

PARIS

**JOURNEES INTERNATIONALES
ET FRANCOPHONES
ANGEIOLOGIE**

2014

Les nouvelles technologies

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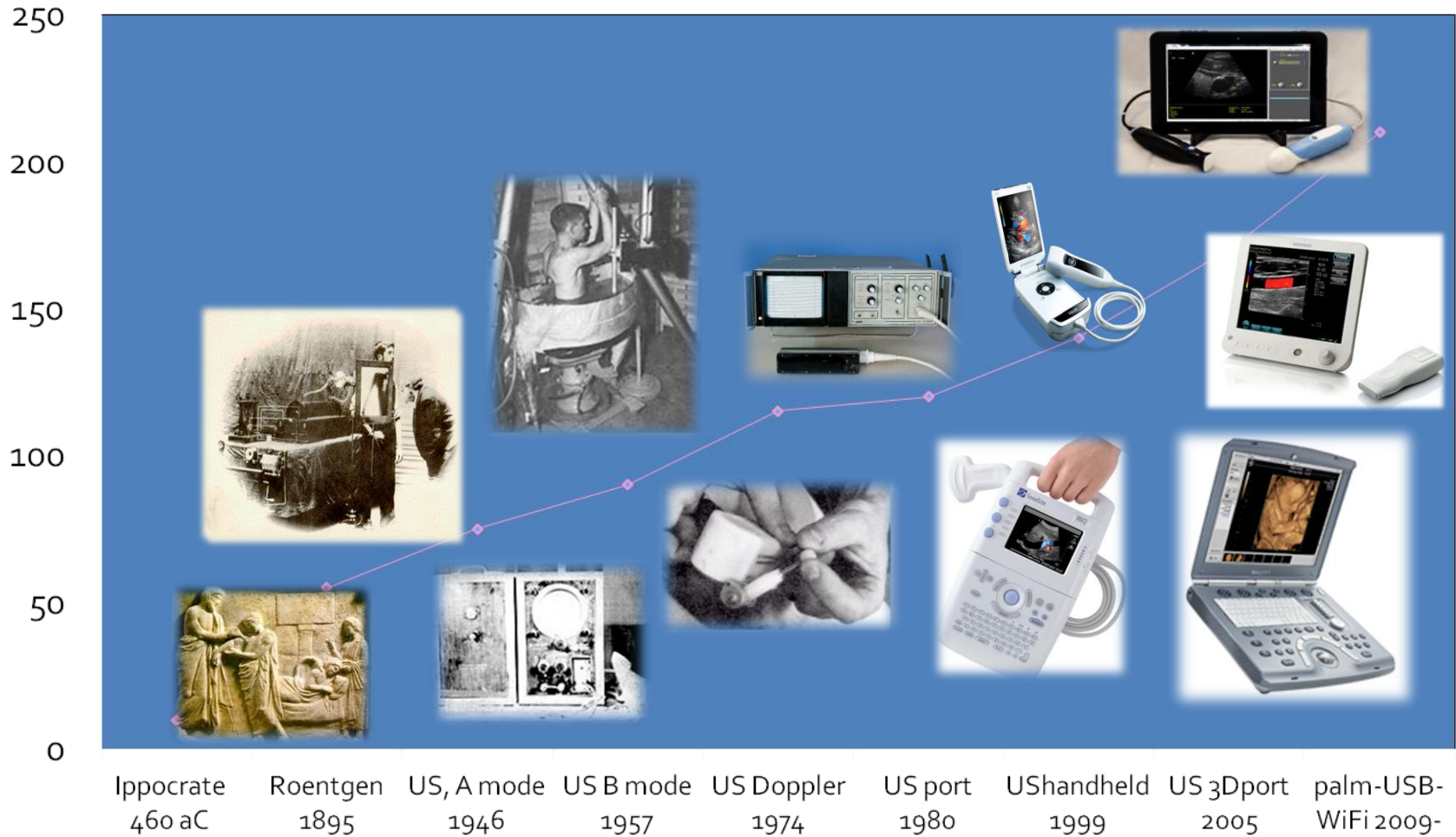


**The author declares
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in this report.**

The Clinical Examination

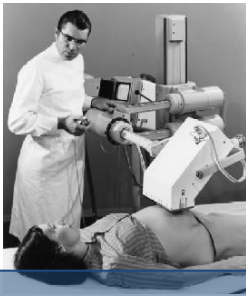
historical and technical evolution

Diagnostic accuracy by time and instruments



Pioneering Ultrasound

First system with
Ultrasound realtime



More than 17.000
Systems in the world



First handpocket
Ultrasound system



First volumetric
cardio-system



First wireless ultrasound
system in the world



1953 1968 1983 1996 2006 2007 2008 2009 2010 2013



Used by Edler and Hertz
to perform the first
echocardiography



First ultrasound system
computer assisted



Vectorial method for the
study of the cardiac walls
movements



New elastography method
on echo-image



First automatic system for
volumetric breast
echography

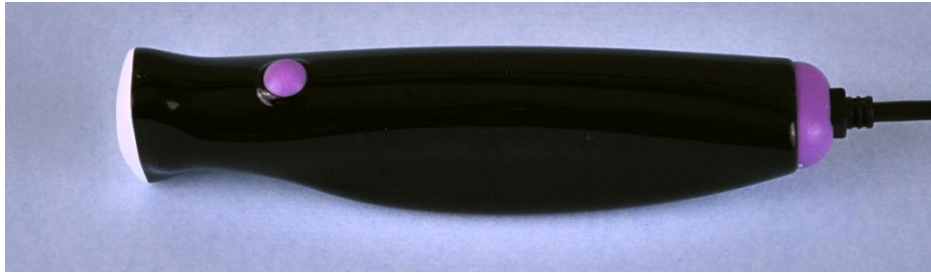
Market analysis

ultrasound 2013

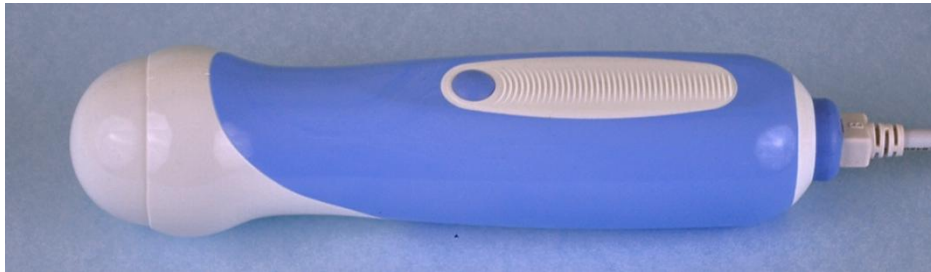
- Market of medical ultrasound devices (Markets and Markets)
 - 2011: \$5.6 billion
 - 2017: predicted to reach \$8.1 billion
- Fastest-growing market categories
 - US systems for EM, anesthesiology and interventional musculoskeletal applications
- Worldwide demand for portable point-of-care diagnostic tools will focus on
 - **smaller device size**
 - **low cost**
 - **better image quality**

Interson SeeMore™ probes

USB 7.5 and 3.5 MHz



SR 7.5 MHz



GP 7.5 MHz

- SeeMore software is installed on the computer and the probe(s) are connected. After the USB drivers are automatically installed, the SeeMore application may be opened to control the probe and display real-time images.
- Auto Scan mode. Save, send, and print images. Built in measurements, calculations, and patient reports.
- Computer Operating System – Windows 7 or Windows 8
- Minimum processor – 2.5 GHz (or 1.6 GHz if Intel - i5)
- Minimum RAM – 4 GB
- USB 2.0 port
- Minimum Display - 1366 X 768 resolution, 32 bit color, IPS
- Plugs into the USB 2.0 port 32 of any MS Windows laptop or tablet, with instant on function
- Fully Digital B mode, 256 shades of gray scale. Real time, 15 frames per second.

Panasonic Toughbook

CF-H2 Health



- Windows® 8 or 7 pro Intel® Core™ i5 3437U vPro™ Processor
- 4GB DDR3L SDRAM (max. 8GB), 500GB HDD (SATA) or 128GB SSD, Intel® HD Graphics 4000, USB 3.0, LAN and Serial Port , WLAN Advanced-N 6235 802.11 a/b/g/n, 3G Mobile Broadband (HSPA+)
- 10.1" sunlight-viewable TFT plus LCD, 1024 x 768 res, with Dual Touch (up to 6.000cd/m² reflective brightness)
- Vibration and shock resistant (90 cm drop), Water , alcohol wipe and dust resistant
- Lightweight 1.58kg, 274mm × 268mm × 58mm
- Dual hot swappable batteries (up to 7 hrs life)
- Integrated Barcode Reader , Contact Smartcard Reader, 3MP Camera, GPS, Fingerprint Reader



Computer Operating System – Windows 7 or Windows 8

Minimum processor – 2.5 GHz (or 1.6 GHz if Intel - i5)

Minimum RAM – 4 GB

USB 2.0 port

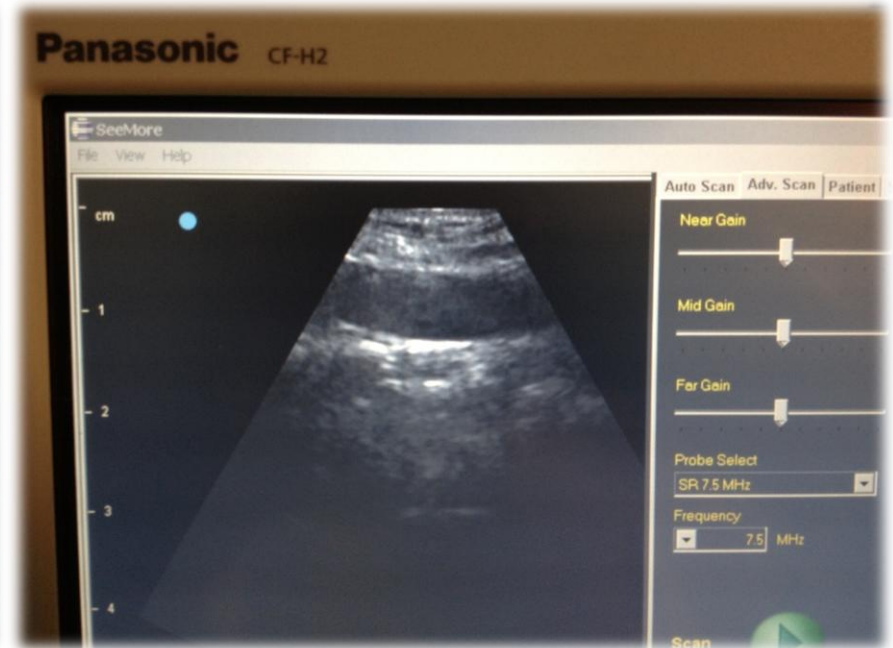
Minimum Display - 1366 X 768 resolution, 32 bit color, IPS

