

# Contrast Enhanced Ultrasound

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# Objectives

- ✓ Composition of contrast ultrasound.
- ✓ Image Production.
- ✓ Advantages.
- ✓ Side effect and contra indications.
- ✓ Applications.
- ✓ Cases.

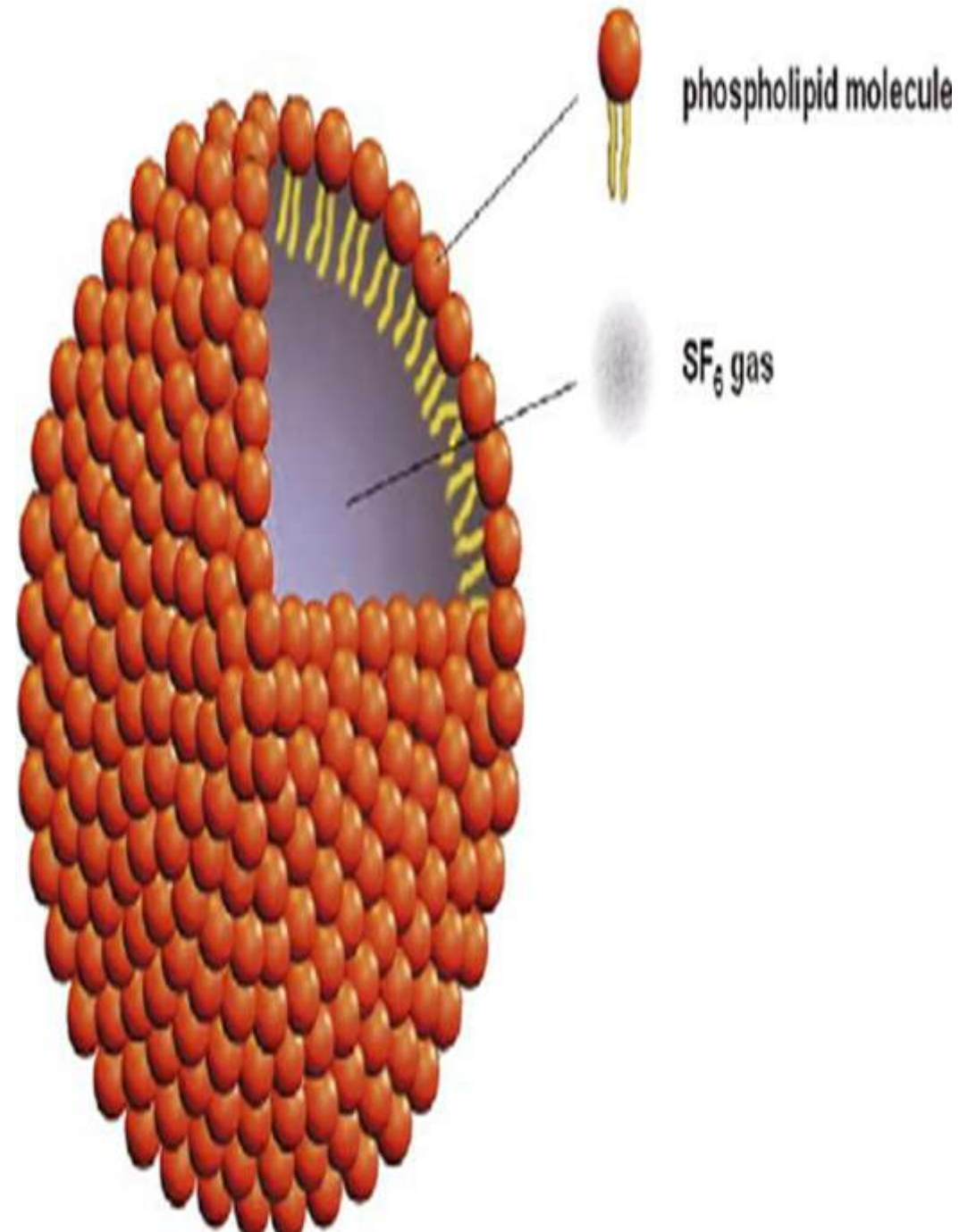


A desk setup featuring a spiral-bound notebook on a wooden stand. The word "BASICS" is printed in large, bold, black letters on the notebook's page. In the foreground, there is a pair of gold-rimmed glasses, a silver and black pen, and a clipboard with a white sheet of paper and a black clip. The background is a plain, light-colored wall.

