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Letters

TO THE EDITOR

Percutaneous Coronary Intervention Outcomes in Very Elderly Patients From a Single Large-Volume Tertiary Care Center, Specifically Focusing on Nonagenarians

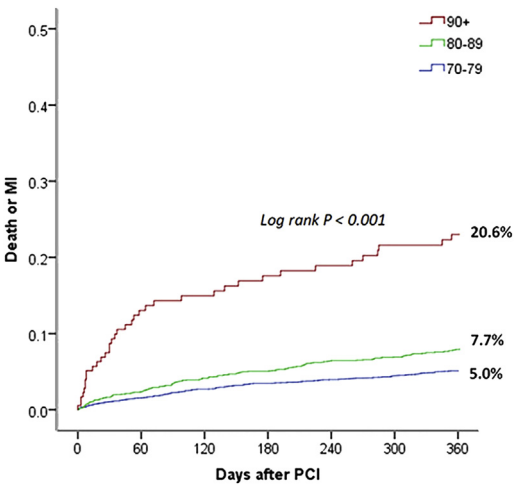
Cardiovascular disease remains the leading cause of morbidity and mortality among elderly patients (1). Elderly cardiac patients with several comorbidities have been underrepresented in randomized clinical trials. Several large registries have examined outcomes following percutaneous coronary intervention (PCI) in octogenarians, but data on nonagenarians have been limited to single-center experiences with rather small patient cohorts (2,3). The aims of the present study were to provide insight on this patient population and to compare outcomes after PCI in different age subsets.

We performed a retrospective analysis of patients who underwent PCI at the Mount Sinai cardiac catheterization laboratory between January 2009 and December 2014 according to age category: 70 to 79 years (n = 4,841), 80 to 89 years (n = 2,119), and older than 90 years (n = 182). We evaluated 30-day and 1-year outcomes of death or myocardial infarction (MI) in patients who underwent PCI for stable coronary artery disease and acute coronary syndrome. Detailed demographic, clinical, angiographic, and procedural data and 30-day and 1-year clinical outcomes were obtained. Hazard ratios for adverse events associated with age categories were estimated using Cox proportional hazards regression adjusting for baseline variables including sex, body mass index, hyperlipidemia, hypertension, ST-segment elevation MI or non-ST-segment elevation MI presentation, diabetes, chronic kidney disease, current smoking, peripheral arterial disease, warfarin use, SYNTAX (Synergy Between PCI With Taxus and Cardiac Surgery) score, calcification, contrast volume used, and ejection fraction.

Compared with younger patients, nonagenarian patients were admitted with a higher incidence of ST-segment elevation MI (70 to 79 years, 1.4%; 80 to 89 years, 1.4%; ≥90 years, 4.9%; $p < 0.001$) and non-ST-segment elevation MI (70 to 79 years, 9.2%; 80 to 89 years, 14.3%; ≥90 years, 22.5%; $p < 0.001$). About one-fourth of the patients in this age group had diabetes, which was significantly lower compared with the other 2 age groups (70 to 79 years, 47.4%; 80 to 89 years, 36.8%; ≥90 years, 23.6%; $p < 0.001$), and almost 70% had chronic kidney disease, which was higher compared with the other groups (70 to 79 years, 43.3%; 80 to 89 years, 58.8%; ≥90 years, 68%; $p < 0.001$). Angiographically the lesions were more calcified ($p < 0.001$) and thrombotic ($p = 0.001$) in the nonagenarians with higher SYNTAX scores.

The crude incidence of death or MI was significantly higher in nonagenarians compared with septuagenarians and octogenarians (Figure 1). The incidence of major procedural complications (grade III dissection, side branch closure, slow or no flow, vessel closure) was not different between the groups (70 to 79 years, 4.1%; 80 to 89 years, 4.3%; ≥90 years, 4.2%; $p = 0.90$), but femoral thrombosis was

FIGURE 1 Kaplan-Meier Curve



MI = myocardial infarction; PCI = percutaneous coronary intervention.

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more frequent in the nonagenarian group (p = 0.017). After multivariate adjustment, risks for death or MI at 30 days and 1 year in patients 90 years of age and older remained significant compared with septuagenarians (adjusted hazard ratios: 5.7 [95% confidence interval: 2.2 to 15.2] and 3.0 [95% confidence interval: 1.8 to 4.8]).

In this study, we report the outcomes of PCI in 182 nonagenarian patients, which appears to be the largest series yet to be reported from a single center thus far. Our study shows that age ≥90 years is an independent factor for death or MI at 30 days and 1 year. These findings are in accordance with the limited number of studies done in the past on a similar patient population (2,3), but none of them compared septuagenarians, octogenarians, and nonagenarians. Also, our study has revealed that the immediate procedural complications were not statistically significantly different among these 3 age groups.

The reasons for these adverse outcomes in nonagenarians could be multifold. Very elderly patients have complex, multivessel disease requiring challenging multivessel interventions. Age leads to significant coronary calcification (4), and interventions for this lead to inadequate stent expansion and in-stent restenosis. Noncardiac comorbid conditions commonly associated with aging also play a substantial part in triggering adverse periprocedural outcomes. Despite modern interventional techniques and concomitant treatment, elderly patients who undergo PCI for acute coronary syndrome have a worse prognosis than younger patients. Among patients in stable condition, the randomized TIME (Trial of Invasive Versus Medical Therapy in Elderly Patients) study (5) showed similar outcomes in octogenarians treated invasively versus medically. Age remains an important predictor of major adverse cardiac events after PCI even in the very elderly. Future studies to evaluate strategies to improve the last years of life in this very elderly population, along with developing age-specific guidelines for treatment of coronary artery disease and performing PCI, are warranted.

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Bioresorbable Everolimus-Eluting Vascular Scaffold for Long Coronary Lesions

A Subanalysis of the International, Multicenter GHOST-EU (Gauging coronary Healing with bioresorbable Scaffolding plaTforms in EUrope) Registry

We read with great interest the manuscript by Geraci et al. (1), reporting a subanalysis of the GHOST-EU (Gauging coronary Healing with bioresorbable Scaffolding plaTforms in EUrope) registry on long coronary lesions treated with bioresorbable vascular scaffolds (BVS). The authors conclude that treatment of very long coronary lesions with BVS (≥60 mm) was associated with a higher target lesion failure rate if compared to treatment with shorter length of BVS (either ≤30 mm or 30 to 60 mm).

However, the message of the study could be misleading. First, it is difficult to draw any conclusion on clinical hard endpoints taking into account a subgroup of 81 patients. Second, the differences in target lesion failure rate among groups (≥60 mm vs. others) can be explained by unbalanced baseline and