



# Literature Reviews

## Aortic valve bypass for the high-risk patient with aortic stenosis.

Gammie JS, Brown JW, Brown JM, Poston RS, Pierson RN, Odonkor PN, White CS, Gottdiener JS, Griffith BP. *Ann Thorac Surg* 81: 1605-1611, 2006.

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**Abstract:** Interest in percutaneous therapy of heart valve disease has focused attention on the high-risk patient with aortic stenosis. Aortic valve bypass (apicoaortic conduit) surgery is the construction of a vascular graft containing a bioprosthetic valve from the apex of the left ventricle to the descending thoracic aorta. The authors have undertaken a programmatic effort to perform aortic valve bypass surgery as an alternative to conventional aortic valve replacement in selected high-risk patients and report their recent experience. Fourteen patients with aortic stenosis underwent aortic valve bypass surgery. All patients selected were deemed to be at very high risk for conventional aortic valve replacement and represented 5.8% (4/243) patients undergoing isolated aortic valve surgery during the same time period. Mean Society of Thoracic Surgeons predicted risk for operative mortality (11%) was between the 90th and 95th percentile. Twelve of 14 patients had previous cardiac surgery with bypass grafts. Average age was 78 years. Mean aortic valve area was 0.68 squared cm. All operations were performed through a left thoracotomy on the beating heart (no crossclamp). Cardiopulmonary bypass was used for 6 patients (median time 15 minutes). There were two perioperative deaths. Median postoperative length of stay was nine days. Two noncardiac late deaths occurred. Nine of 10 surviving patients remain functional class I and are living independently. Early postoperative echocardiography confirmed excellent aortic valve bypass function with preservation of ventricular ejection performance. The authors conclude that treatment of high-risk aortic stenosis patients with aortic valve bypass surgery is promising. Avoidance of sternotomy and cardiopulmonary bypass supports broader application to moderate-risk patients with aortic stenosis and as a control arm for studies of novel interventional therapies.

**Comments:** With modern prostheses, myocardial protection, and advanced perioperative care, the in-hospital mortality for isolated aortic valve replacement has fallen below 4%. Such surgery, first performed in the early 1960s, has changed little yet continues to afford symptomatic relief and prolongation of life for millions of patients worldwide. However, in certain patient populations (elderly, women, reoperation, patients on hemodialysis), morbidity and

mortality is increased. In fact, a number of elderly patients with symptomatic aortic stenosis are never considered for surgery because of this increased risk. Bypassing the native aortic valve provides a clever way to work around difficult situations in these high-risk patients. Just as the advent of stenting has stimulated surgeons to consider more creative ways to perform coronary artery bypass, the advent of percutaneous valve techniques has stimulated surgeons to consider alternative approaches to conventional aortic valve replacement. These authors describe an alternative surgical option for these challenging and very high-risk patients with aortic stenosis. Aortic valve bypass surgery was first conceived in the early 1900s and involves inserting a valved conduit from the left ventricular apex to the descending thoracic aorta. This procedure was initially performed experimentally and clinically in the late 1950s and early 1960s but did not gain popularity because of problems with hemolysis/emboli and the success of direct aortic valve resection and replacement. The major advantages of aortic valve bypass surgery, when compared to conventional aortic valve replacement, include avoidance of aortic crossclamping and the minimal use (oftentimes avoidance) of cardiopulmonary bypass. The potential problems associated with this technique include pseudoaneurysm formation, left ventricular apex bleeding, difficult aortic anastomosis secondary to extensive calcification, conduit kinking, and dislodgement of left ventricular apical thrombus, among others. This small retrospective chart review demonstrates that aortic valve bypass surgery is a promising alternative to conventional aortic valve replacement for the high-risk patient with aortic stenosis. Cardiac surgeons will no doubt be interested in resurrecting this technique and developing ways to simplify the operation and perhaps expand its application.