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Impact of Drug-Eluting Stents Among Insulin-Treated Diabetic Patients *A Report from the NHLBI Dynamic Registry*

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Abstract

Objective—To evaluate the safety and efficacy of drug-eluting stents (DES) compared with bare metal stents (BMS) in patients with insulin-treated and non-insulin-treated diabetes.

Background—Diabetes is a powerful predictor of adverse events following percutaneous coronary interventions (PCI), and insulin-treated diabetic patients have worse outcomes. DES are efficacious among patients with diabetes; however, their safety and efficacy, compared to BMS, among insulin-treated versus non-insulin-treated diabetic patients is not well established.

Methods—Using the NHLBI Dynamic Registry, we evaluated 1-year outcomes of insulin-treated (n=817) and non-insulin-treated (n=1749) patients with diabetes who underwent PCI with DES versus BMS.

Results—The use of DES, compared to BMS, was associated with a lower risk for repeat revascularization for both non-insulin-treated patients (adjusted HR=0.59, 95% CI 0.45–0.76) and insulin-treated subjects (adjusted HR=0.63, 95% CI 0.44–0.90). With respect to safety in the overall diabetic population, DES use was associated with a reduction of death or MI (adjusted HR=0.75, 95% CI 0.58–0.96). However, this benefit was confined to the population of non-insulin-treated patients (adjusted HR=0.57, 95% CI 0.41–0.81). Among insulin-treated patients, there was no difference in death or MI risk between DES- and BMS-treated patients (adjusted HR=0.95, 95% CI 0.65–1.39).

Conclusions—Drug-eluting stents are associated with lower risk for repeat revascularization compared with BMS in treating coronary artery disease among patients with either insulin-treated or non-insulin-treated diabetes. In addition, DES use is not associated with any significant increased safety risk compared to BMS. These findings suggest that DES should be the preferred strategy for diabetic patients.

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Conflicts: None

CONDENSED ABSTRACT—Insulin-treated patients with diabetes mellitus have worse outcomes following percutaneous coronary intervention (PCI) compared with non-insulin-treated patients. The present study from the NHLBI Dynamic Registry evaluates the safety and efficacy of drug-eluting stents (DES) compared with bare metal stents (BMS), among insulin-treated and non-insulin-treated patients with diabetes. Our results suggest that over a 1-year follow-up period, DES are both efficacious and safe compared with BMS in both non-insulin-treated as well as insulin-treated patients. These findings suggest that DES should be the preferred strategy for diabetic patients.

Keywords

Diabetes; Insulin; Drug-eluting stents; Percutaneous coronary intervention

INTRODUCTION

Diabetes mellitus is a risk factor for cardiovascular disease [1]. While intra-coronary stenting is routinely used to treat coronary disease, clinical and angiographic outcomes for diabetic patients compared with nondiabetic individuals are worse. Diabetes remains a strong predictor of adverse prognoses in patients undergoing percutaneous coronary intervention (PCI) [2,3]. The clinical efficacy of drug-eluting stents (DES), by reducing the need for repeat revascularization, has resulted in their widespread use [4,5].

Within the diabetic population, the use of insulin therapy is associated with worse cardiovascular prognosis than those treated with oral hypoglycemic drugs or diet [6,9]. Restenosis rates and mortality after PCI are higher among insulin-treated patients than among non-insulin-treated diabetic patients [9,10]. Although DES are effective for the prevention of restenosis, their efficacy among insulin-treated patients has not been fully elucidated [11,12]. Moreover, despite their short-term efficacy, several recent reports suggest that DES are associated with late stent thrombosis, and diabetes mellitus is itself a risk factor for this [13–15]. However, the safety of DES, in relation to BMS, among insulin-treated diabetic patients has not been reported.

Therefore, we investigated the safety and efficacy of DES, compared to BMS, among diabetics, according to whether or not insulin treatment was part of their therapy. We utilized the NHLBI Dynamic Registry to evaluate one-year outcomes of insulin-treated and non-insulin-treated patients with diabetes who underwent percutaneous coronary intervention with DES versus those who received BMS.

METHODS

NHLBI Registry Design

The Registry, coordinated at the University of Pittsburgh, includes 23 sites across North America that enrolled consecutive patients undergoing PCI at several periods of time or “waves.” Recruitment of 10,962 patients into the 5 waves occurred as follows: Wave 1 (07/97-02/98, n=2524), Wave 2 (02/99-06/99, n=2105), Wave 3 (10/01-03/02, n=2047), Wave 4 (02/04-05/04, n=2112), and Wave 5 (02/06-08/06, n=2174). The sirolimus-eluting stent was FDA-approved in March 2003 and was available at all Registry sites by the time Wave 4 began. The paclitaxel-eluting stent was FDA-approved in April 2004 and was available at all sites at that time.

