Ramzy John (Orcid ID: 0000-0001-8910-3863)

OUTCOMES IN PATIENTS WITH PERIPHERAL VASCULAR DISEASE FOLLOWING PERCUTANEOUS CORONARY INTERVENTION

John Ramzy [a*], Nick Andrianopoulos [b], Louise Roberts [c,d], Stephen J Duffy, MBBS, PhD [b,e], David Clark [f], Andrew W Teh [c,d], Andrew Ajani [a], Christopher M Reid [b,g], Angela Brennan, RN [b], Melanie Freeman [c,d]

[a] *Department of Cardiology, The Royal Melbourne Hospital, Melbourne, Victoria, Australia*

[b] *Centre of Cardiovascular Research and Education in Therapeutics (CCRE), Department of Epidemiology and Preventative Medicine, Monash University, Melbourne, Victoria, Australia*

[c] *Department of Cardiology, Box Hill Hospital, Melbourne, Victoria, Australia*

[d] *Monash University Eastern Health Clinical School, Melbourne, Victoria, Australia*

[e] *Department of Cardiovascular Medicine, Alfred Hospital, Melbourne, Victoria, Australia*

[f] *Department of Cardiology, Austin Hospital, Melbourne, Victoria, Australia*

[g] *School of Public Health, Curtin University, Perth, Western Australia*

On behalf of the Melbourne Interventional Group (MIG)

* Corresponding Author: Dr John Ramzy, Alfred Heart Centre, 3rd Floor Philip Block, Alfred Hospital, 55 Commercial Rd, Melbourne 3004, AUSTRALIA. Telephone +61 423 246 960. E-mail Address: johnramzy@yahoo.com.au

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1. Abstract

Objectives: To evaluate the clinical characteristics and outcomes of patients with Peripheral Vascular Disease (PVD) undergoing Percutaneous Coronary Intervention (PCI) in a contemporary setting, and to determine whether use of drug-eluting stents (DES) improves outcomes.

Background: PVD was an independent risk factor for adverse outcomes following PCI in the bare-metal stent (BMS) era. It is not known whether outcomes in these patients have improved with advances in interventional techniques and stent technology, as they have for the general population.

Methods: 18,380 patients undergoing PCI from an Australian registry between 2005 and 2013 were studied. Clinical and procedural data, 30-day and 12-month outcomes were compared in those with and without a reported history of PVD. Outcomes were also compared between patients with PVD who received DES and those who received BMS. Long-term mortality was compared using Australian National Death Index linkage.

Results: Patients with PVD (n=1,251, 6.8%) were older and had more prevalent diabetes, hypertension, cerebrovascular disease, heart failure, renal impairment, ostial lesions, left main and multi-vessel disease ($p<0.001$). Patients with PVD had significantly higher rates of major adverse cardiovascular events (MACE) compared with those without PVD, in-hospital (5.7% vs. 4.1%, $p<0.008$), at 30-days (8.6% vs. 5.8%, $p<0.001$) and at 12-months (24.6% vs. 13.2%, $p<0.001$). At 4.9±2.6 years follow-up, there was significantly greater mortality in the PVD group. PVD patients who received DES experienced significantly less MACE than PVD patients treated with BMS at 30-days (4.8 vs. 10.1%, $p<0.001$) and 12-months (19.4 vs. 26.4%, $p<0.005$).

Conclusions: PVD is an independent predictor of adverse outcomes in patients undergoing PCI. PVD patient who received DES had improved outcomes compared with those receiving BMS.

2. Introduction

The incidence of lower extremity peripheral vascular disease (PVD) has grown by 23.5% in the first decade of this century. It now affects 3-12% of the world's population; around 202 million cases worldwide [1]. Patients with PVD have similar atherosclerotic risk profiles to those with coronary artery disease (CAD). In the Global Atherothrombosis Assessment (AGATHA) study, one in two patients with PVD had concomitant CAD, and one in five CAD patients had PVD [2]. Approximately 23% of patients with both PVD and CAD have undergone percutaneous coronary intervention (PCI) [3]. Amongst the overall population of patients undergoing PCI advanced stent technology and more aggressive adjunctive antiplatelet and anticoagulant therapy have resulted in an improvement in outcomes [4, 5]. However, there is evidence that this has not been the case for patients with PVD. Despite a reduction in the rate of repeat PCI, their risk of major adverse cardiovascular events outcomes following PCI has remained unchanged across the early bare-metal stent (BMS) and drug-eluting stent (DES) eras [6]. While PVD is recognized as an independent predictor of poor outcomes after PCI in the BMS era [7-15], there is a paucity of data within the DES era [16]. This study aimed to evaluate whether PVD is an independent predictor of adverse outcomes outcomes in patients undergoing PCI in a contemporary setting. Furthermore, we aimed to investigate whether patients with PVD represent a subgroup of patients who may derive particular benefit from the use of DES over BMS.

3. Methods

3.1 Patient Population

We analysed prospectively collected data from 18,380 consecutive patient procedures in the Melbourne Interventional Group (MIG) registry between 2005 and 2013. No procedures were excluded from the study. All procedures (n=18,380) were divided into two groups. Group one consisted of procedures on patients with a history of PVD (n=1,251) and group two consisted of procedures on patients without PVD (n=17,129). Clinical characteristics, procedural data medication use and in-hospital, 30-day and 12-month adverse outcomes (MACE, death, recurrent myocardial infarction and target vessel revascularisation) were compared between these two groups. We further divided the PVD group into those who had received DES (n=542) and those who received BMS (n=595) and compared 30-day and 12-month adverse outcomes between these two subgroups. Using National Death Index (NDI) linkage, long-term mortality (mean follow-up 4.9 ± 2.6 years) was compared between four subgroups: patients without PVD who received DES (n=7,653), patients without PVD who received BMS (n=8,376), patients with PVD who received DES (n=539) and patients with PVD who received BMS (n=594).

3.2 Definitions

Peripheral vascular disease was defined by either a history of chronic or acute occlusion or aneurysmal narrowing of the arterial lumen of the aorta or extremities and includes: claudication with exertion, extremity ischaemic rest pain, amputation for arterial insufficiency, documented aortic aneurysm, documented renal artery stenosis, positive

non-invasive testing (e.g. ankle brachial index less than 0.9) and vascular reconstruction, bypass surgery or percutaneous intervention to the extremities [17]. Patients were not screened for asymptomatic PVD.

3.3 Registry Design

The Melbourne Interventional Group is a collaboration between interventional cardiologists at six major hospitals in Victoria, Australia [18, 19]. The registry is coordinated by the Centre for Cardiovascular Research & Education in Therapeutics, a research body within the Department of Epidemiology and Preventative Medicine Monash University, Melbourne, Australia.

The ethics committee of each participating hospital has approved the registry and all participants gave informed consent using an 'opt-out' model. A free-call number that could be used to exclude one's self from the study was provided to patients. Clinical-quality registries have recommended this model [20], which is also used by other large Australian registries [21].

Investigators at each site recorded demographic, clinical and procedural characteristics of all patients undergoing PCI using a case-report form with standard definitions for all fields [19]. Regular independent audits conducted on 15 verifiable variables from 5% of MIG procedures have demonstrated 96.5% accuracy [22], similar to other large registries [23].

3.4 Procedural decisions

Taking into account guidelines and clinical factors, the choice between balloon-only angioplasty, PCI with BMS or PCI with DES was at the discretion of the treating clinician at each centre. In Australian public (government funded) hospitals, DES are currently recommended for patients with lesions at high risk of restenosis including; diabetics, lesions greater than 18 mm in length, vessels less than 2.5 mm in diameter, in-stent restenosis and bifurcation or ostial lesions [24]. Peri-procedural antiplatelet and anticoagulant use was generally guideline based, however was also ultimately decided by each patient's treating team.

