# Doppler imaging with GE Vivid E95
# IN3015 H23

October 23, 2023

## Starting up the scanner

In this exercise you will use the GE Vivid E95 medical ultrasound scanner. You can find more information about the scanner here. You can go thorough this exercise in groups of two but the report has to be written individually. Start the scanner with the on/off button located at the front panel (See image 1). Press ”Cancel”. ”Skip” or ”Discard” if any dialogue shows up. Place in your memory stick in one of the USB ports. Once the scanner is on, press the ”Probe” button and select the ”Carotid” application under the 9-L probe (See image 2). You are going to use this linear probe to scan your carotid artery.


Figure 1: Front panel of the scanner

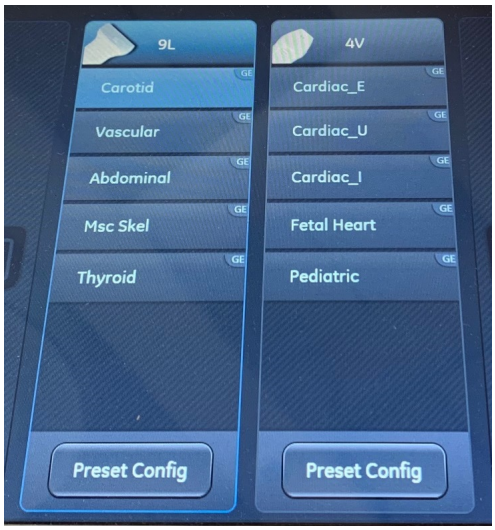


Figure 2: Carotid application under 9L list

## Preparing for recordings

The carotid arteries are located on both sides of your neck. Apply conductivity gel to the probe and place it on your neck. Try to get an ultrasound image where the carotid artery is clearly visible (See image below)

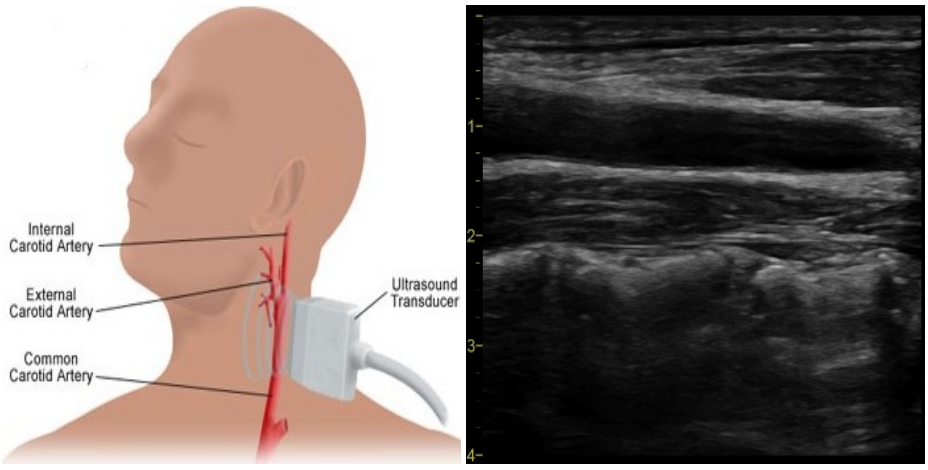


Figure 3: Carotid artery location and an example ultrasound image

## Task 1

Set the scanner in PW-Doppler and place the sample volume in the middle of your carotid artery. You should get an image similar to the one shown below.