USB-probe Ultrasound System

Interson SR 7.5 MHz & Panasonic Toughbook CF-H2

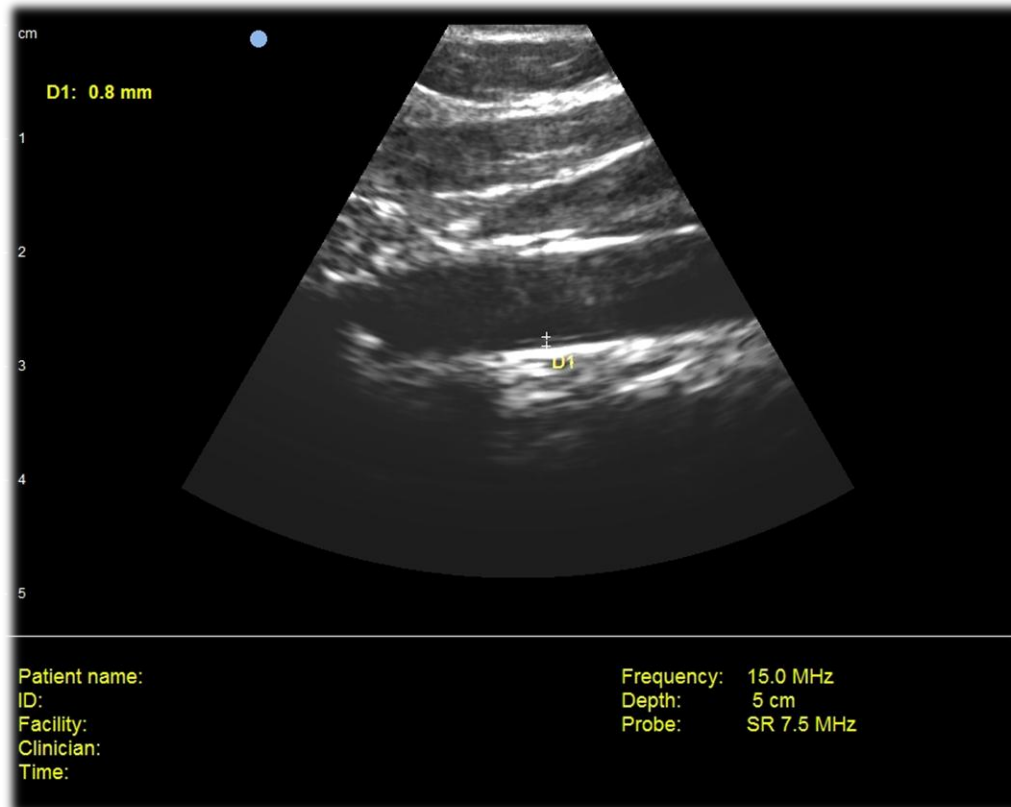


The system setup



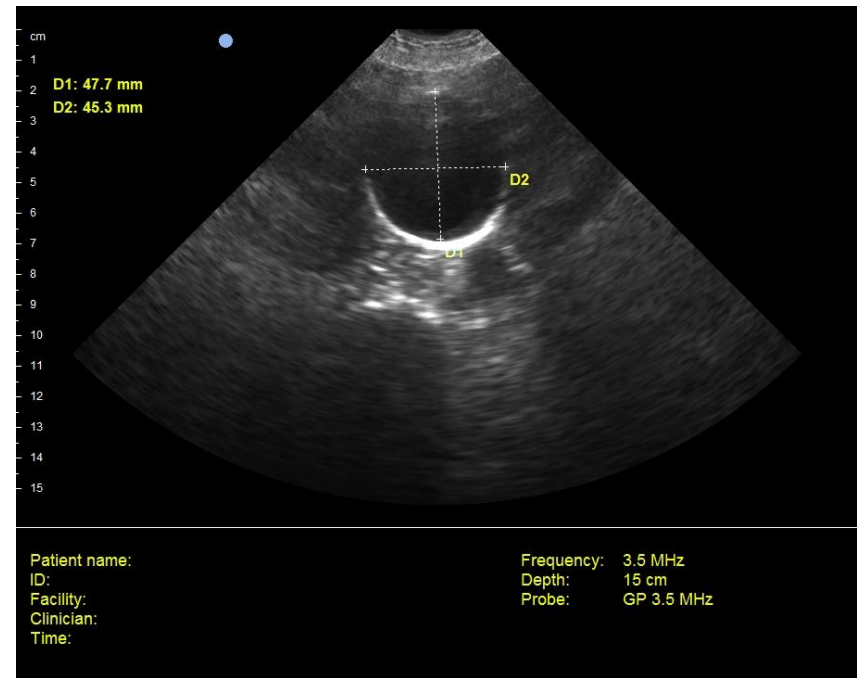
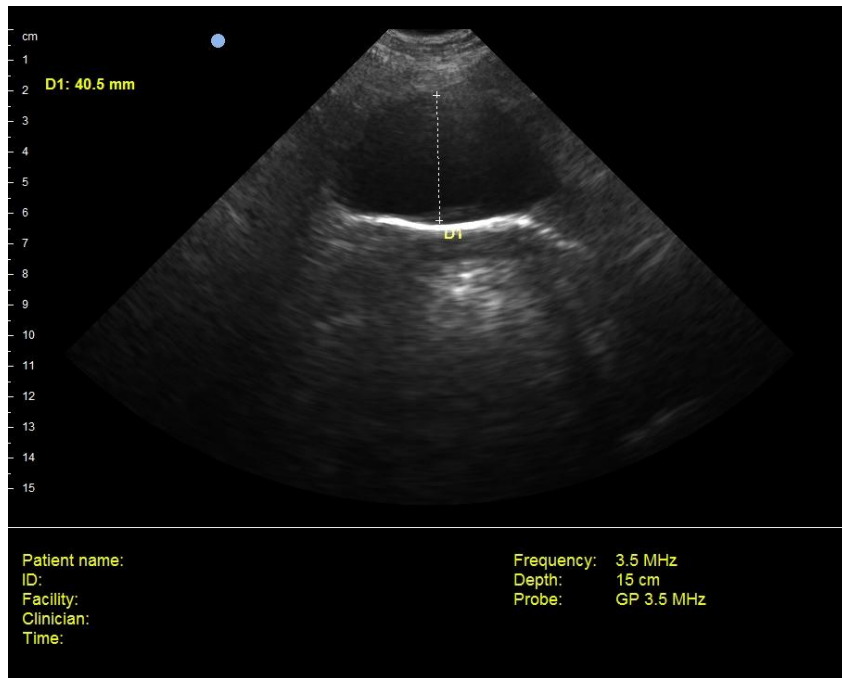
The SeeMore™ software imaging