Methods of data collection, quality assurance, and definition of terms have been previously described [16,17]. Data collected included baseline demographic, clinical, angiographic, and procedural characteristics, during the index PCI, as well as the incidence of death, myocardial infarction (MI), and the need for coronary artery bypass graft surgery (CABG) during

hospitalization. In-hospital and 12-month follow-up data were collected by research coordinators using standardized report forms, guided by a manual of operations. Medical records were reviewed for patients requiring repeat hospitalization. Follow-up coronary angiography was obtained only if clinically-indicated.

Study Population

The analyses evaluate the course of all diabetics within Waves 1–5 who underwent PCI, categorized by the type of stents received (BMS versus DES) and by diabetes treatment (insulin-treated versus non-insulin-treated). To minimize selection bias, for those patients enrolled during waves 4 and 5 (i.e. when both DES and BMS were available), only diabetics who received a DES were included in the analysis while wave 4 and 5 patients treated with BMS were excluded (n=297). Analyses of the wave 4 and 5 patients who received a BMS suggest that these subjects were of higher clinical risk than the BMS-treated patients from earlier waves and were thus not included in these analyses. Use of DES across US-sites was relatively uniform. The Dynamic Registry identified study patients with diabetes according to the use of oral hypoglycemic agents, diet, or treatment with insulin. Patients on both insulin and oral therapy were categorized into the insulin-treated group. Seventy-two patients who received a combination of DES and BMS were included in the DES group. Analyses were performed both by including and excluding such patients. Angiograms were analyzed by visual estimates of lesion stenosis, lesion length, and diameter stenosis.

Clinical Outcomes

Patients were followed prospectively for 12 months to ascertain death, MI, coronary artery bypass graft (CABG) surgery, repeat PCI, and repeat revascularization (PCI/CABG). The primary outcomes were analyzed as time to event, with the follow-up time measured in days from study entry (index PCI) to the date of the first event among death, MI, CABG, or repeat PCI. Those who were event-free were censored 12 months after study entry. Stent thrombosis was not tracked during waves 1–3 and thus not specifically included in this analysis.

Statistical Analysis

Patient characteristics pertaining to the index PCI, including demographics, medical history, cardiac presentation, peri-procedural medications, procedural characteristics, and outcomes were compared by student *t*-tests and chi-square tests (asymptotic or Fisher's Exact test) for categorical variables for comparisons by diabetes treatment and by stent received. One year cumulative incidence rates of clinical outcomes (e.g. death, MI, repeat PCI, and CABG) and composite outcomes (e.g. repeat PCI/CABG, death/MI) were estimated by the Kaplan-Meier method and tested by the log-rank statistic. Multivariable Cox proportional hazards regression was used with cardiac events as the outcome with BMS as the referent category. Fully adjusted one-year outcome models were fit that included demographic characteristics, clinical variables, and procedural and lesion characteristics as explanatory variables for adjustment. Covariates were selected by forward stepwise methods and those considered to be biologically relevant.

RESULTS

Baseline Patient Characteristics

A total of 9,170 (84%) patients received stents and 1-year rate of follow-up was 96%. Among those receiving stents, 817 (8.9%) were insulin-treated diabetic patients and 1749 (19.1%) were non-insulin-treated diabetic patients. Within the insulin treated group, 373 (45.7%) were treated with DES and 444 (54.3%) were treated with BMS, while the non-insulin-treated group consisted of 779 (44.5%) treated with DES and 970 (55.5%) treated with BMS. Table 1 lists the baseline characteristics. There was no significant difference in age, but the insulin-treated

patients were more likely to be female, to be non-white, and to present with more cardiovascular comorbidities, including prior revascularization, cerebrovascular disease, renal insufficiency, peripheral vascular disease, and congestive heart failure. Those receiving DES, compared with BMS, were more likely to have hypertension, hypercholesterolemia, and concomitant renal insufficiency, but were less likely to have a history of congestive heart failure. As shown in Table 2, the insulin-treated patients had greater extent of atherosclerotic burden. In comparing DES versus BMS, there were no important differences in angiographic characteristics, except that the DES groups had longer lesion lengths.

Procedural and Lesion Characteristics

Table 3 illustrates the procedural and lesion characteristics. The lesions intervened upon in the insulin-treated patients were more likely to be complex and calcified. Among the entire cohort, patients receiving BMS were more likely to have unstable angina and angiographic evidence of thrombus within treated lesions compared to those who received DES, who were more likely to be present with stable symptoms. However, there were no significant differences observed relating to setting of the procedure (i.e. elective, urgent, or emergent). There was greater use of glycoprotein IIbIIIa inhibitors in the non-insulin treated group treated with BMS. Mean stented length was longer among the DES-treated patients by 3.5 mm.

