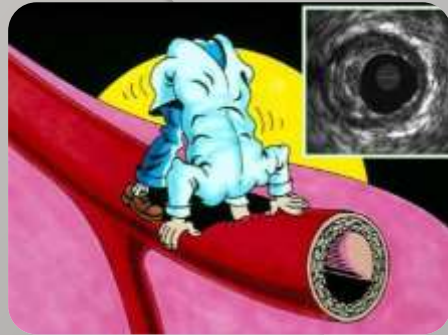


IVUS



What nurses should know?

Ahmed Said Abdul.meguid

IVUS is one of the advanced diagnostic tools used in Cath lab



Why do we need these Advanced techniques?

#For more and accurate ASSESSMENT

- Angiography demonstrates only a 2-dimensional view of coronary arteries and doesn't have the capability of providing information regarding vessel physiology.
- Lesions that appear to be similar may in fact look very different from across-sectional view and be have different from a physiologic standpoint.

More

or

Less



But No Details

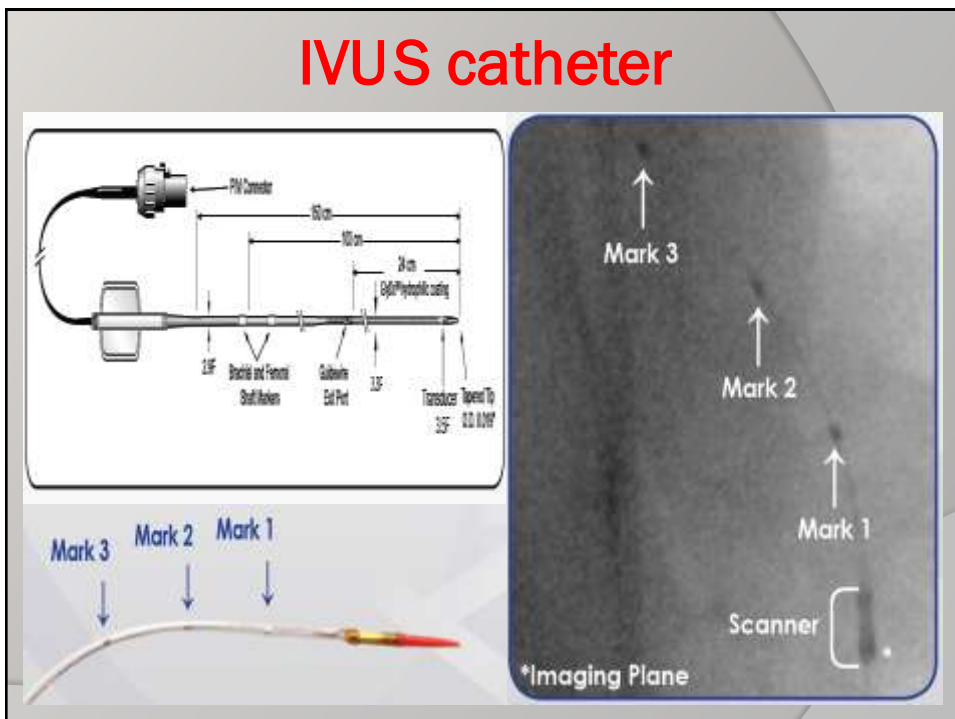
Definition

(IVUS) Is a medical imaging methodology using a specially designed catheter with a miniaturized ultrasound probe attached to the distal end of the catheter.

The proximal end of the catheter is attached to computerized ultrasound equipment.

* **That** allows physicians to acquire images of diseased vessels from inside the artery.

IVUS catheter



IVUS provides detailed and accurate measurements of lumen and vessel size, plaque area and volume, and the location of key anatomical landmarks.