Angiology



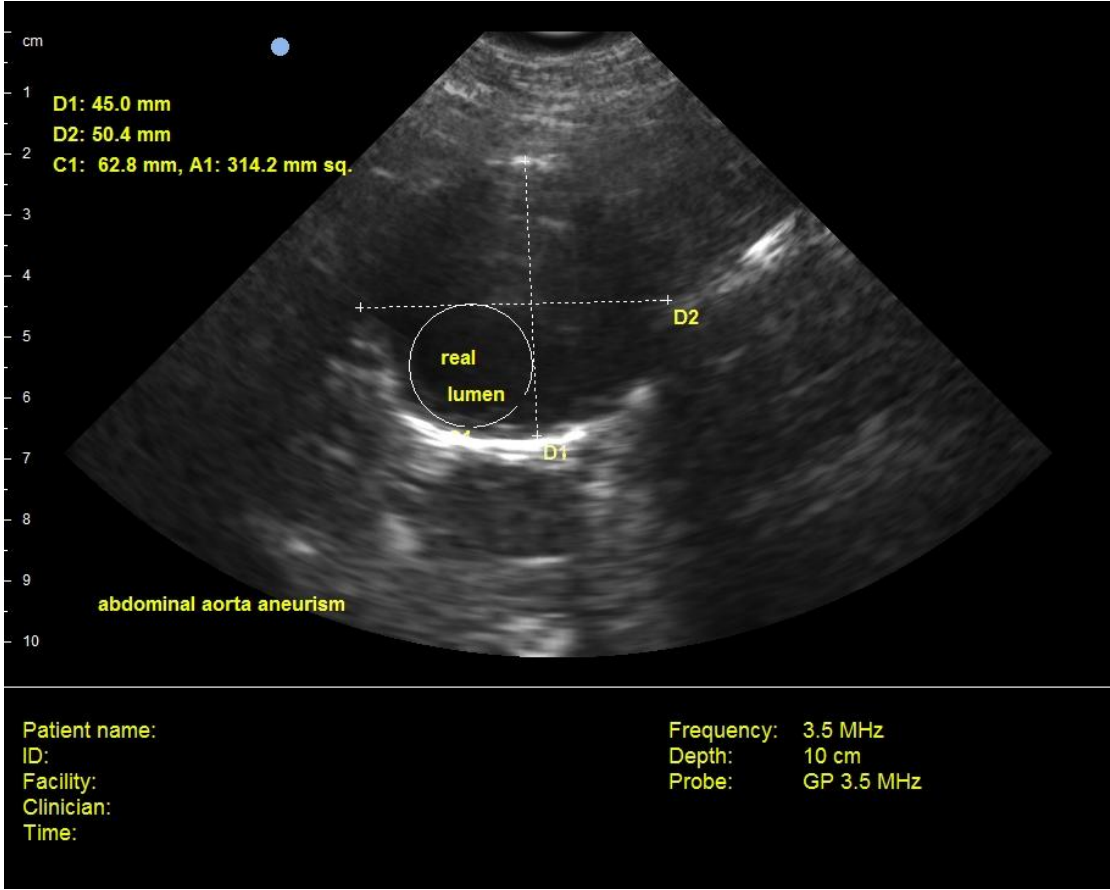
IMT left carotid

Angiology



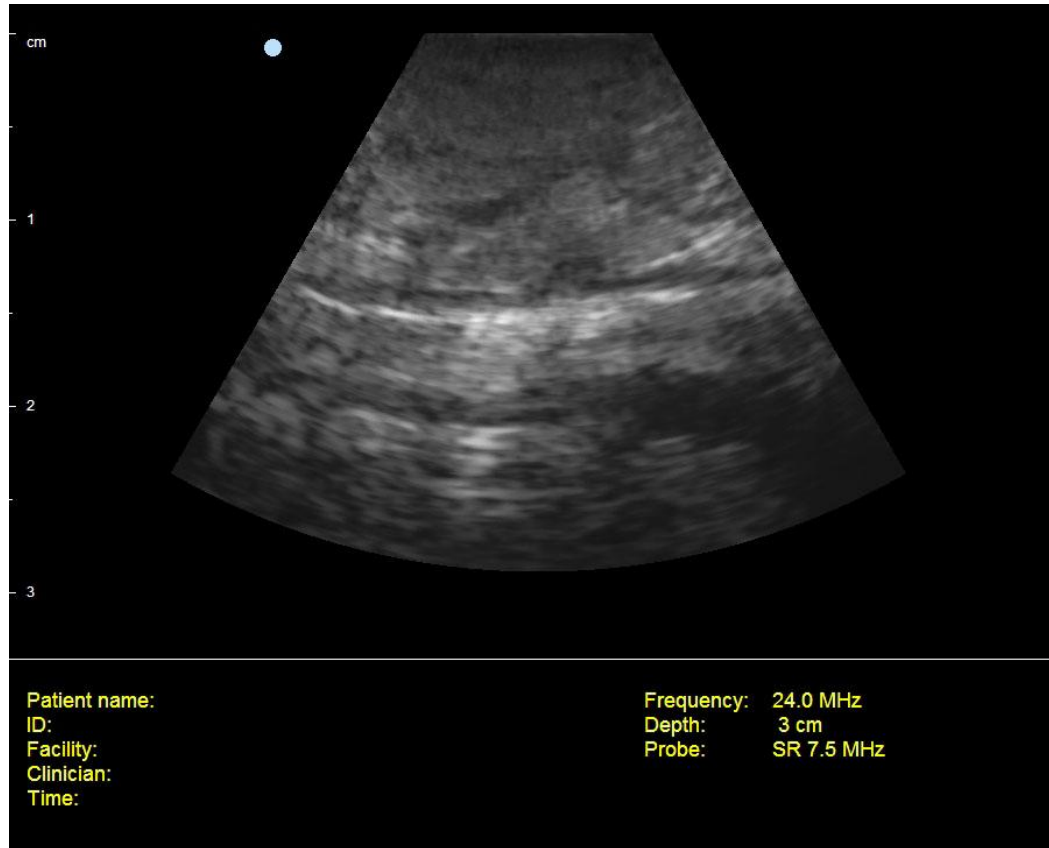
Abdominal aortic aneurism

Angiology



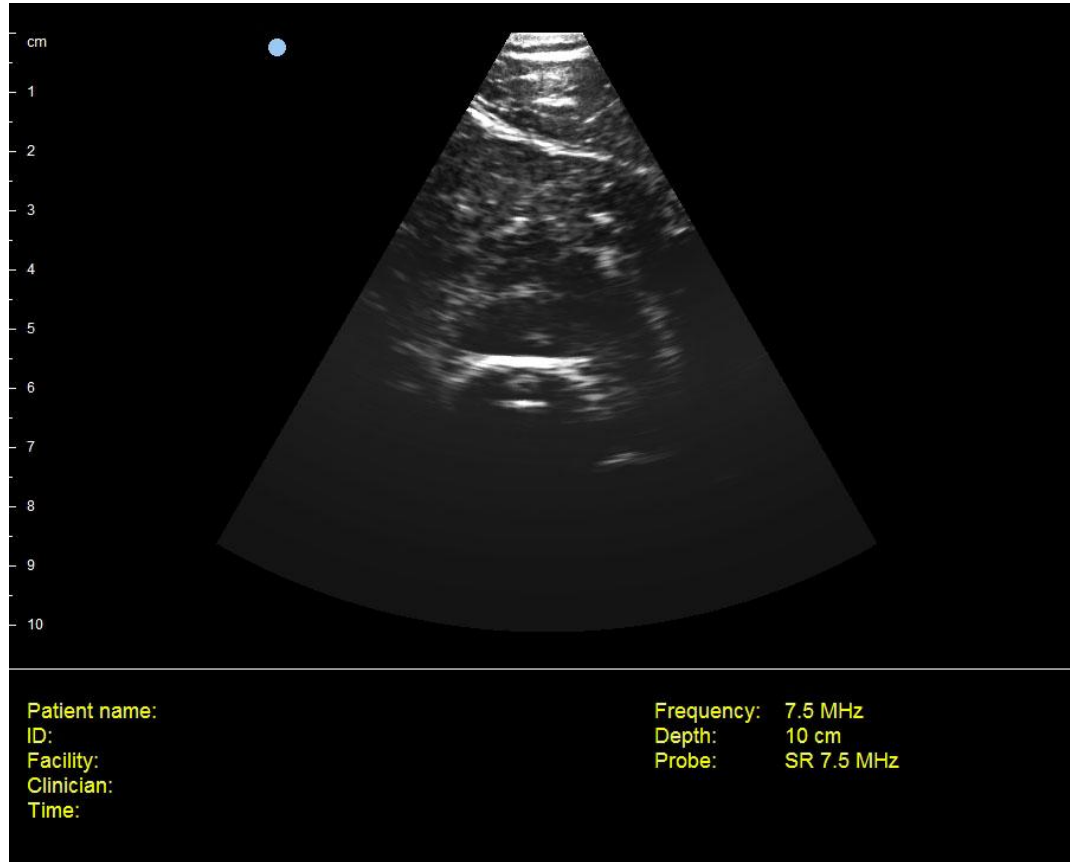
Abdominal aortic aneurism

Angiology



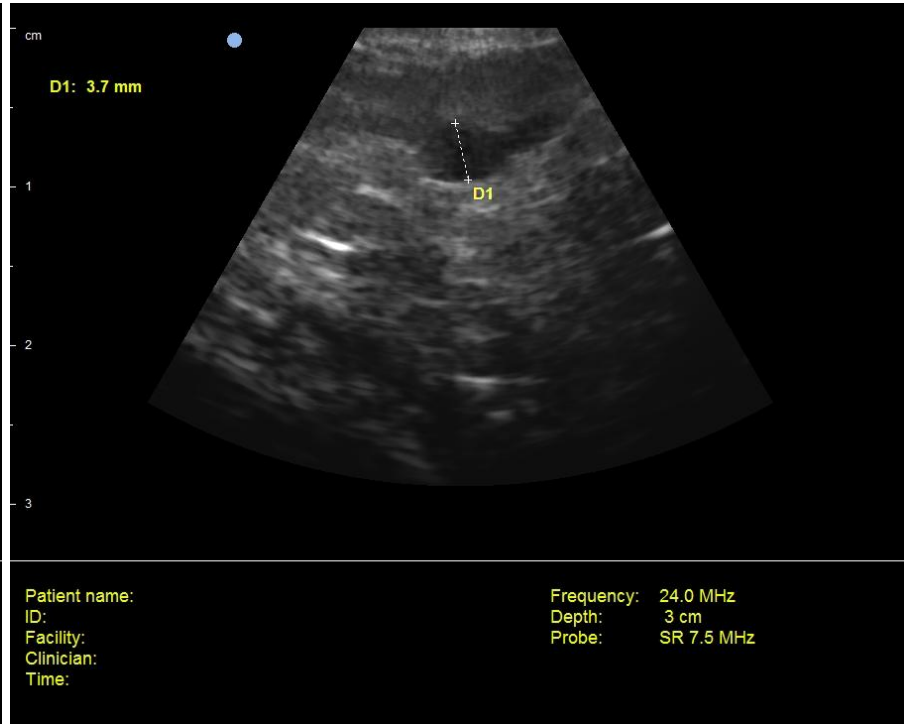
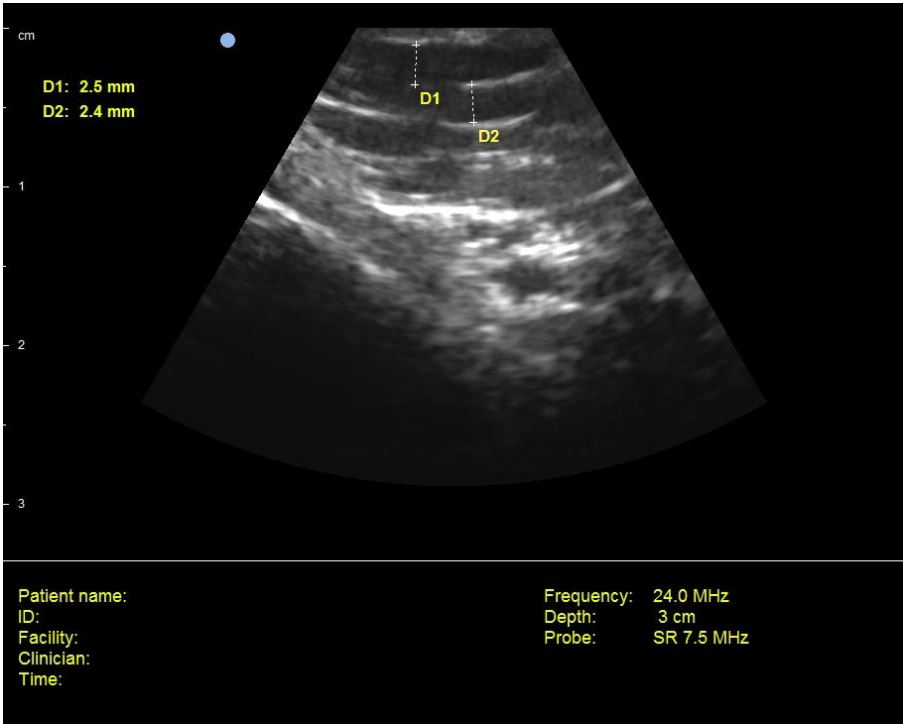
Subcutaneous edema