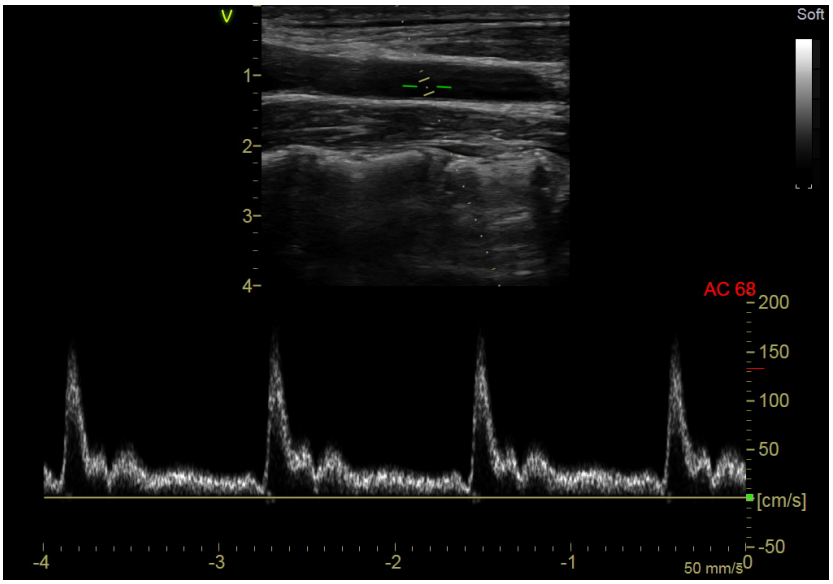


Figure 4: Doppler image showing the blood velocity inside the carotid artery

Acquire an image of your carotid artery and an image when in PW-Doppler mode. Save these images by first pressing the ”Freeze” button, then ”P2” button and then the *Update Menu* $\rightarrow$ *Save as* and add these to your report. Save your images as jpg files.

## Task 2

There is a knob labelled ”Angle corr.”. What is this knob used for? How should you set it? What happens to the velocity scale for large values of this parameter? Explain what you see.

## Task 3

After properly choosing the value for the ”Angle corr.”, freeze the acquisition. The value for the peak-systole (PS) and end-diastole (ED) velocities should be automatically displayed. What are the measured velocities?

## Task 4

Unfreeze the acquisition (you might need to turn off and on again the PW-Doppler to get live measurements). There is a knob called ”Scale”. Set the velocity range approximately 70% of the PS velocity. Acquire an image and add this to your report. What do you observe on the velocity plot? How can you explain it? How does the sound change?

## Task 5

There is a knob called ”Steer angle”. What is it used for? What happens when the angle changes from positive to negative values? What happens when the angles is close to 0°?

## Task 6

Set the scanner in triplex mode (B-mode, color flow imaging and PW-Doppler) by pressing Color and PW buttons. You should see an image that looks like the image below.

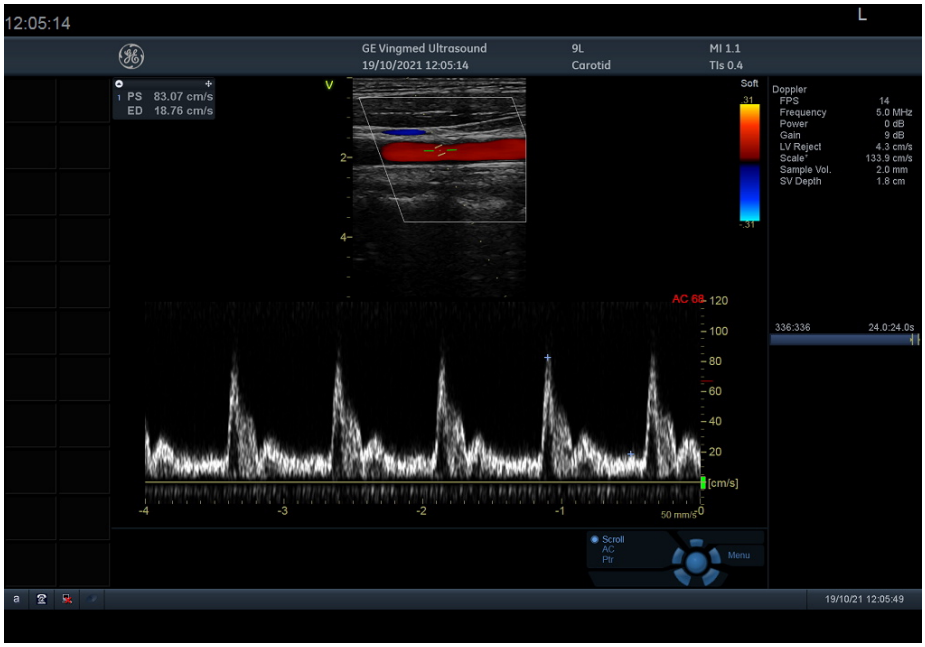


Figure 5: Triplex mode

Increase the gain using the ”Active mode” knob until the noise floor is visible on the spectrogram. Save the image and include it in your report. Now press the ”Color” button to put the scanner in only PW-Doppler mode. Save another image and include it in your report. Compare the images. What happens to the spectrogram when you change from triplex mode to only PW-Doppler mode? What is the reason for this change?

## When done

After you have finished your work, wipe off the probe and turn of the scanner with the on/off button.