3.5 Data Collection and Outcomes

In-hospital complications were logged at the time of discharge from the index admission. Thirty-day and 12-month follow-up were obtained by telephone contact with the patient, their next-of-kin or treating medical practitioner, and all events were verified by case record review. Long-term mortality was determined using the Australian National Death Index (NDI) linkage, the methodology of which has been previously described in detail [25]. Essentially, The Australian NDI is a database that uses information from the births, deaths and marriages registries of each Australian state to record all deaths nation-wide. Its purpose is to enable epidemiological research. Several demographic variables (name, date of birth, age at death, date of death, gender, state/territory of registration) were used to match deceased patients in the NDI with all patients in the MIG registry. The mean ± standard deviation NDI follow-up for patients in the MIG registry was 4.9 ± 2.6 years.

3.6 Statistical Analysis

Continuous variables are expressed as mean ± standard deviation and categorical as numbers/percentages. The Pearson chi-squared test was used to analyse differences in discrete variables relating to characteristics, procedural data and outcomes between groups. Student's t-test or Kruskal-Wallis equality-of-populations rank test was used for continuous variables as appropriate. The Kaplan-Meier method was used to construct survival curves and the differences in survival were assessed with the log-rank test. A p value of <0.05 was considered to indicate statistical significance. Thirty-five baseline clinical and procedural characteristics were considered in the identification of factors independently associated with outcomes at 12-month follow-up. Factors with p value <0.1 in simple logistic regression were considered for multiple logistic regression. Statistical analyses were carried out using Stata for Windows (Stata/MP 13.1, College Station, TX, USA).

4. Results

A total of 18,380 patient procedures were enrolled in the registry between 2005 and 2013. Of these, 1,251 patients (6.8%) had PVD and 17,129 (93.2%) did not have a history of PVD. DES were used in 44.7% of procedures overall.

4.1 Baseline Characteristics

Patients with PVD were older and had a significantly greater prevalence of cardiovascular risk factors including diabetes, hypertension, dyslipidaemia and a history of MI when compared to those without PVD (all p<0.001) (Table 1). They were also more likely to have a history of cerebrovascular disease, chronic pulmonary disease, heart failure, previous PCI and prior coronary artery bypass grafting (CABG) (all p<0.001). The PVD group underwent more procedures for elective and non-emergent acute coronary syndromes (ACS) while patients without PVD had a higher rate of PCI for ST-elevation MI (STEMI) (p<0.001) (Table 1). In keeping with the lower incidence of STEMI in this group, thrombolytics and IIb/IIIa antagonists were used less often in patients with PVD (p<0.001). However, despite the lower incidence of STEMI, the PVD group still had a significant number of patients presenting with out-of-hospital VF-arrest; they also had similar numbers of patients presenting with cardiogenic shock and requiring intra-aortic balloon pump use (Table 1). The proportion of males was similar in both groups (74.2% vs. 75.6%, p=0.25) There were more current smokers in the non-PVD group than the PVD group (24.3% vs. 19.7%, p<0.001) (Table 1). Comparison of medication use between the two groups (Tables 3 and 4) revealed a significantly greater proportion of non-PVD patients

were taking statins at 30-days, and beta-blockers and ACE inhibitors at 30-days and 12-months. Conversely, the use of ezetimibe, nitrates and calcium channel blockers was significantly higher amongst the PVD group. The PVD group were more often treated with anticoagulation in addition to single or dual-antiplatelet therapy than the non-PVD patients, who had significantly higher rates of dual-antiplatelet therapy alone.

4.2 Angiographic characteristics

The procedural success rate was lower in patients with PVD (94.3% vs. 95.9%, p<0.001). They were more likely to have multi-vessel and left main disease than those without PVD (76.5% vs. 58.4%, p<0.001 and 3.4% vs. 0.8%, p<0.001 respectively) (Table 2). There was a higher rate of in-stent restenosis amongst patients with PVD (9.5% vs. 5.8%, p<0.001) (Table 2). Complex lesions (ACC/AHA B2/C) and ostial lesions were more common amongst the PVD group (p=0.013 and p<0.001 respectively), while there was no significant difference in the number of bifurcation lesions (p=0.075) (Table 2). Both DES and BMS use was lower in patients with PVD who had more balloon only procedures than patients without PVD (p<0.001). Detailed angiographic data are shown in Table 2.

*4.3 In-Hospital, 30-Day and 12-Month Clinical Outcomes***.**

Patients with PVD experienced more in-hospital MACE (5.7% vs. 4.1%, p=0.008), driven by a significantly increased risk of death (3.8% vs. 2.1%, p<0.001) (Table 5). They also had higher rates of new renal impairment (1.9% vs. 1.1%, p=0.015), major bleeding (3.8% vs. 2.4%, p=0.004) and peri-procedural arterial dissection at the percutaneous access site (0.6% vs. 0.2%, p=0.003) (Table 5).

There was a higher rate of 30-day MACE amongst patients with PVD (8.6% vs. 5.8%, p<0.001). Death (5.0% vs. 2.4%, p<0.001) and new or recurrent MI (3.1% vs. 2.0%, p=0.006) occurred significantly more often in the PVD group, while the rate of target vessel revascularisation (TVR) was similar in the two groups (2.2% vs. 2.4%, p=0.53) (Table 5).

At 12 months, patients with PVD had higher rates of MACE (24.6% vs. 13.2%, p<0.001), death (12.2% vs. 4.2%, p<0.001), new or recurrent MI (9.8% vs. 4.4%, p<0.001) and TVR (9.5% vs. 7.2%, p=0.003) (Table 5).

Independent predictors of MACE at 12 months included PVD (OR 1.35, 95% CI: 1.14-1.60, p<0.001), cardiogenic shock (OR 5.11, 95% CI: 4.14-6.30, p<0.001) and eGFR<30 ml/min/1.73 m^2 (OR 3.09, 95% CI: 2.48-3.85, p<001) (Table 6). PVD was also independently associated with 12-month mortality (OR 2.01, 95% CI: 1.56-2.59, p<0.001), as were cardiogenic shock and eGFR<30 ml/min/1.73 m^2 (Table 7).

4.4 PVD and DES Use

Amongst those with PVD, 542 (43.3%) received BMS and 595 (47.6%) received DES with the remaining 114 (9.1%) patients undergoing balloon angioplasty alone. There was a significantly higher prevalence of diabetes amongst the PVD patients who received DES compared with those who received BMS (54.2% vs. 35.1%, p<0.001) (Table 8). PVD patients receiving BMS had a higher rate of STEMI as the indication for PCI (24.4% vs. 9.4%, p<0.001) while DES was used more often in NSTEMI, unstable angina and non-ACS presentations (Table 8). When compared to the PVD patients who received DES, a higher proportion of the PVD patients receiving BMS presented with out of hospital cardiac

arrest (2.5% vs. 0.6%, p<0.008) and cardiogenic shock (5.9% vs. 1.9%, p<0.001) (Table 8). More patients in the PVD and DES group had complex lesions (ACC/AHA classification type B2/C) treated compared to the PVD and BMS group (59.1% vs. 52.1%, p=0.01) (Table 9). As expected, the PVD patients who received DES had higher rates of DAPT use at 30 days and 12 months (95.2% vs. 89.3%, p<0.001 and 79.8% vs. 51.4%, p<0.001 respectively) (Tables 10 and 11).

Compared with PVD patients who received DES, patients who received BMS had a significantly higher incidence of in-hospital complications including; MACE (6.4% vs. 2.8%, p=0.004), death (4.2% vs. 1.9%, p=0.022) and new or recurrent MI (2.0% vs. 0.2%, p=0.004) (Table 12). At 30-days, patients with PVD who received DES had significantly less MACE (4.8% vs. 10.1%, p<0.001), death and MI than those who received BMS. However, the rates of TVR did not differ significantly between the two groups (1.5% vs. 2.2%, p=0.96) (Table 12).

