Once drinking well, diabetic patients will be restarted on their original preoperative diabetic regimens (oral agents and/or insulin therapy). The treatment of diabetes during this study will be closely monitored in collaboration with an endocrinologist specializing in the management of diabetes.

Primary Outcomes

The primary endpoint of this study will be to assess whether the addition of clopidogrel to aspirin reduces intimal hyperplasia in saphenous vein grafts 12 months after bypass surgery, as assessed by IVUS. Patients will undergo IVUS imaging 12 months post-CABG, and the average intimal area in the proximal 40 mm of one vein graft per patient will be assessed.

Secondary Outcomes

At the time of intravascular ultrasound, coronary and graft angiography will also be performed to assess vein graft patency and areas of stenosis. Although this trial will not be sufficiently powered for such a purpose, this data will be obtained whilst gathering information pertaining to the primary outcome.

Endpoints related to safety will also be documented, both at the time of surgery as well as during the one year of study drug administration. After surgery, data will be recorded regarding chest tube blood loss, blood product transfusions, bleeding requiring tube thoracostomy or sternal re-opening, perioperative MI, and gastrointestinal complications. Complete blood counts (CBC) will assess the hemoglobin level in the immediate postoperative period and during the one year follow-up. In addition, the incidence of major adverse cardiovascular events following CABG (mortality, MI, cerebrovascular accident, hospitalization for coronary ischemia, need for coronary intervention) will be recorded.

IVUS Procedure

Intravascular ultrasound will be used to assess the area of intimal hyperplasia present in saphenous vein grafts at 12 months after surgery. IVUS differs from angiography by providing cross-sectional images of both the vessel wall and lumen with high resolution. The process of intimal hyperplasia is easily detectable and quantifiable by IVUS, but may completely escape visualization by angiography. At one year following CABG, vein graft intimal hyperplasia is universally present.

Efforts will be made to schedule all patients at 52 ± 2 weeks from the day of randomization (Figure 1). The IVUS procedure will first start with angiography of the native coronary arteries and the coronary bypass grafts. This will allow assessment of the progression of native coronary artery atherosclerosis (both in grafted and non-grafted vessels). Patency of all bypass grafts will be scored using 1) the Fitzgibbon method [14] and 2) the TIMI classification [48]. Patency of the coronary arteries will be assessed by the TIMI method.

IVUS studies will be performed using a 40 MHz imaging catheter (Atlantis® SR Pro, Boston Scientific). This catheter is a monorail system and has 6F guiding catheter compatibility. All IVUS imaging will be done with the administration of unfractionated heparin (70 units per kg, minimum 4000 units) before the introduction of the guidewire into a vein graft. Each patient will have at least two vein grafts implanted at the time of surgery. However, imaging of more than one graft is not clinically advisable for safety and practical reasons. In order to minimize bias, the cardiologist performing the IVUS procedure will be blinded to the treatment allocation, and the selection of the SVG for IVUS imaging will be randomized. For this purpose, a sequence randomization scheme (based on the number of vein grafts) will produce a random sequence of numbers for each patient, such as "2, 1 and 3". These numbers will correspond to the position of the proximal anastomosis of each SVG on the ascending aorta (by increasing number from cranial to caudal, starting from 1). The graft whose random number is produced first will be selected for intubation with the IVUS catheter, unless 1) this particular graft showed more than 50% stenosis on the selective angiography performed immediately prior, or 2) access to this graft is technically difficult (graft tortuosity, difficult graft intubation). If any of the above two instances is encountered, the graft with the next number in the randomization sequence will instead be selected for IVUS, and so on. Graft exclusion for whatever basis (either because >50% stenosis or technically difficult access) will be recorded for all patients in each group.

Once the randomized graft selection has been completed, the actual IVUS procedure will take place. Intracoronary nitroglycerin (200 μg) will be given before advancing the IVUS catheter, and a 6F guiding catheter will be used to engage the vein graft. Then, a 0.014" coronary angioplasty guidewire will be advanced distally through the vein graft and positioned into the native coronary artery. The IVUS catheter will then be advanced into the graft at least 50 mm beyond the aorto-ostial anastomosis. The guiding catheter will then be disengaged to ensure visualization of the aorto-ostial anastomosis on pullback. This is essential because the aorto-ostial anastomosis will be the only landmark available to assure measurements of the proximal portion of each graft are comparable between groups. IVUS imaging will be done using a validated motorized pullback device at 0.5 mm/sec. Each study will be recorded on a separate S-VHS videotape. Only one quality pullback will be needed per graft, but a second pullback