Clinical Outcomes

There were no significant differences in 30-day outcomes of death, MI, or repeat revascularization by diabetes regimen or use of DES versus BMS (data not shown). Table 4 illustrates the one-year event rates in each of the 4 groups. The risk of repeat revascularization among the entire diabetic cohort was significantly lower with DES compared with BMS (13.7% vs. 21%, $p<0.001$). Among all DES-treated diabetics, there were no significant differences (data not shown) in 1-year death, MI, or repeat revascularization when comparing sirolimus-eluting stents (n=752) versus paclitaxel-eluting stents (n=364). As seen in Table 4 and in Figure 1, there were significant differences in revascularization outcomes between the insulin-treated and non-insulin-treated diabetic patients. Compared to BMS, the use of DES was associated with significantly lower rates of 1-year need for repeat PCI among non-insulin-treated patients (11.2% vs. 15.6%, $p=0.008$) but not among the insulin treated diabetic patients (14.1% vs. 18.1%, $p=0.17$). The 1-year cumulative rate of repeat revascularization was statistically significantly lower in the DES-treated patients among the non-insulin treated diabetic group (13.1% vs. 20.4%, $p<0.001$) as well as the insulin treated group (14.9% vs. 22.3%, $p=0.02$). There were no significant changes in these findings when the patients who received a combination of both DES and BMS were excluded from the analysis. Furthermore, no differences were observed between paclitaxel-eluting and sirolimus-eluting stents within either the insulin-treated or non-insulin-treated populations.

Overall, as seen in Table 4, among the entire diabetic population studied, the hazard rate (HR) of death and MI at one year was significantly lower among the DES-treated patients compared with the BMS-treated patients (10.3% vs. 13.8%, $p<0.001$). However, as seen in Figure 2, this benefit was only observed in the population of non-insulin-treated patients (7.6% vs. 12.7%, $p<0.001$) while among insulin-treated patients, there was no difference in death or MI risk between DES- and BMS-treated patients (15.8% vs. 16%, $p=0.99$). In evaluating the entire diabetic cohort, there was a reduction in the combined outcome of death, MI, and repeat revascularization with DES compared to BMS (20.1% vs. 29.8%, $p<0.001$). This benefit was appreciated in both the insulin-treated and non-insulin-treated subjects (Table 4).

Figure 3 depicts adjusted relative risks for adverse outcomes for the 4 groups, with variables adjusted for detailed in the figure legend. Overall, the use of DES was efficacious and safe in both the insulin-treated and non-insulin treated groups. In non-insulin-treated patients, the use

of DES was associated with an estimated 35% lower risk of repeat PCI (adjusted HR=0.65, 95% confidence interval 0.49–0.87, p=0.003), 41% lower risk of repeat revascularization (adjusted HR=0.59, 95% confidence interval 0.45–0.76, p=0.0001), and 43% lower risk of death or MI (adjusted HR=0.57, 95% confidence interval 0.41–0.81, p=0.001). Among insulin-treated patients, the adjusted relative risk estimates related to use of DES for repeat PCI among the insulin treated group showed a trend towards significance with a 24% lower risk for repeat PCI (adjusted HR=0.76, 95% confidence interval 0.52–1.11, p=0.15) and a 37% lower risk for repeat revascularization (adjusted HR=0.63, 95% confidence interval 0.44–0.90, p=0.01). There was virtually no difference in the adjusted risk of death or MI with DES use (adjusted HR=0.95, 95% confidence interval 0.65–1.39, p=0.79). With respect to the combined outcome of death, MI, and repeat revascularization, after adjustment, DES-use was associated with a significant decrease in event rates in the non-insulin-treated group (adjusted HR 0.65, 95% confidence interval 0.52–0.82, p<0.001) but not in the insulin-treated group (adjusted HR 0.79, 95% confidence interval 0.60–1.04, p=0.1). Tests for interactions between stent type and treatment (insulin-treated vs. non-insulin-treated) showed no significant effect.

DISCUSSION

This study is among the first to focus exclusively upon the safety and efficacy of DES among patients with diabetes mellitus, stratified by insulin-therapy. The primary finding is the beneficial effect of DES in reducing the need for repeat revascularization in both insulin-treated and non-insulin-treated diabetic patients as compared to BMS. Several studies have documented the benefit of DES over BMS among non-insulin-treated diabetic patients [5]. Our results confirm these observations and extend this benefit to insulin-treated patients as well, without evidence of increased hazard. This benefit in the insulin-treated population is particularly noteworthy given the baseline differences between the groups. Compared to the BMS-treated patients, those that received DES had higher rates of hypertension, hypercholesterolemia, renal insufficiency, and had longer lesion lengths. In spite of the fact that these characteristics portend worse outcomes, DES was still found to be beneficial over BMS.

The rates of repeat revascularization observed in our study are consistent with findings from prior studies. In the first Arterial Revascularization Therapy Study (ARTS I), the 1-year rate of repeat revascularization for BMS in the diabetic patient subgroup was 22.3%, which is similar to our findings with rates of 20.4% and 22.3% among non-insulin treated and insulin-treated patients, respectively [18]. Similarly, in the ARTS II trial, 12.6% of DES-treated diabetic patients required repeat revascularization by 1-year [18]. In our study, the DES-treated groups had repeat revascularization rates of 13.1% and 14.9% among non-insulin treated and insulin-treated patients, respectively.

