Comparison of Late Results of Percutaneous Coronary Intervention Among Stable Patients ≤65 Versus >65 Years of Age With an Occluded Infarct Related Artery (from the Occluded Artery Trial)

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Although opening an occluded infarct-related artery >24 hours after myocardial infarction in stable patients in the Occluded Artery Trial (OAT) did not reduce events over 7 years, there was a suggestion that the effect of treatment might differ by patient age. Baseline characteristics and outcomes by treatment with percutaneous coronary intervention (PCI) versus optimal medical therapy alone were compared by prespecified stratification at age 65 years. A p value <0.01 was prespecified as significant for OAT secondary analyses. The primary outcome was death, myocardial infarction, or New York Heart Association class IV heart failure. Patients aged >65 years (n = 641) were more likely to be female, to be nonsmokers, and to have hypertension, lower estimated glomerular filtration rates, and multivessel disease compared to younger patients (aged ≤65 years, n = 1,560) (p <0.001). There was no significant observed interaction between treatment assignment and age for the primary outcome after adjustment (p = 0.10), and there was no difference between PCI and optimal medical therapy observed in either age group. At 7-year follow-up, younger patients tended to have angina more often compared to the older group (hazard ratio 1.21, 99% confidence interval 1.00 to 1.46, p = 0.01). The 7-year composite primary outcome was more common in older patients (p <0.001), and age remained significant after covariate adjustment (hazard ratio 1.42, 99% confidence interval 1.09 to 1.84). The rate of early PCI complications was low in the 2 age groups. The trend toward a differential effect of PCI in the young versus the old for the primary outcome was likely driven by measured and unmeasured confounders and by chance. PCI reduces angina to a similar degree in the young and old. In conclusion, there is no indication for routine PCI to open a persistently occluded infarct-related artery in stable patients after myocardial infarction, regardless of age. **(Am J Cardiol 2012;109:614–619)**

The Occluded Artery Trial (OAT) randomized stable patients with persistent occlusions of the infarct-related artery (IRA) >24 hours after myocardial infarction (MI) to optimal medical therapy with percutaneous coronary intervention (PCI) versus optimal medical therapy alone. Although in the overall OAT population, there was no clinical benefit of PCI on a composite outcome of death, MI, or New York Heart Association class IV heart failure after a mean follow-up period of 3 years, PCI reduced angina early in follow-up and, in a prespecified substudy, modestly reduced adverse remodeling at 1 year.[1,2] There was also a trend observed (p = 0.03) toward an interaction between treatment and age >65 years on the primary outcome measure at 5 years, raising the possibility of a differential effect of PCI in older patients.[2] We therefore set out to compare treatment and outcomes in detail in the 2 prespecified age groups.

Methods

The study design of OAT has been described previously.[3] Patients with MI who underwent coronary angiography with persistent IRA occlusion >24 hours (3 to 28 calendar days, with symptom onset on day 1) were eligible if they had left ventricular ejection fractions ≤50% or proximal occlusions of major epicardial vessels. Exclusion criteria were New York Heart Association class III or IV heart failure, shock, a serum creatinine level >2.5 mg/dl,

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Table 1
Baseline characteristics by age group

Clinical characteristic	Age (years)		p Value
	≤65 (n = 1,560)	>65 (n = 641)	
Age (years)	53.1 ± 7.6	72.0 ± 4.6	<0.001
Men	83.5%	64.7%	<0.001
White	79.2%	82.4%	0.09
Body mass index (kg/m^2)	28.8 ± 5.2	27.8 ± 4.5	<0.001
Diabetes mellitus	20.3%	21.5%	0.50
Previous angina pectoris	21.3%	25.4%	0.03
Previous MI	10.9%	12.0%	0.45
Previous cerebrovascular disease	2.5%	6.7%	<0.001
Previous peripheral vascular disease	3.3%	5.0%	0.05
Previous hypertension	44.7%	58.3%	<0.001
Previous hypercholesterolemia	53.9%	47.0%	0.003
Family history of coronary heart disease	44.2%	30.1%	<0.001
Previous heart failure	1.9%	3.6%	0.02
Heart failure at baseline	28.6%	39.2%	<0.001
Rales	4.7%	10.0%	<0.001
New Q waves	69.2%	61.8%	<0.001
Current smoker	47.6%	18.1%	<0.001
Previous PCI	5.0%	4.2%	0.43
Previous coronary bypass surgery	0.4%	0.3%	0.65
Left ventricular ejection fraction (%)	48.0 ± 10.8	47.0 ± 11.8	0.05
Left ventricular ejection fraction <40%	19.1%	24.1%	0.009
Estimated glomerular filtration rate (ml/min/1.73 m^2)	84.8 ± 20.6	70.4 ± 20.2	<0.001
ST-segment elevation	66.3%	66.2%	0.97
Coronary collateral vessels	89.8%	85.1%	0.002
Multivessel disease	15.4%	22.1%	<0.001
Systolic blood pressure (mm Hg)	119 ± 17	124 ± 19	<0.001

Data are expressed as mean ± SD or as percentages.

Table 2
Discharge medications by age group

Medication	Age (years)		p Value
	≤65 (n = 1,560)	>65 (n = 641)	
Aspirin	96.7%	93.0%	<0.001
Thienopyridine	60.4%	60.4%	0.99
β blockers	89.0%	84.9%	0.008
Angiotensin-converting enzyme inhibitors or angiotensin receptor blockers	79.6%	82.7%	0.09
Lipid-lowering agents	83.7%	75.2%	<0.001
Long acting nitrates	20.3%	28.2%	<0.001
Calcium channel blockers	5.3%	7.2%	0.09
Warfarin	8.7%	12.3%	0.01
Oral hypoglycemic agents	13.1%	14.7%	0.32
Insulin	6.7%	5.0%	0.13
Diuretics	12.6%	27.1%	<0.001
Antiarrhythmic agents	2.4%	7.3%	<0.001

left main or 3-vessel coronary artery disease in need of surgical revascularization, rest angina, and high-grade ischemia on stress testing, which was required if the infarct zone was not akinetic or dyskinetic. Patients were randomly assigned to PCI with stent deployment and optimal medical therapy or optimal medical therapy alone. Follow-up during extended follow-up was conducted for up to 9 years by the participating sites or centrally for some patients. Event rates were presented at 7 years because of few events and unstable event rates in subsequent years. The mean follow-up duration for this analysis was 6.0 years.[4]

The primary end point was a composite of death, reinfarction, or New York Heart Association class IV heart failure requiring hospitalization or treatment in a short-stay unit. Secondary end points included the separate components of the primary end point as well as symptoms and other clinical events. All study end point events were adjudicated by an independent events committee blinded to treatment assignment. The age stratification point, originally prespecified at 70 years, was changed to 65 years before the completion of enrollment because of a lower than anticipated number of participants aged >70 years. On the basis of the revised prespecified stratification, older patients (aged >65 years) enrolled in OAT were compared to younger patients (aged ≤65 years) with respect to baseline characteristics and outcomes by treatment assignment. Angina was assessed at baseline, 4 months, and yearly follow-up contacts.

Estimates of the cumulative event rates were calculated using the Kaplan-Meier product-limit method, and treatments were compared to the use of log-rank tests of the 7-year curves.[5,6] Hazard ratios (HRs) and 99% confidence intervals (CIs) were calculated using Cox proportional-hazards regression models. Adjusted analyses incorporated variables from the risk model for the primary outcome.[4]