

# CONTRAST ENHANCED ULTRASOUND PROTOCOL

UW Medicine

## BILING CODES TO BE USED:

**UABDLCON** - US Abdomen Limited with Contrast

**URETRCCON** - US Retroperitoneal Complete with Contrast

**URETLCON** - US Retroperitoneal Limited with Contrast

**PATIENT PREP:** NPO is preferred, but not necessary.

\*\*\*Research Contrast Exams often have a different protocol, please check with Radiologist or research coordinator to confirm.

## DAY OF EXAM

**REVIEW IMAGES:** Radiologist and sonographer should review prior imaging together before scanning to identify area of interest

**LUMASON:** Radiologist or sonographer should place a pharmacy order for Lumason. Call the OR Pharmacy at 84194 and request to have it filled. Pick up is at the OR pharmacy.

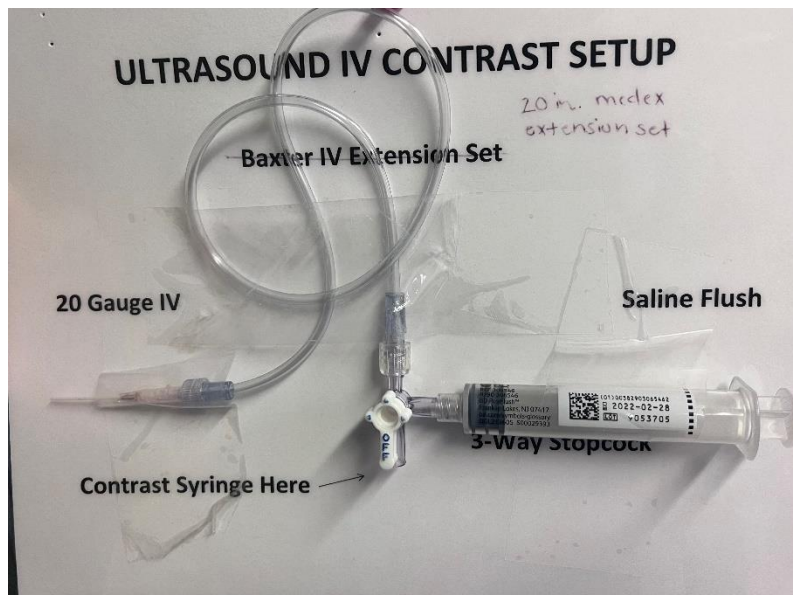
## SET OUT SUPPLIES:

- Lumason, 3 way stop, extension tubing, 2 saline syringes
- 2X2 pack and Tegaderm or paper tape for when pulling the IV.

**ROOM PATIENT:** Put the patient in ultrasound exam room with contrast capabilities (Room 1, 6 or 7).

**IV:** Call the charge nurse at 83731 to request an IV be placed.

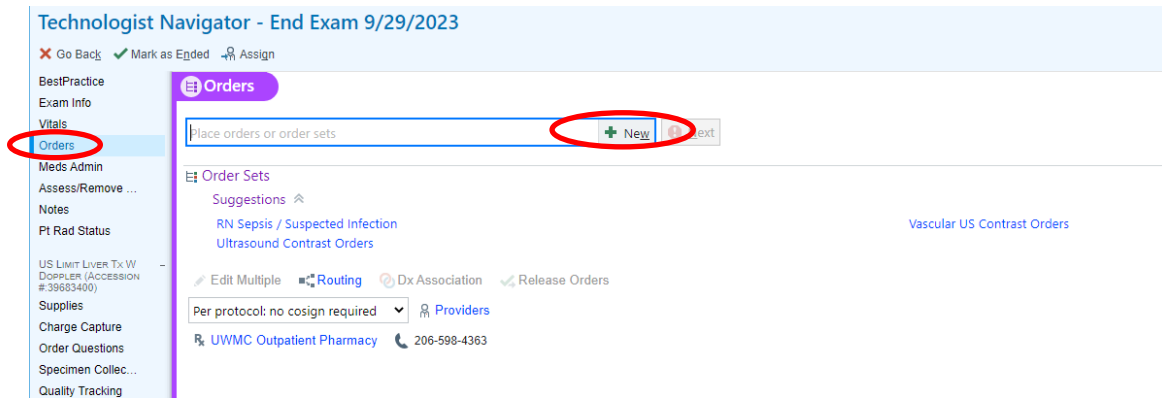
- The IV should be: 20 gauge with extension tubing and should be placed at the elbow level of the left arm
- The nurses will fill out the IV section in EPIC.
- The sonographer will be responsible for pulling out the IV and completing the IV section in EPIC. \*\*This is only to be done after proper training on how to remove an IV. If you need help pulling the IV, ask Belaynesh, Shaun, or Becky.
  - When removing the IV, hold pressure with one 2x2 for 30 seconds. Check to make sure the IV site has stopped bleeding. If the bleeding has stopped, fold a 2x2 over the site and secure it with a small tegaderm or paper tape. Fill out the IV section in EPIC.