At 12-months, there was a significantly lower incidence of MACE (19.4% vs. 26.4%, p=0.005) and death (8.5% vs. 14.6%, p<0.001) amongst patients treated with DES. However, there was no longer a difference in the rate of MI, and TVR continued to be similar (Table 12).

Over a mean follow-up period of 4.9 ± 2.6 years patients with PVD who received BMS had the highest mortality (38.4%) when compared to patients with PVD who received DES (29.1%) and those without PVD (15.3% and 12.0% with BMS and DES respectively, p<0.001) (Figure 1).

5. Discussion

This is one of the largest registries examining outcomes in patients with PVD following PCI in the DES era. This study has shown that patients with PVD have an increased risk of short-, medium- and long-term adverse outcomes following PCI. Furthermore, PVD is an independent predictor of adverse outcomes following PCI in the DES era, despite advances in stent technology and medical therapy. Finally, an important finding of this study is that patients with PVD who were treated with DES had lower rates of death and overall major adverse cardiac events than those who received BMS.

Several studies in the BMS era concluded that PVD was an independent predictor of adverse outcomes after PCI [7-11, 13-15, 26, 27]. Nikolsky *et al* examined 12-month outcomes in 10,440 consecutive patients undergoing PCI in the BMS era, 1,969 of whom had symptomatic lower extremity PVD. The PVD group had a significantly higher 12-month mortality rate (13.6% vs. 5.2%, $p<0.001$), and after multivariate analysis, PVD was independently associated with increased 12-month mortality (OR 1.71, 95% CI 1.42-2.07, $p<0.001$) [15]. Similarly, Singh *et al* found that, even after adjustment for concomitant risk factors, patients with PVD treated with PCI in the BMS era had an 84% relative-risk increase in in-hospital mortality and a 48% relative-risk increase in death at 3 year follow-up compared to patients without PVD [7]. Analysis of the Tirofiban and Reopro Give Similar Efficacy Outcome Trial (TARGET) showed that PVD was independently associated with a 2 to 3 fold increase in mortality 12 months after PCI [10]. Amongst patients undergoing PCI for MI, PVD was independently associated with a doubling of in-hospital

mortality, and the number of diseased vascular beds in patients with PVD was associated with a graded increase in the risk of adverse outcomes [26].

Similar to findings in the BMS era, our study suggests that PVD continues to be independently associated with roughly a two-fold increased risk of 12-month mortality post-PCI in the DES era.

This study also examined differences in outcomes between patients with PVD who received DES and those PVD patients receiving BMS. Interestingly, we found that patients with PVD who received DES had reduced short-, medium- and long-term MACE and mortality despite no difference in TVR. The difference in mortality was seen out to mean follow-up of 4.9 ± 2.6 years. In stent-restenosis and the need for TVR are greatest in the first year after stent insertion and this is when DES have been shown to be superior to BMS in reducing the need for TVR, but not mortality [28]. In the absence of a reduction in TVR, there is no clear explanation for the reduced short- and long-term MACE and mortality in our PVD patients who received DES compared to those who received BMS. However, in this cohort we found a significantly higher rate of PCI performed for in-stent restenosis in the PVD group. Our data suggests that outcomes for patients with PVD undergoing real world PCI could possibly be improved by greater use of drug-eluting stents over bare-metal stents in this particular group of patients.

Prior to our registry, only two other studies have compared outcomes between patients with PVD and those without PVD in the DES era [16, 29]. Midwall *et al* investigated outcomes amongst 173 patients with PVD and 2,282 patients without a history of PVD who

underwent PCI in the early-DES era [16]. The PVD group had significantly higher unadjusted rates of death than the non-PVD group in-hospital (1.8% vs. 0.1%, p=0.006), at 12-months (8.2 vs. 2.9, p=0.001) and 4-years (23.8% vs. 10.8%, p<0.001). However, after adjustment for differences in the patient's clinical and angiographic characteristics, PVD was no longer an independent predictor of mortality [16]. In contrast, our study found that PVD remained an independent predictor of adverse outcomes after multivariate adjustment. Of note, the study by Midwall *et al* had a smaller number of patients and may have been underpowered to detect a true mortality difference after multivariate adjustment. Additionally, the definition of PAD in Midwall's study allowed for the inclusion of patients without PAD of the aorta, renal arteries or extremities, but who had only carotid artery disease or a history of cerebrovascular accident. These patients were not included in our PVD cohort, all of whom had PVD involving the aorta, renal arteries or extremeties. There is some evidence that cerebrovascular disease may be a lesser risk factor for adverse outcomes after PCI than peripheral arterial disease [11, 14] hence their inclusion in the PVD cohort may have reduced the apparent overall increased risk amongst their PVD group.

More recently, an analysis of the Assessment of Dual AntiPlatelet Therapy with Drug Eluting Stents (ADAPT-DES) study was conducted to determine the relationship between PVD, platelet reactivity and subsequent adverse outcomes. There was a 10.2% prevalence of PVD amongst the 8,582 patients included in the analysis, all of whom received drug-eluting stents. In-line with our findings, PAD was found to be an independent predictor of MACE (adjusted HR 1.34, p=0.003), mortality, MI and bleeding at

two year follow-up. The increased risk amongst PVD patients was not mediated by heightened platelet reactivity (HPR), which affected both PVD and non-PVD patients similarly [29].

The increased rate of adverse outcomes observed in our PVD group may be related to their higher rate of periprocedural bleeding events (3.8% vs. 2.4%, p=0.004). Amongst the general population of patients undergoing PCI, periprocedural bleeding has been associated with a 3 to 10-fold increased risk of in-hospital and 30-day mortality [30-34] and a 2 to 4.5-fold increased risk of 12-month mortality [30, 34-37]. Bleeding has also been associated with a greater risk of myocardial infarction and stroke [30, 34]. Analysis of the Harmonizing Outcomes with Revascularization and Stents in Acute Myocardial Infarction (HORIZONS-AMI) trial found an increased risk of MACE and mortality that persisted out to 3 years post-PCI in STEMI patients who had an in-hospital major bleed [38]. Patients with vascular disease may be less able to control the systemic amplification of local clotting mechanisms triggered by bleeding because the counter regulatory pathways are primarily active within endothelial cells. This may predispose them to a hypercoagulable state following a bleeding event [39]. In addition, periprocedural bleeding may lead to antiplatelet or antithrombotic therapy being withheld, which may contribute to the risk of thrombotic complications. Of the patients who experienced bleeding in the Global Registry of Acute Coronary Events (GRACE) registry, there was higher in-hospital mortality in those who had their aspirin, thienopyridine or low-molecular-weight heparin ceased, compared with those in whom the medications were continued in spite of bleeding [40]. Furthermore,

blood transfusion after PCI may itself independently increase risk of 12-month mortality (RR=2.42, p=0.0045) amongst patients with severe bleeding [41].

In addition to carrying their own mortality risks, greater age and a higher proportion of co-morbidities may influence clinicians to treat residual CAD in these patients less aggressively. Results from the 'Get With the Guidelines' Program that included 37,633 ACS patients with a history of vascular disease found that these patients had a higher adjusted in-hospital mortality than those without a history of vascular disease, yet received less statins, ACE inhibitors and smoking cessation advice [42]. Our analysis suggests that patients with PVD are less often treated with medications that carry prognostic benefit (beta-blockers and ACE-inhibitors) and more often treated with those that portend a symptomatic benefit (nitrates and calcium channel blockers). The increased age and comorbidities among patients with PVD may also negatively impact their participation in exercise-based cardiac rehabilitation, which has been shown to improve medium and long-term mortality in patients after coronary revascularisation [43].

