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INTERVENTIONAL CARDIOLOGY

Maintenance of Long-Term Clinical Benefit With Sirolimus-Eluting Stents in Patients With ST-Segment Elevation Myocardial Infarction

3-Year Results of the SESAMI (Sirolimus-Eluting Stent Versus Bare-Metal Stent In Acute Myocardial Infarction) Trial

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Objectives The aim of this study was to investigate whether the reported favorable 1-year outcome of the sirolimus-eluting stent (SES) versus the bare-metal stent (BMS) in the SESAMI (Sirolimus-Eluting Stent Versus Bare-Metal Stent In Acute Myocardial Infarction) trial, in the setting of ST-segment elevation myocardial infarction (STEMI), is maintained at 3-year follow-up.

Background At present, only long-term registry data, but not randomized trials, on the safety and effectiveness of SES in STEMI patients are available.

Methods Overall, 320 STEMI patients were randomized to receive SES or BMS. The primary end point was the incidence of major adverse cardiovascular events (MACE), at 3-year follow-up. The secondary end points were the rate of target lesion revascularization (TLR) and target vessel revascularization (TVR) and target vessel failure (TVF). The incidence of late events, starting from clopidogrel withdrawal, was also investigated.

Results The 3-year incidence of MACE was lower in the SES group compared with the BMS group (12.7% vs. 21%, $p = 0.034$), as were TLR (7% vs. 13.5%, $p = 0.048$), TVR (8% vs. 16%, $p = 0.027$), and TVF (11.5% vs. 20.5%, $p = 0.028$) rates. The 3-year survival rate free from MACE, TLR, and TVF was significantly higher in the SES group than in the BMS group (87%, 93%, and 89.5% vs. 79%, 86.5%, and 79.5%, respectively, $p < 0.05$). The lower incidence of adverse events in the SES group was driven by TLR reduction and achieved in the first year of follow-up. The cumulative incidence of death and recurrent myocardial infarction, starting from clopidogrel discontinuation, was comparable in the 2 groups.

Conclusions The clinical benefits of SES have been shown to be greater than those of BMS at 3-year follow-up. (J Am Coll Cardiol 2010;55:810–4) © 2010 by the American College of Cardiology Foundation

Primary percutaneous coronary intervention (PCI) has become the treatment of choice in patients presenting with ST-segment elevation myocardial infarction (STEMI) (1). Drug-eluting stents (DES) effectively reduce neointimal proliferation with better short- and long-term clinical and angiographic results, and these are as safe as bare-metal stents (BMS) (2–4). However, concerns have been raised regarding the long-term safety and effectiveness of DES implantation in the setting of STEMI (5). Long-term randomized data in this subgroup of patients have usually been limited to ≤2 years (6–8). The aim of the present analysis was to define whether the favorable effect on clinical outcome, observed in the SESAMI (Sirolimus-Eluting Stent Versus Bare-Metal Stent In Acute Myocardial Infarction) trial (7), persisted at 3 years' follow-up.

Methods

Patient selection. The design and detailed methods of the SESAMI trial have been published elsewhere (7).

Study end points and definitions. The primary end point of this trial was the incidence of major adverse cardiovascular events (MACE) at 3-year follow-up, defined as a composite of cardiac and noncardiac death, Q-wave and

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non–Q-wave myocardial infarction (MI), coronary artery bypass grafting (CABG), or target lesion revascularization (TLR). The secondary end points were: 1) 3-year TLR, defined as repeated PCI or CABG of the target lesion driven by clinical symptoms of myocardial ischemia, a positive stress test due to the target vessel, or in-stent restenosis >70% of the reference luminal diameter; 2) 3-year target vessel revascularization (TVR), defined as repeated revascularization within the treated vessel; and 3) 3-year target vessel failure (TVF), defined as a combination of TVR, recurrent MI, and target vessel-related death.

Stent thrombosis (ST) was classified according to the definitions of the Academic Research Consortium (9).

The cumulative incidence of death from all causes and recurrent MI, starting from dual antiplatelet therapy discontinuation, was also recorded.

Follow-up protocol. Patients were scheduled to undergo clinical follow-up at 30 days and thereafter at 6, 12, 24, and 36 months. An independent clinical-event committee, the members of which were unaware of the patient's treatment, reviewed all clinical end points during follow-up.

