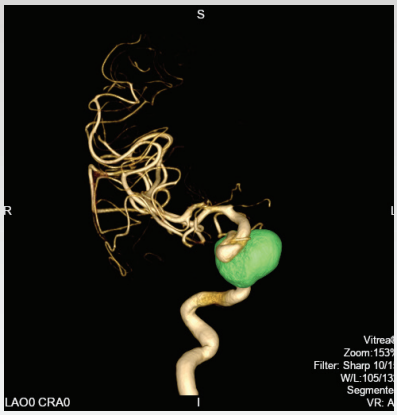
Stent LCI through cavernous sinus



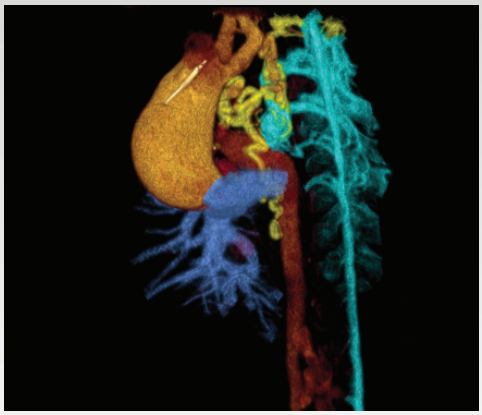
3D DA of superior mesenteric artery showing location of false aneurysm



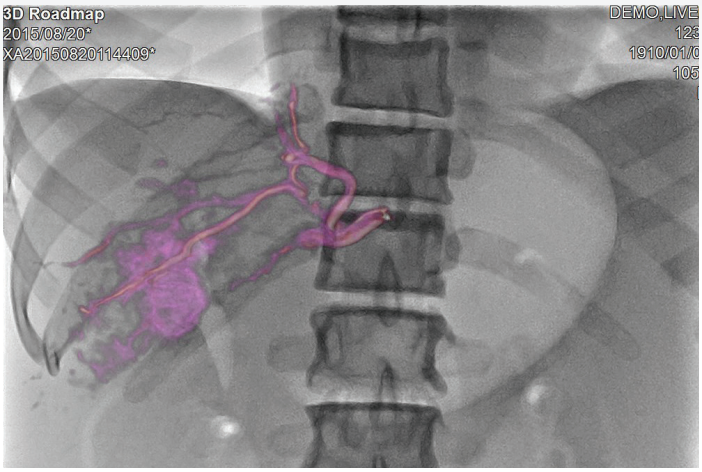
3D DSA lateral view carotid artery



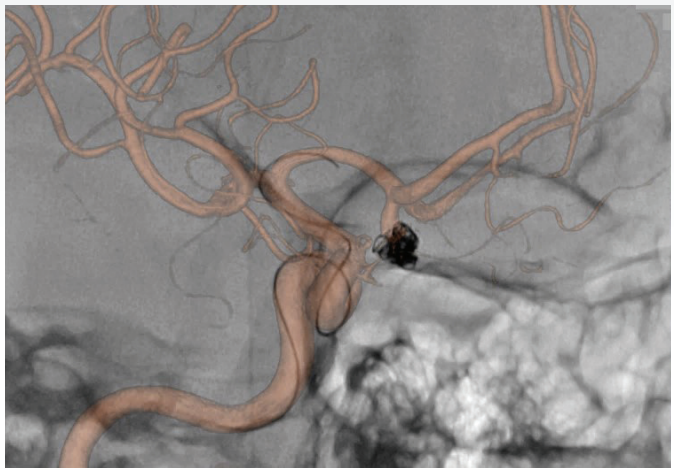
3D DSA carotid artery aneurysm



Peds 3D DSA of aorta shows collaterals



3DRM using arterial injection of a LCI for tumor feeders



3DRM used for cerebral aneurysm coiling

of-View (FOV) or C-arm angulation, the 3D overlay remains consistently aligned with the fluoroscopic image provided.

MMF

Using Vital software analysis tools, a 3D enhanced image previously acquired by CT, MRI or an angiographic system can be superimposed and displayed with live fluoroscopy.