This study highlights the importance of identifying patients with PVD undergoing PCI. Asymptomatic PVD, as detected by non-invasive testing, is 3 to 4 times more common than symptomatic PVD [15]. In a substudy of the Bypass Angioplasty Revascularization (BARI) trial, asymptomatic PVD yielded the same increased mortality risk as symptomatic PVD amongst patients who underwent coronary revascularisation [9]. Seventy per cent of the patients with lower extremity arterial disease in that study would not have been identified without the use of ABI. Reflecting these findings, the 2005 ACCF/AHA guideline for the management of patients with peripheral artery disease was updated in 2011 to

include a class one recommendation for ankle-brachial index screening for all patients over 65 regardless of symptoms or risk factors [44]. The detection of PVD is important, as it can be a marker of other underlying comorbidities such as CAD and diabetes mellitus that may require intervention.

There were some limitations to this analysis. A registry-based observational study has inherent limitations with data collected prospectively but analysed retrospectively. The reliance on symptomatic reporting and historical evidence in identifying patients with PVD likely resulted in under-recognition of patients with the condition. Finally, patients with severe PVD may have been more likely to be treated medically, thus skewing the population of PVD patients included in our interventional registry.

6. Conclusion

PVD is an independent predictor of adverse outcomes following PCI in the contemporary setting. Further studies are warranted to elucidate the mechanisms responsible for this. The improvement in long-term outcomes seen with drug eluting-stent use was significantly greater for PVD patients than non-PVD patients, suggesting that operators should particularly preference the use of DES over BMS for this high-risk cohort.

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Figure Legend

Figure 1

Long-Term Kaplan-Meier Survival in patients; without Peripheral Vascular Disease (PVD) receiving Drug-eluting Stents (DES), without PVD receiving Bare-Metal Stents (BMS), with PVD receiving DES, and with PVD receiving BMS.

Table 1: Baseline characteristics

	PVD (N = 1,251)	No PVD (N = 17,129)	p value
Mean age – years	71.0 ± 10	64 ± 12	<0.001
Male gender	928 (74.2%)	12,956 (75.6%)	0.25
Medical history			
Diabetes mellitus	564 (45.1%)	3,998 (23.4%)	<0.001
Smoking (current)	244 (19.7%)	4,137 (24.3%)	<0.001
Chronic lung disease	219 (17.6%)	1,627 (9.5%)	<0.001
Hypertension	1,088 (87.0%)	11,206 (65.4%)	<0.001
Dyslipidaemia	1,076 (86.1%)	11,905 (69.6%)	<0.001
Family history of CAD	464 (37.9%)	6,596 (38.9%)	0.524
Cerebrovascular disease	282 (22.6%)	943 (5.5%)	<0.001
Heart failure	154 (12.32%)	557 (3.3%)	<0.001
Previous MI	608 (48.6%)	4,495 (26.3%)	<0.001
Previous PCI	441 (35.3%)	4,221 (24.65%)	<0.001
Previous CABG	311 (24.9%)	1,308 (7.6%)	<0.001
eGFR			<0.001
<30	163 (13.2%)	400 (2.4%)	
30-59	397 (32.2%)	3,273 (19.6%)	
>60	675 (54.7%)	13,065 (78.1%)	

Mean Baseline Serum Cr	140.8 ± 144.7	93.2 ± 66.3	<0.001
Mean BMI (kg/m^2)	27.8 (27.4-28.1)	28.4 (28.3-28.5)	<0.001
LVEF			
<30%	53 (5.0%)	350 (2.35%)	<0.001
30-45%	325 (30.8%)	3,384 (22.7%)	
>45%	677 (64.2%)	11,172 (75.0%)	
Indication for index PCI			
STEMI	217 (17.4%)	5,249 (30.7%)	<0.001
NSTEMI	413 (33.0%)	4,503 (26.3%)	
Unstable angina	127 (10.2%)	1,669 (9.8%)	
Non-ACS	493 (39.4%)	5,696 (33.3%)	
Out of hospital cardiac arrest	21 (1.7%)	437 (2.6%)	0.056
Cardiogenic shock	52 (4.2%)	550 (3.2%)	0.070
IABP	27 (2.2%)	422 (2.5%)	0.50
Medications			
Thrombolytics	22 (1.8%)	801 (4.7%)	<0.001
IIb/IIIa Blockade	263 (21.1%)	5,399 (31.5%)	<0.001
Heparin	1229 (98.2%)	16726 (97.7%)	0.21
LMWH	239 (19.1%)	3272 (19.1%)	0.99
Bivalirudin	13 (1.1%)	258 (1.6%)	0.15
Aspirin	1239 (99.0%)	16900 (98.7%)	0.28
Clopidogrel	1167 (93.4%)	15918 (93.0%)	0.55

Table 2. Angiographic characteristics

	PVD (N = 1,251)	No PVD (N = 17,129)	p value
Procedure status			
Elective	502 (40.3%)	5,866 (34.3%)	<0.001
Urgent	739 (59.1%)	10,985 (64.1%)	
Rescue	10 (0.8%)	278 (1.6%)	
Percutaneous entry location			<0.001
Femoral	1,079 (86.3%)	15,412 (90.0%)	
Radial	137 (11.0%)	1,671 (9.8%)	
Disease extent			<0.001
Single-vessel disease	293 (23.5%)	7,086 (41.6%)	
Multi-vessel disease	954 (76.5%)	9,963 (58.4%)	
Culprit vessel			
Left main coronary artery	51 (3.4%)	170 (0.8%)	<0.001
Proximal LAD	193 (12.7%)	3,302 (16.3%)	<0.001
LAD	415 (27.4%)	7,057 (34.8%)	<0.001
LCx	228 (15.1%)	2,668 (13.2%)	0.036
RCA	480 (31.7%)	6,496 (32.1%)	0.77
Grafts	145 (9.6%)	491 (2.4%)	<0.001
Type of coronary lesion			<0.001

De novo	1,362 (89.9%)	19,034 (93.9%)	
Restenosis (no prior stent)	9 (0.6%)	66 (0.3%)	
In stent restenosis	144 (9.5%)	1,165 (5.8%)	
Mean no of lesions treated/patient	1.2 ± 0.5	1.2 ± 0.4	0.02
Mean no. of stents deployed/procedure	1.2 ± 0.7	1.2 ± 0.6	0.90
Lesion type			
B2 and C	869 (57.4%)	10,960 (54.1%)	0.013
Mean stent diameter (mm%)	2.9 ± 0.5	2.9 ± 0.5	0.20
Mean stent length (mm%)	16.9 ± 5.3	17.3 ± 5.6	0.009
Bifurcation lesion	142 (9.4%)	2,197 (10.8%)	0.075
Ostial lesion	142 (9.4%)	1,368 (6.8%)	<0.001
Type of stent			
Balloon only	114 (9.1%)	1,066 (6.2%)	<0.001
Bare metal	595 (47.6%)	8,386 (49.0%)	
Drug eluting	542 (43.3%)	7,677 (44.8%)	
Procedural success rate	1357 (94.3%)	17,846 (95.9%)	0.004