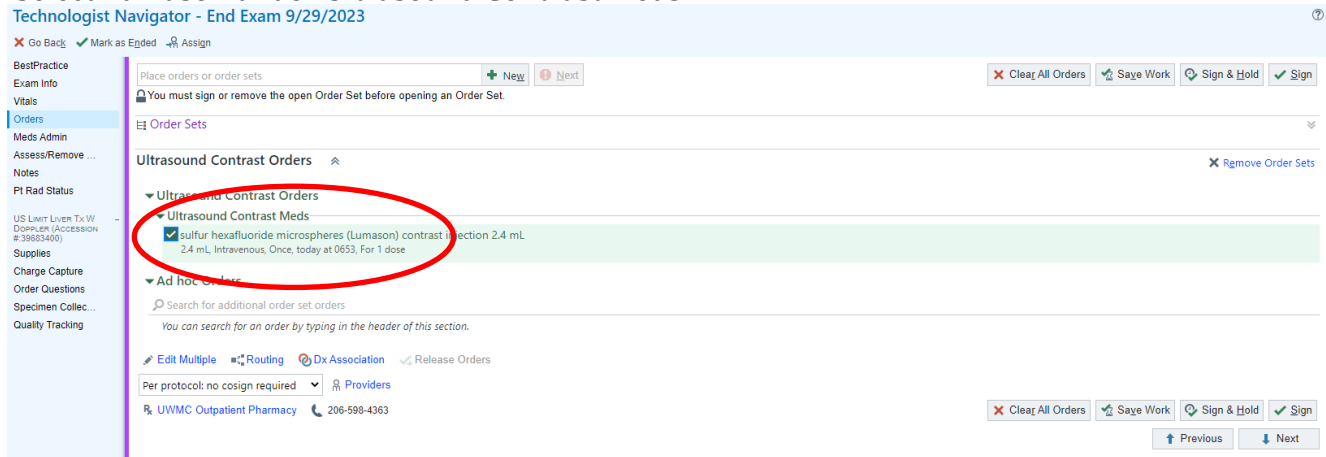
# ORDERING LUMASON

## IN EPIC END EXAM NAVIGATOR:

1. Go to the Orders tab on the menu. Select New.



2. Select Lumason under Ultrasound Contrast Meds.



When put in correctly, it will then appear in the Medication Administration list under Orders.

