MARY WASHINGTON HEALTHCARE IMAGING SERVICES

LOWER EXTREMITY GRAFT EVALUATION

I. **Clinical Indications:** Clinical symptoms such as claudication, ischemic rest pain, dependent rubor, pallor, coolness, gangrene or ulceration of extremity should be documented. A complete history will be taken prior to the beginning of the exam. This is to include prior testing, previous interventions or revisions, including angioplasty, stent, endarterectomy & bypass graft including the type and location of graft. Obtain post-operative notes when possible.

II. **Equipment**: Performed with a real-time scanner using a linear array transducer with an operating frequency of 8.0 MHz or higher. For deeper grafts, a 5.0 MHz curved transducer can be used.

III. **Patient Preparation**: NPO 4 hours if abdominal graft is present. Otherwise, no preparation is necessary.

IV. **Patient positioning**: Patient should lie supine on with their head elevated 30-45 degrees. If possible, the patient will be slightly rotated to the side of the leg being evaluated with the leg externally rotated and knee slightly bent.

V. **Imaging Optimization:**
Optimize the image by using the arterial preset, DGC controls, Master Gain, I-scan, harmonics and transmit focal zone.

VI. **Imaging Technique**:

1. Begin in the transverse scan plane to identify the proximal artery, proximal anastomosis and proximal graft.
2. In a longitudinal scan plane, obtain a gray scale image, a color Doppler image and an image of the peak systolic velocity at the following locations:
    a. native artery proximal to graft anastomosis
    b. proximal anastomosis
    c. proximal graft
    d. insonate full length of graft with Color Doppler
    e. mid graft
    f. distal graft
    g. distal anastomosis
    h. native artery distal to graft anastomosis
3. Documentation of areas of suspected stenosis MUST include representative waveforms recorded before, at and distal to the stenosis. Note the presence of tardus parvus waveform.
4. Perform velocity ratio at each area of stenosis found in the graft by dividing the peak systolic velocity at the site of disturbance by the peak systolic velocity in the adjacent proximal segment.
5. After completing the exam, the technologist will scan the order for the exam into iSite and track the exam in the Syngo system.
6. When critical findings are present or wet reading is requested by the ordering physician, the technologist should discuss the exam with an available radiologist (preferably one on-site), then reserve the exam with the RadReserve system. If necessary, the Radiologist will provide a verbal wet reading to the ordering physician with a priority written report to follow.

Image Summary

Image	Measurement
1. Patient information screen	
2. Long proximal native artery grayscale	
3. Long proximal native artery color	
4. Long proximal native artery color with spectral Doppler	PSV
5. Long proximal anastomosis grayscale	
6. Long proximal anastomosis color	
7. Long proximal anastomosis color with spectral Doppler	PSV
8. Long proximal graft grayscale	
9. Long proximal graft color	
10. Long proximal graft color with spectral Doppler	PSV
11. Long mid graft grayscale	
12. Long mid graft color	
13. Long mid graft color with spectral Doppler	PSV
14. Long distal graft grayscale	
15. Long distal graft color	
16. Long distal graft color with spectral Doppler	PSV
17. Long distal anastomosis grayscale	
18. Long distal anastomosis color	
19. Long distal anastomosis color with spectral Doppler	PSV
20. Long distal native artery gray scale	
21. Long distal native artery color	
22. Long distal native artery color with spectral Doppler	PSV

Documentation of areas of suspected stenosis MUST include representative waveforms recorded before, at and distal to the stenosis.

<u>References:</u>

1. AIUM March 1998 Meet the Professor Session, Dr JF Polak, MD MPH
2. Mills JL, Harris EJ, Taylor LM Jr., Beckett WC, Porter JM. The importance of routine surveillance of distal bypass grafts with duplex scanning: a study of 379 reversed vein grafts. J Vasc Surg 1990; 12:379-389
3. Idu MM, Blankestein JD, de Gier P, Truyen E, Buth J. Impact of color-flow duplex surveillance program on infrainguinal vein graft patency; a five year expeience. J Vasc Surgery 1993; 130:42-53
4. Mohan C., Hoballah J, Scheuppert M, Sharp W, Kresowik T, miller E, Corson J.Should all in situ saphenous vein bypasses undergo permanent duplex surveillance? Arch Surg 1995; 130: 483-8
5. Mills JL, Bandyk DF, Gathan V, Esses GE, The origin of infrainguinal vein graft stenosis: A prospective study based on duplex surveillance. J Vasc Surg 1995; 21: 16-25.