**BASICS**

# Ultrasound Contrast Agents

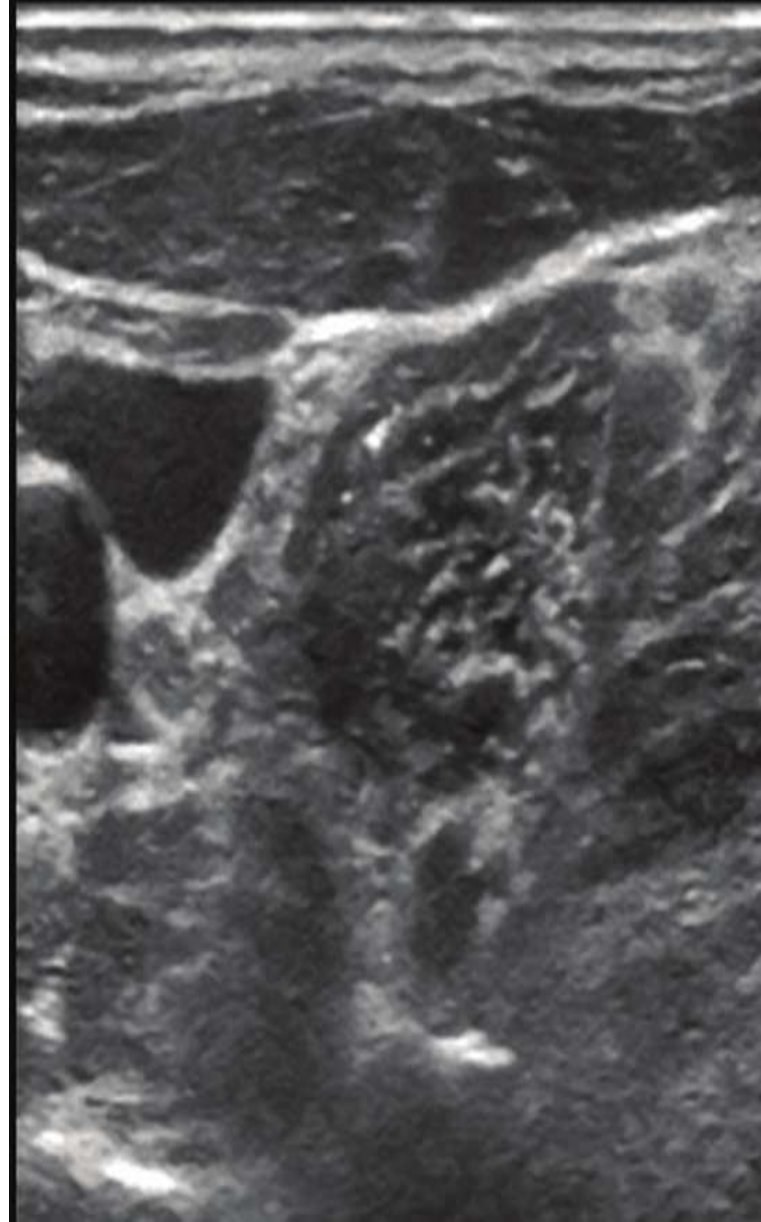
- UCA gas-filled microbubbles, stabilized within a lipoprotein shell.
- Smaller than red blood cells.
- Eliminated via the lungs within 20 min of administration.



# Contrast Enhanced Image production



- Contrast specific software using low mechanical index (MI) is required to perform CEUS.