Angiology



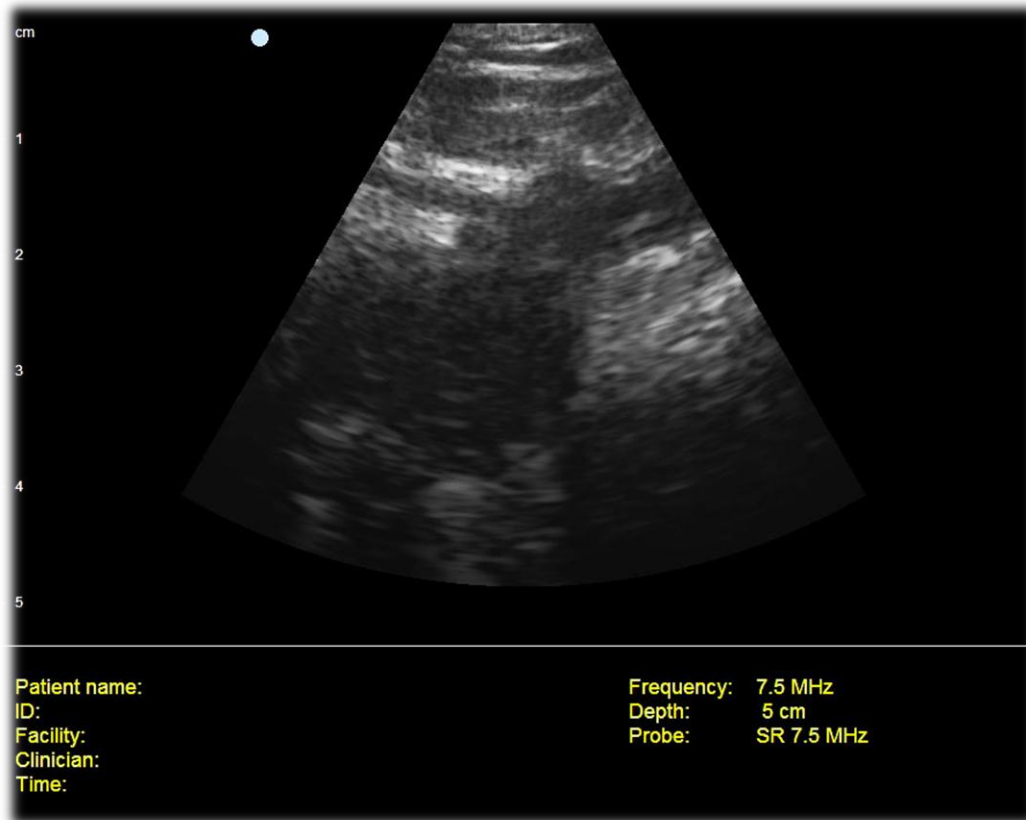
Muscular (quadriceps) haematoma

Angiology



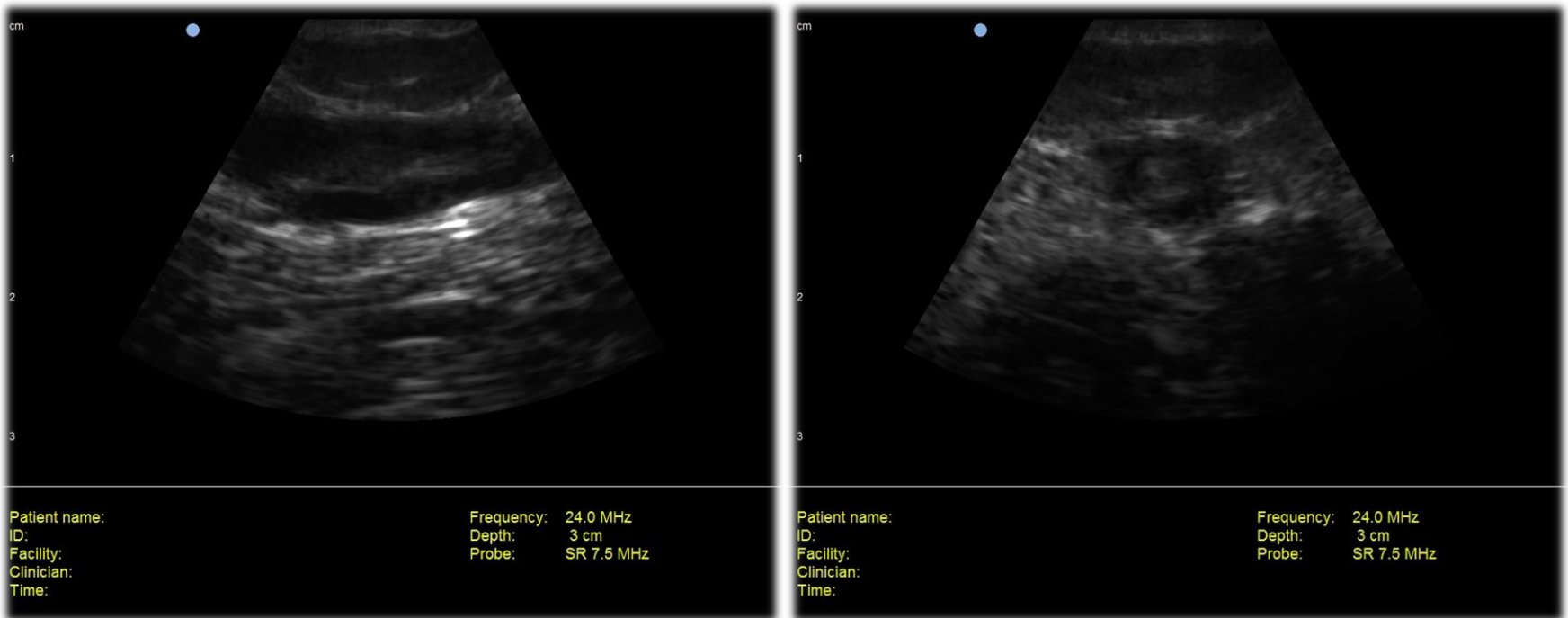
Varices

Angiology



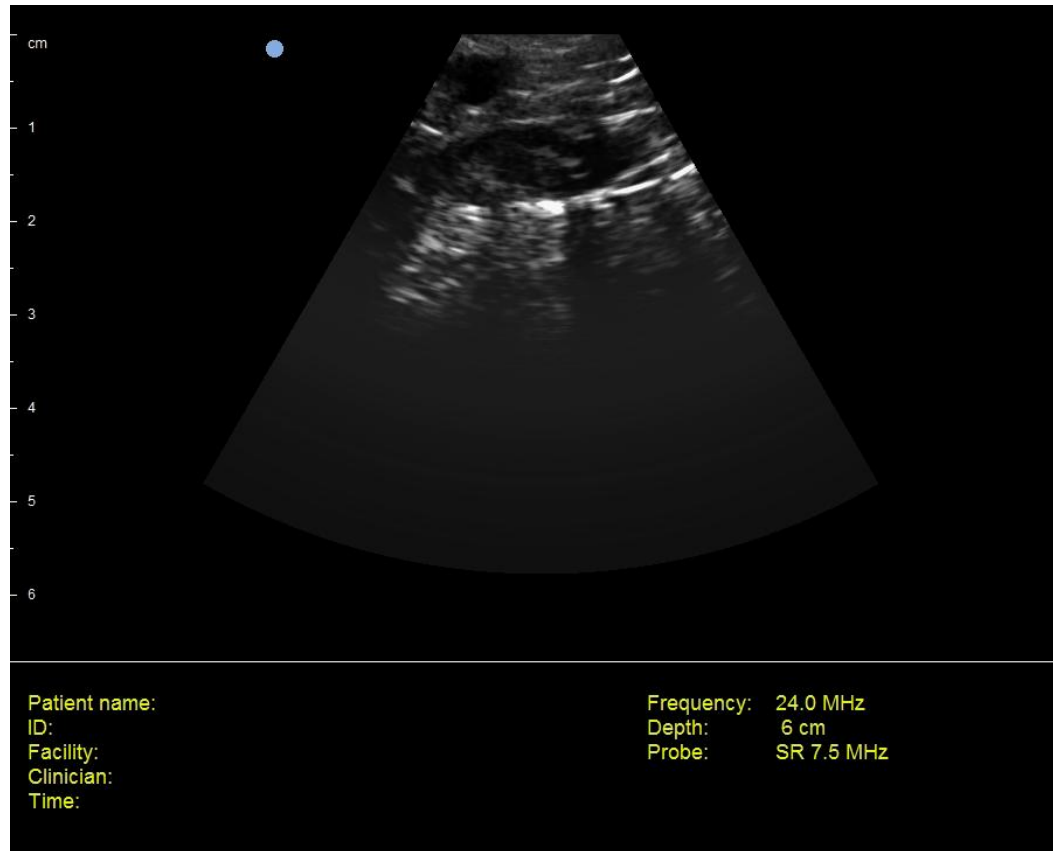
Deep femoral vein (and cross) venous thrombosis