Medication	Exam Related	Last Dose Given	Route	Last Admin
Administered furosemide (Lasix) injection 40 mg	<input type="checkbox"/>	40 mg	Intravenous	9/29/2023 2:03 AM
Administered furosemide (Lasix) injection 40 mg	<input type="checkbox"/>	40 mg	Intravenous	9/28/2023 8:16 PM
Administered furosemide (Lasix) injection 20 mg	<input type="checkbox"/>	20 mg	Intravenous	9/28/2023 5:27 PM
Administer glucagon injection 1 mg	<input type="checkbox"/>			
Administer glucagon injection 0.5 mg	<input type="checkbox"/>			

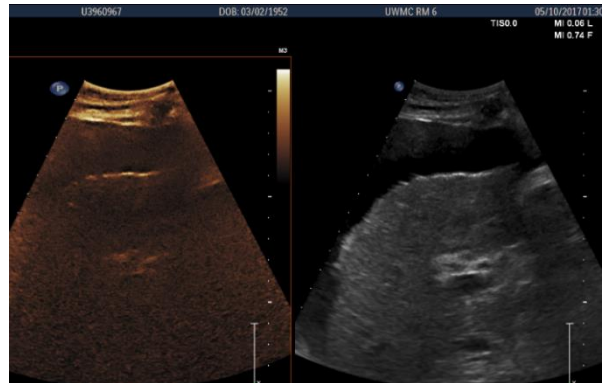
The OR pharmacy will fill the order and it can be picked up there. If you need to call the number is 84194.

# ULTRASOUND IMAGING AND SETTINGS

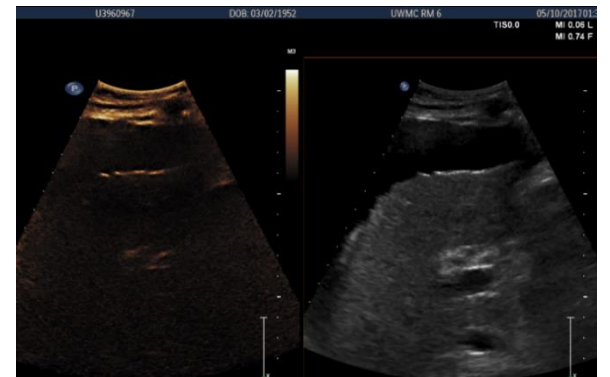
1. **USE THE C5-1 PROBE**, other probes have the capability, but this is the only probe that has been optimized for contrast imaging of the liver and kidney.
  - For contrast of small parts, the L18 can be used with contrast volume increased to 2cc.
2. **OPTIMIZE THE IMAGE in 2D**
3. **SELECT CONTRAST MODE** -When image is optimized, select “Contrast” on the touch screen.
4. **CONTRAST SIDE/SIDE** - Once in contrast mode, chose the “Contrast Side/Side” view on touch screen.
5. **MAX View** for larger screen image.
6. **FOCUS should be at the BOTTOM** of the image. If the focus is at or above the lesion, it breaks the bubbles more quickly
7. **CGEN/CRES/CPEN** - Once in contrast mode, you can also switch between these as needed.
8. **ADJUST GAIN** setting and take an image of the side-by-side view showing the level of gain before beginning. See below for proper gain setting technique.

*Gain settings are the important in contrast. Turn up the gain and adjust the TGC to make the gain uniform throughout the image. After you have adjusted to make the overall gain is uniform, turn the gain down to make the image barely visible in the contrast image. See below images*

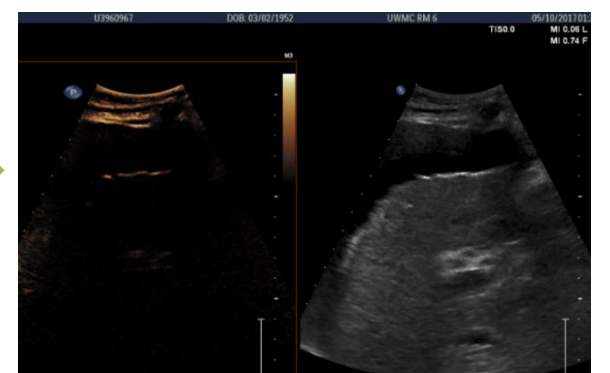
*TOO BRIGHT*



*STILL A BIT TOO BRIGHT*



*ABOUT RIGHT. JUST ENOUGH GAIN TO SHOW REFLECTIVE TISSUE INTERFACES.*



# **LIVER CONTRAST INJECTIONS AND IMAGE ACQUISITION**

## **2 INJECTIONS to be performed, each with 5-10cc bolus of saline:**

- First injection - 1.5 to 2.0 cc Lumason, depending on patient size.
- Second injection – 1.2 to 1.8 cc Lumason, evaluate whether to focus on the same or different area.

