Summary

Arterial bypass is an established surgical procedure for the treatment of complications of peripheral vascular disease, aneurysms, and lower extremity trauma ***(Lopera et al., 2008).*** Also, peripheral arterial bypass graft surgery has become an established treatment for symptomatic arterial occlusive disease of the lower extremities when percutaneous interventional treatments have failed or are considered to be ineffective ***(Willmann et al., 2003).***

Many patients experience no symptoms in the presence of a developing graft stenosis, and grafts may fail without any prior warning. However, symptoms that can be attributable to imminent graft failure are the sudden onset of severe claudication or a sensation of coldness involving the foot. Urgent intervention is required in this situation to prevent graft occlusion. Graft surveillance programs will detect the development of most graft defects ***(Thrush et al., 2005).***

Postoperative surveillance of peripheral arterial bypass grafts is considered to be important, since as many as 30% of patients develop graft-related complications within the first 2 years after surgery. Timely identification of failing grafts can often avert impending graft failure and improve the secondary bypass graft patency rate.

Patients are normally scanned at 1, 3, 6, 9 and 12 months following bypass surgery. Many vascular units also continue to scan patients indefinitely beyond the first year at 6-month intervals to detect late graft problems ***(Thrush et al., 2005).***

The time interval between scans is shortened to 1-2 months if a patient shows signs of developing a moderate stenosis. It can be seen that graft surveillance programs require considerable commitment from the vascular laboratory, and there has been some debate as to the benefit and cost-effectiveness of surveillance programs. There is, however, some evidence to suggest that they are effective in maintaining patency rates and are less costly than surgical revision after a graft thrombosis, or rehabilitation following amputation ***(Wixon et al., 2000).***

Residual valve cusps, anastomotic strictures, arteriovenous fistulas, poor distal run-off, fibrin-platelet aggregates, intimal flaps, and other technical imperfections may lead to early graft failure. More late complications of peripheral arterial bypass grafts include intimal hyperplasia of the graft or progression of the atherosclerosis, which results in graft stenosis.

Duplex US can demonstrate graft patency and enables detection of complications, including stenosis or occlusion, perigraft fluid collections, arteriovenous fistulas, and pseudoaneurysms. Because of its noninvasive quality, low cost, and the rapid access it provides, duplex US is considered to be the primary imaging modality for use in postoperative graft surveillance ***(Willmann, et al 2003)***.

Multidetector CT angiography (MDCTA) is an established, minimally invasive tool that can be used to image most major vessels in the body. Research on various portions of the vascular system has shown that CT angiography (CTA) clearly depicts vessel abnormalities such as stenosis, ulcers, pseudoaneurysms, calcifications, plaques, intimal thickening and graft ingrowth ***(Karadeli et al., 2009).***

CT angiography almost completely replaced the conventional angiography for the study of bypass graft, since it is safer, less expensive, and quicker and allows anatomic definition of the vascular structures as well as the soft tissues. CT angiography also avoids unnecessary puncture and catheterization of a bypass graft and the potential complications of conventional angiography ***(Sun, 2006).***

All these findings suggest that multi–detector row CT angiography must be incorporated into a comprehensive graft assessment strategy as a secondary morphologic modality after functional assessment of the bypass graft with duplex US and better delineation of any potential problems detected with duplex US ***(Willmann, et al 2003).***