Table 3. 30 Day Medication Use

	PVD (N = 1,090)	No PVD (N = 15, 601)	p value
Antiplatelet/Anticoagulant			
No AP and no AC	4 (0.4%)	34 (0.2%)	0.318
Aspirin only	52 (4.8%)	593 (3.8%)	0.108
Thienopyridine only	22 (2.0%)	193 (1.2%)	0.027
Aspirin and Thienopyridine	985 (89.6%)	14, 673 (93.2%)	<0.001
Anticoagulation only	6 (0.6%)	19 (0.1%)	<0.001
Single AP and AC	30 (2.8%)	213 (1.4%)	<0.001
Triple therapy	78 (7.2%)	813 (5.2%)	0.006
Statin	998 (91.6%)	14, 816 (94.7)	<0.001
Fibrate	24 (2.6%)	224 (1.8%)	0.070
Ezetimibe	100 (10.8%)	586 (4.6%)	<0.001
Beta Blocker	774 (71.3%)	12, 142 (77.9%)	<0.001
ACE inhibitor	599 (55.3%)	9, 942 (63.8%)	<0.001
ARB	287 (26.5%)	2, 722 (17.5%)	<0.001
Nitrate	200 (21.8%)	1, 056 (8.4%)	<0.001
Ca Channel Blocker	268 (29.1%)	1, 975 (15.7)	<0.001

Table 4. 12-Month Medication Use

	PVD (N = 966)	No PVD (N = 14, 696)	p value
Antiplatelet/Anticoagulant			
No AP and no AC	13 (1.4%)	167 (1.1%)	0.528
Aspirin only	231 (23.9%)	3, 890 (26.1%)	0.121
Thienopyridine only	39 (4.0%)	493 (3.3%)	0.230
Aspirin and Thienopyridine	619 (63.7%)	9, 785 (65.6%)	0.233
Anticoagulation only	14 (1.5%)	47(0.3%)	0.000
Single AP and AC	52 (5.4%)	520 (3.5%)	0.002
Triple therapy	34 (3.5%)	377 (2.5%)	0.006
Statin	882 (91.2%)	13, 828 (92.7)	0.079
Fibrate	25 (2.7%)	291 (2.1%)	0.211
Ezetimibe	114 (12.4%)	943 (6.8%)	<0.001
Beta Blocker	630 (65.8%)	10, 564 (71.3%)	<0.001
ACE inhibitor	490 (51.3%)	8, 718 (58.9%)	<0.001
ARB	276 (28.8%)	3, 154 (21.3%)	<0.001
Nitrate	153 (16.7%)	1, 160 (8.4%)	<0.001
Ca Channel Blocker	302 (33.2%)	2, 406 (17.5)	<0.001

Table 5. In-Hospital, 30-Day and 12-Month Clinical Outcomes

	PVD (N = 1,251)	No PVD (N = 17,129)	p value
In-Hospital			
MACE	71 (5.7%)	705 (4.1%)	0.008
Death	47 (3.8%)	357 (2.1%)	<0.001
New or recurrent MI	17 (1.4%)	199 (1.2%)	0.534
Repeat PCI	3 (0.2%)	108 (0.6%)	0.084
CABGs	10 (0.8%)	148 (0.9%)	0.806
New Renal Impairment	24 (1.9%)	196 (1.1%)	0.015
Bleeding event	47 (3.8%)	418 (2.4%)	0.004
Site of bleeding			0.698
Retroperitoneal	4 (8.7%)	24 (6%)	
Percutaneous entry site	16 (34.8%)	157 (39.4%)	
Other	26 (56.5%)	218 (54.6%)	
Vascular Complication			
Access Site Occlusion	0	6 (0.04%)	0.501
Loss of distal pulse	1 (0.1%)	17 (0.1%)	0.833
Peripheral Arterial Dissection	7 (0.6%)	29 (0.2%)	0.003
AV Fistula	1 (0.1%)	9 (0.1%)	0.688
Pseudoaneurysm	1 (0.1%)	56 (0.3%)	0.129

30-Days			
MACE	107 (8.6%)	996 (5.8%)	<0.001
Death	62 (5.0%)	416 (2.4%)	<0.001
Cardiac cause	48 (77.4%)	329 (79.3%)	0.737
Myocardial infarction	39 (3.12%)	339 (2.0%)	0.006
TVR	27 (2.2%)	418 (2.4%)	0.531
12-Months			
MACE	308 (24.6%)	2264 (13.2%)	<0.001
Death	153 (12.2%)	720 (4.2%)	<0.001
Cardiac cause	90 (58.8%)	431 (60.1%)	0.768
Myocardial infarction	123 (9.8%)	758 (4.4%)	<0.001
TVR	119 (9.5%)	1236 (7.2%)	0.003

Table 6. Predictors of 12-Month MACE

Variable	OR	95% CI	p value
PVD	1.35	1.14 – 1.60	<0.001
Age (per year)	1.01	1.00 – 1.01	<0.001
Diabetes	1.38	1.23 – 1.54	<0.001
PHx CABGs	1.47	1.15 – 1.89	0.002
Hypertension	1.29	1.14 – 1.44	<0.001
Reference vessel < 2.5mm	1.45	1.29 – 1.62	<0.001
LAD lesion	1.19	1.07 – 1.32	0.001
PHx MI	1.24	1.12 – 1.39	<0.001
B2/C lesion	1.52	1.37 – 1.69	<0.001
Ostial lesion	1.38	1.17 – 1.63	<0.001
eGFR			
<30	3.09	2.48 – 3.85	<0.001
30-59	1.21	1.08 – 1.37	0.002
LVEF			
<30%	2.61	2.05 – 3.32	<0.001
30-45%	1.44	1.29 – 1.60	<0.001
Cardiogenic shock	5.11	4.14 – 6.30	<0.001
Thrombolysis	0.68	0.52 – 0.88	0.003
DES	0.48	0.43 – 0.53	<0.001

Table 7. Predictors of 12-Month Mortality

Variable	OR	95% CI	p value
PVD	2.01	1.56 – 2.59	<0.001
Age	1.04	1.03 – 1.05	<0.001
MVD	1.29	1.06 – 1.58	0.013
Diabetes	1.44	1.19 – 1.75	<0.001
Urgent or Rescue PCI	2.23	1.72 – 2.88	<0.001
CLD	1.58	1.25 – 2.01	<0.001
Dyslipidaemia	0.67	0.55 – 0.81	<0.001
CD	1.40	1.07 – 1.84	0.014
DES	0.66	0.54 – 0.80	<0.001
B2/C lesion	1.39	1.14 – 1.69	0.001
eGFR			
<30	5.44	4.03 – 7.34	<0.001
30-59	1.85	1.51 – 2.26	<0.001
LVEF			
<30%	5.23	3.83 – 7.14	<0.001
30-45%	1.82	1.50 – 2.20	<0.001

Reference vessel < 2.5mm	1.35	1.10 – 1.65	0.003
Cardiogenic shock	9.18	7.14 – 11.80	<0.001
RCA lesion	0.70	0.57 – 0.86	0.001

Table 8. Baseline characteristics in PVD patients with BMS vs. DES

	PVD + BMS (N = 595)	**PVD + DES (N = 542)**	**p value**
Mean age – years	72 ± 11	70 ± 10	<0.001
Male gender	442 (74.3%)	402 (74.2%)	0.96
Medical history			
Diabetes mellitus	209 (35.1%)	294 (54.2%)	<0.001
Smoking (current)	112 (19.0%)	121 (22.5%)	0.134
Chronic lung disease	121 (20.4%)	83 (15.4%)	0.029
Hypertension	501 (84.3%)	486 (89.7%)	0.008
Dyslipidaemia	496 (83.4%)	479 (88.5%)	0.012
Family history of CAD	201 (34.5%)	218 (41.1%)	0.023
Cerebrovascular disease	139 (23.4%)	117 (21.6%)	0.465
Heart failure	71 (12.0%)	65 (12.0%)	0.984
Previous MI	258 (43.4%)	273 (50.4%)	0.018
Previous PCI	161 (27.1%)	221 (40.8%)	<0.001
Previous CABG	118 (19.8%)	149 (27.5%)	0.002

eGFR			0.060
<30	73 (12.5%)	71 (13.2%)	
30-59	207 (35.4%)	155 (28.8%)	
>60	305 (52.1%)	312 (58.0%)	
Mean Baseline Serum Cr	138.6 ± 135.8	138.3 ± 142.5	0.969
Mean BMI (kg/m^2)	27.3 (26.9 - 27.8)	28.2 (27.7 - 28.7)	0.009
LVEF			
<30%	25 (5.0%)	23 (4.9%)	0.437
30-45%	159 (32.1%)	132 (28.3%)	
>45%	312 (62.9%)	311 (66.7%)	
Indication for index PCI			
STEMI	145 (24.4%)	51 (9.4%)	<0.001
NSTEMI	183 (30.8%)	201 (37.1%)	
Unstable angina	51 (8.6%)	65 (12.0%)	
Non-ACS	215 (36.2%)	225 (41.5%)	
Out of hospital cardiac arrest	15 (2.5%)	3 (0.6%)	0.008
Cardiogenic shock	35 (5.9%)	10 (1.9%)	<0.001
IABP	19 (3.2%)	5 (0.9%)	0.008
Medications			
Thrombolytics	15(2.5%)	6(1.1%)	0.077
IIb/IIIa Blockade	139 (23.4%)	104 (19.3%)	0.096
Heparin	586(98.5%)	530(97.8%)	0.380