## **FOR CONTRAST REACTIONS – CALL 222 AND RAPID RESPONSE CODE ADVERSE REACTION BOX LOCATED IN ROOM 6 AND IN BETWEEN ROOM 1&3**

- 1. START THE TIMER** when the radiologist injects the contrast. *Do not reset the timer until beginning the second injection.*
- 2. PRESS ACQUIRE 1** immediately to begin the cine clip when the radiologist injects the contrast, do not wait for the bubbles to be seen.
- 3. REMAIN FIXED** on area of interest with patient using normal respiration.
- 4. PRESS FREEZE AT 60 SECONDS** to capture cine loop. Do not freeze prior to this for any reason.
- 5. KEEP IMAGE FROZEN** and DO NOT move your hand.
- 6. UNFREEZE TO TAKE STILL IMAGE EVERY 30 SECONDS** until you get to 5 minutes. You do not need to sweep through area of interest. Do not continuously scan between the 30 second intervals. This breaks the bubbles. Keep hand in place between intervals so that you are not searching for the target for an increased period.
- 7. ADDITIONAL IMAGES OR CINE SWEEPS** to be taken at the radiologist's discretion.

## **BEFORE SECOND INJECTION:**

- 8. BREAK BUBBLES** by coming out of contrast mode and turning on color flow doppler, repeat until bubbles are no longer seen.
- 9. END TIMER AND RESET WHEN READY TO REPEAT STEPS 1-7**

# **RENAL CONTRAST INJECTIONS AND IMAGE ACQUISITION**

**1 OR MORE INJECTIONS to be performed, each with 5-10cc bolus of saline:**

- First injection - 1.5 to 1.8 cc depending on patient size.
- Second injection – as needed at the discretion of the radiologist.

**FOR CONTRAST REACTIONS – CALL 222 AND RAPID RESPONSE CODE  
ADVERSE REACTION BOX LOCATED IN ROOM 6 AND IN BETWEEN ROOM 1&3**

- 1. START THE TIMER** when the radiologist injects the contrast. *Do not reset the timer until beginning the second injection.*
- 2. PRESS ACQUIRE 1** immediately to begin the cine clip when the radiologist injects the contrast, do not wait for the bubbles to be seen.
- 3. REMAIN FIXED** on area of interest with patient using normal respiration.
- 4. PRESS FREEZE AT 30 SECONDS** to capture cine loop. Do not freeze prior to this for any reason.
- 5. UNFREEZE AND SWEEP THROUGH LESION** in transverse and sagittal - ACQUIRE 1, sweep through and freeze to save sweeps.
- 6. UNFREEZE AND SWEEP THROUGH ENTIRE kidney** in transverse and sagittal - ACQUIRE 1, sweep through and freeze to save sweeps.

If lesion is **CYSTIC** this is the last step.

If lesion is **SOLID** continue with the following images:

- 7. UNFREEZE TO TAKE STILL IMAGE EVERY 30 SECONDS** until you get to 3 minutes. You do not need to sweep through area of interest. Do not continuously scan between the 30 second intervals. This breaks the bubbles. Keep hand in place between intervals so that you are not searching for the target for an increased period.
- 8. ADDITIONAL IMAGES OR CINE SWEEPS** to be taken at the radiologist's discretion.