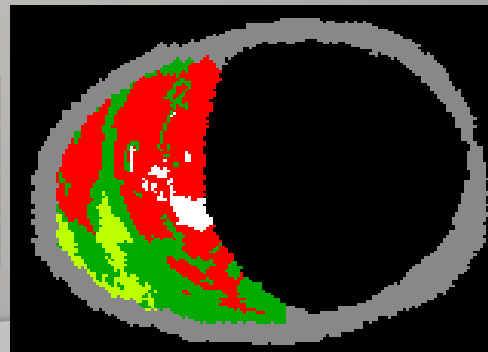
IVUS Technology

1-Virtual Histology(VH)

helps differentiate the four plaque types:

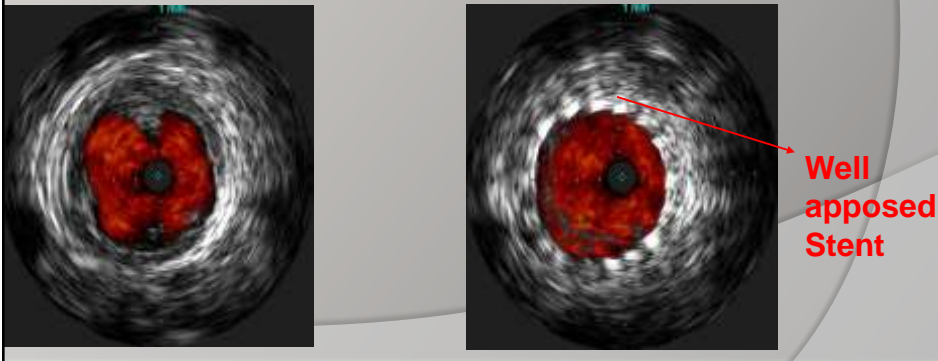
fibrous, **fibro-fatty**, **necrotic core** and **dense calcium**.

Fibrous
Fibro-Fatty
Dense Calcium
Necrotic Core



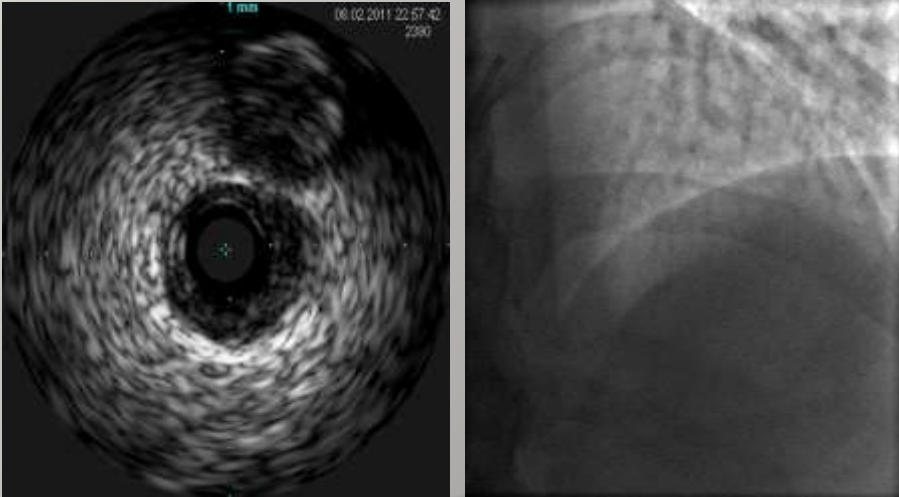
2-Imaging – ChromaFlo

- ChromaFlo highlights blood motion in red
- ChromaFlo allows to find the true lumen and check stent full apposition