Needle Guidance

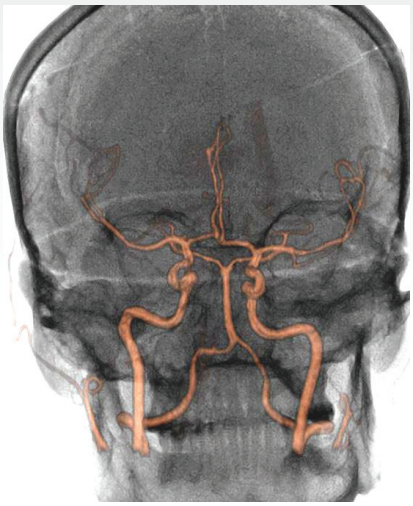
Needle guidance supports real-time navigation of needle insertion during percutaneous procedures; such as biopsy or RF ablation. Needle guidance software identifies the optimum point of needle entry and distance to the targeted anatomy. Acquired LCI or 3D DA images are superimposed over the live fluoroscopic image to provide visualization of anatomical structures during the procedure.

Vitrea Advanced Visualization Software

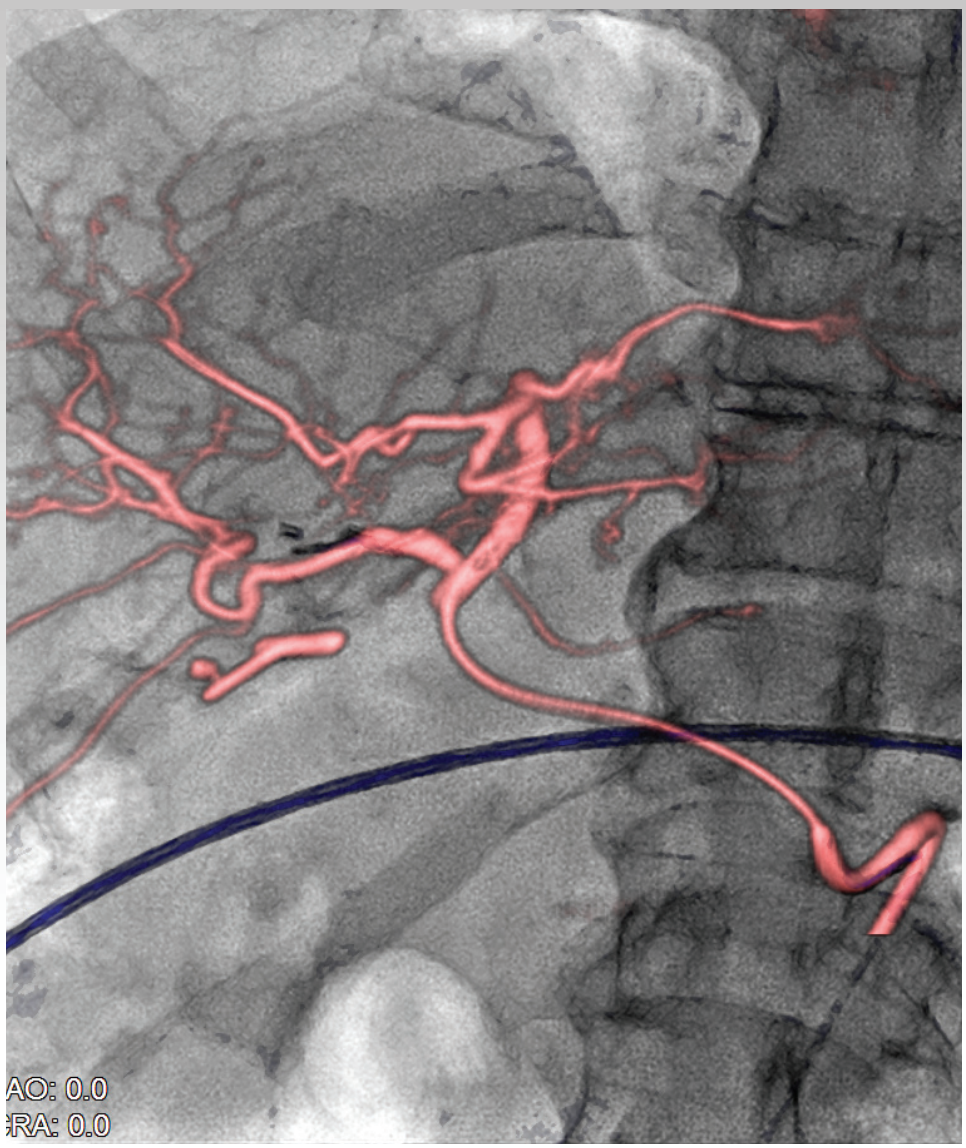
Vitrea software enables the visualization and analysis of 2D, 3D and 4D images of anatomy and physiological functions using CT (computed tomography) and MR (magnetic resonance), PET, Ultrasound and XA scan data, giving medical specialists time-saving, Web-accessible tools for greater productivity.