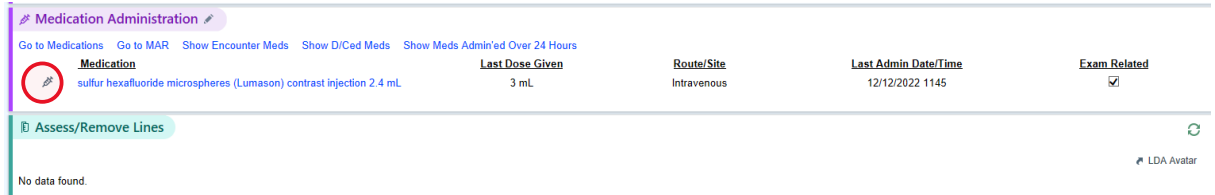
## **BEFORE SECOND INJECTION:**

- 1. BREAK BUBBLES** by coming out of contrast mode and turning on color flow doppler, repeat until bubbles are no longer seen.
- 2. END TIMER AND RESET WHEN READY TO REPEAT STEPS 1-7**

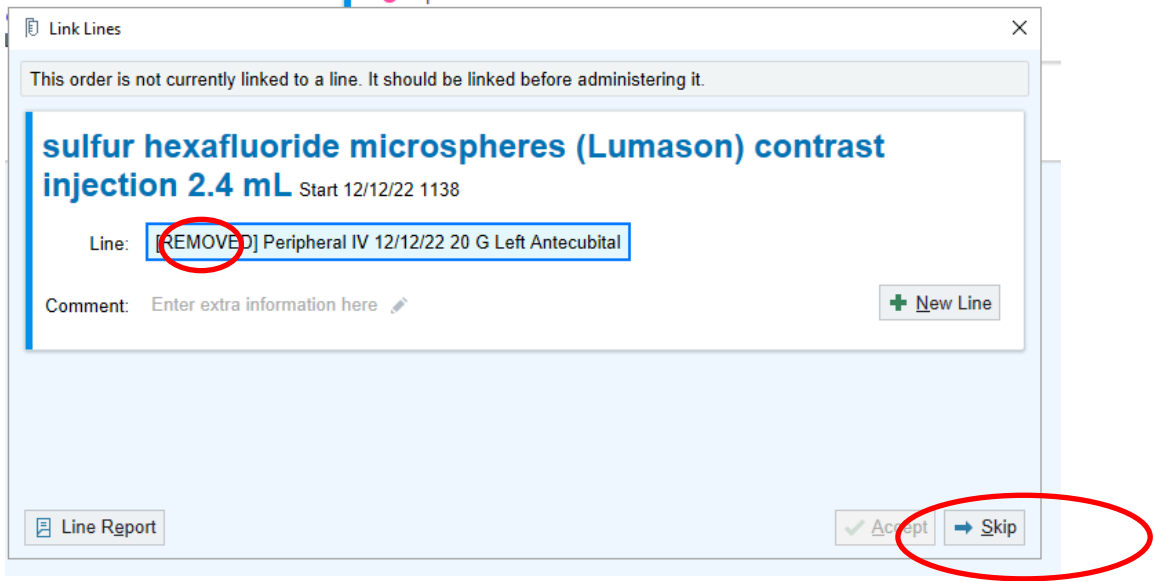
# POST PROCEDURE DOCUMENTATION

## IN EPIC END EXAM NAVIGATOR:

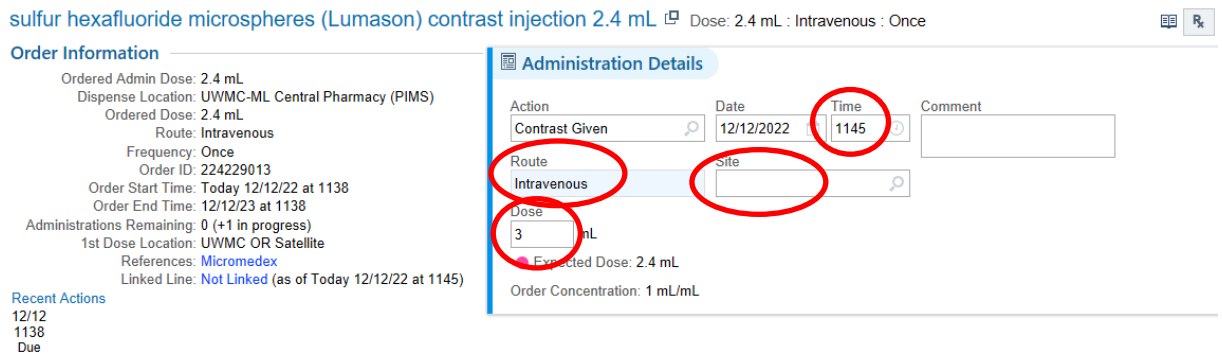
1. Document the amount of Lumason administered in Medication Administration. Click on small Syringe to get window to do so.