MI 0.4 TIs 0.4 12L-RS  
--:--:-- MscSkel

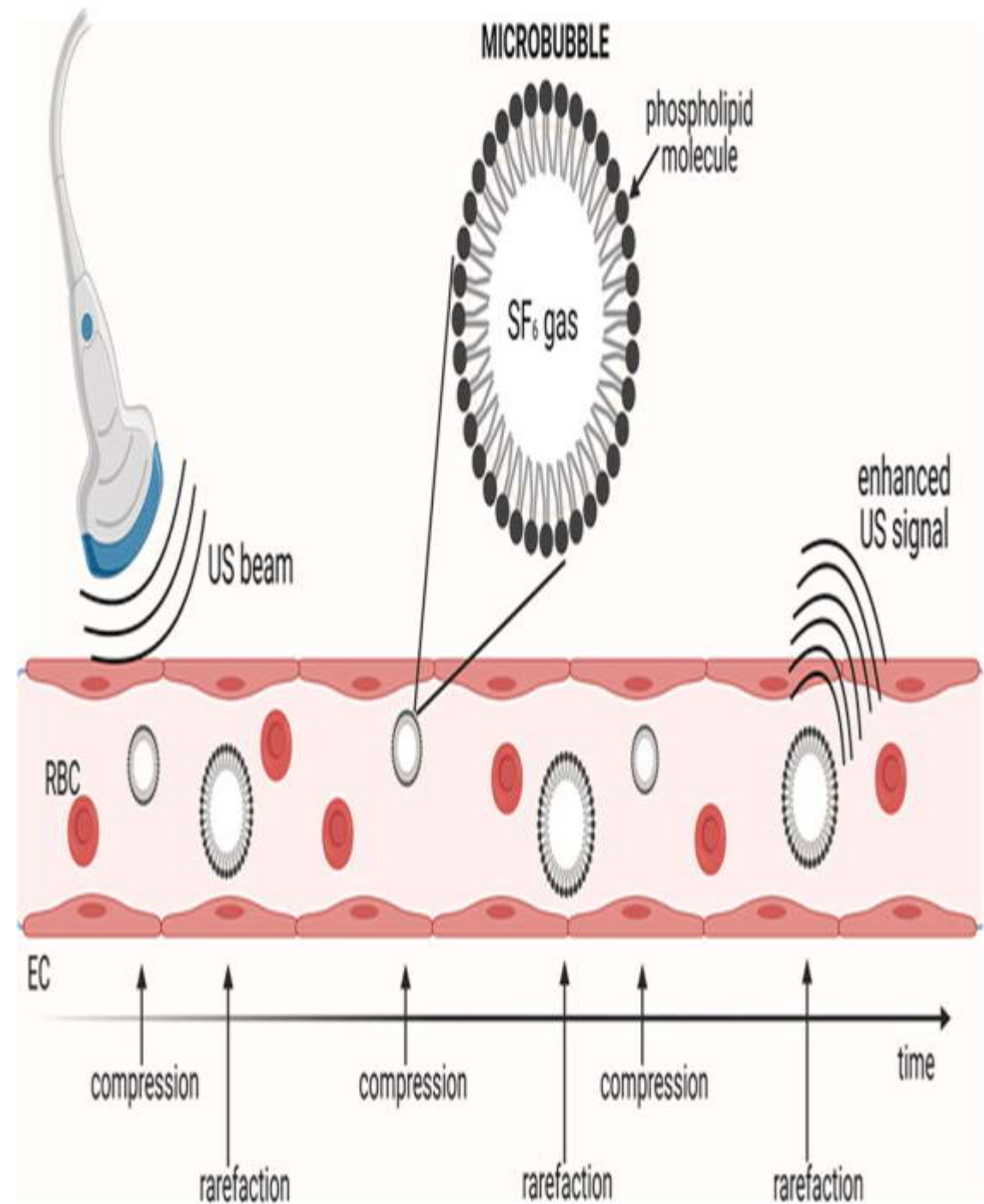
- B CHI  
- Frq 12.0 MHz  
Gn 98  
- E/A 2/2  
Map A/1/0  
- D 4.5 cm  
1- DR 75  
FR 19 Hz  
- AO 100 %  
⏸ XBeam On