Our results support those from the DIABETES study, in which the beneficial impact of DES over BMS in reducing repeat PCI was compatible in both insulin-treated and non-insulin treated diabetic patients [5]. However, in the SIRIUS study, those who were on insulin therapy did not have a significant benefit of DES against target lesion revascularization [19], but our study had greater numbers of patients. In a trial comparing sirolimus-eluting versus paclitaxel-eluting stents, the two stents had similar outcomes in all diabetic patients; however, among insulin-treated patients, paclitaxel-eluting stents were associated with lower adverse event rates [20, 21]. We found no differences between the two currently FDA-approved DES stents.

Recently, there has been a focus upon the safety of DES for “off-label” indications. The FDA has noted that at least 60% of DES use is off-label for indications including in-stent restenosis, long lesions, coronary artery bypass grafts, and the use of overlapping and multiple stents in a single vessel [22]. Our group has also confirmed the widespread use of DES for off-label

indications [23]. These characteristics are frequently seen among diabetes patients; therefore, there is interest in the safety profile of DES in this group. Moreover, the safety of DES has recently come into question with studies suggesting that sirolimus-eluting stents are associated with increased mortality in the diabetic population [24].

We demonstrated no short-term (1-year) adverse safety issue as it pertains to the outcome of death or MI among insulin-treated diabetic patients treated with DES compared with BMS. After statistical adjustment, there was no difference in mortality among insulin-treated patients regardless of the stent used. However, it is notable that while an overall reduction in death or MI was seen in the DES-treated diabetic patients (compared with the BMS-treated diabetic subjects), this was limited only to the non-insulin-treated subjects. This finding may represent a real phenomenon in that there are several reports of restenosis resulting in increased mortality, especially among diabetic patients [25]. Therefore, it is plausible that DES, by prevention of restenosis, may be associated with lower rates of death or MI. Still, our results should be cautiously interpreted as it appears unlikely that there is an interaction between DES, non-insulin treatment, and mortality. There were important baseline differences between the BMS-treated and DES-treated groups within this population. The BMS-treated patients were more likely to present with unstable angina and with angiographic evidence for thrombus, both characteristics that may predispose them to worse clinical outcomes, especially in the presence of diabetes mellitus [26]. Furthermore, despite our efforts to statistically adjust for several different variables, it is still possible that there are confounding variables that are un-accounted for and that can partially explain some of these findings.

The higher rate of mortality among the insulin-treated patients is consistent with other studies demonstrating a higher mortality risk among insulin-requiring patients [27,28]. Overall, though, the safety of DES vs. BMS in the high-risk diabetic population is consistent with a recent meta-analysis which revealed a similar safety profile of DES in these patients [29]. The safety of DES in insulin-treated patients is an important finding given several recent reports from other registries suggesting that diabetes, particular insulin-treated diabetes, is an independent predictor of stent thrombosis [30,31]. Although we did not specifically track stent thrombosis in our study, the lack of significant differences in mortality and MI between the DES- and BMS-treated patients suggests that the 1-year safety profile is favorable.

Limitations

The Dynamic Registry is not a randomized trial. The number of insulin-treated patients treated with DES was relatively modest; nonetheless, we were able to identify significant differences. There may be residual confounding not fully accounted for in the multivariable analyses; however, the large cohort of patients and the relative similarity in baseline variables between the DES and the BMS groups argue in favor of the validity of the results. Another limitation is that we may not be able to account for the precise effect of changing patterns in pharmacologic therapy of atherosclerosis and diabetes. We could not account for the duration or degree of control of diabetes. Despite this, our results regarding rates of repeat revascularization among insulin-treated and non-insulin treated patients mimic those from other studies.

In conclusion, our results show the efficacy of DES over BMS in reducing the need for repeat revascularization in insulin-treated as well as non-insulin treated diabetics. In addition, DES use is not associated with any significant increased safety risk compared to BMS. These findings suggest that DES should be the preferred strategy for patients with diabetes.