LMWH	120 (20.2%)	101 (18.7%)	0.524
Bivalirudin	9 (1.6%)	3 (0.6%)	0.116
Aspirin	590 (99.2%)	535 (98.7%)	0.457
Clopidogrel	573 (96.5%)	518 (95.8%)	0.533
Ticagrelor	10 (1.7%)	16 (3.0%)	0.408
Prasugrel	9 (1.5%)	12 (2.2%)	0.652

Table 9. Angiographic characteristics in PVD patients with BMS vs. DES

	PVD + BMS (N = 595)	PVD + DES (N = 542)	p value
Procedure status			
Elective	217 (36.5%)	232 (42.8%)	0.056
Urgent	375 (63.0%)	305 (56.3%)	
Rescue	3 (0.5%)	5 (0.9%)	
Percutaneous entry location			0.890
Femoral	512 (86.1%)	469 (86.5%)	
Radial	66 (11.1%)	60 (11.1%)	
Disease extent			0.040
Single-vessel disease	156 (26.3%)	114 (21.1%)	
Multi-vessel disease	437 (73.7%)	426 (78.9%)	
Culprit vessel			
Left main coronary artery	17 (2.5%)	28 (4.1%)	0.096
Proximal LAD	105 (15.4%)	72 (10.6%)	0.008
LAD	193 (28.3%)	188 (27.6%)	0.750
LCx	100 (14.7%)	110 (16.1%)	0.460
RCA	249 (36.6%)	186 (27.3%)	<0.001
Grafts	54 (7.9%)	79 (11.6%)	0.023
Type of coronary lesion			<0.001

De novo	665 (97.7%)	585 (85.8%)	
Restenosis (no prior stent)	3 (0.4%)	4 (0.6%)	
In stent restenosis	13 (1.9%)	93 (13.6%)	
Mean no of lesions treated/patient	1.2 ± 0.4	1.3 ± 0.5	0.046
Mean no. of stents deployed/procedure	1.3 ± 0.6	1.4 ± 0.6	<0.001
Lesion type			
B2 and C	355 (52.1%)	403 (59.1%)	0.010
Mean stent diameter (mm%)	3.1 ± 0.5	2.8 ± 0.4	<0.001
Mean stent length (mm%)	15.7 ± 4.3	18.1 ± 6.0	<0.001
Bifurcation lesion	48 (7.1%)	75 (11.0%)	0.011
Ostial lesion	51 (7.5%)	70 (10.3%)	0.072
Procedural success rate	644 (99.4%)	636 (98.0%)	0.028

Table 10. 30 Day Medication Use in PVD patients with BMS vs. DES

	PVD + BMS (N = 595)	PVD + DES (N = 542)	p value
Antiplatelet/Anticoagulant			
No AP and no AC	3 (0.6%)	0 (0.0%)	0.088
Aspirin only	25 (4.9%)	4 (0.8%)	<0.001
Thienopyridine only	10 (2.0%)	10 (2.0%)	0.939
Aspirin and Thienopyridine	457 (89.3%)	472 (95.2%)	<0.001
Anticoagulation only	4 (0.8%)	1 (0.2%)	0.191
Single AP and AC	13 (2.6%)	9 (1.8%)	0.434
Triple therapy	59 (11.6%)	13 (2.6%)	<0.001
Statin	461 (90.8%)	453 (91.9)	0.523
Fibrate	17 (3.9%)	7 (1.7%)	0.056
Ezetimibe	36 (8.2%)	50 (12.2%)	0.058
Beta Blocker	351 (69.6%)	356 (72.4%)	0.345
ACE inhibitor	271 (54.0%)	278 (56.5%)	0.424
ARB	130 (25.8%)	139 (28.3%)	0.372
Nitrate	97 (22.4%)	85 (20.7%)	0.556
Ca Channel Blocker	118 (27.3%)	120 (29.3)	0.529

Table 11. 12-Month Medication Use in PVD patients with BMS vs. DES

	PVD + BMS (N = 595)	PVD + DES (N = 542)	p value
Antiplatelet/Anticoagulant			
No AP and no AC	10 (2.3%)	2 (0.5%)	0.018
Aspirin only	146 (33.3%)	57 (12.7%)	<0.001
Thienopyridine only	13 (3.0%)	21 (4.7%)	0.183
Aspirin and Thienopyridine	226 (51.4%)	360 (79.8%)	<0.001
Anticoagulation only	7 (1.6%)	3 (0.7%)	0.191
Single AP and AC	37 (8.5%)	6 (1.3%)	<0.001
Triple therapy	22 (5.0%)	10 (2.2%)	0.026
Statin	398 (90.7%)	407 (90.9)	0.923
Fibrate	17 (4.0%)	8 (1.9%)	0.069
Ezetimibe	41 (9.7%)	58 (13.8%)	0.067
Beta Blocker	280 (64.5%)	298 (67.1%)	0.417
ACE inhibitor	217 (49.9%)	231 (52.3%)	0.481
ARB	126 (28.9%)	132 (29.9%)	0.754
Nitrate	67 (16.0%)	67 (16.0%)	1.000
Ca Channel Blocker	125 (29.9%)	149 (35.7)	0.077

Table 12. In-Hospital, 30-Day and 12-Month Outcomes in PVD patients with BMS vs. DES

	PVD + BMS (N = 595)	PVD + DES (N = 542)	p value
In-Hospital			
MACE	38 (6.4%)	15 (2.8%)	0.004
Death	25 (4.2%)	10 (1.9%)	0.022
New or recurrent MI	12 (2.0%)	1 (0.2%)	0.004
Repeat PCI	1 (0.2%)	2 (0.4%)	0.507
CABGs	4 (0.7%)	1 (0.2%)	0.215
New Renal Impairment	13 (2.2%)	6 (1.1%)	0.158
Bleeding event	22 (3.7%)	20 (3.7%)	0.995
Site of bleeding			0.721
Retroperitoneal	2 (9.5%)	2 (10.0%)	
Percutaneous entry site	6 (28.6%)	8 (40.0%)	
Other	13 (61.9%)	10 (50.0%)	
Vascular Complication			
Access Site Occlusion	0	0	-

