

Treatment of coronary disease in elderly individuals

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Old age and the passage of time teach all things
[Sophocles]

To me, old age is always fifteen years older than I am
[Bernard Baruch]

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As a consequence of public health measures and medical innovations, the average lifespan in even the most industrialized nations continues to increase in an impressive manner. In the United States, for example, from 1960 to 2000 life expectancy for newborns increased by 7 years, representing nearly a 10% gain [1]. Since atherosclerosis remains predominantly a disease of older individuals, more and more elderly patients can be expected to require medical care for coronary artery disease as the population ages. Unfortunately, older individuals traditionally have not been included in prospective trials examining treatment strategies for coronary disease, leaving us with limited information on how best to treat this ever-growing patient subgroup.

Coronary angioplasty in the elderly

Since the inception of coronary angioplasty, registry-based analyses consistently have identified advanced age as a strong independent risk factor for

procedural mortality. Although in-hospital outcomes have improved among all age groups with enhancements in angioplasty equipment, techniques, and adjuvant medical therapies, patient age remains a strong predictor of in-hospital death following percutaneous coronary intervention (PCI) [2, 3].

In everyday practice, given the increased procedural risks, there is often greater reluctance among physicians to refer older individuals for PCI. Despite these heightened risks, however, observational data suggests that PCI for elderly patients is potentially beneficial across the spectrum of coronary syndromes. Among elderly individuals with stable angina, PCI appears to confer equivalent improvements in quality of life compared to younger individuals [4]. In the setting of acute coronary syndromes, older patients enrolled in the TIMI-18 trial benefited from an early invasive strategy including angioplasty rather than a strategy of initial conservative management [5]. Likewise, in the setting of acute ST segment elevation myocardial infarction, primary PCI is associated with an even greater relative reduction in mortality compared to thrombolytic therapy in elderly patients than among younger individuals [6].

Current study

In light of improving PCI outcomes, the study by Sukiennik et al. [7] that appears in the current issue of Cardiology Journal provides additional insights into contemporary “real world” experience with PCI among older individuals. One thousand

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consecutive patients who underwent PCI at a single center were dichotomized into those < 70 years old versus those \geq 70 years of age. Not surprisingly, the authors found that patients over age 70 had more comorbid conditions than younger patients, including diabetes, hypertension, a history of congestive heart failure, and prior stroke. Multivessel coronary disease was more common among older individuals, and older patients were more likely to undergo PCI in the setting of an acute coronary syndrome or cardiogenic shock. PCI was more difficult from a technical standpoint among older individuals, as inferred by the need for greater amounts of fluoroscopy time and radiographic contrast during the procedure. Primary stenting was also less common among older patients as was overall stent use, which likewise implies less favorable anatomy for PCI. Even after adjustment for other comorbidities, in-hospital mortality remained approximately 3-fold greater among older compared to younger individuals.

These findings are similar to those of a larger recently published registry of over 82,000 consecutive patients who underwent PCI in New York State [8]. Within this cohort, age represented the strongest independent clinical predictor of in-hospital death following PCI. Mortality rates following elective PCI rose from 0.1% among individuals younger than 60 years old to 1.1% among patients > 80 years old. A similar 10-fold increase in mortality was noted following emergency PCI, with in-hospital mortality increasing from 1.0% for patients < 60 years old to 11.5% for patients > 80 years old. The authors speculated that the age-related increase in adverse procedural outcomes was at least in part related to greater technical difficulties in performing PCI in the elderly population, as reflected by greater likelihoods of peripheral vascular disease and aorto-iliac tortuosity (which increase the difficulty of accessing the coronary circulation) and greater coronary calcification and extent of coronary disease (which reduce the likelihood of procedural success) among older individuals.

Clinical implications

How might the findings of these recent studies of PCI affect the clinical decision-making process for a physician attempting to optimize care for an elderly patient with symptomatic coronary artery disease? Foremost, it should be kept in mind that these PCI registry-based reports examined only a selected group of patients, namely those who had already been referred by their physicians to undergo PCI. These studies therefore cannot provide infor-

mation regarding the relative merits of PCI versus either medical therapy or bypass surgery among elderly patients. Because of the potential risks associated with more invasive procedures, physicians often remain hesitant to recommend PCI for older patients, often favoring conservative medical therapy. As a result, older patients may not be referred for PCI until later in the course of their disease, rendering PCI more technically challenging and risky than it may have been had the procedure been performed at an earlier stage.

