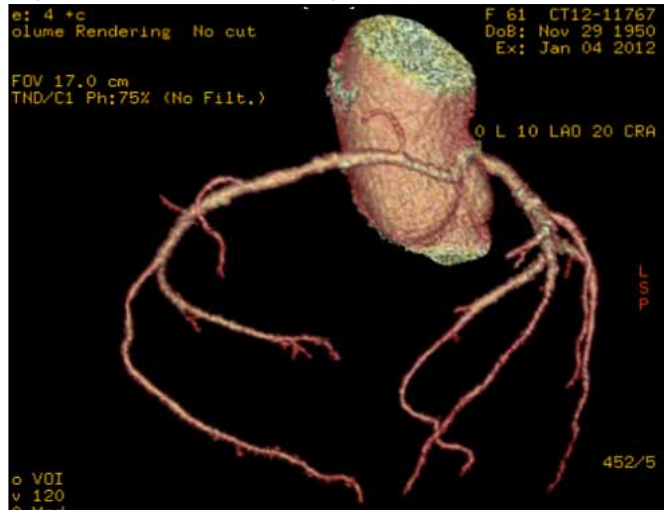


Figure 2. Volume Rendering; No Cut.



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The study staff at Dr. Massay's center includes 2 cardiologists, 2 radiologists, a visiting cardiac radiologist, and 2 CT radiographers. Eligible patients for CCTA included those who were asymptomatic with abnormal baseline electrocardiograms (ECGs; ie, complete left bundle branch block, T-wave changes, and marked ST) that made it difficult to interpret stress ECGs, symptomatic patients unable to do a treadmill stress test, and those with an equivocal treadmill stress test (ie, symptomatically negative but electrically positive or symptomatically positive but electrically negative).

Minor indications included a high Framingham Risk Score; dilated cardiomyopathy, recurrence of clinical symptoms in a population with metabolic syndrome, or patients >50 years of age with coronary heart or valve disease needing heart surgery/intervention. Patients with active arrhythmias were excluded from the study.

To achieve the low and regular heart rate necessary for optimal imaging (ie, <70 beats per minute [bpm]), patients were administered atenolol 100 mg daily x 5 days, nadolol 80 mg daily x 5 days, bisoprolol 5 mg daily x 5 days, and/or metoprolol 5 to 10 mg intravenously (IV) if still needed to bring the heart rate to <70 bpm. Sublingual glyceryl trinitrate was used for coronary dilation. Patients avoided stimulants and ate a light breakfast.

Enrollment began in February 2010 and ended in May 2012. The sample included a total of 211 patients (57% male). The median age was 55 years, with a range from 34 to 85 years. Complications included 1 case of acute bronchospasm, an allergic reaction in 1 patient, incomplete tests in 2 patients; an inability to get good IV access in 1 patient, and claustrophobia in 1 patient. A total of 16 patients had CA. The association with CCTA was positive in 12 cases and

negative in 4. Among those who had CA, 6 patients had percutaneous coronary intervention and 2 had coronary artery bypass graft surgery.

According to Dr. Massay, CCTA service in Barbados is now well established and safe, with an acceptable degree of accuracy. Future plans for the use of the technology call for myocardial tissue characterization and identification of valve disease. CCTA will also serve as an adjunct to intervention for assessment of fractional flow reserve and see increased use in the management of chest pain in the acute setting.

Metabolic Syndrome Disease Markers and CIMT Differ by Ethnicity as Predictors of CVr Event Risk

Evidence suggests that metabolic syndrome is associated with significantly increased risk of incident cardiovascular disease (CVD) and all-cause and cardiovascular (CV) death [Mottillo S et al. *J Am Coll Cardiol* 2010]. A clinical priority is to identify patients at risk for stroke and other CV events to enable preventive interventions and promote lifestyle modifications [Timóteo AT et al. *J Clin Hypertens* 2012].

Most studies in primary prevention settings have shown a relationship between metabolic syndrome and carotid intima-media thickness (CIMT) [Khan UI et al. *Atherosclerosis* 2011; Magnussen CG et al. *Circulation* 2010; Antonini-Canterin F et al. *Angiology* 2010]. Kenneth Connell, MB, BS, DM (Internal Medicine), The University of the West Indies, Cave Hill, Barbados, presented outcomes from an investigation of the relationship between traditional markers of metabolic syndrome and CIMT. The study also examined ethnic differences in metabolic profiles.

A total of 114 healthy volunteers (84 black, 59 white) recruited from South East London participated in the study. Standard anthropometric measures were collected, along with laboratory tests of lipids and glucose. Ambulatory blood pressure (BP) was monitored for 24 hours. CIMT measurements of the central carotid artery were taken using high-resolution ultrasound and special edge-detection computer software. Other than body mass index (BMI; $p < 0.0001$), 24-hour ambulatory systolic BP ($p = 0.003$), and glucose ($p = 0.003$), there were no significant differences in baseline characteristics.