MMF

CT fusion for endovascular aortic repair

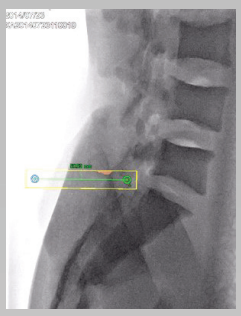


MR fusion showing Circle of Willis

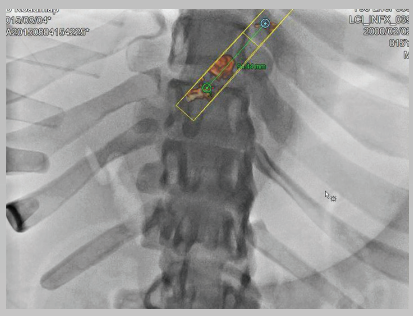


CT fusion of segmented liver vessels

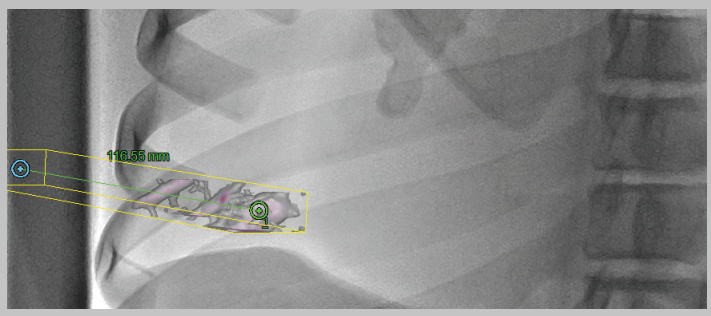
Needle Guidance



Lumbar puncture

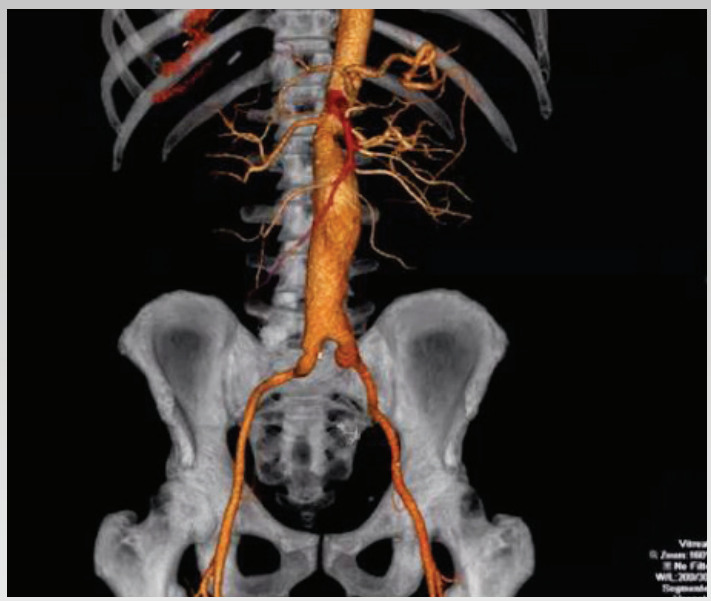


Liver lesion biopsy



Lung lesion biopsy

CTA Carotid software



CTA Vascular Aorta software

CTA Renal software

Software Applications included are: CT Liver Analysis, CT Endovascular Stent Planning (EVSP), CT Renal, CT Runoff, CT Vascular Aorta, CT Carotid, and CT Circle of Willis.

EVSP enables visualization and measurements of aortic vessels for evaluation, treatment and follow up for aortic vascular disorders. It performs automatic 3D segmentation of the aorta and initializes stent measurements, based on a template provided by stent manufacturers for a highly efficient workflow.