Angiology



Superficial thrombosis of the right saphenous vein
(longitudinal and trasversal)

Angiology

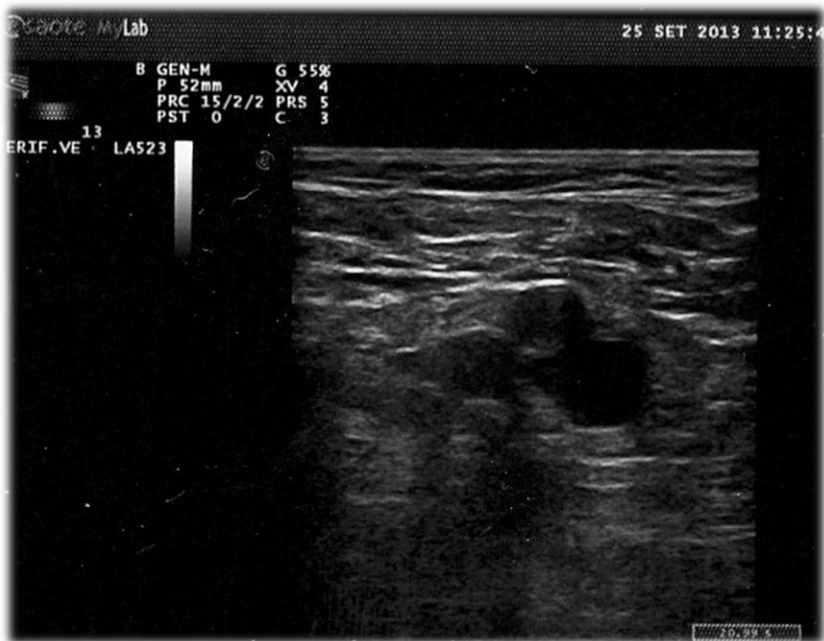


Superficial venous thrombosis

Bedside ultrasound in IM

head to head comparison

std US machine



USB-probe



Mickey Mouse sign

USB-probe Ultrasound **Pros** and **Cons**

PROS

- Very light and small US tablet/laptop system (1-1.8 kg)
 - *Patientside vs. bedside*
- Fast and simple use
 - *Instant on (40 sec), autoscan, U-button record video, cloud ready, PDF reports,*
- Low price
 - *1/3 to 1/4 vs. handheld US (6,000 -8,000 USD)*

CONS

- No Doppler
- Low resolution if compared with std US machines

In this setting and in pre-hospital examination as well, *USB-probe US may be cost-effective* vs standard HUSD for the detection of acute conditions which need prompt treatment

DVT, ascites, hydronephrosis, pleural effusions
for better orienting the clinical course

The dream
of
every
echographer

Cordless
Wireless



The first cordless ultrasound probe wireless assisted

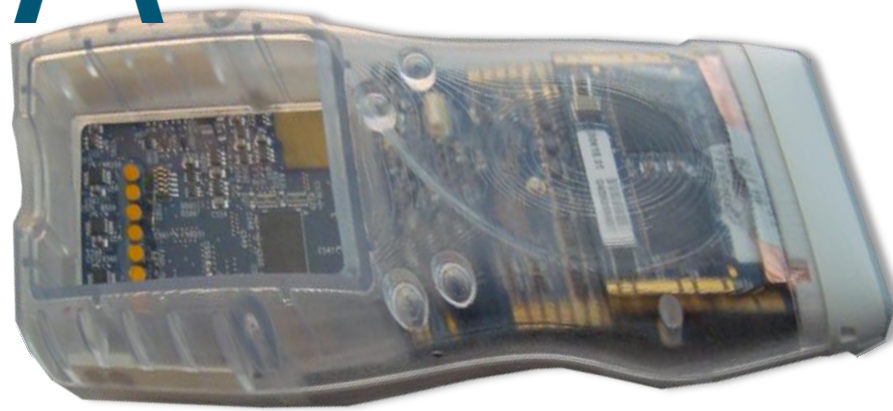
SIEMENS

Proprietary
Ultra-
wideband
Radio



Capacitive
Touch

Designed to be
easily cleaned
(immersion)



Proprietary
Antenna
Polling
System

Bluetooth

Li-Ion Battery
Power
Management





ACUSON Freestyle™ Ultrasound System Transducers

SIEMENS

Transducers Available at First Release

Broadband Transducers	L13-5	L8-3	C5-2
Frequency	13 - 5 MHz	3 - 8 MHz	2 - 5 MHz
Depth	2 - 6 cm	2.5 - 9 cm	8 - 24cm
Footprint	25 mm	38 mm	60 mm
Elements	128	128	128



Three type of probe

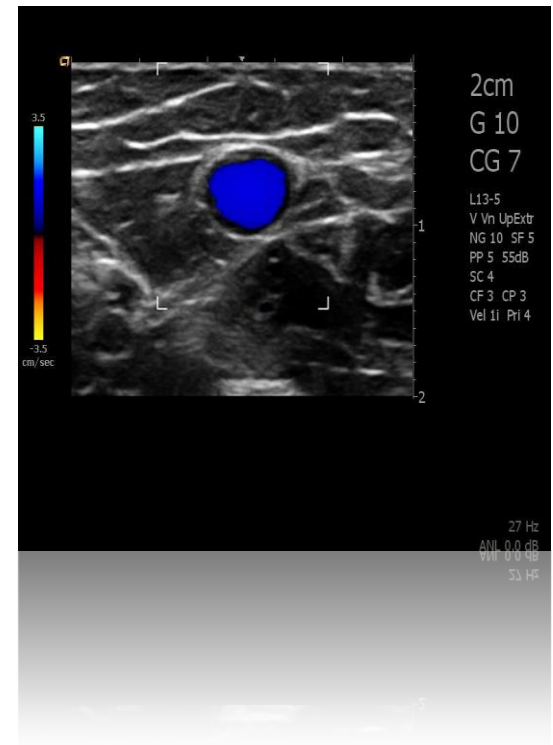
Excellent Image Quality



Excellent detail
and
contrast
resolution

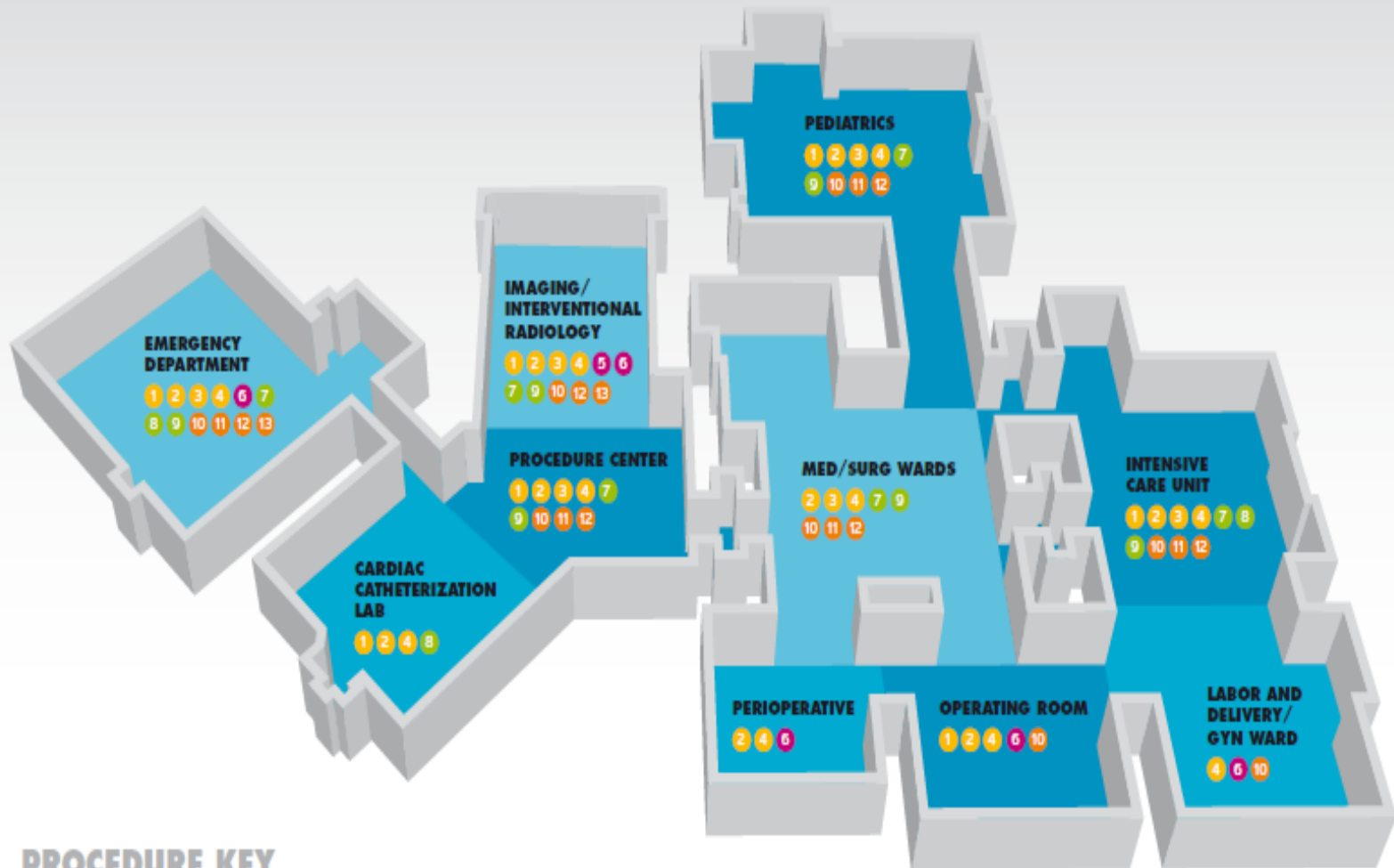


Easily discern finite
structures
such as fascicular
components
in the nerve



Easily identify a vein from
an artery with color
velocity
and color Power Doppler