Acknowledgments

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ABBREVIATIONS LIST

PCI
Percutaneous coronary intervention

DES
Drug-eluting stents

BMS
Bare metal stents

MI
Myocardial infarction

CABG
Coronary artery bypass graft

SAT
Subacute thrombosis

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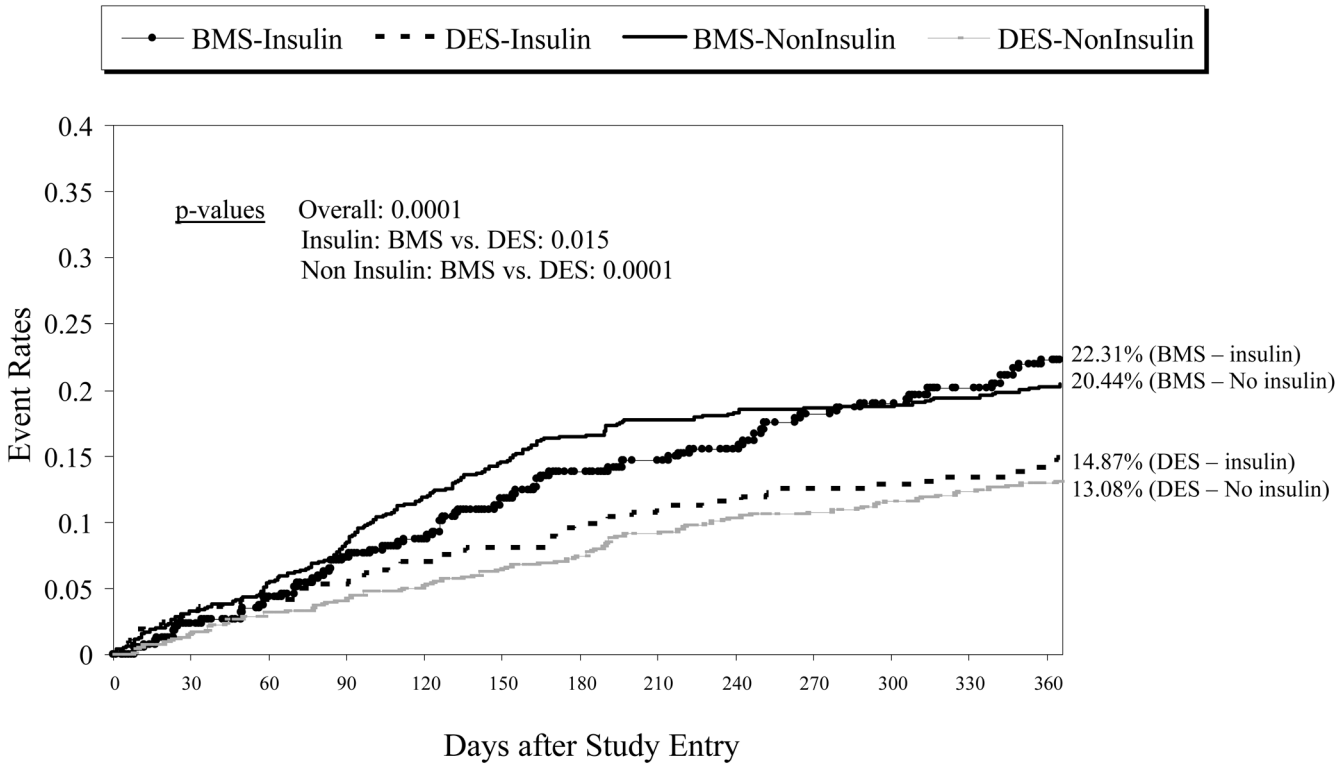

Figure 1.
Repeat revascularization event rates. Kaplan-Meier 1-year curves of the incidence of the composite endpoint of post-discharge repeat PCI or CABG by diabetes treatment regimen and use of DES versus BMS.