There were statistically significant ethnic differences in both BMI (26.7 kg/m² black vs 24.1 kg/m² white; $p < 0.0001$) and triglycerides (0.74 black vs 0.92 white; $p = 0.005$), with no significant difference in mean systolic BP (117 mm Hg

black vs 121 mm Hg white; $p=0.308$). Office systolic BP was a significant predictor of CIMT ($p=0.009$).

The correlation between CIMT and systolic BP was significant ($r=0.239$; $p=0.012$), but there was no significant correlation with any lipid subfraction. The ethnic difference in CIMT between blacks and whites (0.477 mm black vs 0.425 mm white; $p=0.001$) was significant.

The present study showed significant ethnic differences in BMI, 24-hour ambulatory BP (systolic), and fasting glucose when using traditional markers of metabolic syndrome. No significant correlation between any CIMT and lipid subfractions was observed, but there was a statistically significant correlation with office systolic BP. Indeed, office rather than ambulatory BP was the most significant predictor of CIMT.

These data suggest that the main difference observed in CIMT between blacks and whites may not be related to traditional markers of metabolic syndrome. Given the low but statistically significant correlation with BP, there may be additional factors that play a role in the genesis of atherosclerosis in different ethnic groups.

CIMT has been suggested as a surrogate marker for coronary and peripheral artery disease because it is easily obtained by a noninvasive test, and is therefore recommended by guidelines for CV risk stratification, particularly in patients at intermediate risk [Stein JH et al. *J Am Soc Echocardiography* 2008]. Whether it should replace traditional metabolic syndrome markers in predicting the risk of CVD events and mortality has yet to be determined.

Multi-arterial Grafting Is Effective but Underused

Written by Rita Buckley

Edward B. Savage, MD, Cleveland Clinic Florida, Weston, Florida, USA, reviewed the facts that support multiarterial bypass grafting, discussed complications, and reviewed circumstances for favorable outcomes.

The left internal thoracic artery (LITA) is universally accepted as the best conduit for the left anterior descending artery in coronary artery bypass graft surgery (CABG) and is routinely used in over 90% of CABG procedures [Tatoulis J et al. *Ann Thorac Surg* 2011]. It reduces morbidity and mortality compared with the use of saphenous vein grafts (SVGs) [Slaughter MS. *Circulation* 2011].

To date, only the benefit of the single internal thoracic artery (SITA) has been proven by randomized trials.

However, observational studies on the use of bilateral ITA (BITA) have shown similar improved outcomes when compared with LITA and SVG. Likewise, a recent propensity score-matched trial of concomitant radial artery (RA) versus second ITA in 1001 CABG patients found significant overall survival ($p=0.022$) and major cardiac and cerebrovascular event-free survival ($p<0.001$) using the ITA rather than RA grafts [Ruttman E et al. *Circulation* 2011].

Even more recently, Galbut et al. [*J Thorac Cardiovasc Surg* 2012] demonstrated that broadly applied BITA compared with SITA grafting in propensity-matched patients provides enhanced long-term survival with no increase in operative mortality or morbidity for patients with normal and reduced ejection fraction.

Still, multiple arterial revascularization is performed in <13% of CABG procedures, with the RA most commonly used as the second conduit of choice [Ruttman E et al. *Circulation* 2011]. According to Slaughter [*Circulation* 2011], this is of concern given the known limitations of the RA, including susceptibility to vasospasm, potential calcification and poor quality in elderly patients, and the need for a proximal anastomosis with a small diameter conduit.

The right ITA (RITA), though biologically identical to the LITA, has been used less often [Tatoulis J et al. *Ann Thorac Surg* 2011]. Many institutions and cardiac surgeons either never or infrequently use the RITA in CABG. Reasons that RITA is used less frequently may include additional time to harvest, concerns over deep sternal wound infection, myocardial hypoperfusion, unfamiliarity, lack of randomized trials, and insufficient patency data [Tatoulis J et al. *Ann Thorac Surg* 2011].

After a study of 5766 patients and 991 angiograms, Tatoulis et al. [*Ann Thorac Surg* 2011] found evidence to reconsider RITA. Late patencies of RITA were excellent, equivalent to LITA for identical territories, always better than RAs ($p<0.01$) and SVGs ($p<0.001$), and remained free of atheroma. Use of RITA in addition to LITA was associated with excellent survival in triple vessel coronary disease (10-year survival, 89%).

According to Dr. Savage, impediments to the use of multiarterial grafting include higher incidence of sternal wound infection; longer duration of surgery; and increased technical difficulty, especially with branched grafts. However, each additional ITA used improves survival and freedom from major adverse cardiac and cerebrovascular events, and skeletonization of the ITA reduces risk of wound infection. He reported that for most patients, multiarterial grafting improves long-term outcomes without significantly increasing perioperative risk.