UTILIZATION OF ULTRASOUND GUIDANCE DURING INVASIVE PROCEDURES WITHIN THE HOSPITAL



PROCEDURE KEY

VASCULAR ACCESS

1. Arterial Cannulation
2. Central Venous Catheter (CVC)
3. Peripherally Inserted Central Catheter (PICC)
4. Peripheral IV

NERVE BLOCKS

5. Nerve Block-Chronic Pain
6. Nerve Block-Epidural; Regional Anesthesia

CAVITY DRAINAGE

7. Paracentesis
8. Pericardiocentesis
9. Thoracentesis

OTHER PROCEDURES

10. Biopsies and Soft Tissue Aspirations/Drains
11. Joint Injections/Arthrocentesis
12. Lumbar Puncture
13. Foreign Body Extraction

ACUSON Freestyle™ Ultrasound System

Pros and Cons

Pros

High Resolution Display

15 in./38 cm, high resolution LED display
Large icons improve readability

Easy-to-Operate

Easy and efficient wireless operation
Prevent tiring of hands and arms
Boot up 30 seconds
VGA output / USB ports
Battery operable – 1 hour

Sleek and Lightweight

Easy to transport (roll stand) or wall mounted
Increased user flexibility
Weight: 10.5 lbs/4.8 kg



Connectivity, Data Management, Archiving and Report

On-Board Study Storage and Review
DICOM Storage, Modality Worklist
Cabled Ethernet connectivity
802.11 b/g (WiFi) connectivity

Fast Data Transmission at Low Power

Robust operation within 3 meters allows
flexible local positioning of system

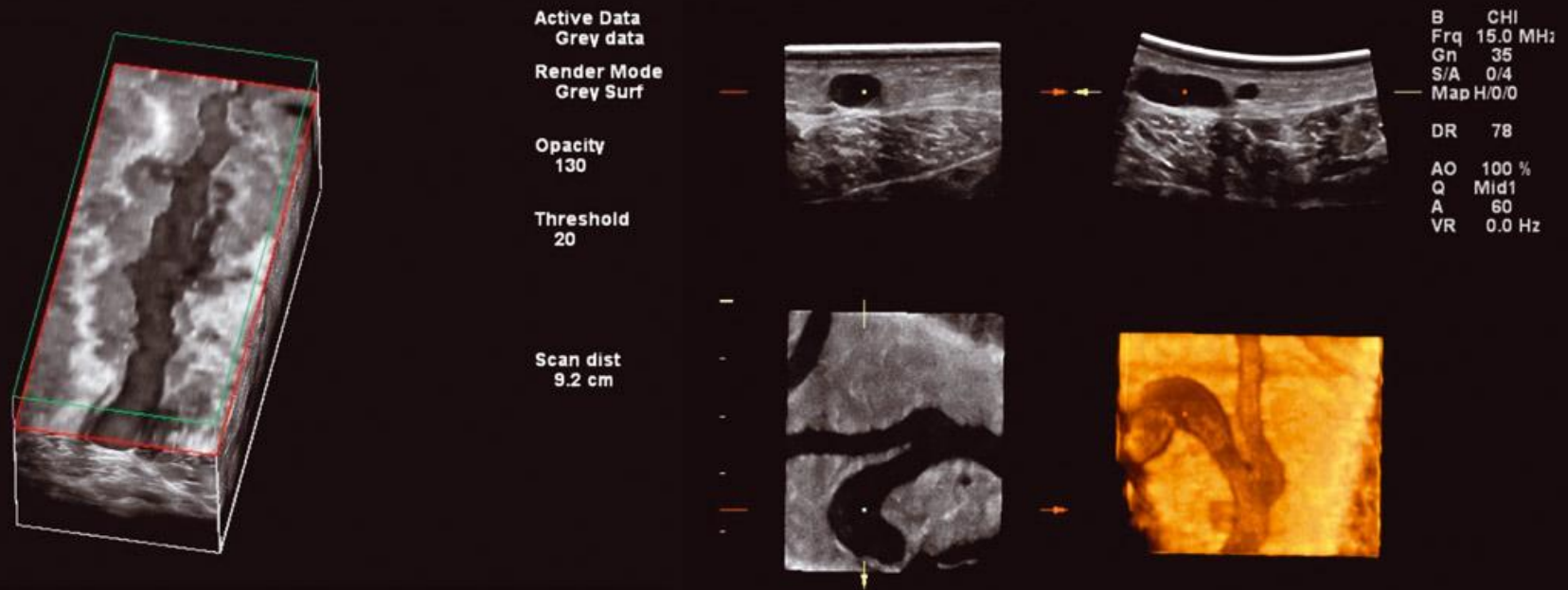
Three Transducers Available

L13-5 Linear, L8-3 Linear, C5-2 Curvilinear

Cons

Actually no Pulsed Doppler

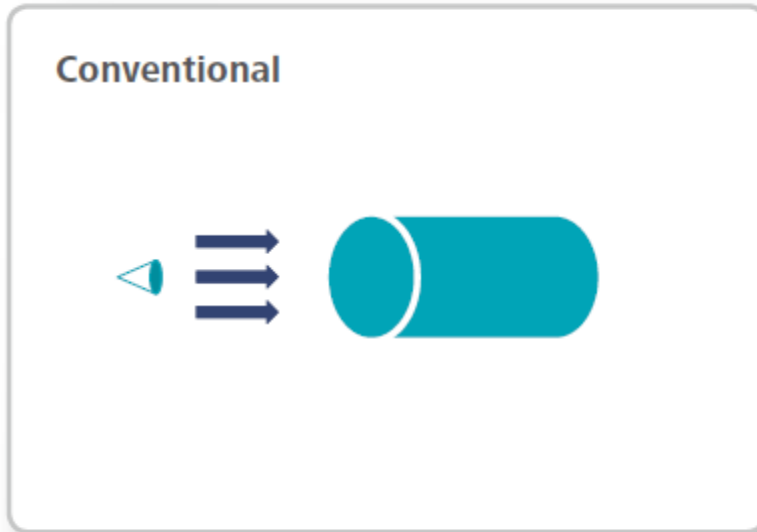
Towards the future



3D rendering of varices

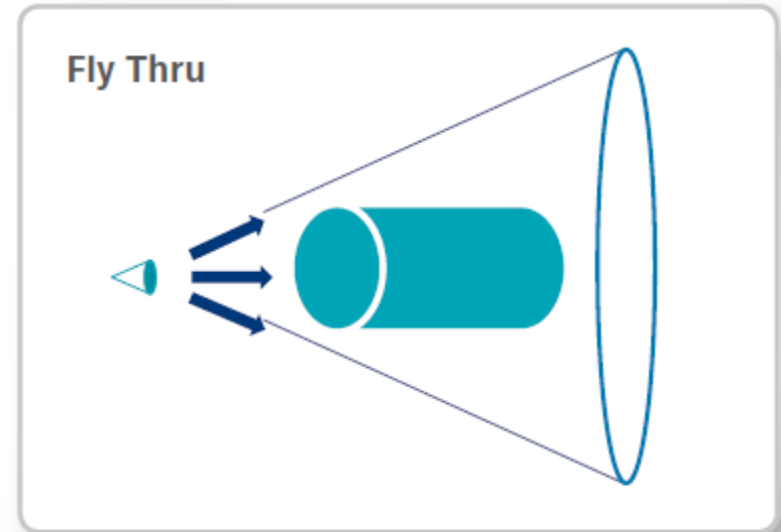
Towards the future ... FlyThru

TOSHIBA



Conventional 3D

Conventional 3D imaging makes use of parallel projection to display the surface of a given structure. All objects, proximal or distal, are displayed at the same size.



