

Cardiovascular Surgery in the Elderly

David W. Yaffee, MD, and Mathew R. Williams, MD

The elderly population is the fastest growing demographic in Western countries. As the population ages, the incidence of age-related comorbidities such as diabetes mellitus, chronic obstructive pulmonary disease, peripheral vascular disease, renal disease, cerebrovascular disease, and cardiovascular disease increases. With cardiovascular disease occurring in approximately one-quarter of the population over the age of 75 years and more than half of all cardiac procedures performed on this age group, the number of potential elderly surgical candidates is increasing. However, data suggest that old age is associated with increased morbidity and mortality following cardiac surgery. Over the past 2 decades, improvements in myocardial protection, extracorporeal circulation, anesthesia, and surgical techniques have significantly reduced the morbidity and mortality associated with cardiac surgery. Although most prospective studies exclude elderly patients, data from large retrospective studies and subgroup analyses suggest that cardiac surgery is a viable option for many elderly patients with cardiovascular disease, with good outcomes observed in reasonable-risk candidates; moreover, there are a growing number of available less-invasive options for them when surgical risk becomes prohibitive. In this article, we discuss the current state of cardiovascular surgery in the elderly as well as emerging technologies on the horizon.

Semin Thoracic Surg ■■■■■ © 2016 Elsevier Inc. All rights reserved.

Keywords: cardiac surgery, elderly, aortic valve, mitral valve, transcatheter aortic valve replacement, coronary artery bypass

INTRODUCTION

The elderly population is the fastest growing demographic in Western countries, with the world population of people over the age of 60 years expected to double to roughly 2 billion by the year 2050 and those over the age of 80 years to increase 26-fold.¹ As the population ages, the incidence of age-related comorbidities such as diabetes mellitus, chronic obstructive pulmonary disease, peripheral vascular disease, renal disease, cerebrovascular disease, and cardiovascular disease increases. With cardiovascular disease occurring in approximately one-quarter of the population over the age of 75 years and more than half of all cardiac procedures performed on this age group, the number of potential elderly surgical candidates is increasing. Data suggest that old age is associated with increased morbidity and mortality following cardiac surgery, with 78% of

Department of Cardiothoracic Surgery, NYU School of Medicine, New York, New York

Address reprint requests to Mathew R. Williams, Department of Cardiothoracic Surgery, NYU School of Medicine, 530 First Ave, Suite 9V, New York, NY 10016. E-mail: mathew.williams@nyumc.org



David W. Yaffee, MD

Central Message

Cardiac surgery is a viable option for many elderly patients. Outcomes in reasonable-risk candidates continue to improve, and high-risk patients have a growing number of less-invasive options.

major complications and death occurring in patients over the age of 75 years.²

As the body ages, changes occur in the cardiovascular system leading to decreased physiological reserve. The large systemic arteries dilate and thicken secondary to changes in smooth muscle tone and enzymatic and wall matrix composition, resulting in increased vascular stiffness, which leads to systemic hypertension with increased aortic impedance and cardiac mechanical load. These alterations to afterload lead to compensatory cardiac remodeling that eventually results in impaired cardiac performance. Aging also effects intrinsic changes to the heart. Biochemical alterations in mitochondrial and protein function, calcium-dependent excitation-contraction coupling and myofilament function, extracellular matrix composition, cell division, and apoptosis result in age-related changes in cardiac morphology leading to decreased contractile efficiency, changes in myocyte shape and activity, altered cell turnover, and stiffened myocardial and connective tissues with blunted contractile and inotropic responses. Additionally, increased levels of the vasoconstrictor endothelin I, decreased levels of nitric oxide, and impaired endothelium-dependent

dilation of resistance coronary vessels may lead to a reduction in vasodilator reserve. When combined with the elevated baseline cardiac work and myocardial blood flow generated by the morphologic and functional changes detailed earlier, it leads to older patients often having a reduction in coronary flow reserve.