2-



3-

- The microbubbles have a non-linear response.
- When used with a low MI compared to other tissue types which have a linear response.
- Specific computer software with CEUS augments the non-linear response from the bubbles, creating a vascular only image
- This phenomenon makes the bloodstream more opaque compared to the tissues, producing images with greater contrast and thus yielding more diagnostic information

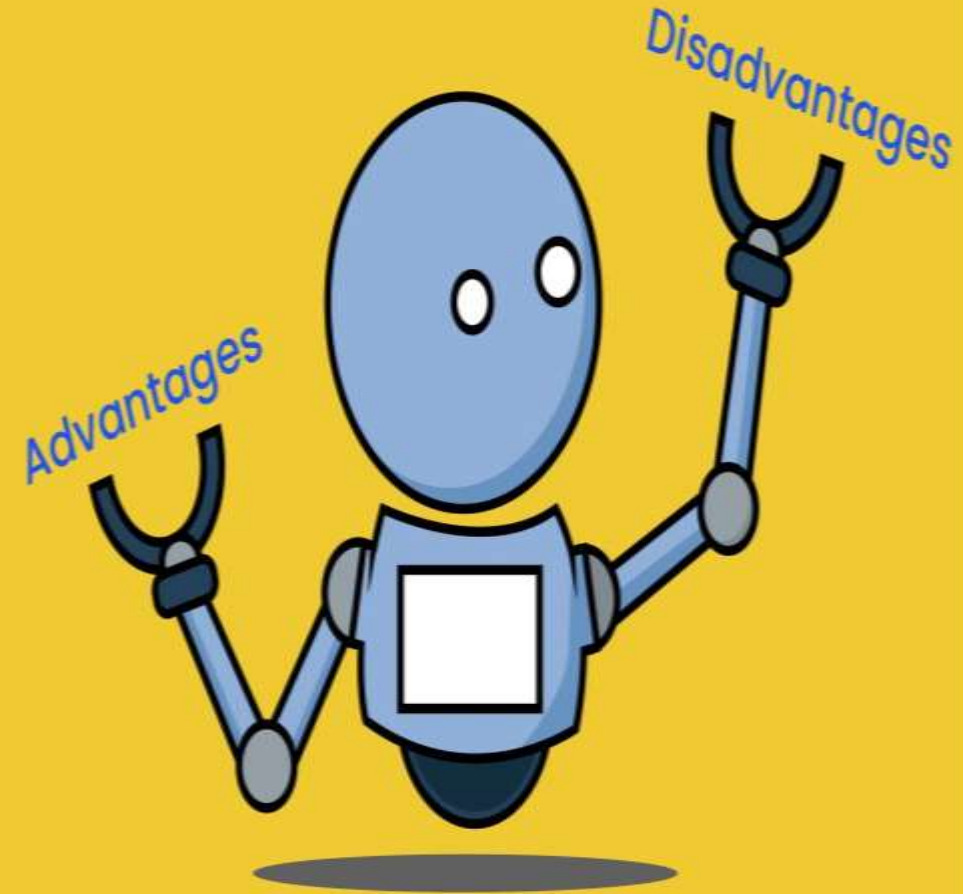






# Advantages Over CE-CT & MRI

- The lack of radiation.
- UCA are not nephrotoxic nor hepatotoxic.
- Patients in renal failure and even dialysis can safely undergo CEUS.
- UCA have very few side effects and those that occur are extremely mild, including headache and nausea.
- UCA can be used in patients with iodine allergies.
- The only contraindication to the use of Lumason is sulfur hexafluoride allergy.
- Allergy to sulfa medication is not a contraindication.



# Side effects

## Usually very mild like:

- back or flank pain.
- allergic reaction.

## Other less common including :

- headache, dizziness
- flushing
- hypo or hypertension.



# Contraindications

- known case or suspected cardiac shunts.
- allergic reaction to previous injection.
- intra arterial injection.



# Applications of CEUS

## Diagnostic :

1. Liver: focal liver lesion and diffuse liver disease.
2. Kidneys: solid renal masses , complex cysts and renal infarct.
3. Voiding cystourethrography.
4. targeted diagnosis.

