

## HFCM Preoperative Ultrasound Mapping For Placement of Hemodialysis Access - Imaging Protocol

### NOTE:

- Abbreviation key at end of protocol
- All diameters measured in AP dimension, transverse plane, gray scale
- All spectral waveforms measured in longitudinal plane. Measure PSV on all spectral measurements, except SCV, IJ
- Patient sitting upright except for SCV, IJ assessment

### 1) ARTERIES (pre-tourniquet placement) \*

#### Brachial Artery (BA): 2 cm cranial to antecubital fossa (AC)

- Look at caudal 1/3 of artery for stenosis (gray scale)
- Diameter (cm)
- Spectral waveform (waveform will be graded normal/abnormal)
- Calcification: Trans, long (grade absent, mild/moderate, severe (circumferential))
- Blood flow x 3 (Gate diameter to include entire vessel, spectral measurement to include 3-5 waveforms)

#### Radial Artery (RA): 2 cm cranial to the wrist

- Look at caudal 1/3 of artery for stenosis (gray scale)
- Diameter (cm)
- Spectral waveform (waveform will be graded normal/abnormal)
- Calcification: Trans, long (graded absent, mild/moderate, severe (circumferential))

\* If high radial artery takeoff, measure blood flow in both radial artery (RA) and ulnar artery (ULNA), 2 cm cranial to antecubital fossa, as well as the diameter of both arteries

\* If arterial stenosis, measure PSV at stenosis and 2 cm cranial (upstream) from stenosis

### 2) VEINS

Compress as go up arm (grayscale), do not need to image compression. Assess for thrombus, stenosis, vein wall thickening. If smallest vein diameter is elsewhere other than location below, record location and diameter (cm), draw in on worksheet.

#### Cephalic Vein (CV)

- |                   |                 |
|-------------------|-----------------|
| Wrist:            | Diameter, depth |
| Mid FA:           | Diameter, depth |
| Cranial FA:       | Diameter, depth |
| Antecubital (AC): | Diameter, depth |
| Mid UA:           | Diameter, depth |
| Cranial UA:       | Diameter, depth |

Median Antecubital Vein: Diameter (largest vein)  
(MAV)

Basilic Vein (BAV)

4 cm caudal to antecubital (AC): Diameter (to assure adequate length of vein)  
Antecubital (AC): Diameter  
Mid UA: Diameter  
Cranial UA: Diameter  
Brachial vein: Draw line to brachial vein in approximate location where basilic vein drains into brachial veins. Measure largest diameter brachial vein thereafter at prescribed locations (downstream). If measuring largest basilic vein rather than brachial vein, extend line from basilic vein to brachial vein on drawing.

Axillary Vein (AXV): Diameter

- 3) **SUBCLAVIAN VEIN (SCV)**: Assess for transmitted cardiac pulsatility and respiratory phasicity, longitudinal plane: Grade as normal, stenosis, thrombus. It will likely be easier to image the patient in the supine position for imaging of the SCV, IJ. Note: remainder of the exam should be performed with subject upright.

Lateral SCV: Color, spectral  
Medial SCV: Color, spectral

- 4) **INTERNAL JUGULAR VEIN (IJ)**: Assess for transmitted cardiac pulsatility and respiratory phasicity: Normal, stenosis, thrombus. It will likely be easier to image the patient in the supine position for imaging of the SCV, IJ. Note: remainder of the exam should be performed with subject upright.

Cranial IJ: Trans dual or cine clip without / with compression transverse plane; Longitudinal color, spectral  
Caudal IJ: Trans dual or cine clip without / with compression transverse plane; Longitudinal color, spectral

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**ABBREVIATION KEY:**

AC = antecubital	FA = forearm
ANAS = anastomosis	IJ = internal jugular vein
AXV = axillary vein	MAV = median antecubital vein
BA = brachial artery	MID= mid
BAV = basilic vein	PSV = peak systolic velocity
BR = branch	RA = radial artery
BRV = brachial vein	SCV = subclavian vein
CA = caudal	UA = upper arm
CR = cranial	ULNA = ulnar artery
CV = cephalic vein	WR = wrist
EDV = end diastolic velocity	