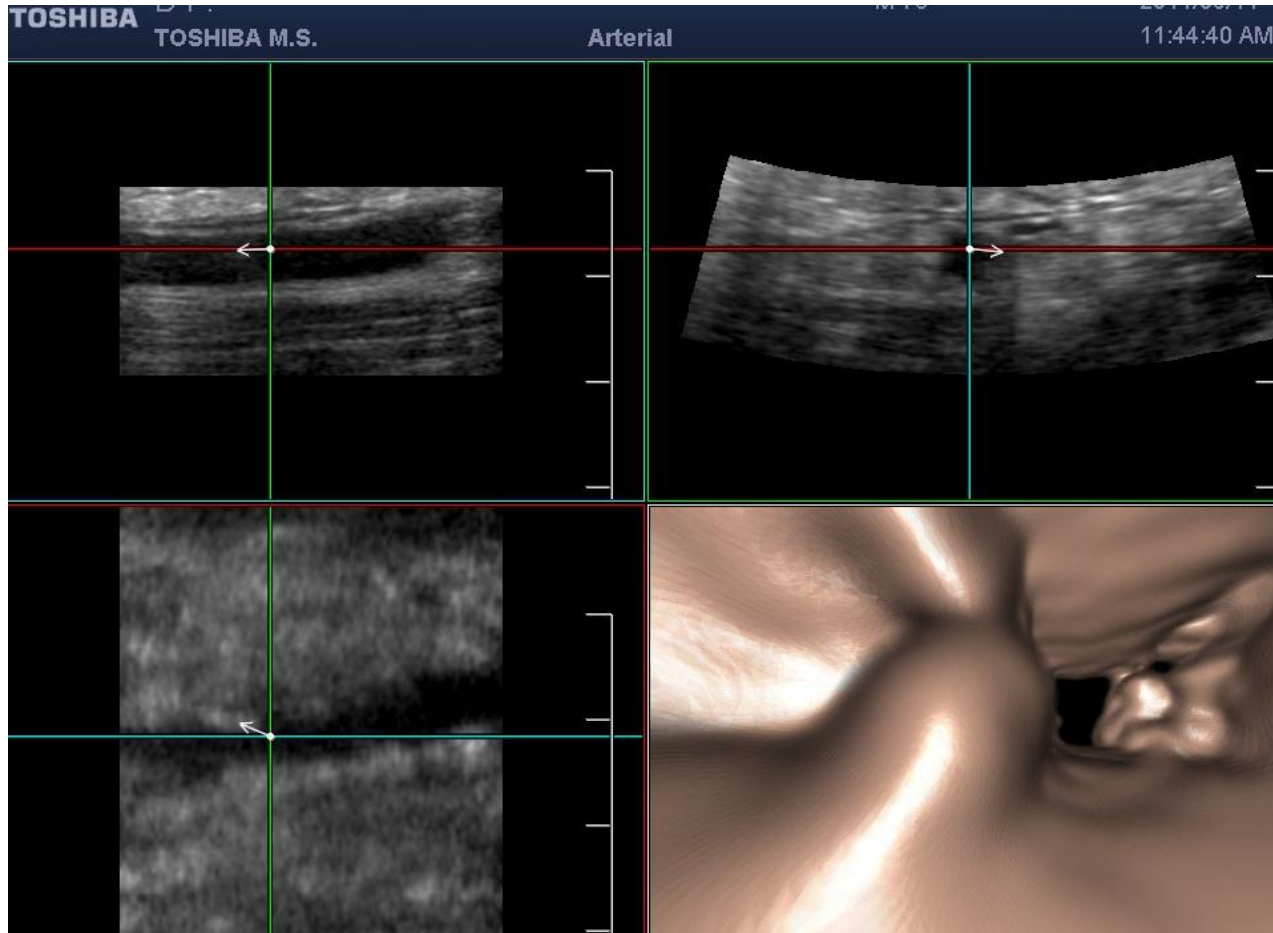
FlyThru

endoluminal virtual navigation

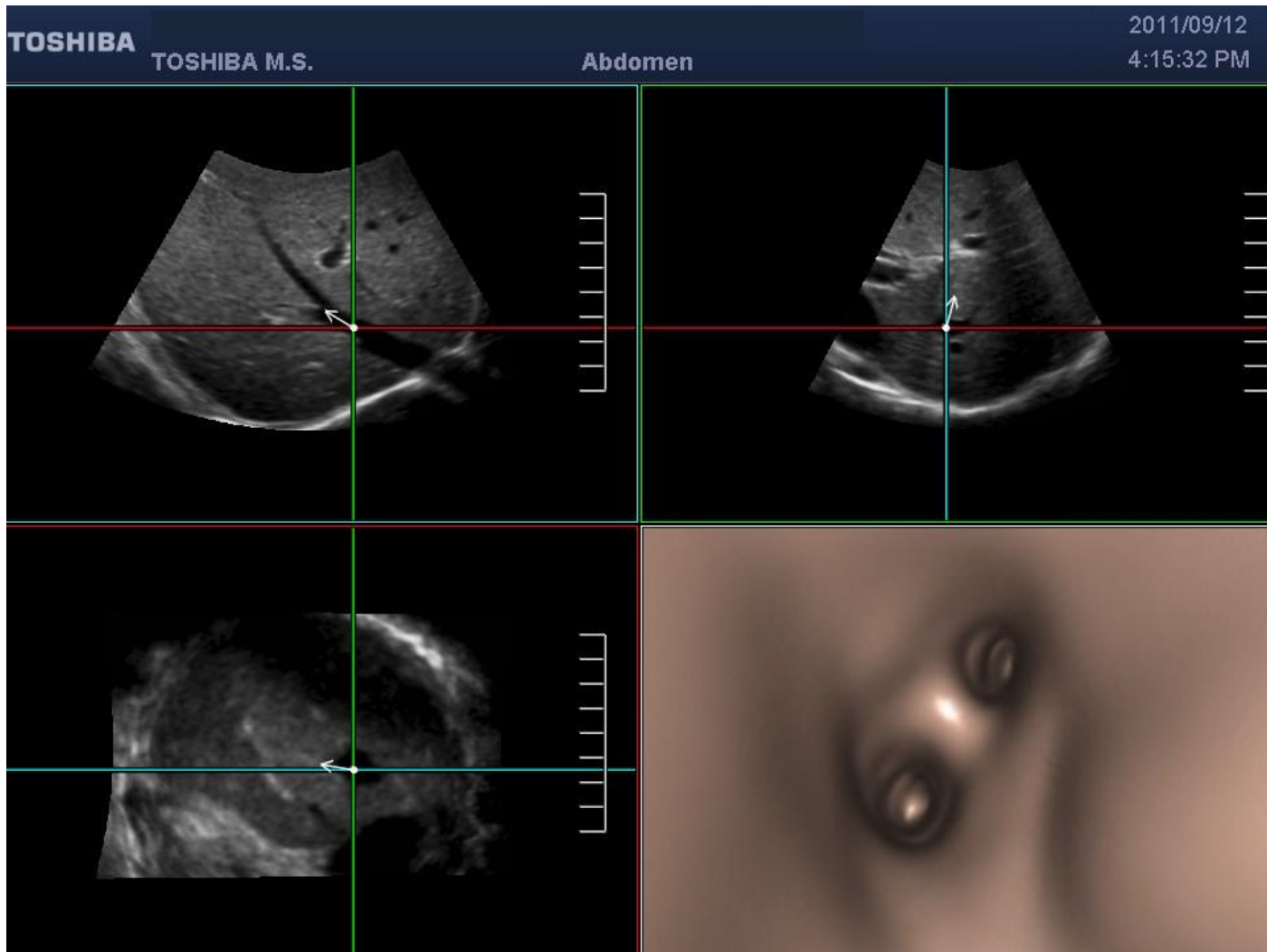
Fly Thru uses perspective projection to display the surface structure, emphasizing the near field over the far field. Thus proximal objects appear bigger than distal objects.

Towards the future... Flythru

FlyThru ...endoluminal virtual navigation



Towards the future... Flythru



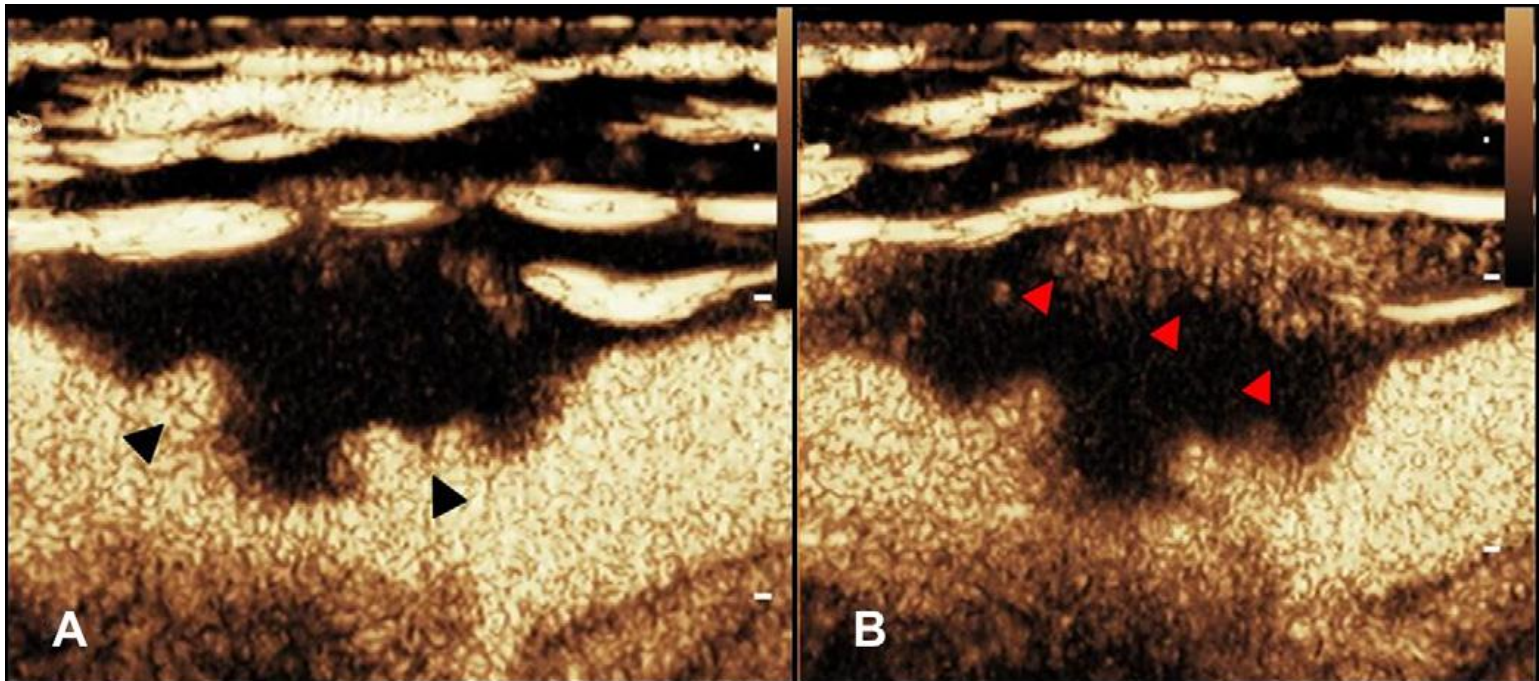
Towards the future... Flythru



Are there limits for ultrasound ?