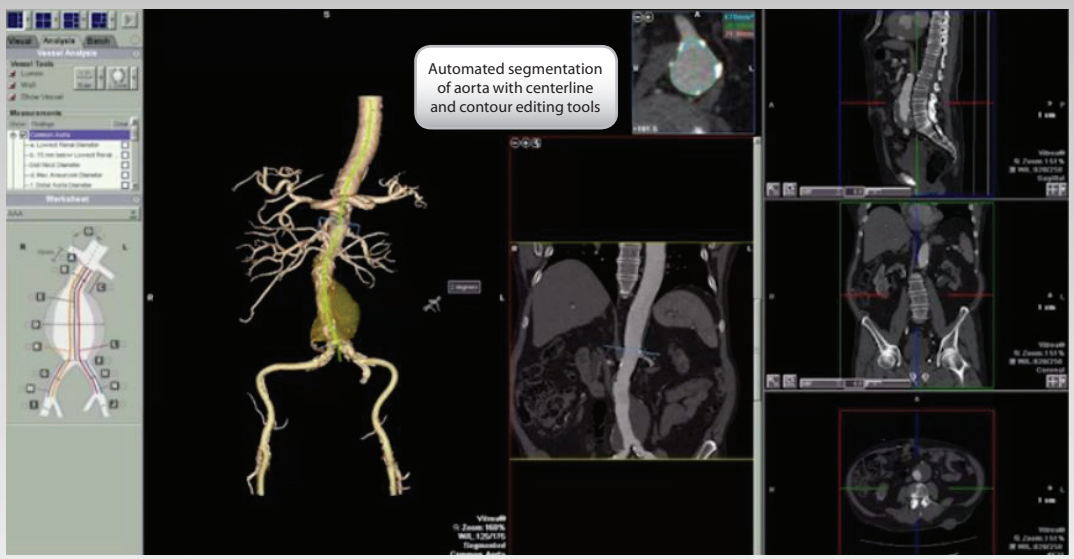
CT Liver Analysis provides tools for segmenting and quantifying the liver and liver-related tumors. It provides automatic registration for display of multiple series, optimized screen layouts and quantification tools for routine clinical measurements.

PI

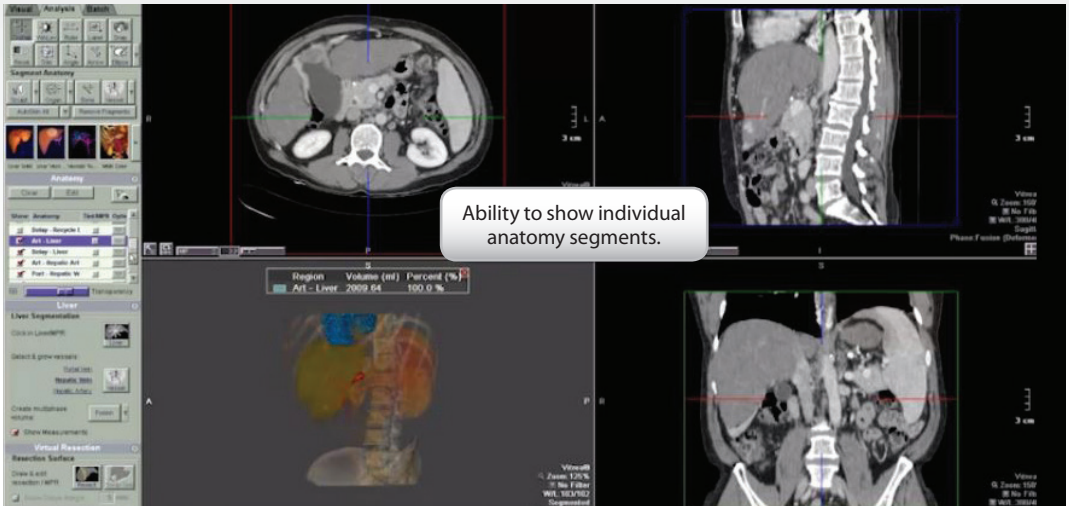
PI assists with the visualization of hemodynamic properties in interventional procedures. Time-density curve parameters are calculated for each pixel of a 2D DSA image and each pixel is color coded based on the respective calculated values. Pre and post procedural PI maps can help in the visualization of blood flow changes. The images show PI maps of time-to-peak values with red to blue colormaps representing fast to slow flow.

CCC

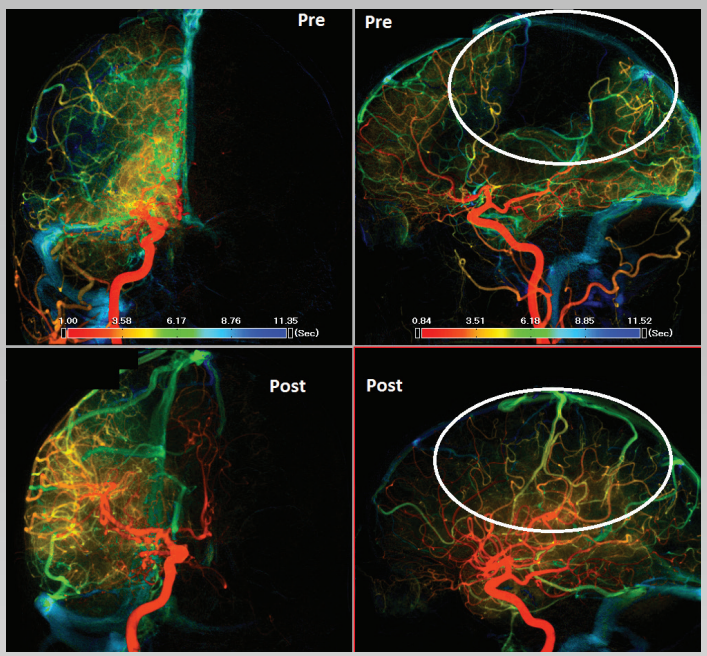
CCC creates a movie by shifting color scale gradually, enabling clinicians to more easily understand vascular flow dynamics.