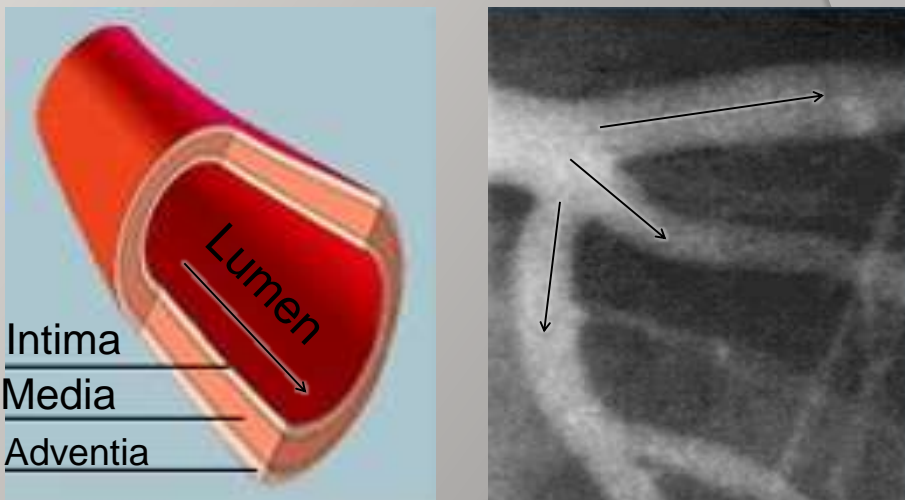


- Identifies red blood cell movement through the lumen
- Helps identify:
 - * Lumen size
 - * Stent apposition
 - * Plaque involvement in bifurcations
 - * Dissection
 - * Thrombus
 - * Plaque rupture

IVUS = Picture **Angio** = Shadow

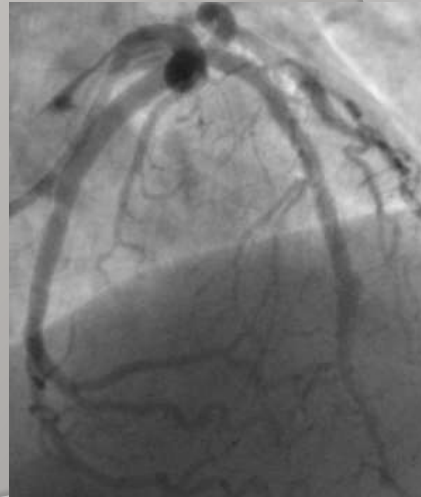
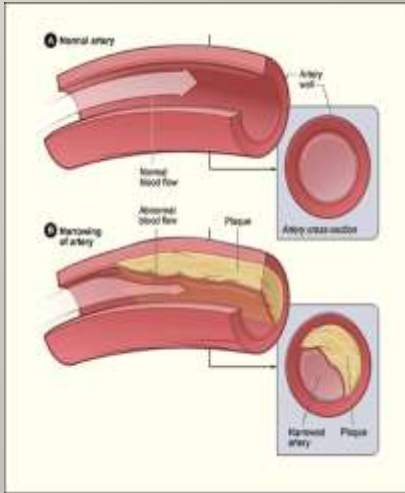


IVUS = All layers **Angio** = Lumen



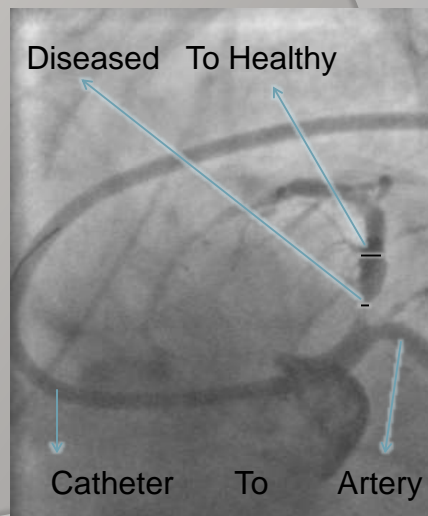
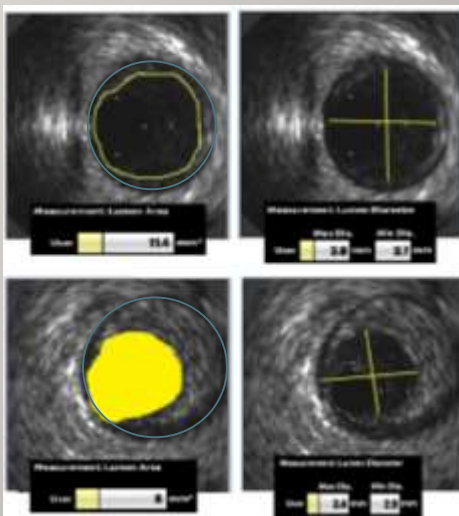
IVUS = Cross & Long

