Commentary: Microvesicles: A target for personalized medicine following coronary artery bypass grafting

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Graft patency after coronary artery bypass grafting (CABG) is clinically important, as graft occlusion is associated with increased need for repeat revascularization and mortality. The natural history of all bypass grafts is one of failure over time, the rate of which may be affected by a multitude of factors. Although early graft failure is thought to be largely related to technical issues, medium- and long-term graft patency are thought to be affected by multiple risk factors, including patient-related factors such as continued smoking and poorly controlled diabetes, conduit type (arterial vs venous), graft type (in situ vs free), and more difficult-to-quantify factors, such as competitive flow and distal runoff.

In this issue of the Journal, Moore and Harken review the work of Camera and colleagues, who retrospectively examined the influence of preoperative patient microvesicles as a predictive marker for graft failure at 18 months after CABG. As Moore and Harken point out, higher preoperative levels of inflammatory and platelet derived microvesicles were associated with higher rates of both arterial and saphenous vein graft thrombosis, suggesting a patient specific (and potentially intervenable) cause for mid-term graft thrombosis. Interestingly, this association was independent of conduit type.

Although previous studies have attempted to associate genetic and cellular predictors of graft failure after CABG, these studies have focused on the progression of atherosclerosis as a cause for graft failure, thus limiting the ability to intervene beyond the current recommendation for lipid-lowering therapy already considered best practice after CABG. As the authors point out, a personalized, preoperative risk assessment for graft thrombosis may allow for tailoring of postoperative antiplatelet or anticoagulant therapy in an attempt to maintain graft patency.

Further investigation in attempts to reduce graft thrombosis in patients with high microvesicle scores is clearly needed. The benefit of dual prolonged antiplatelet or anticoagulant therapy in these patients remains controversial. Moreover, no commercially available measurement of inflammatory or platelet-derived microvesicles is available; however, should a benefit be demonstrated, a commercially available “microvesicle risk score” may become an important part of clinical practice, much in the same way that oncologic gene profiles have changed the care of cancer patients and allowed for personalized and individually tailored treatment.

References
Commentary: Microvesicles, personalized surgery, and tailored medical therapy to improve coronary artery bypass grafting outcomes

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When it comes to graft patency in coronary artery bypass grafting (CABG), there are likely myriad factors, such as patient baseline characteristics, coronary anatomy, and procedure-related aspects, that are associated with outcomes.1,2 It is up to a surgeon to weigh all these different considerations when it comes to deciding what operation to offer his or her patient. In coronary surgery, the key procedure-related questions include off-pump or on-pump, multiple arterial grafts versus supplemental vein grafts, conduit harvesting techniques (eg, skeletonization, no touch, or endoscopic), and which conduits should be anastomosed to which diseased vessels.3-5 These considerations are carefully weighed based on the patient’s baseline level of health, comorbidities, conduit quality and availability, and the anatomy of the diseased coronary vessels. Moore and Harken6 review an article that looked at microvesicles; that is, circulating molecules in the blood that when analyzed, provide a unique signature to describe an individual’s coagulation profile (eg, whether he or she in a prothrombotic state or not). Moore and Harken6 argue that perhaps surgeons have been too hard on themselves when it comes to graft failure and that some of the blame can instead be explained by a hypercoagulable profile. As Moore and Harken6 point out,