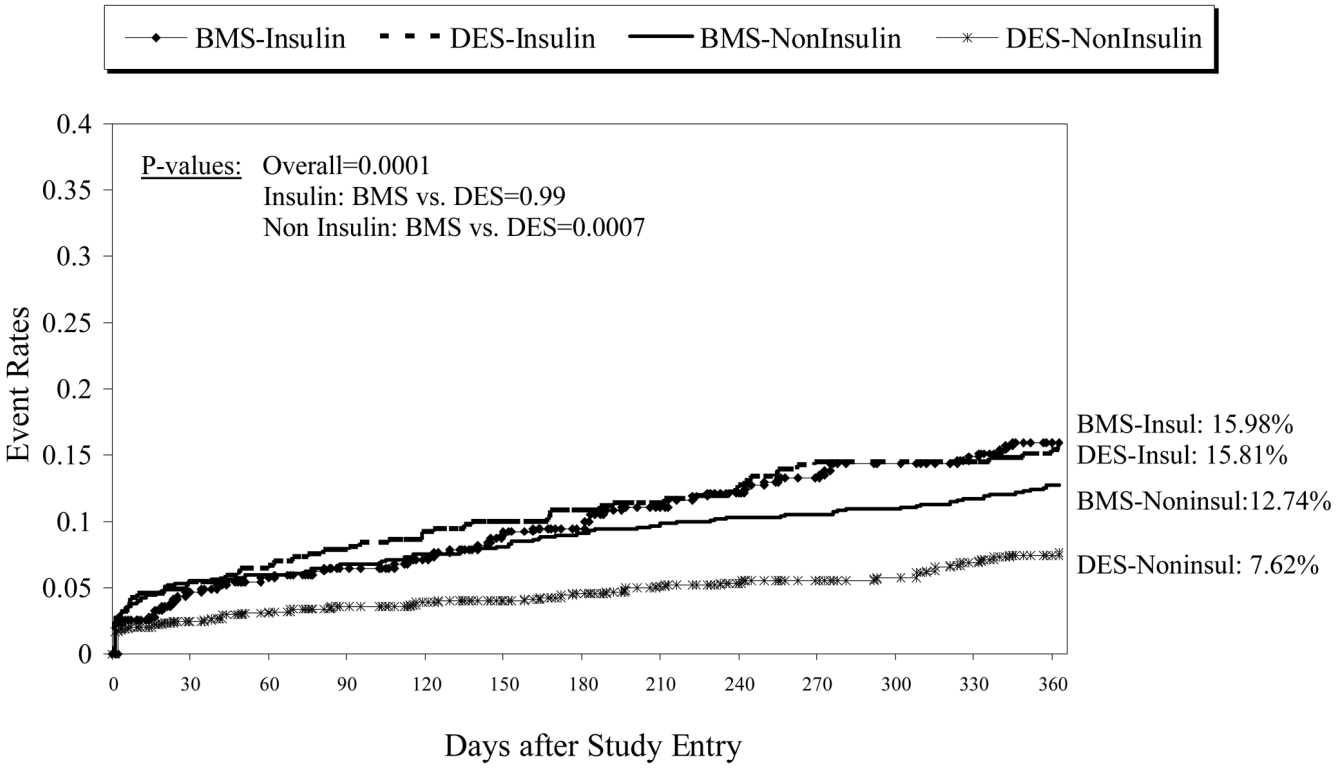

Figure 2.
Death or myocardial infarction event rates. Kaplan-Meier 1-year curves of the incidence of the composite endpoint of death or MI by diabetes treatment regimen and use of DES versus BMS.

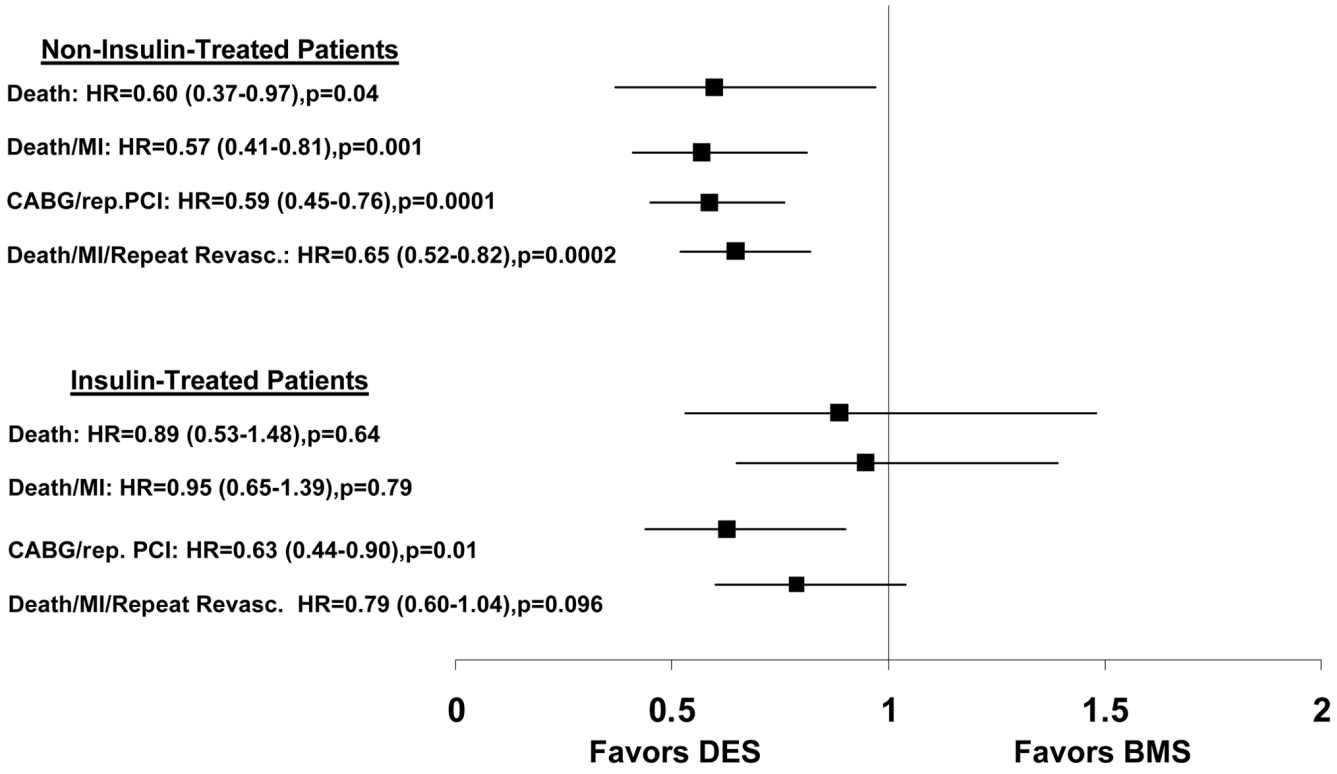

Figure 3.