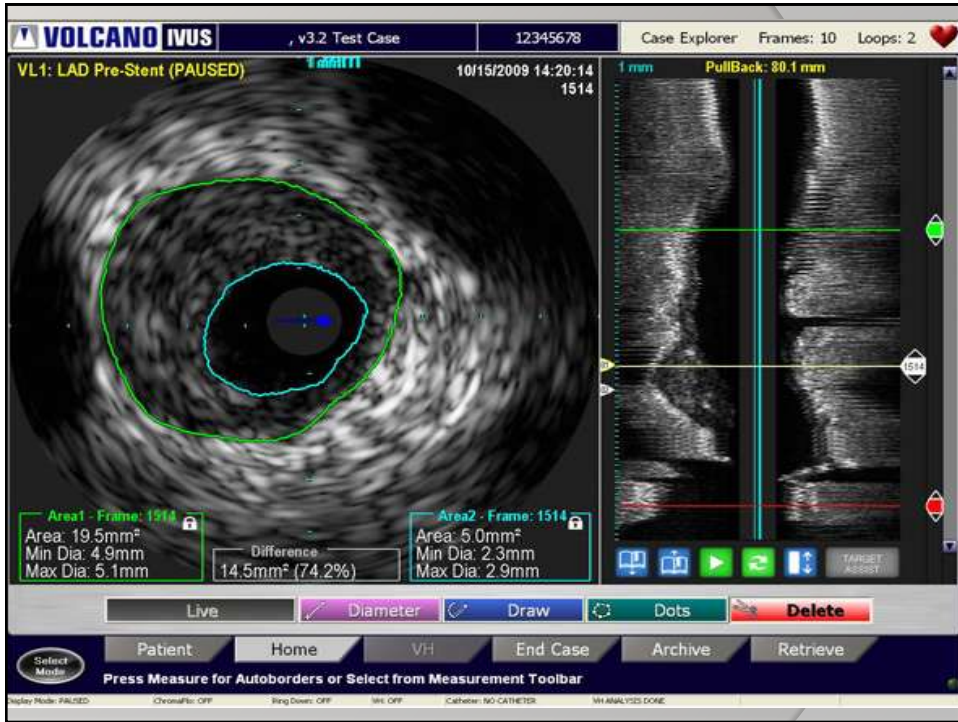
Angio = Long



IVUS = Measures

Angio = Visual !?





IVUS = Plaque Type **Angio = Lesion !?**

Frame Statistics:

LUMEN	VESEL
Area: 3.0 mm ²	Area: 8.8 mm ²
Min Dia: 1.8 mm	Min Dia: 3.2 mm
Max Dia: 2.2 mm	Max Dia: 3.5 mm

PLAQUE Burden: 63.4%

COMPOSITION:

- FF: 2.7 mm² (75.1%)
- FF: 0.3 mm² (8.2%)
- NC: 0.6 mm² (16.5%)
- CC: 0.0 mm² (0.3%)

Segment Statistics:

LUMEN	VESEL
Avg Area: 4.9 mm ²	Avg Area: 9.3 mm ²
Min Dia: 1.6 mm (7)	Min Dia: 1.7 mm (7)
Max Dia: 3.4 mm (40)	Max Dia: 6.6 mm (40)

PLAQUE Vol: 0.0 mm³

LENGTH: 44 frames

COMPOSITION:

- FF: N/A
- FF: N/A
- NC: N/A
- CC: N/A

VH Virtual Histology

Dissection ??