Loss of distal pulse	0 (0.0%)	1 (0.2%)	0.295
Peripheral Arterial Dissection	4 (0.7%)	3 (0.6%)	0.158
AV Fistula	1 (0.2%)	0 (0.0%)	0.340
Pseudoaneurysm	0 (0.0%)	1 (0.2%)	0.295
30-Days			
MACE	60 (10.1%)	26 (4.8%)	0.001
Death	35 (5.9%)	14 (2.6%)	0.006
Cardiac cause	25 (71.4%)	11 (78.6%)	0.609
Myocardial infarction	25 (4.2%)	9 (1.7%)	0.012
TVR	13 (2.2%)	8 (1.5%)	0.375
12-Months			
MACE	157 (26.4%)	105 (19.4%)	0.005
Death	87 (14.6%)	46 (8.5%)	0.001
Cardiac cause	44 (50.6%)	30 (65.2%)	0.106
Myocardial infarction	61 (10.3%)	44 (8.1%)	0.214
TVR	51 (8.6%)	46 (8.5%)	0.959

Ramzy John (Orcid ID: 0000-0001-8910-3863)

OUTCOMES IN PATIENTS WITH PERIPHERAL VASCULAR DISEASE FOLLOWING PERCUTANEOUS CORONARY INTERVENTION

John Ramzy [a*], Nick Andrianopoulos [b], Louise Roberts [c,d], Stephen J Duffy, MBBS, PhD [b,e], David Clark [f], Andrew W Teh [c,d], Andrew Ajani [a], Christopher M Reid [b,g], Angela Brennan, RN [b], Melanie Freeman [c,d]

[a] *Department of Cardiology, The Royal Melbourne Hospital, Melbourne, Victoria, Australia*

[b] *Centre of Cardiovascular Research and Education in Therapeutics (CCRE), Department of Epidemiology and Preventative Medicine, Monash University, Melbourne, Victoria, Australia*

[c] *Department of Cardiology, Box Hill Hospital, Melbourne, Victoria, Australia*

[d] *Monash University Eastern Health Clinical School, Melbourne, Victoria, Australia*

[e] *Department of Cardiovascular Medicine, Alfred Hospital, Melbourne, Victoria, Australia*

[f] *Department of Cardiology, Austin Hospital, Melbourne, Victoria, Australia*

[g] *School of Public Health, Curtin University, Perth, Western Australia*

On behalf of the Melbourne Interventional Group (MIG)

* Corresponding Author: Dr John Ramzy, Alfred Heart Centre, 3rd Floor Philip Block, Alfred Hospital, 55 Commercial Rd, Melbourne 3004, AUSTRALIA. Telephone +61 423 246 960. E-mail Address: johnramzy@yahoo.com.au

This author takes responsibility for all aspects of the reliability and freedom from bias of the data presented and their discussed interpretation

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1. Abstract

Objectives: To evaluate the clinical characteristics and outcomes of patients with Peripheral Vascular Disease (PVD) undergoing Percutaneous Coronary Intervention (PCI) in a contemporary setting, and to determine whether use of drug-eluting stents (DES) improves outcomes.

Background: PVD was an independent risk factor for adverse outcomes following PCI in the bare-metal stent (BMS) era. It is not known whether outcomes in these patients have improved with advances in interventional techniques and stent technology, as they have for the general population.

Methods: 18,380 patients undergoing PCI from an Australian registry between 2005 and 2013 were studied. Clinical and procedural data, 30-day and 12-month outcomes were compared in those with and without a reported history of PVD. Outcomes were also compared between patients with PVD who received DES and those who received BMS. Long-term mortality was compared using Australian National Death Index linkage.

Results: Patients with PVD (n=1,251, 6.8%) were older and had more prevalent diabetes, hypertension, cerebrovascular disease, heart failure, renal impairment, ostial lesions, left main and multi-vessel disease ($p<0.001$). Patients with PVD had significantly higher rates of major adverse cardiovascular events (MACE) compared with those without PVD, in-hospital (5.7% vs. 4.1%, $p<0.008$), at 30-days (8.6% vs. 5.8%, $p<0.001$) and at 12-months (24.6% vs. 13.2%, $p<0.001$). At 4.9±2.6 years follow-up, there was significantly greater mortality in the PVD group. PVD patients who received DES experienced significantly less MACE than PVD patients treated with BMS at 30-days (4.8 vs. 10.1%, $p<0.001$) and 12-months (19.4 vs. 26.4%, $p<0.005$).

Conclusions: PVD is an independent predictor of adverse outcomes in patients undergoing PCI. PVD patient who received DES had improved outcomes compared with those receiving BMS.

2. Introduction

The incidence of lower extremity peripheral vascular disease (PVD) has grown by 23.5% in the first decade of this century. It now affects 3-12% of the world's population; around 202 million cases worldwide [1]. Patients with PVD have similar atherosclerotic risk profiles to those with coronary artery disease (CAD). In the Global Atherothrombosis Assessment (AGATHA) study, one in two patients with PVD had concomitant CAD, and one in five CAD patients had PVD [2]. Approximately 23% of patients with both PVD and CAD have undergone percutaneous coronary intervention (PCI) [3]. Amongst the overall population of patients undergoing PCI advanced stent technology and more aggressive adjunctive antiplatelet and anticoagulant therapy have resulted in an improvement in outcomes [4, 5]. However, there is evidence that this has not been the case for patients with PVD. Despite a reduction in the rate of repeat PCI, their risk of major adverse cardiovascular events outcomes following PCI has remained unchanged across the early bare-metal stent (BMS) and drug-eluting stent (DES) eras [6]. While PVD is recognized as an independent predictor of poor outcomes after PCI in the BMS era [7-15], there is a paucity of data within the DES era [16]. This study aimed to evaluate whether PVD is an independent predictor of adverse outcomes outcomes in patients undergoing PCI in a contemporary setting. Furthermore, we aimed to investigate whether patients with PVD represent a subgroup of patients who may derive particular benefit from the use of DES over BMS.

3. Methods

3.1 Patient Population

We analysed prospectively collected data from 18,380 consecutive patient procedures in the Melbourne Interventional Group (MIG) registry between 2005 and 2013. No procedures were excluded from the study. All procedures (n=18,380) were divided into two groups. Group one consisted of procedures on patients with a history of PVD (n=1,251) and group two consisted of procedures on patients without PVD (n=17,129). Clinical characteristics, procedural data medication use and in-hospital, 30-day and 12-month adverse outcomes (MACE, death, recurrent myocardial infarction and target vessel revascularisation) were compared between these two groups. We further divided the PVD group into those who had received DES (n=542) and those who received BMS (n=595) and compared 30-day and 12-month adverse outcomes between these two subgroups. Using National Death Index (NDI) linkage, long-term mortality (mean follow-up 4.9 ± 2.6 years) was compared between four subgroups: patients without PVD who received DES (n=7,653), patients without PVD who received BMS (n=8,376), patients with PVD who received DES (n=539) and patients with PVD who received BMS (n=594).

3.2 Definitions

Peripheral vascular disease was defined by either a history of chronic or acute occlusion or aneurysmal narrowing of the arterial lumen of the aorta or extremities and includes: claudication with exertion, extremity ischaemic rest pain, amputation for arterial insufficiency, documented aortic aneurysm, documented renal artery stenosis, positive

non-invasive testing (e.g. ankle brachial index less than 0.9) and vascular reconstruction, bypass surgery or percutaneous intervention to the extremities [17]. Patients were not screened for asymptomatic PVD.

3.3 Registry Design

The Melbourne Interventional Group is a collaboration between interventional cardiologists at six major hospitals in Victoria, Australia [18, 19]. The registry is coordinated by the Centre for Cardiovascular Research & Education in Therapeutics, a research body within the Department of Epidemiology and Preventative Medicine Monash University, Melbourne, Australia.

The ethics committee of each participating hospital has approved the registry and all participants gave informed consent using an 'opt-out' model. A free-call number that could be used to exclude one's self from the study was provided to patients. Clinical-quality registries have recommended this model [20], which is also used by other large Australian registries [21].

Investigators at each site recorded demographic, clinical and procedural characteristics of all patients undergoing PCI using a case-report form with standard definitions for all fields [19]. Regular independent audits conducted on 15 verifiable variables from 5% of MIG procedures have demonstrated 96.5% accuracy [22], similar to other large registries [23].