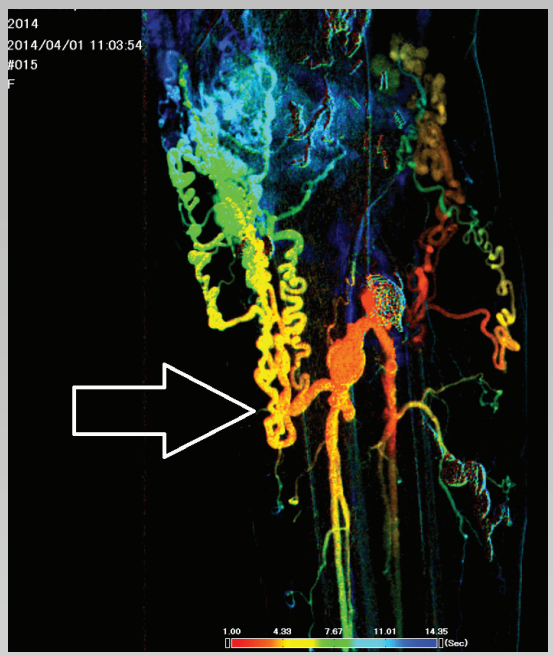
EVSP software



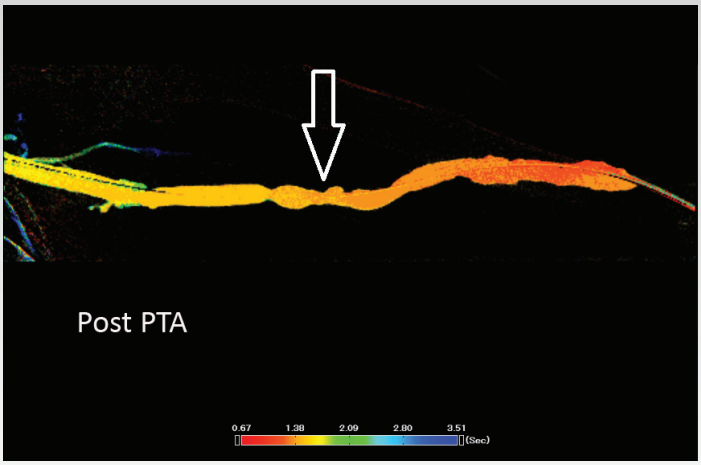
CT Liver Analysis software with tumor probe