Relative benefit of DES over BMS for safety and efficacy. Adjusted hazard ratios (solid rectangles) and 95% confidence intervals (horizontal lines) for safety and efficacy outcomes at 1-year comparing DES versus BMS (referent category) treated patients, stratified by diabetes treatment regimen. Variables adjusted for included: Age, vessel disease, history of congestive heart failure, hypertension, prior coronary intervention, peripheral vascular disease, history of hypercholesterolemia, number of significant lesions, renal disease, presence of total occlusion, tortuous lesion, unstable angina, AMI, cardiogenic shock, emergency procedure, urgent procedure, attempted an ostial lesion, attempted a class C lesion, attempted lesion receiving collaterals, attempted thrombus, and discharge medication (i.e. presence of at least 2 of the following: Beta blockers, Calcium blocker, Long acting nitrates, ACE inhibitors, statins, Clopidogrel/ticlopidine).

Table 1

Baseline Clinical Characteristics and Risk Factors by Diabetes Treatment

	Insulin-Treated			Non-Insulin-Treated			
	BMS (n=444)	**DES (n=373)**	**p-value BMS vs DES**	**BMS (n=970)**	**DES (n=779)**	**p-value BMS vs DES**	**p-value Ins. vs. Non-Ins.**
Mean age, yrs	63.9	63.0	0.39	64.4	64.0	0.39	0.15
Female, %	53.4	45.3	0.02	41.6	35.4	0.008	<0.001
Race, %			0.03			0.002	<0.001
White	71.3	62.5		71.5	69.4		
Black	17.6	26.1		12.5	16.7		
Hispanic	7.9	6.7		8.8	10.2		
Asian	2.9	4.0		6.6	3.6		
Other	0.2	0.5		0.6	0.1		
Mean body mass index (kg/m2)	31.0	32.2	0.01	30.3	31.4	<0.001	0.06
Prior PCI, %			0.008			<0.001	0.006
None	65.5	58.4		70.1	60.1		
One	21.2	20.1		20.1	24.5		
>1	13.3	21.4		9.8	15.5		
Prior CABG			0.59			0.56	<0.001
None	72.3	69.2		82.4	81.6		
One	25.0	28.2		15.1	16.5		
>1	2.7	2.7		2.5	1.9		
Prior Myocardial Infarction	38.9	31.2	0.02	33.4	27.3	0.006	0.02
Concomitant Diseases, %							
Severe noncardiac comorbidity	52.6	59.1	0.06	39.6	40.1	0.83	<0.001
Cerebrovascular	10.4	11.7	0.56	8.8	7.8	0.43	0.03
Renal	16.3	29.0	<0.001	6.8	11.0	0.002	<0.001
Peripheral vascular disease	18.5	13.6	0.06	8.8	9.8	0.46	<0.001
Pulmonary	13.3	10.0	0.15	9.0	8.5	0.73	0.02
Cancer	7.2	9.2	0.30	6.8	7.6	0.52	0.40
Other	17.2	21.1	0.15	12.6	13.2	0.73	<0.001
Congestive heart failure, %	23.9	20.9	0.32	16.1	12.0	0.02	<0.001

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	Insulin-Treated			Non-Insulin-Treated			
	BMS (n=444)	**DES (n=373)**	**p-value BMS vs DES**	**BMS (n=970)**	**DES (n=779)**	**p-value BMS vs DES**	**p-value Ins. vs. Non-Ins.**
Hypertension, %	80.8	88.8	0.002	77.4	88.7	<0.001	0.21
Hypercholesterolemia, %	73.8	85.1	0.001	68.4	86.2	<0.001	0.16
Smoking, %			0.76			0.66	0.09
Never	39.7	42.2		37.3	35.2		
Current	17.0	16.8		18.8	19.9		
Former	43.4	41.0		43.9	44.9		

Table 2

Angiographic Characteristics by Diabetes Treatment

	Insulin-Treated			Non-Insulin-Treated			
	BMS (n=444)	**DES (n=373)**	**p-value BMS vs DES**	**BMS (n=970)**	**DES (n=779)**	**p-value BMS vs DES**	**p-value Ins. vs. Non-Ins.**
Mean left ventricular function, %	48.7	50.0	0.14	51.7	52.0	0.62	0.01
Abnormal left ventricular function, %	41.1	36.7	0.28	34.3	30.3	0.12	0.005
Coronary artery lesion location, %							
Left anterior descending (LAD) only	15.4	14.5	0.74	18.9	15.1	0.04	0.17
Left circumflex (LCx) only	5.6	7.5	0.28	6.9	7.9	0.40	0.45
Right coronary (RCA) only	10.7	6.7	0.05	11.6	8.2	0.02	0.34
LAD, LCx, and RCA	36.9	40.5	0.30	29.7	35.4	0.01	0.002
Number of vessels diseased, %			0.75			0.03	0.03
Single-vessel	29.3	26.5		35.5	29.3		
Double-vessel	32.1	31.4		32.5	33.2		
Three-vessel	38.1	41.6		31.8	37.0		
% with stenoses >50% in diameter							
Left main coronary artery	7.7	7.5	0.94	5.3	6.3	0.36	0.07
Left anterior descending artery	74.8	77.7	0.32	73.9	76.1	0.29	0.50
Left circumflex artery	60.6	65.1	0.18	54.9	62.4	0.002	0.03
Right coronary artery	70.7	69.4	0.69	64.4	66.0	0.50	0.01
Bypass graft	19.8	22.0	0.45	13.2	11.6	0.30	<0.001
Any total occlusions	46.2	45.6	0.87	37.9	37.4	0.80	<0.001
Mean number of significant lesions	3.5	3.8	0.13	3.2	3.3	0.04	<0.001
Amenable to complete revascularization by PCI, %	71.6	83.3	<0.001	78.8	89.6	<0.001	<0.001
Amenable to complete revascularization by CABG, %	75.9	72.6	0.29	81.8	77.3	0.02	0.003

