

## Ultrasound ARTERIOVENOUS GRAFT (AVG)

<b>Patient Position</b>	<b>Patient positioning is most often supine, with the arm relaxed and extended out to the side with the area to be evaluated closest to the technologist. For patient comfort, support the arm on a table/pillow.</b>
<b>Indications</b>	Failure to mature, malfunction of access site, low blood flows, increased venous pressure, palpable mass, loss of thrill, arm swelling.
<b>Contraindications</b>	Open wounds, indwelling catheters, acoustic shadowing from calcification, dialysis or fistulogram performed the same day.
<b>Special Notes:</b>	<ol style="list-style-type: none"> <li>1. A complete evaluation includes B-mode imaging, spectral Doppler analysis, and color Doppler imaging of all accessible portions of the hemodialysis access.</li> <li>2. Doppler spectral analysis is performed in the sagittal plane.</li> <li>3. Velocity measurements should be obtained from a longitudinal plane at an angle of 60 degrees parallel to the direction of the blood flow/vessel walls.</li> <li>4. Doppler angles less than 45 degrees may be necessary due to patient anatomy</li> <li>5. To obtain peak velocity, utilize color Doppler to note areas of concern and 'walk' the spectral Doppler cursor throughout these areas. Post-stent turbulence should be documented when present.</li> <li>6. When a stenosis is identified, velocities should be documented proximal to, within, and distal to the stenosis.</li> <li>7. Flow volumes should be calculated and used to determine fistula maturation.</li> <li>8. Functional disorders can also be identified using flow volumes.</li> </ol>
<b>INFLOW ARTERY (AFFERENT)</b>	Obtain peak systolic (PSV) and end diastolic (EDV) velocities at least 2 cm cephalad to the arterial anastomosis.
<b>ARTERIAL ANASTOMOSIS</b>	Obtain PSV and EDV. Obtain diameter measurement on B-mode image o Note any areas of narrowing or abnormality
<b>GRAFT</b>	Obtain PSV and EDV along the body of the graft. o Proximal, mid, distal outflow vein <input type="checkbox"/> Include arterial side, loop end, and venous side for a loop graft. <input type="checkbox"/> Include serial segments along the length of a straight graft.
	Flow volume measures are obtained from the arterial and venous side of a loop graft and within the mid-portion of a straight graft. o Obtain diameter on B-Mode image o Optimize spectral window and obtain Time-Averaged Mean Velocity (TAMV) <input type="checkbox"/> Open sample volume to include entire diameter of vessel <input type="checkbox"/> Use a 60-degree angle <input type="checkbox"/> Measure 2-3 cardiac cycles
<b>VENOUS ANASTOMOSIS</b>	Obtain PSV and EDV. o Obtain diameter on B-Mode image
<b>OUTFLOW VEIN</b>	Evaluate for any areas of abnormality using B-mode, color, and spectral Doppler.

## Ultrasound ARTERIOVENOUS FISTULA (AVF)

Continued:	
<b>GRAFT</b>	Obtain PSV and EDV along the body of the graft. <ul style="list-style-type: none"> <li>o Proximal, mid, distal outflow vein</li> <li><input type="checkbox"/> Include arterial side, loop end, and venous side for a loop graft. <input type="checkbox"/> Include serial segments along the length of a straight graft.</li> </ul>
	Flow volume measures are obtained from the arterial and venous side of a loop graft and within the mid-portion of a straight graft. <ul style="list-style-type: none"> <li>o Obtain diameter on B-Mode image</li> <li>o Optimize spectral window and obtain Time-Averaged Mean Velocity (TAMV)                             <ul style="list-style-type: none"> <li><input type="checkbox"/> Open sample volume to include entire diameter of vessel</li> <li><input type="checkbox"/> Use a 60-degree angle</li> <li><input type="checkbox"/> Measure 2-3 cardiac cycles</li> </ul> </li> </ul>
	Include diameter measurements from any areas of narrowing or abnormality.
<b>VENOUS ANASTOMOSIS</b>	Obtain PSV and EDV. <ul style="list-style-type: none"> <li>o Obtain diameter on B-Mode image</li> </ul>
<b>OUTFLOW VEIN</b>	Evaluate for any areas of abnormality using B-mode, color, and spectral Doppler.