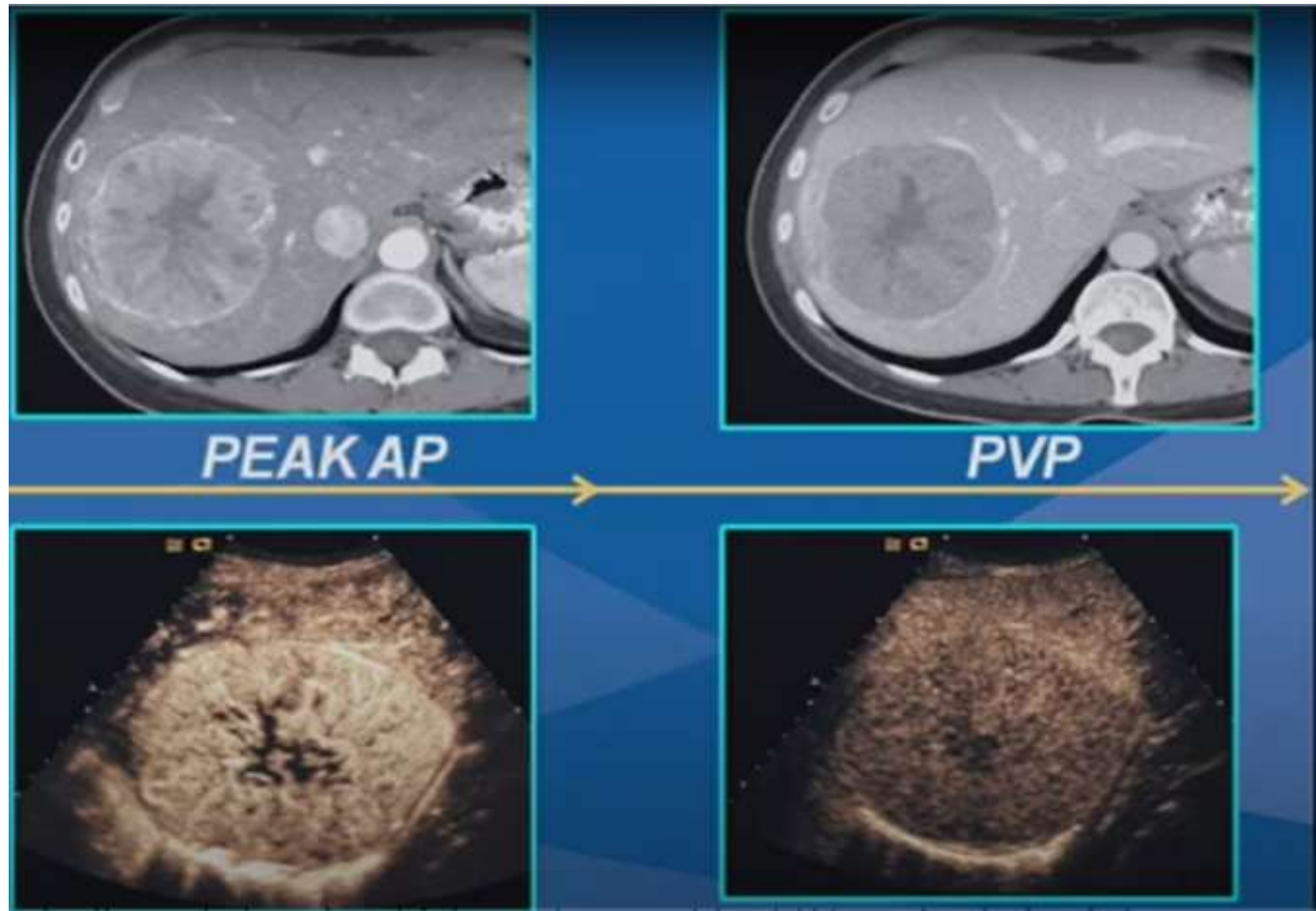
# Applications of CEUS

## Therapeutic :

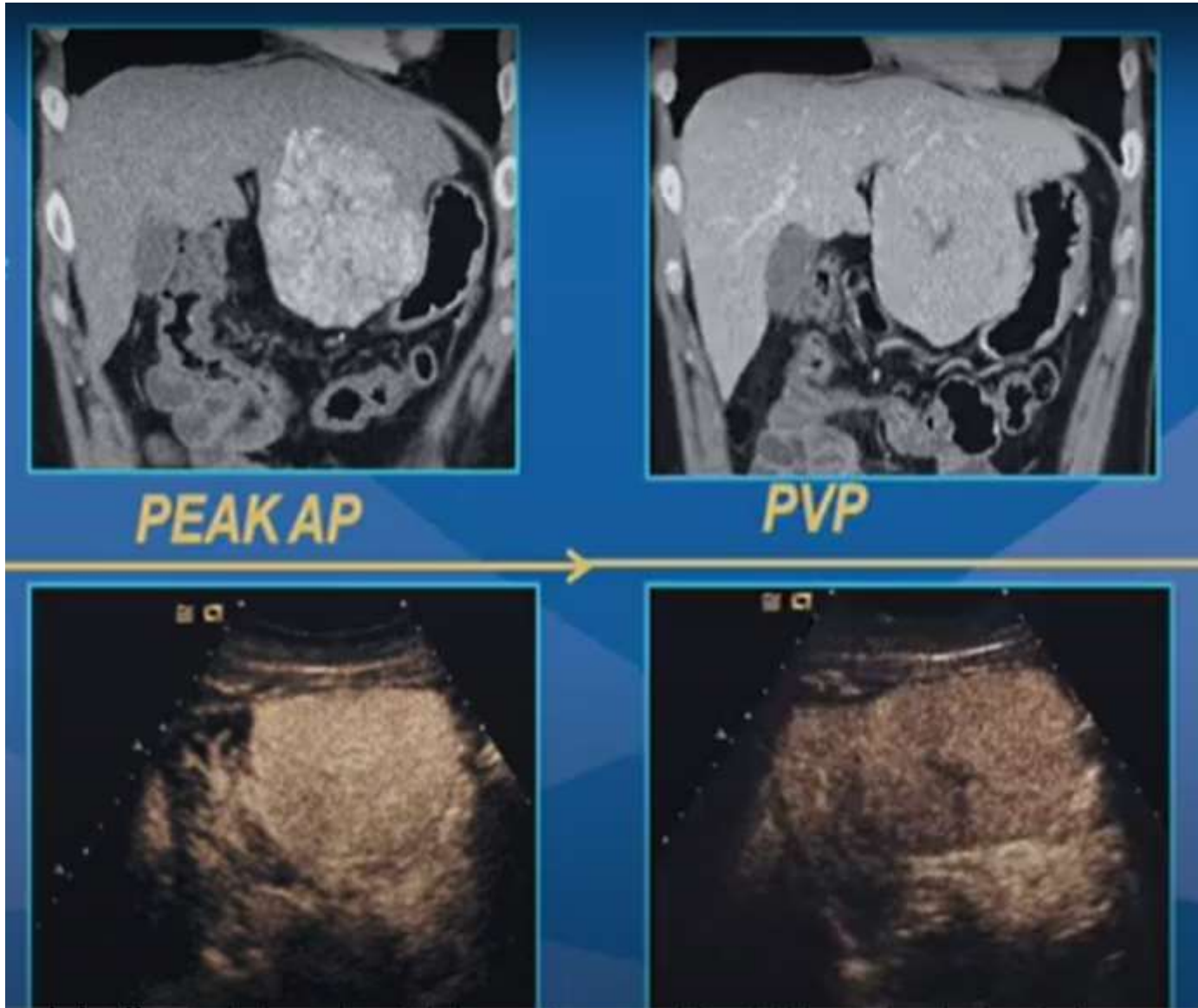
1. Thrombolytic effect.
2. Increasing Cell Membrane Permeability.
3. Increasing Blood-Brain Barrier Permeability.
4. Tissue Ablation