IVUS = Sure **Angio = Sometimes !!**

The image shows two rows of comparisons. The top row shows an IVUS image on the left with a red arrow pointing to a corresponding Angiography image on the right. The Angiography image has a blue circle around a 'Flap' and a red arrow pointing to it. The bottom row shows an IVUS image on the left with a red arrow pointing to a corresponding Angiography image on the right. The Angiography image has a blue circle around a 'Hazy' area and a red arrow pointing to it.

Medial dissection → Flap

Intimal dissection → Hazy

What to notice

The image shows a bifurcation. On the left, an IVUS image shows a main branch and a side branch. A white arrow points to the main branch, and a white arrow points to the side branch. On the right, an Angiography image shows the same bifurcation. A blue arrow points to the main branch, and a blue arrow points to the side branch.

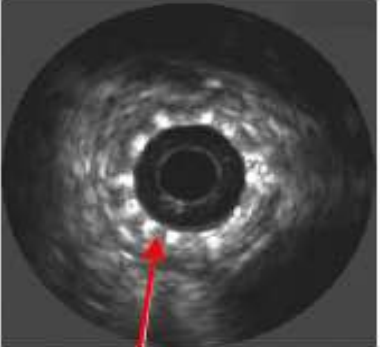
Bifurcation

Main Branch


Side Branch

IVUS = Sure **Apposition ??**
Angio = Sometimes !!

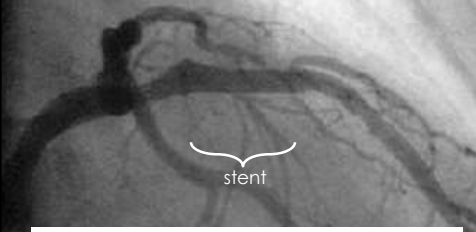
Stent



Stent Struts

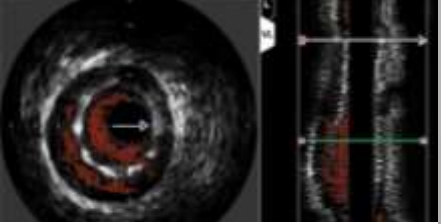


Similar Angio Image, Different Result




stent

Angio alone seems to highlight adequate flow and apposition

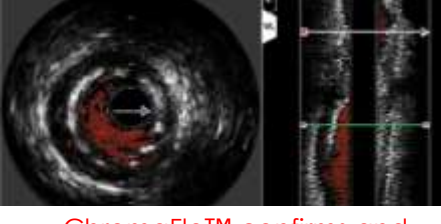


ChromaFlo™ identifies region of severe mal-apposition



stent

After post-dilatation with balloon (angiographic projection similar)



ChromaFlo™ confirms and documents full apposition

Nursing and technician role

1- Before

- Preparing
- Data entry

2- During

- Measuring
- Recording
- Saving
- Naming

3- After

- Ending
- Archiving

Indications of IVUS

- **Accurate quantitation .**
 - **Identify specific disease**
 - **left main stem, ostial lesions**
 - **Identify plaque morphology**
 - **Examine vessel when angiography is inconclusive**
 - **hazy lesions, presence or absence of thrombus or dissection**
 - **Measure plaque load .**
 - **Assessment of reference segment**
- OR Measure true vessel size**

Indications cont...

- **Interventional strategy & device selection ,provide important information (stent sizing, lesion length, presence of calcium, etc.)**
- **In-stent restenosis**
- **Recognition of any ambiguous appearance**
- **Optimal balloon angioplasty**
- **IVUS-guided stenting**

Take Home Message

IVUS

- **IS one of the advanced techniques help in optimizing vascular intervention and management.**
- **Use Ultra Sound waves.**
- **Provide images with accepted resolution.**
- **Well defined layers.**
- **Precise measurements and stent apposition .**
- **Fair follow up image.**

