Editorial

Surgical ventricular reconstruction in ischemic heart disease

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Ischemic heart disease (IHD) is a leading cause of morbidity and mortality worldwide. Severe left ventricular (LV) dysfunction is a common complication of IHD and is associated with poor outcomes. Even if early revascularization was successful following an ST-elevation myocardial infarction, some patients experience a substantial increase in LV volume. This increase in LV volume also results in changes in LV shape so that the natural elliptical LV transforms into a more spherical shape (1). The process of cardiac remodeling involves progressive LV dysfunction and, eventually, heart failure symptoms. Although the goal of medical therapy is to achieve reverse remodeling, many patients will need surgery in addition to optimal medical therapy to improve prognosis and symptoms. The most common cardiac surgical procedure for patients with IHD and LV dysfunction is coronary artery bypass grafting (CABG) (2-4). Another option that may be considered in patients with LV systolic dysfunction and dilation after anterior myocardial infarction is to combine CABG with surgical ventricular reconstruction (SVR) (1,5). The purpose of SVR is to reduce LV volume and to restore LV shape (6-12). The SVR operation can also include mitral valve procedures (13,14), and alleviate ventricular arrhythmias (15,16).

In a recent study published in the *Journal of Thoracic Disease*, Dr. Yang and colleagues compared the outcomes of two surgical strategies in patients with IHD and severe LV dysfunction (17). They included 140 consecutive patients with a prior myocardial infarction and severe LV dysfunction from 2010 to 2013. The most important criteria for inclusion, in addition to myocardial infarction and severe LV dysfunction, were coronary artery disease that required CABG, dyspnea as the principal symptom, and a cardiac magnetic resonance imaging study that showed an ejection fraction ≤35%, wall motion abnormalities, and the presence of anterior LV akinesia or dyskinesia. They excluded patients with prior cardiac surgery or if concomitant valve procedures were planned. Patients were divided into two groups according to the surgical strategy that was chosen by the operating surgeon: isolated CABG or CABG + SVR, and 10-year survival free from cardiovascular events, and other clinically relevant outcomes, were compared between the groups. The authors concluded that CABG + SVR, compared to isolated CABG, offered a greater improvement in LV ejection fraction and New York Heart Association (NYHA) class, and that patients were less likely to be re-hospitalized for heart failure (17).

The benefit of SVR in addition to CABG has previously been investigated in a large multi-center randomized clinical trial, the Surgical Treatment of Ischemic Heart Failure (STICH) trial (8) that included 1,000 patients with IHD and an LV ejection fraction <35%. The STICH trial showed no benefit regarding symptoms or survival of adding SVR to CABG in patients with LV dysfunction (8). However, the STICH study conduct and results has been

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criticized and discussed extensively (1,18,19). The European guidelines on myocardial revascularization state that SVR + CABG may be done at experienced centers if heart failure symptoms are more predominant than angina, and if myocardial scar and moderate LV remodeling are present (2).

In the current study, there was a clear majority of male patients (89%), and the study could not investigate possible sex differences. However, previous research has shown comparable outcomes in men and women following SVR (20). It should be noted that SVR is not a clearly defined or unique procedure, and several distinct surgical techniques have been described (6,9,21-23). In the current study, most patients (79%) underwent aneurysmectomy with linear repair. Other features of the study Dr. Yang and colleagues that should be considered is that patients who needed correction of mitral valve regurgitation were excluded. Prior research has shown that preoperative mitral regurgitation impaired prognosis in this patient group (11). There are also studies reporting results following SVR + CABG combined with mitral valve surgery in this particular subset of patients with IHD and LV dysfunction (13,14,24). In the study by Dr. Yang and colleagues, the prevalence of preoperative spontaneous or inducible ventricular tachycardia was not reported (17). Knowing beforehand if patients had clinical or subclinical ventricular arrhythmias could have resulted in more patients receiving SVR because it is easy to add highly effective cryoablation and/or endocardiectomy to the SVR procedure (15,16).

Despite the interesting findings of the study, some limitations should be considered. First, the study was non-randomized, and the operating surgeon made the final decision on the surgical strategy which could have introduced systematic errors or bias. Second, the study was conducted at a single center, which likely limit the generalizability of the findings. While it is evident that SVR has the potential to enhance cardiac function (25), the optimal selection of patients is less clear. The study by Dr. Yang and colleagues (17) contribute to our evolving understanding of the benefits of adding SVR to CABG in patients with IHD and LV dysfunction.

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