Improvements in myocardial protection, extracorporeal circulation, anesthesia, and surgical techniques have significantly reduced the morbidity and mortality associated with cardiac surgery. With life expectancy of more than 17 years at the age of 65 years and 8.2 years at the age of 80 years¹ and the quality of life (QOL) of the elderly patient with cardiac disease improving, QOL may be more important to elderly patients than longer life and the surgical options for cardiovascular disease in the elderly population cannot be overlooked.

CORONARY ARTERY BYPASS

With more than 16 million adults with coronary artery disease (CAD) in the United States and the prevalence increasing to more than 80% after the age of 80 years, CAD is the most common cause of morbidity and mortality in the elderly population. Most of these patients become functionally impaired once symptoms begin, yet historically old age has been a contraindication to surgical intervention. Wilson et al³ compared 2272 patients older than 75 years with 9745 patients <75 years old who underwent coronary artery bypass grafting (CABG) between 1997 and 2001 and found that the older patients had an increased length of stay, higher perioperative mortality, and higher in-hospital cost. However, as other studies have shown psychological and social recovery patterns similar to younger patients despite the increased perioperative risk, and contemporary data show a perioperative survival ranging from 2.7%-6.4% for isolated CABG with a 5-year survival rate of approximately 70%,⁴ CABG remains a viable option for the elderly patients.

CABG vs Medical Management

A survival benefit of CABG over medical management in the elderly population has been observed, with postoperative life expectancy often equaling or exceeding the age-matched general population. The TIME trial evaluated invasive intervention (percutaneous coronary intervention [PCI] and CABG) vs medical management in elderly patients with chronic symptomatic CAD. This prospective, randomized trial of 305 patients with chronic, stable angina reported that patients who underwent CABG or PCI had a better QOL and fewer major adverse

cardiac events (19% vs 49%) than those who underwent medical management alone.⁵

Coronary Artery Bypass Grafting vs Percutaneous Coronary Intervention

Although CABG has been shown to have excellent results in octogenarians, and prospective randomized trials have demonstrated a clear benefit of CABG over PCI for multivessel coronary disease in patients <65 years of age, most prospective, randomized trials exclude older patients. As data from younger patients may not be applicable to the elderly population, the best treatment option remains unknown.

The ASCERT trial, a retrospective trial combining the ACCF PCI database and the Society of Thoracic Surgeons (STS) Adult Cardiac Surgery Database, compared 103,549 patients >65 years of age who underwent PCI with 86,244 patients who underwent CABG for 2- or 3-vessel CAD without an acute myocardial infarction (MI) and found a lower mortality rate with CABG compared with PCI (16.4% vs 20.8%, 95% CI: 0.7–0.8) at 4 years, despite a higher stroke rate in the CABG group.⁶

The SYNTAX trial, which randomized patients with triple-vessel or left main CAD to either paclitaxel-eluting stents or CABG, demonstrated a better freedom from major adverse cardiac and cerebrovascular events with CABG at 1 year (12.3% vs 17.6%, $P = 0.002$) secondary to a higher incidence of repeat intervention with PCI.⁷ Cardiac death and nonfatal MI were higher in the PCI group at 3 years and the composite end points of death, stroke, and MI were higher in the PCI group at 5 years. Although there was an increased risk of stroke with CABG at 1 year, the difference became non-significant at 3- and 5-year follow up. Subgroup analyses of the intermediate- and high-risk tertiles similarly favored CABG at 3 and 5 years. Although graft occlusion (4.0%) and in-stent thrombosis (5.5%) were similar in rate of occurrence, stent thrombosis resulted in a 22% incidence of MI with approximately one-third of these resulting in cardiac death.⁸ This occurred significantly more often compared with graft occlusion, which develops more slowly and allows for formation of collaterals, jeopardizing a smaller area of myocardium.

On-Pump vs Off-Pump CABG

The goal of off-pump CABG (OPCAB) over on-pump CABG (ONCAB), especially in the elderly, was to reduce the morbidity attributable to the aortic manipulation, global hypoperfusion, and the systemic inflammatory response associated with

Download English Version:

<https://daneshyari.com/en/article/5621595>

Download Persian Version:

<https://daneshyari.com/article/5621595>

[Daneshyari.com](https://daneshyari.com)