

How to make your own ultrasound phantoms to practice ultrasound guided vascular access cannulation – Dr Simon van Hooland

What you need:

- A pyrex glass container (for example 17 x 27 x 5 cm)
- Cooking oil : to lubricate the glass container (prevents the phantom from sticking to the wall)
- Hot water
- Gelatin is chosen as a bulking agent because it is commercially available, inexpensive and easy to suspend in water. It gels quickly and provides both firmness and elasticity to the phantom. You will need three packages or 20 g per 250 ml water.
- Sugar free Metamucil (contains psyllium hydrophilic mucilloid fibre) can be used as a scattering agent: 1 tablespoon per 250 ml water. When mixed with gelatin, it has an echotexture similar to subcutaneous tissue.
- A sieve to remove clots
- Coloring agent
- Party balloons or Penrose drains (1/2 inch = 1,25 cm to mimic neck vessels; 1/4 inch or 0,6 cm for peripheral vessels)
- A 20 ml syringe

Procedure

Step 1



Measure 1/3 of the container volume in water and heat it up in a pot (no need to let it boil).



Add the gelatine 3 packages per 250 ml water.
You can let the gelatin soak a few minutes in lukewarm water beforehand
Stir gently until the gelatine has dissolved.

Do not use a mixer because this will create small airbubbles in your phantom !



Add the metamucil: 1 tablespoon/ 250 ml water
Stir until it has dissolved.



Remove clumps Metamucil or gelatin with a sieve



-Add a few squirts of coloring agent

-Pour the mixture in the container and put it in the refrigerator for 1-2 hours.

Step 2

Meanwhile prepare the balloons or penrose drains.

Balloons: use party balloon and fill them with 12-15 ml of water. Make sure all the air is gone inside before closing them.

Penrose drains: fill them up with water and tie a knot at both ends.

Step 3



When the basic layer has stiffened, put the drains/balloons on top.

Then repeat **step 1**



Before pouring the second layer on top of the balloons, one can fixate the ends of the balloons/drains with a paperclip to the basic layer. This way one prevents the balloons from floating to the surface.

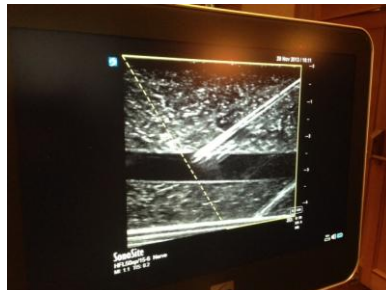
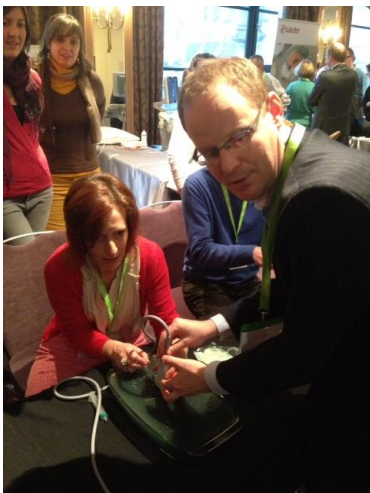
Put the container to the refrigerator for 1-2 hours.

Then repeat **step 1**

This third layer will cover the balloons/drains completely. Let harden in the fridge.



Then, you're ready to go !:



Aknowledgements:

I would like to thank Rosa Marticorena from Canada (Toronto) for sharing her recipe for dialysis vascular access phantoms with me.

The following article was also a source of inspiration:

ULTRASOUND-GUIDED CENTRAL VENOUS ACCESS: A HOMEMADE PHANTOM FOR SIMULATION TIPS FROM THE TRENCHES

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