Presumptive evidence for such a referral delay is present in the Sukiennik study [7], as a significantly higher proportion of elderly compared to younger patients underwent PCI in an urgent rather than elective setting. While intriguing to speculate, it remains uncertain as to whether outcomes among selected elderly patients might improve if there was less hesitancy to refer these individuals for elective PCI earlier, rather than waiting for the onset of unstable symptoms. This is especially true in light of the dramatic increase in mortality rates among older patients when PCI is performed on an acute rather than elective basis.

As with PCI, the risks of coronary bypass surgery also increase with patient age [9]. For individuals with more extensive coronary disease, bypass grafting permits a higher likelihood of complete coronary revascularization than PCI, which may be associated with more favorable clinical outcomes. Because of its less invasive nature and quicker recovery times, however, PCI is often presumed more desirable than bypass surgery among older patients, even if the possibility of complete revascularization must be sacrificed. While a widely held assumption exists that less invasive therapies may be preferable for elderly individuals, examples to the contrary exist.

For instance, carotid stenting has gained acceptance as a safe and effective less invasive alternative to carotid endarterectomy for carotid artery revascularization among individuals at higher surgical risk. It was initially assumed that the benefits of carotid stenting would be especially robust among the elderly patients. Emerging data from a number of trials of carotid stenting, however, have shown this assumption to be flawed. While the results of carotid stenting appear favorable in younger individuals, there is a sharp and consistent increase in the incidence of major complications among octogenarians undergoing carotid stent placement, which appears to far outstrip the less dramatic age-related increase in procedural risk that accompanies carotid endarterectomy [10]. The age-related

increase in complications with carotid stenting is likely related to anatomic and lesion-related factors that accompany aging, such as increased aortic arch and carotid calcification and tortuosity, which make catheter manipulation within the vasculature more difficult. Overall, as it becomes more evident that older patients can respond quite differently than younger individuals to various therapies, the importance of performing dedicated therapeutic trials among elderly patients is apparent.

Economic implications

With an ever-increasing number of elderly individuals seeking medical attention for coronary artery disease, economic issues must also be considered. Medical care for the elderly accounts for a large percentage of total health care costs, and evidence for the utility of many therapies employed near the end of life is often lacking. It has been noted that in the United States, 30% of all Medicare (government health insurance for individuals ≥ 65 years old) expenditures are consumed in the final year of life [11]. Consequently, avoidance of costly procedures that are not associated with clinical benefit is clearly desirable for both individual patients and society as a whole.

Because the performance of an increasing number of invasive procedures, such as PCI, could potentially place a greater economic burden on societies, it is especially essential to identify the specific groups of elderly individuals for whom PCI is indeed superior to more conservative strategies. An analysis of patients aged 75 years or greater who were enrolled in a prospective Swiss trial of PCI versus medical therapy did suggest that PCI could lead to improved clinical outcomes at only minimally increased economic costs, but further study is needed [12].

Conclusions

Given their heightened comorbidity profiles, tendency toward more difficult coronary anatomy, and shorter life expectancies, ideal strategies to treat coronary disease in older individuals may vary substantially from algorithms established in younger patients. Evidence-based guidelines for the treatment of older individuals remain woefully inadequate. These deficiencies are compounded by a lack of common agreement over the age at which a person should be considered "elderly," with various arbitrary age cutoffs ranging from 65 to 85 years used among published studies. Indeed, as humor-

ously alluded to by Bernard Baruch's quotation at the outset of this editorial, no universal cut-point can ever exist to define the onset of old age, as a person's chronological age does not always correlate with their so-called "physiological" age.

Nevertheless, advanced age unquestionably represents a potent risk factor for adverse outcomes among patients with coronary artery disease, and merits special attention. Given the increasing average age of patients seeking treatment for coronary disease, the time is ideal for the performance of dedicated prospective trials examining the relative merits of medical therapies, PCI and coronary artery by-pass grafting among older individuals. Such studies are essential to better define the risks, benefits, and costs of these options in this unique patient group. Until more data becomes available (and even after it does), treatment recommendations among the elderly will likely always remain highly individualized, with a heavy reliance on physician judgment and experience, as well as the individual patient's desires for a more or less invasive treatment approach.

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