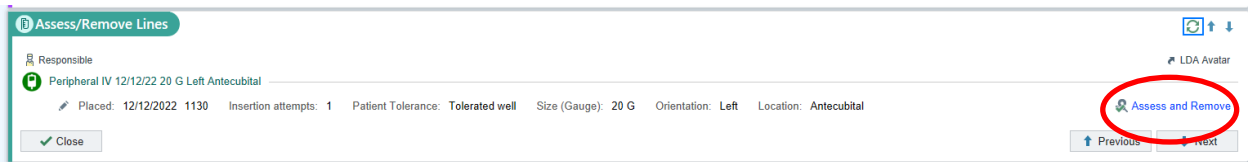
Select the appropriate Line used and click ACCEPT, or SKIP if no IV was entered by RN.



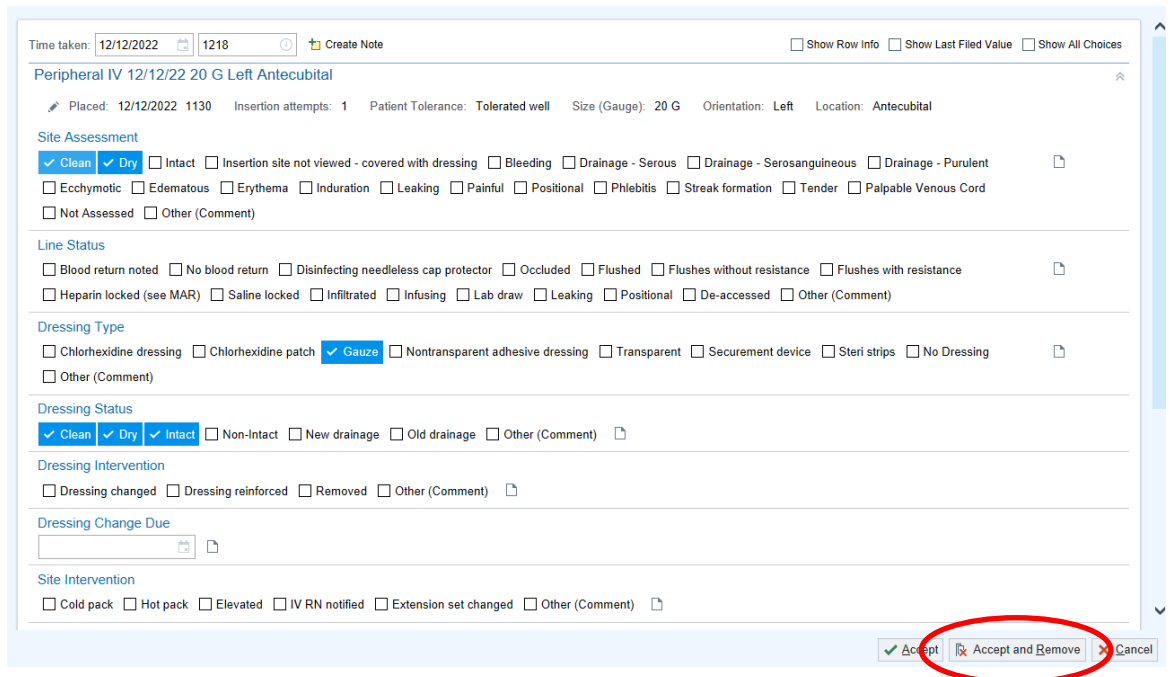
Fill in time, route, site (if available) and dose – 4.8cc are in the vial.