Statistical analysis. The comparison between variables representing counts was assessed with the chi-square test or Fisher exact test. Normally distributed variables were assessed with Student *t* test. The TLR and the composite of MACE and TVF were analyzed by the Kaplan-Meier method, and survival between groups was compared with the log-rank test. A 2-sided probability value of $p < 0.05$ was considered statistically significant.

Results

Baseline characteristics. Baseline characteristics and procedural results of patients are shown in Table 1.

Long-term clinical follow-up. Complete datasets were available in 157 of 160 (98%) patients in the SES group and in 156 of 160 (97.5%) patients in the BMS group.

The 3-year outcome is outlined in Table 2. The SES implantation showed a reduction of 40.5% in MACE risk compared with BMS (12.7% vs. 21%, $p = 0.034$). The cumulative 3-year survival rates free from MACE were 87% and 79% for the SES group and the BMS group, respectively ($p < 0.05$) (Fig. 1A). Results of the SES were, with regard to concerns overall secondary end points, better than those of BMS: TLR 7% versus 13.5% ($p = 0.048$) with 48% of risk reduction; TVR 8% versus 16% ($p = 0.027$) with 50% of risk reduction; and TVF 11.5% versus 20.5% ($p = 0.028$) with 44% of risk reduction. The lower incidence of adverse events in the SES group was due primarily to fewer TLRs. The greatest benefit was achieved in the first year of follow-up with no significant differences between 12 and 36 months. The cumulative 3-year survival rates free from TLR (Fig. 1B) and TVF (Fig. 1C) were 93% and 89.5% for the SES group and 86.5% and 79.5% for the BMS group, respectively ($p < 0.05$). There was no statistical difference in terms of death, recurrent MI, or ST between the 2 groups.

We revealed, compared with the previous assessment of clinical outcome at 1-year, 12 new MACE, 7 in the SES group (Table 3). In this group 2 more patients died—1 from gastric cancer, and 1 from pulmonary embolism. One patient presented with nonfatal recurrent MI, and 4 patients underwent TLR—3 underwent re-PCI for a focal in-stent restenosis in 2 cases and ST in 1 case. The fourth patient underwent CABG for in-stent restenosis and progression of the left main coronary artery disease. In the BMS group, another patient died from lung cancer, and another had nonfatal MI. Another 3 patients underwent percutaneous TLR—1 for focal in-stent restenosis, 1 for diffuse in-stent restenosis, and 1 for ST.

The mean duration of dual antiplatelet therapy was 375 ± 12 days and 369 ± 35 days for the SES and BMS groups, respectively (p = NS). The cumulative incidence of death for all causes and nonfatal MI was comparable in the 2 groups starting from the time of clopidogrel discontinuation at 3-year follow-up.

Abbreviations and Acronyms

BMS = bare-metal stent(s)
CABG = coronary artery bypass grafting
MACE = major adverse cardiovascular event
MI = myocardial infarction
PCI = percutaneous coronary intervention
SES = sirolimus-eluting stent(s)
ST = stent thrombosis
TIMI = Thrombolysis In Myocardial Infarction
TLR = target lesion revascularization
TVF = target vessel failure
TVR = target vessel revascularization

Table 1 Baseline and Procedural Characteristics of the SES and BMS Group

	SES Group	BMS Group	p Value
Baseline characteristics			
n	160	160	
Age, yrs	63 (54–70)	62 (52–72)	0.81
Male sex	128 (80)	128 (80)	
Diabetes mellitus	28 (17.5)	37 (23.7)	0.13
Hypertension	87 (54.3)	98 (58.7)	0.20
Hyperlipidemia	123 (62.5)	105 (65%)	0.12
Smoker	91 (56.8)	83 (51.7)	0.1
Prior myocardial infarction	9 (5.6)	20 (12.5)	0.047
Prior PCI	15 (9.4)	17 (10.6%)	0.38
Time from symptom onset to PCI	4 (3–7)	4 (3–6)	0.64
DAT, days	375 ± 12	369 ± 35	NS
Procedural characteristics			
PCI rescue	28 (17.5)	29 (18.2)	0.54
Abciximab therapy	124 (77.5)	118 (74%)	NS
Stent length, mm	19.4 ± 4.8	16.9 ± 4.1	0.001
Stent diameter, mm	3.02 ± 0.28	3.14 ± 0.034	0.001

Values are n, mean (range), n (%), or mean ± SD.

BMS = bare-metal stent(s); DAT = dual antiplatelet treatment; PCI = percutaneous coronary intervention; SES = sirolimus-eluting stent(s).