# Image Interpretation

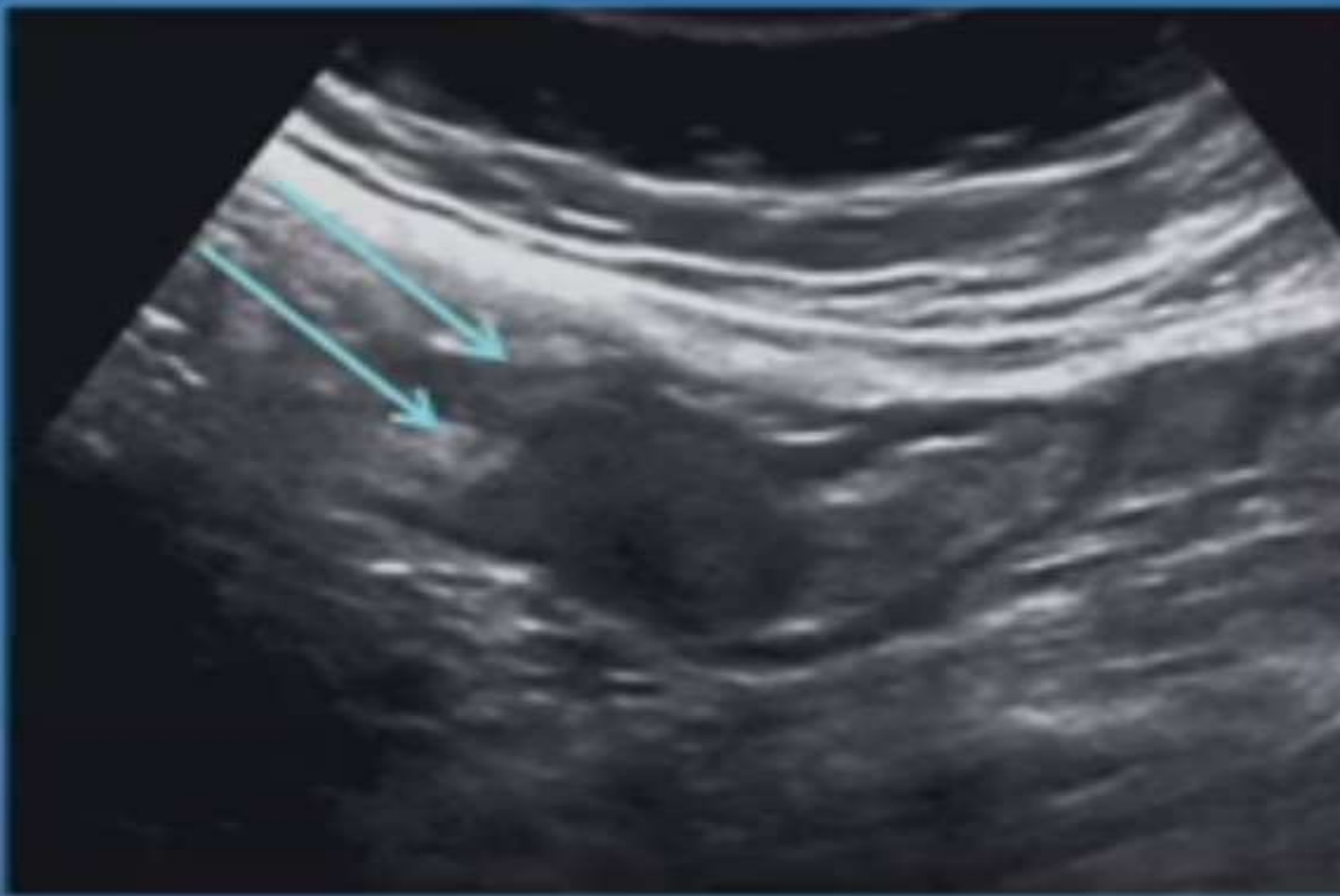
27 year old man with  
HBV



Young female asymptomatic



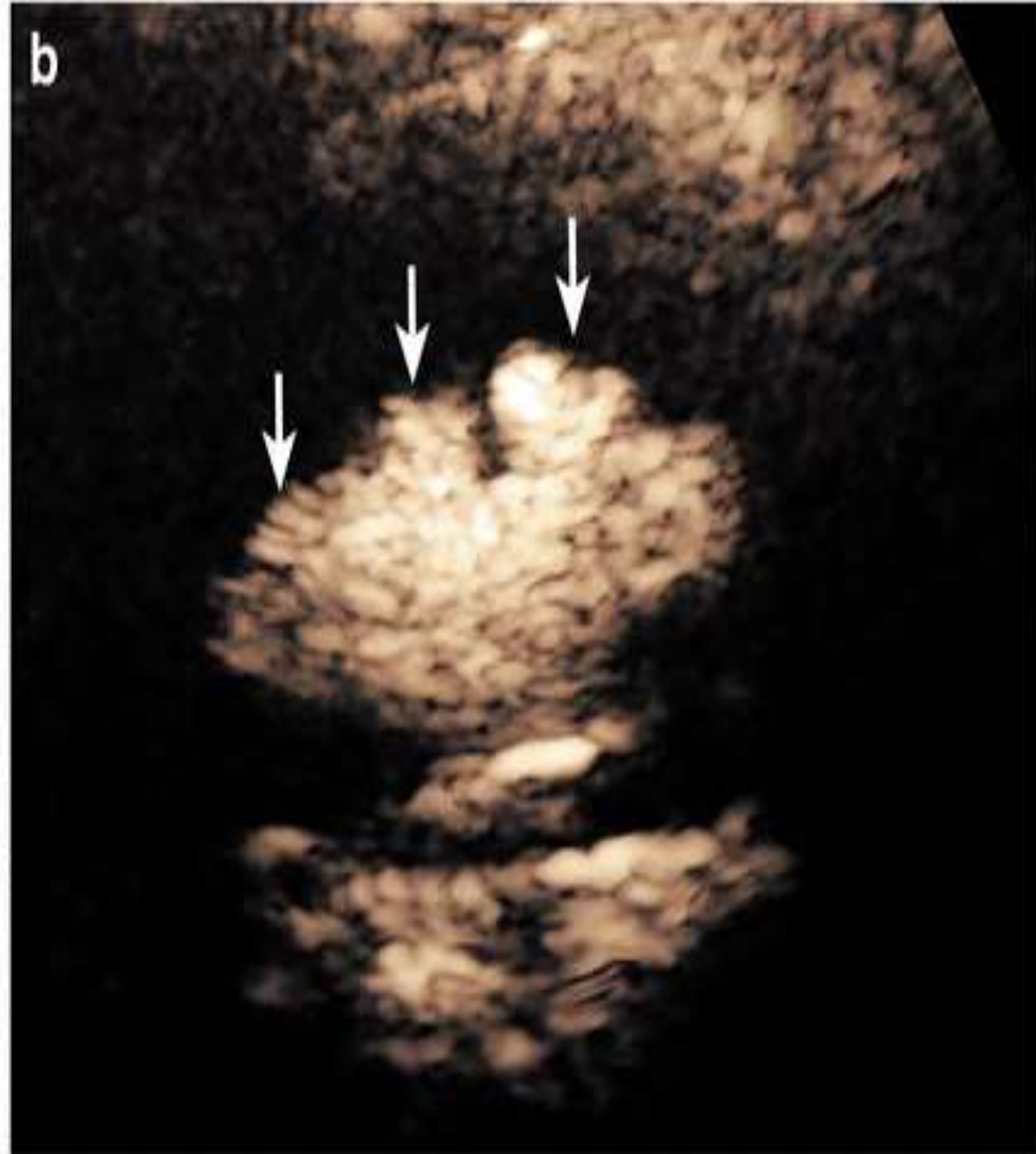
60 year old woman with  
history of breast cancer



*Small Bowel PRIMARY TUMOR  
CARCINOID*



VUCG  
x-ray and US reveal  
left side VUR



RCC



To assess for tubal patency