Table 3

Procedural and Lesion Characteristics by Diabetes Treatment and Type of Stent Received

	Insulin-Treated			Non-Insulin-Treated			
	BMS (n=444)	**DES (n=373)**	**p-value BMS vs DES**	**BMS (n=970)**	**DES (n=779)**	**p-value BMS vs DES**	**p-value Ins. vs. Non-Ins.**
Reason for revascularization, %							
Asymptomatic coronary artery disease	6.1	12.9	<0.001	5.9	14.1	<0.001	0.76
Stable angina	20.0	17.4	0.34	19.8	22.1	0.24	0.25
Unstable angina	47.1	38.9	0.02	45.8	35.7	<0.001	0.33
Acute myocardial infarction	23.0	22.8	0.95	23.5	23.4	0.96	0.75
Cardiogenic shock	2.9	0.5	0.01	2.6	0.4	0.0003	0.67
Circumstances of procedure, %			0.84			0.18	0.23
Elective	60.8	59.8		57.0	61.1		
Urgent	32.0	31.9		32.4	30.2		
Emergent	7.2	8.3		10.6	8.7		
Glycoprotein IIbIIIa inhibitor use, %	35.6	34.3	0.70	39.9	33.2	0.004	0.34
		Insulin-Treated			Non-Insulin-Treated		
Lesions	BMS (n=656)	DES (n=527)	p-value BMS vs DES	BMS (n=1458)	DES (n=1117)	p-value BMS vs DES	p-value Ins. vs. Non-Ins.
ACC/AHA lesion classification, %			0.17			<0.001	0.002
A	13.1	11.5		12.9	9.5		
B1	29.2	27.7		34.2	34.0		
B2	34.2	31.5		34.4	30.8		
C	23.5	29.2		18.5	25.7		
Reference vessel size, mm	3.0	3.0	0.92	3.0	3.0	0.11	0.18
Mean lesion length, mm	12.9	17.5	<0.001	13.2	16.9	<0.001	0.43
Mean % diameter stenosis	83.1	82.7	0.02	82.8	83.3	0.21	0.63
Evidence of thrombus, %	15.2	12.0	0.12	16.0	10.0	<0.001	0.76
Ulcerated, %	13.0	12.8	0.91	12.1	12.0	0.93	0.45

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	Insulin-Treated			Non-Insulin-Treated			
	BMS (n=444)	**DES (n=373)**	**p-value BMS vs DES**	**BMS (n=970)**	**DES (n=779)**	**p-value BMS vs DES**	**p-value Ins. vs. Non-Ins.**
Bifurcation, %	10.4	8.0	0.17	11.2	9.4	0.15	0.31
Calcified, %	29.2	32.9	0.17	25.1	30.2	0.005	0.03
DES Type							
Sirolimus	--	62.0	n/a	--	61.2	n/a	0.97
Paclitaxel	--	31.3	n/a	--	31.7	n/a	0.57

Table 4

Cumulative Event Rates for One-Year Follow-Up by Diabetes Treatment and Type of Stent Received

	All Diabetes Patients			Insulin-Treated			Non-Insulin-Treated		
	BMS (n=1414)	**DES (n=1152)**	**p-value**	**BMS (n=444)**	**DES (n=373)**	**p-value**	**BMS (n=970)**	**DES (n=779)**	**p-value**
Death	8.5	5.4	0.003	9.8	8.4	0.52	7.8	3.9	<0.001
Myocardial Infarction	6.6	5.9	0.52	7.8	10	0.29	6	4	0.07
Coronary Artery Bypass Graft	6.5	2.1	<0.001	5.1	1.8	0.02	7.2	2.3	<0.001
Repeat PCI	16.4	12.1	0.003	18.1	14.1	0.17	15.6	11.2	0.008
Death/Myocardial Infarction	13.8	10.3	<0.001	16	15.8	0.99	12.7	7.6	<0.001
CABG/Repeat PCI	21	13.7	<0.001	22.3	14.9	0.02	20.4	13.1	<0.001
Death/MI/Repeat PCI/CABG	29.8	20.1	<0.001	32.3	24.5	0.03	28.6	18.5	<0.001