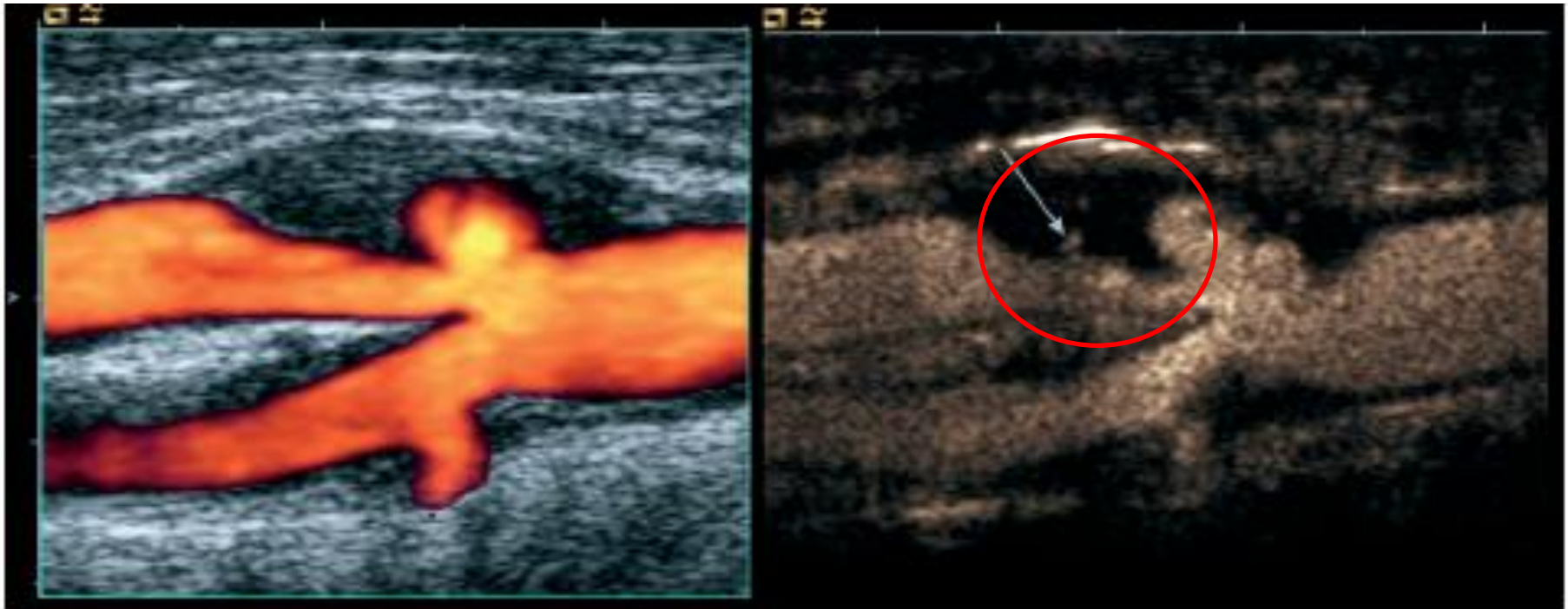
Contrast-Enhanced Ultrasound (CEUS)

Contrast-enhanced ultrasound is a noninvasive imaging modality that is capable of assessing atherosclerotic carotid lesions at risk for rupture (red arrows)



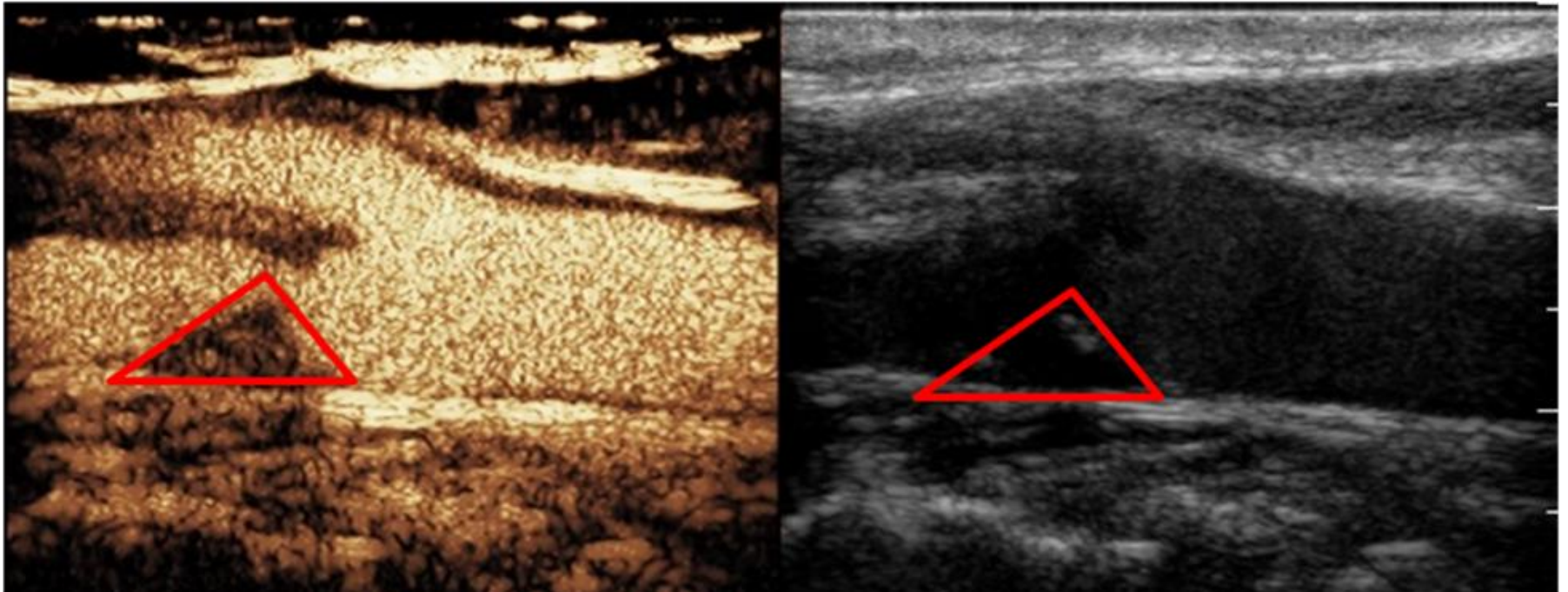
Contrast-Enhanced Ultrasound (CEUS)

Atherosclerotic carotid lesions at risk for rupture



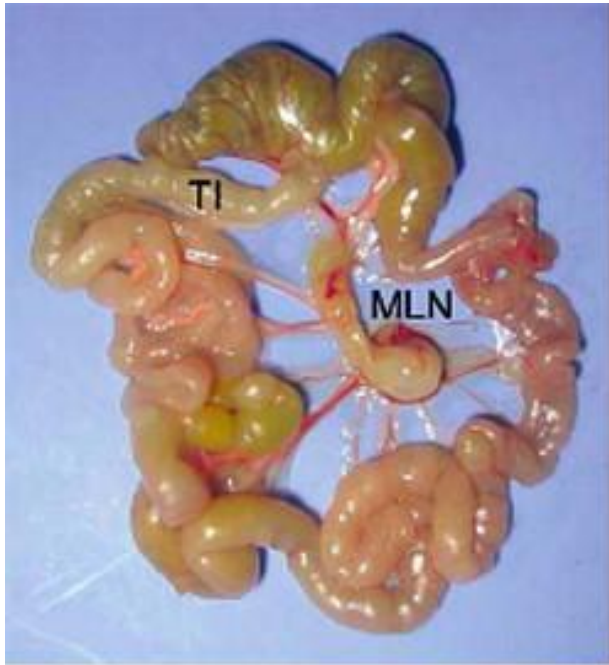
Contrast-Enhanced Ultrasound (CEUS)

Atherosclerotic carotid lesions at risk for rupture

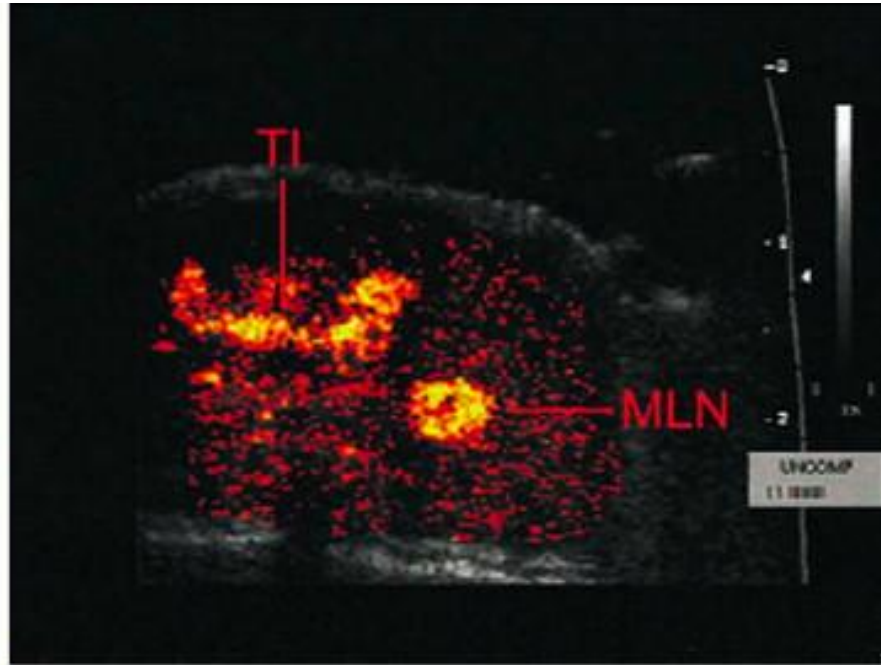


Contrast-Enhanced Ultrasound (CEUS)

Contrast echography may be used also in oncology to identify neo-vascularized areas



(a)



(b)

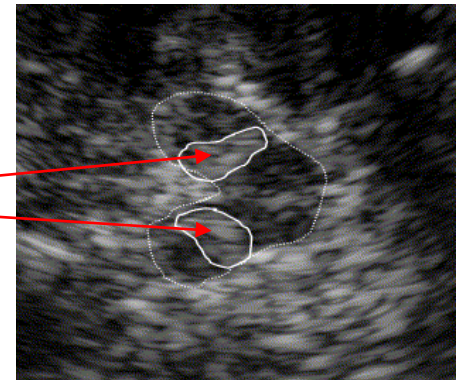
In addition, new applications like as

***Elastography,
Acoustic Radiation Force Impulse (ARFI)
Brain Parenchyma Sonography (BPS)***

have demonstrated to be useful for identification of carotid plaque at risk and for the study of several parenchymal lesions of different nature.

Brain Parenchyma Sonography (BPS)

Hyperechogen areas in Parkinson Disease



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A low-angle photograph of the Eiffel Tower, showing its intricate lattice structure against a bright blue sky. The sun is positioned behind the tower, creating a strong lens flare and illuminating the scene. The tower's structure is dark, contrasting with the bright sky.

Arrivederci