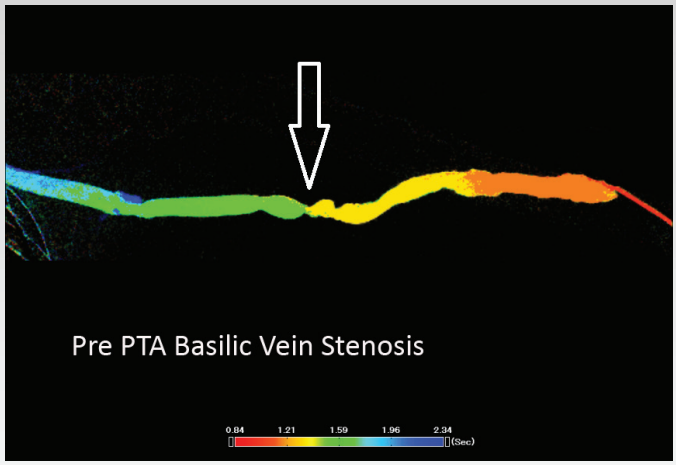


Pre and post lysis of patient with a cerebral stroke

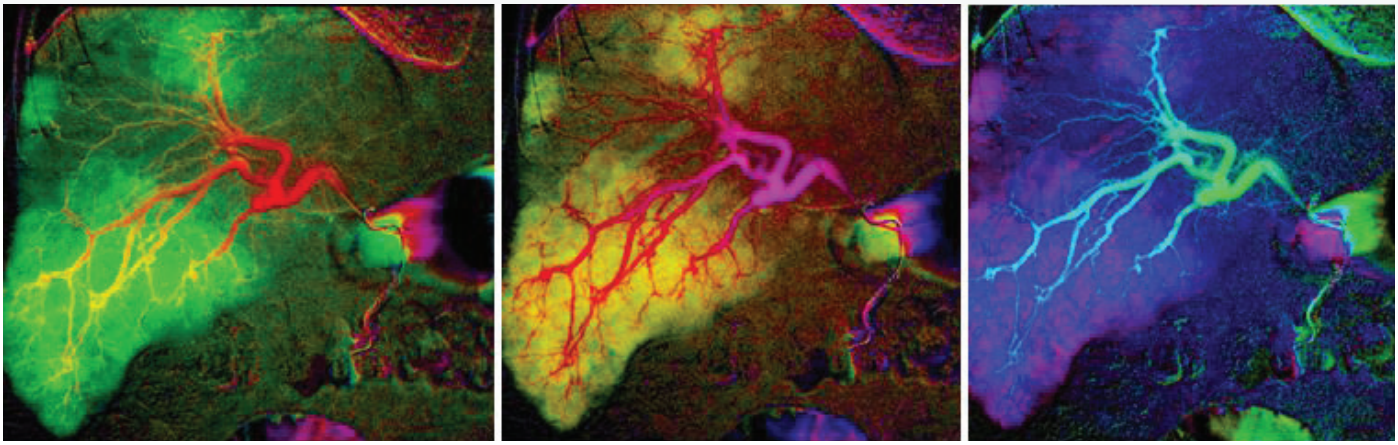


PI of upper leg showing the shunt in the AV fistula





Pre and post angioplasty of basilic vein stenosis showing differences in color flow.



CCC representation of the flow of blood through the liver.

Conventional Imaging in Interventional Radiology

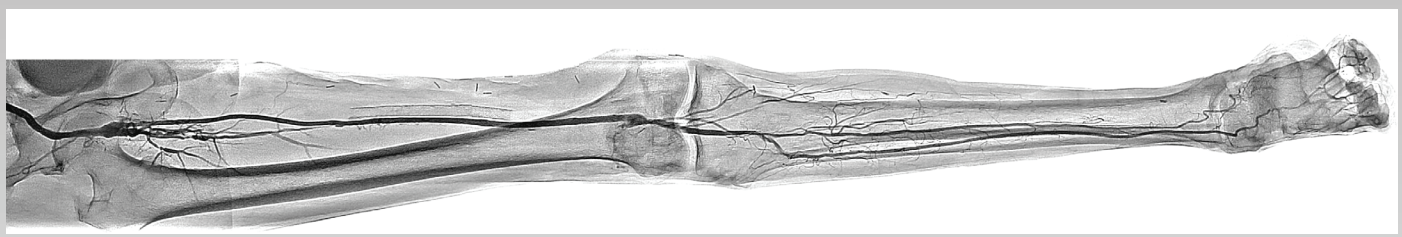
Dynamic Trace (DT)

DT is a digital acquisition method used in a panning mode to enhance vascular imaging by increasing background compression and reducing the presence of bones.

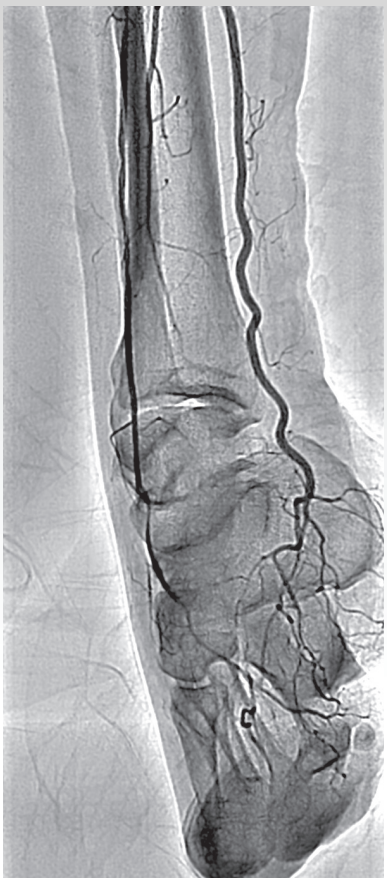
Stepping DSA

Infinix-i offers stepping DSA to help clinicians adhere to the ALARA (as low as reasonably achievable) principle. By utilizing traditional stepping DSA, clinicians can alleviate the additional exposure to the patient and operator. DSA images of the abdomen to the feet are acquired by moving the table in a series of stages, up to a maximum of eight stages depending on the length of patient. The number of stages depends on how long it takes for arterial flow (contrast) to reach the feet.

