Sonographer Scanning Cheat Sheet:
Bilateral Upper Extremity Arterial Duplex US

Procedure Overview: An upper extremity arterial duplex ultrasound assessment can be utilized to detect the presence, severity, and location of arterial disease in the upper extremities.

Required Pre-Procedure Prep:

- Obtain patient verbal consent.
- Obtain a detailed patient history including, but not limited to cardiovascular symptoms, history of tobacco usage, and previous vascular surgery.
- If the patient has arm pain, ask location, when pain occurs, and what relieves the pain.
- Complete a physical exam. Assess the patient's extremities for palpable pulses, trophic changes, lesions, color, and temperature.
- Instruct the patient to remove clothing from their entire arm and to lie supine with their head elevated. Typically it is best for the patient's arm to lie palm facing up resting on the sonographer's lap.

Proper Probe: Linear array probe with a frequency of 6 - 12 MHz that has tri-duplex capabilities.

Protocol for Bilateral Upper Extremity Arterial Duplex Ultrasound (93930)

This protocol aligns with the Mindray I-Works protocol: Imagen Upper Arterial
You may "Suspend" the protocol at any time to take additional images or handle pathology, then restart I-Works.

Proper imaging of UEA vessels:

COLOR BOX- should always be taller than wide. Steered appropriately for Sag.

Grey scale Sag- vessel should be perpendicular to probe and straight across the screen to best visualize intimal wall layer

Sag Color- the vessel should be angled and box steered accordingly

Sag Doppler- be sure angle correct is 45-60 degrees and that the internal stick is perfectly parallel to the anterior wall for proper quantification of velocity measurements

Measurements- measure the PSV for each vessel

Stenosis- walk the sample volume through the narrowing to find the highest velocity. Sample before, through and after stenosis. Document post stenotic turbulence if present. Cine any area of stenosis > 50% in longitudinal and transverse.

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Begin Exam with Right Side:

1. Sag CCA Prox (if not using I-Works, be sure to label appropriately RT or LT)
2. Sag CCA Prox w/Color
3. Sag CCA Prox w/color and Doppler
4. Sag Innominate artery w/Color (only applicable to right side)
5. Sag Innominate w/color and Doppler
6. Sag Subclavian
7. Sag Subclavian w/Color
8. Sag Subclavian w/color and Doppler
9. Sag Axillary artery
10. Sag Axillary w/Color
11. Sag Axillary w/color and Doppler
12. Sag Brachial artery Prox
13. Sag Brachial artery Prox w/Color
14. Sag Brachial artery Prox w/color and Doppler
15. Sag Brachial artery Distal
16. Sag Brachial artery Distal w/Color
17. Sag Brachial artery Distal w/color and Doppler
18. Sag Radial artery Distal w/Color
19. Sag Radial artery Distal w/color and Doppler
20. Sag Ulnar artery Distal w/color and Doppler
21. Sag Ulnar artery Distal w/Color

****Repeat for Left side****

Upper Extremity Arterial Stenosis Diagnostic Criteria		
Degree of Stenosis	**Peak Systolic Velocity (cm/s)**	**Ratio (prior PSV/max PSV)**
<50%	<200 cm/s	<2.0
50 - 75%	200 - 300 cm/s	2.0 - 4.0
>75%	> 300 cm/s	> 4.0

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Common Pathologies

- Stenosis: Appears as an area of visualized plaque, focal velocity acceleration within an area of visualized plaque, and post-stenotic turbulence distal to the stenosis.

- Plaque: If present, classify as one of the following and note texture, surface, and location.
    - Homogeneous: Soft plaque, uniform echo pattern
    - Heterogeneous: Complex echo pattern with multiple echoes and different densities
    - Calcified: High density echoes with posterior shadowing

- Occlusive Disease: Appears as a total blockage of the artery. Power Doppler is implemented to determine if trickle flow is present. Document the severity of the occlusion and locate any collateral pathways.

- Arterial Dissection: Appears as an internal flap (separation of the three arterial layers) with color Doppler showing two separate compartments with opposite directions of flow. Spectral analysis depicts opposite blood flow within both compartments.