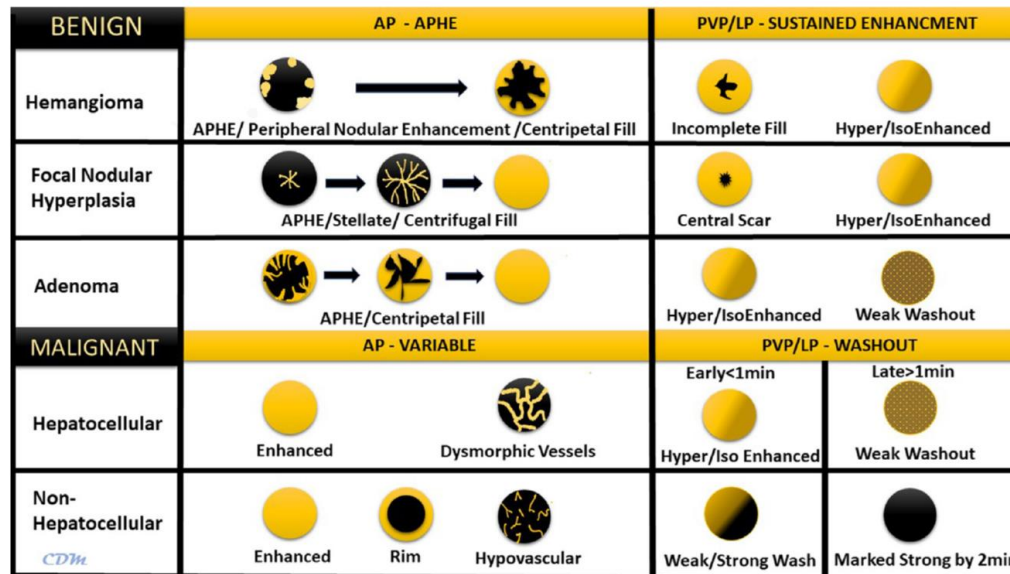
2. Document IV removal. Note: This will only show up if RN completed this section in EPIC when IV was placed. Click on Access and Remove



Minimum requirements to be filled out are selected below.



# CEUS Patterns of Focal Liver Masses



Lesion classification relies on enhancement in arterial and portal venous phase

HCCs most challenging due to compromised liver status and very slow washout

Fig. 1. Schematic algorithm of enhancement of focal liver masses with CEUS. AP = arterial phase; PVP = portal venous phase; LP = late phase. APHE = arterial phase hyper-enhancement.

Wilson SR, Burns PN, Kono Y. Contrast-Enhanced Ultrasound of Focal Liver Masses: A Success Story. *Ultrasound Med Biol.* 2020 May;46(5):1059-1070. <sup>1</sup>

In-house UWMC CEUS consultants:

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Mike Averkiou “contrast Mike” (UW research) 206-778-2356 [maverk@uw.edu](mailto:maverk@uw.edu)

## CONTRAST ENHANCED PROTOCOL HISTORY

	Date	Changes made	By whom
Updated	2/2022	Liver and Renal Injections sections added Enhancement and Washout chart added	Renee Betit Fitz
Added	12/12/22	Added Epic completion instructions	Renee B Fitz
Change	1/23/23	Cine clip to start with injection, do not wait for bubbles. Revised protocol to standardize injections and image acquisition.	Manjiri Dighe Renee B Fitz Becky Marion Shaun Bornemeier
Change	9/26/2023	USE THE C5-1 PROBE, other probes have the capability, but this is the only probe that has been optimized for contrast imaging of the liver and kidney. For contrast of small parts, the L18 can be used with contrast volume increased to 2cc.	Renee Betit Fitzgerald
Added	10/4/2023	Ordering Lumason section	Renee Betit Fitzgerald