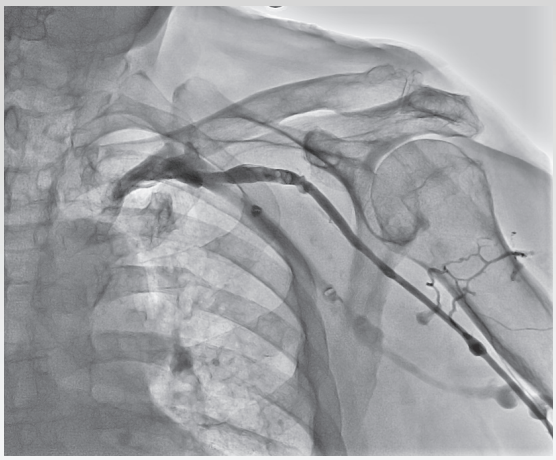
Obtaining DSA images requires clinicians to acquire two runs. The first run takes a mask of each stage starting at the feet and reaching the abdomen. The second run is performed with the injection of contrast while the table is moved or stepped. The clinician follows the injection of contrast while stepping the table from the abdomen to the feet.



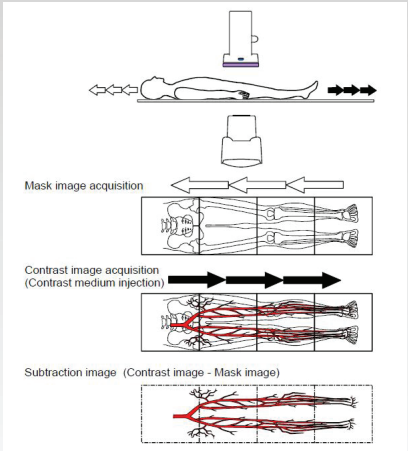
DT enables clinicians to acquire digital acquisition with the flow of contrast while panning the table.

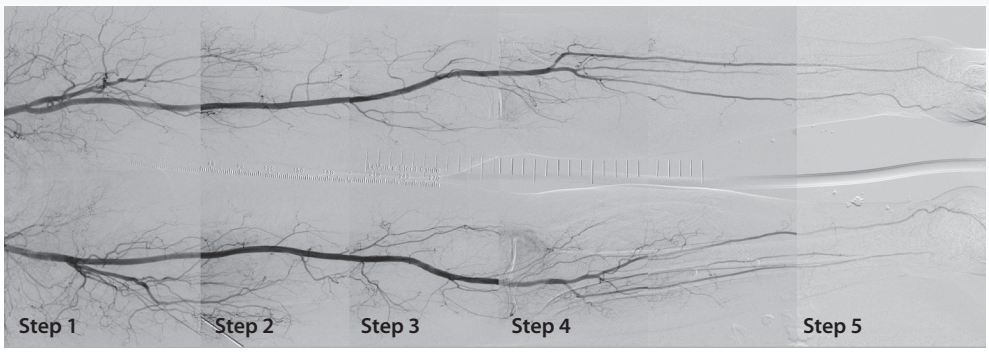


DT fluoro record of foot



DT of a left shoulder venous injection





All steps can be merged with the panoramic view software

DoseRite™

The Infinix-i systems also feature comprehensive dose management tools, called DoseRite, including our exclusive Spot Fluoroscopy, Live Digital Zoom, and Dose Tracking System (DTS), enabling clinicians to obtain optimum image quality at reduced dose.

Spot Fluoroscopy

Spot Fluoroscopy provides asymmetric collimation anywhere within the field of view resulting in lower dose and a larger image display area than conventional collimation. Clinicians can observe a smaller region of anatomy while viewing the Last Image Hold (LIH) surrounding the area.

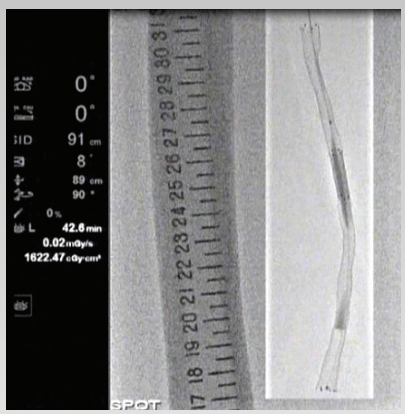
Live Digital Zoom

Live Digital Zoom enhances image visualization by increasing image display size in real time during both fluoroscopy and digital acquisitions, offering potential dose savings compared to traditional FOV magnifications.

