SPR CEUS TASKFORCE GUIDELINES FOR INTRAVENOUS ADMINISTRATION OF ULTRASOUND CONTRAST AGENTS

General principles: All techniques described below require a minimum of two operators; one to inject, the other to image and record. As with all contrast media, have resuscitation equipment readily available in case of anaphylactoid reaction. In general, imaging focal liver lesions requires one injection followed immediately with a 60 second cine clip and intermittent imaging for 5 minutes. Trauma imaging typically requires two injections; one for liver, right kidney/adrenal and pancreas, the second for spleen, left kidney/adrenal area. Please note these guidelines are based on SPR CEUS Taskforce members experience and personal communication. They are subject to change and can be modified at your discretion.

1) Optison™ (GE Healthcare):
   A) Prepare the agent by gentle agitation of vial to suspend microspheres. Vent the Optison™ vial with a sterile vent spike or 18 g needle. Gently agitate the syringe prior to injection to resuspend.
   B) Starting dose: 0.3 mL. Can repeat multiple times as needed up to a total dose of 8.7 mL. May increase or decrease dose as needed. Wait 5-10 minutes for prior dose to clear or less depending on the US scanner.
   C) Can be injected through a 20 g or larger angiocatheter peripheral IV or central IV lines. For peripheral IVs use extension tubing and three way stop-cock; one stop cock connected to contrast syringe, the second to flush syringe, the third to tubing.
   D) Slowly load extension tubing/catheter with Optison being careful not to inject into vein yet. Follow with rapid flush of 3-10 mL 0.9% sodium chloride injection, USP to deliver the contrast agent. Announce out loud, “flushing”, as you are flushing.
   E) Begin a 60 sec cine-clip when the injector announces “flushing”.
   F) Use low MI contrast specific modality of your scanner. On some scanners the mechanical index and gain may be adjusted on the fly, during enhancement, to improve image quality.
   G) FDA approved for adult cardiology use only. Off-label use in children.

2) Lumason™ (Bracco):
   A) Dose: 0.6-2.4 mL. Suggested doses: 0.6 mL infants up to 3-4 yr age, 1.2 mL up to about 12 yr age, 2.4 mL adolescents and adult size patients. Alternatively, 0.03 ml/kg can be used. Repeat as needed after waiting for first dose to clear.
   B) Kit contains Lumason™ vial with 25 mg lipid-type A lyophilized powder and headspace fill of 60.7 mg sulfur hexafluoride, 5 mL syringe of 0.9% Sodium Chloride Injection, USP and minispike.
   C) Follow package directions to inject prefilled syringe into Lumason™ vial. Remember to attach the syringe to the minispike prior to inserting into the vial.
   D) Shake vigorously for 20 seconds. Use immediately or resuspend by brisk hand agitation prior to use.
   E) Use same injection technique as for Optison™.
   F) Use low MI contrast specific modality of your scanner.
   G) Widely used in Europe, including in children under the name SonoVue™.
   H) FDA approved for adult and pediatric liver studies.

3) Definity™ (Lantheus):
   A) Dose: 10 μL/kg. Maximum of two doses.
   B) Requires activation with Vialmix® mixer apparatus.
   C) Use same injection technique as for Optison™.
   D) FDA approved for adult cardiology use only. Off label use in children.