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In Unstable Angina or Non–ST-Segment Acute Coronary Syndrome, Should Patients With Multivessel Coronary Artery Disease Undergo Multivessel or Culprit-Only Stenting?

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Objectives We examined the safety and efficacy of nonculprit multivessel compared with culprit-only stenting in patients with multivessel disease presenting with unstable angina or non–ST-segment elevation myocardial infarction (non–ST-segment elevation acute coronary syndromes [NSTE-ACS]).

Background In patients presenting with NSTE-ACS, multivessel coronary artery disease (CAD) is associated with adverse outcome.

Methods Patients with multivessel CAD and NSTE-ACS that underwent percutaneous coronary intervention were included. The culprit lesion was defined by reviewing each patient's angiographic report, electrocardiogram, echocardiogram and, if available, nuclear stress test. All patients had at least 2 vessels with ≥50% stenosis, and the angiographic severity of CAD was assessed using the Duke Prognostic Angiographic Score. Patients with coronary bypass grafts, chronic total occlusions, and those with uncertain culprit lesions were excluded. Our end point was the composite of death, myocardial infarction, or any target vessel revascularization.

Results From January 1995 to June 2005, 1,240 patients with ACS and multivessel CAD underwent percutaneous coronary intervention with bare-metal stenting and met our study criteria. Of these, 479 underwent multivessel and 761 underwent culprit-only stenting. There were 442 events during a median follow-up of 2.3 years. Multivessel intervention was associated with lower death, myocardial infarction, or revascularization after both adjusting for baseline and angiographic characteristics (hazard ratio 0.80; 95% confidence interval 0.64 to 0.99; $p = 0.04$) and propensity matched analysis (hazard ratio 0.67; 95% confidence interval 0.51 to 0.88; $p = 0.004$).

Conclusions In patients with multivessel CAD presenting with NSTE-ACS, multivessel intervention was significantly associated with a lower revascularization rate, which translated to a lower incidence of the composite end point compared with culprit-only stenting. (J Am Coll Cardiol 2007;49:849–54) © 2007 by the American College of Cardiology Foundation

Coronary artery disease (CAD) is a diffuse process and, often, patients presenting with unstable angina or non–ST-segment elevation myocardial infarction (NSTEMI) have multiple lesions that may be suitable for percutaneous coronary intervention (PCI) (1–3). In the era of contemporary medical therapy, it is not clear whether intervening on stable chronic nonculprit lesions in patients with non–ST-segment elevation acute coronary syndromes (NSTE-ACS) can prevent major adverse cardiovascular events. In addition, multivessel stenting in this setting could potentially be associated with greater dye load and periprocedural myocardial infarction (MI) secondary to side branch closure and distal embolization (4,5).

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Abbreviations and Acronyms

CAD = coronary artery disease

MI = myocardial infarction

NSTE-ACS = non–ST-segment elevation acute coronary syndromes (unstable angina and non–ST-segment myocardial infarction)

NSTEMI = non–ST-segment elevation myocardial infarction

PCI = percutaneous coronary intervention

The American College of Cardiology/American Heart Association guidelines for multivessel PCI in patients presenting with NSTE-ACS recommend that "it be performed when there is a high likelihood of success and a low risk of morbidity and the vessel(s) to be dilated subtend a moderate or large area of viable myocardium and have high risk by noninvasive testing" (6). We sought to examine the clinical outcomes in patients with multivessel CAD presenting with NSTE-ACS who had undergone multivessel versus culprit-only stenting.

Methods

Study population. The study participants are from an ongoing registry of patients undergoing PCI at the Cleveland Clinic. For the purpose of this study, we included all patients from January 1995 to June 2005 who underwent PCI with bare-metal stents. Baseline characteristics, angiographic data, medication use, and other data were prospectively obtained and recorded by trained research coordinators. Patients with chronic total occlusions, staged procedures, and those who had prior bypass graft surgery were excluded. Non–ST-segment elevation acute coronary syndromes were defined as unstable angina or NSTEMI. Unstable angina was defined as rest, new-onset, progressive, or postinfarct chest pain, and NSTEMI was defined as the occurrence of troponin elevation with electrocardiographic changes or angina. The institutional review board of the

Table 1 Baseline and Target Lesion Characteristics of Patients With Multivessel CAD Based on Multivessel Versus Culprit-Only Stenting

	Multivessel Stent (n = 479)	Culprit-Only Stent (n = 761)	p Value
Age, yrs	66 ± 12	65 ± 12	0.14
Male, %	305 (64)	491 (65)	0.76
Body mass index, kg/m^2	29 ± 6	29 ± 5	0.32
Risk factors, %			
Cigarette smoking	91 (19)	200 (26)	0.003
Insulin-dependent diabetes mellitus	64 (13)	92 (12)	0.51
Non–insulin-dependent diabetes mellitus	92 (19)	142 (19)	0.81
Systolic blood pressure	133 ± 24	133 ± 23	0.85
Family history of coronary disease	181 (42)	297 (37)	0.05
Renal dysfunction (creatinine >2.0)	29 (6)	47 (6)	0.93
Medical history, %			
Prior myocardial infarction	222 (46)	357 (47)	0.85
Peripheral arterial disease	49 (10)	71 (9)	0.60
Medications at discharge, %			
Aspirin (within 24 h)	448 (94)	714 (94)	0.83
Angiotensin-converting enzyme inhibitors	119 (25)	156 (21)	0.07
Beta-blockers	212 (44)	360 (47)	0.29
Lipid-lowering agents	388 (81)	681 (89)	<0.001
Clopidogrel	392 (82)	587 (77)	0.05
Glycoprotein IIb/IIIa	357 (75)	464 (61)	<0.001
Baseline angiographic data			
Duke Prognostic Score	36 ± 14	34 ± 14	0.008
Severe CAD (Duke score ≥42)	97 (20)	151 (20)	0.86
≥50% stenosis on 3 vessels	126 (26)	189 (25)	0.56
Lesion with ACC score C	151 (32)	240 (32)	1.00
Operator's volume			
Number of patients with multivessel disease	84 ± 51	84 ± 48	0.93
Number of multivessel stenting procedures	36 ± 26	31 ± 25	<0.001
Location of culprit lesion			
Proximal left anterior descending artery	99 (21)	14 (2)	<0.001
Mid/distal left anterior descending artery	113 (24)	262 (34)	<0.001
Left circumflex artery	98 (20)	203 (27)	<0.001
Right coronary artery	169 (35)	282 (37)	0.53
Left ventricular ejection fraction	51 ± 12	51 ± 12	0.90

ACC = American College of Cardiology; CAD = coronary artery disease.