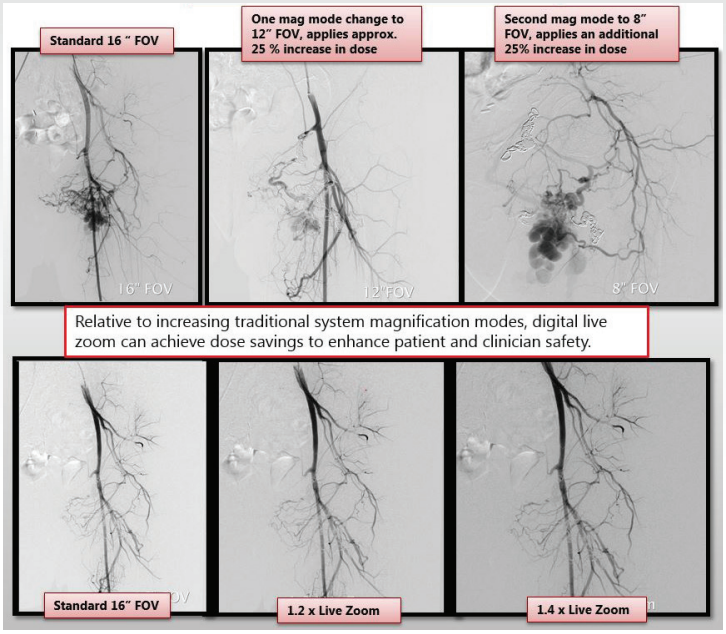
DTS

DTS provides real-time patient skin dose estimates in an easy-to-interpret color representation of radiation exposure to the patient. Real-time feedback of radiation exposure enables the clinician to make adjustments during the procedure.

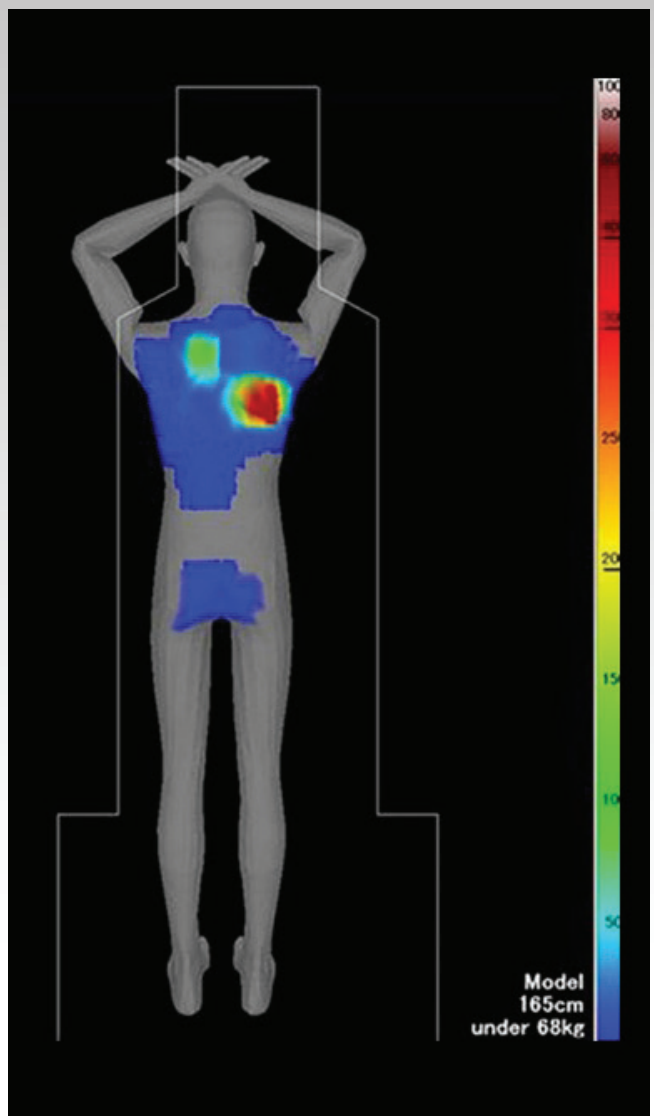
Conventional collimation



Spot Fluoroscopy



DSA of lower extremity



Estimation of peak skin dose available on cardiovascular/ neurovascular procedures

Made For life