3.4 Procedural decisions

Taking into account guidelines and clinical factors, the choice between balloon-only angioplasty, PCI with BMS or PCI with DES was at the discretion of the treating clinician at each centre. In Australian public (government funded) hospitals, DES are currently recommended for patients with lesions at high risk of restenosis including; diabetics, lesions greater than 18 mm in length, vessels less than 2.5 mm in diameter, in-stent restenosis and bifurcation or ostial lesions [24]. Peri-procedural antiplatelet and anticoagulant use was generally guideline based, however was also ultimately decided by each patient's treating team.

3.5 Data Collection and Outcomes

In-hospital complications were logged at the time of discharge from the index admission. Thirty-day and 12-month follow-up were obtained by telephone contact with the patient, their next-of-kin or treating medical practitioner, and all events were verified by case record review. Long-term mortality was determined using the Australian National Death Index (NDI) linkage, the methodology of which has been previously described in detail [25]. Essentially, The Australian NDI is a database that uses information from the births, deaths and marriages registries of each Australian state to record all deaths nation-wide. Its purpose is to enable epidemiological research. Several demographic variables (name, date of birth, age at death, date of death, gender, state/territory of registration) were used to match deceased patients in the NDI with all patients in the MIG registry. The mean ± standard deviation NDI follow-up for patients in the MIG registry was 4.9 ± 2.6 years.

3.6 Statistical Analysis

Continuous variables are expressed as mean ± standard deviation and categorical as numbers/percentages. The Pearson chi-squared test was used to analyse differences in discrete variables relating to characteristics, procedural data and outcomes between groups. Student's t-test or Kruskal-Wallis equality-of-populations rank test was used for continuous variables as appropriate. The Kaplan-Meier method was used to construct survival curves and the differences in survival were assessed with the log-rank test. A p value of <0.05 was considered to indicate statistical significance. Thirty-five baseline clinical and procedural characteristics were considered in the identification of factors independently associated with outcomes at 12-month follow-up. Factors with p value <0.1 in simple logistic regression were considered for multiple logistic regression. Statistical analyses were carried out using Stata for Windows (Stata/MP 13.1, College Station, TX, USA).

4. Results

A total of 18,380 patient procedures were enrolled in the registry between 2005 and 2013. Of these, 1,251 patients (6.8%) had PVD and 17,129 (93.2%) did not have a history of PVD. DES were used in 44.7% of procedures overall.

4.1 Baseline Characteristics

Patients with PVD were older and had a significantly greater prevalence of cardiovascular risk factors including diabetes, hypertension, dyslipidaemia and a history of MI when compared to those without PVD (all p<0.001) (Table 1). They were also more likely to have a history of cerebrovascular disease, chronic pulmonary disease, heart failure, previous PCI and prior coronary artery bypass grafting (CABG) (all p<0.001). The PVD group underwent more procedures for elective and non-emergent acute coronary syndromes (ACS) while patients without PVD had a higher rate of PCI for ST-elevation MI (STEMI) (p<0.001) (Table 1). In keeping with the lower incidence of STEMI in this group, thrombolytics and IIb/IIIa antagonists were used less often in patients with PVD (p<0.001). However, despite the lower incidence of STEMI, the PVD group still had a significant number of patients presenting with out-of-hospital VF-arrest; they also had similar numbers of patients presenting with cardiogenic shock and requiring intra-aortic balloon pump use (Table 1). The proportion of males was similar in both groups (74.2% vs. 75.6%, p=0.25) There were more current smokers in the non-PVD group than the PVD group (24.3% vs. 19.7%, p<0.001) (Table 1). Comparison of medication use between the two groups (Tables 3 and 4) revealed a significantly greater proportion of non-PVD patients

were taking statins at 30-days, and beta-blockers and ACE inhibitors at 30-days and 12-months. Conversely, the use of ezetimibe, nitrates and calcium channel blockers was significantly higher amongst the PVD group. The PVD group were more often treated with anticoagulation in addition to single or dual-antiplatelet therapy than the non-PVD patients, who had significantly higher rates of dual-antiplatelet therapy alone.

4.2 Angiographic characteristics

The procedural success rate was lower in patients with PVD (94.3% vs. 95.9%, p<0.001). They were more likely to have multi-vessel and left main disease than those without PVD (76.5% vs. 58.4%, p<0.001 and 3.4% vs. 0.8%, p<0.001 respectively) (Table 2). There was a higher rate of in-stent restenosis amongst patients with PVD (9.5% vs. 5.8%, p<0.001) (Table 2). Complex lesions (ACC/AHA B2/C) and ostial lesions were more common amongst the PVD group (p=0.013 and p<0.001 respectively), while there was no significant difference in the number of bifurcation lesions (p=0.075) (Table 2). Both DES and BMS use was lower in patients with PVD who had more balloon only procedures than patients without PVD (p<0.001). Detailed angiographic data are shown in Table 2.

*4.3 In-Hospital, 30-Day and 12-Month Clinical Outcomes***.**

Patients with PVD experienced more in-hospital MACE (5.7% vs. 4.1%, p=0.008), driven by a significantly increased risk of death (3.8% vs. 2.1%, p<0.001) (Table 5). They also had higher rates of new renal impairment (1.9% vs. 1.1%, p=0.015), major bleeding (3.8% vs. 2.4%, p=0.004) and peri-procedural arterial dissection at the percutaneous access site (0.6% vs. 0.2%, p=0.003) (Table 5).

There was a higher rate of 30-day MACE amongst patients with PVD (8.6% vs. 5.8%, p<0.001). Death (5.0% vs. 2.4%, p<0.001) and new or recurrent MI (3.1% vs. 2.0%, p=0.006) occurred significantly more often in the PVD group, while the rate of target vessel revascularisation (TVR) was similar in the two groups (2.2% vs. 2.4%, p=0.53) (Table 5).

At 12 months, patients with PVD had higher rates of MACE (24.6% vs. 13.2%, p<0.001), death (12.2% vs. 4.2%, p<0.001), new or recurrent MI (9.8% vs. 4.4%, p<0.001) and TVR (9.5% vs. 7.2%, p=0.003) (Table 5).

Independent predictors of MACE at 12 months included PVD (OR 1.35, 95% CI: 1.14-1.60, p<0.001), cardiogenic shock (OR 5.11, 95% CI: 4.14-6.30, p<0.001) and eGFR<30 ml/min/1.73 m^2 (OR 3.09, 95% CI: 2.48-3.85, p<001) (Table 6). PVD was also independently associated with 12-month mortality (OR 2.01, 95% CI: 1.56-2.59, p<0.001), as were cardiogenic shock and eGFR<30 ml/min/1.73 m^2 (Table 7).

4.4 PVD and DES Use

Amongst those with PVD, 542 (43.3%) received BMS and 595 (47.6%) received DES with the remaining 114 (9.1%) patients undergoing balloon angioplasty alone. There was a significantly higher prevalence of diabetes amongst the PVD patients who received DES compared with those who received BMS (54.2% vs. 35.1%, p<0.001) (Table 8). PVD patients receiving BMS had a higher rate of STEMI as the indication for PCI (24.4% vs. 9.4%, p<0.001) while DES was used more often in NSTEMI, unstable angina and non-ACS presentations (Table 8). When compared to the PVD patients who received DES, a higher proportion of the PVD patients receiving BMS presented with out of hospital cardiac

arrest (2.5% vs. 0.6%, p<0.008) and cardiogenic shock (5.9% vs. 1.9%, p<0.001) (Table 8). More patients in the PVD and DES group had complex lesions (ACC/AHA classification type B2/C) treated compared to the PVD and BMS group (59.1% vs. 52.1%, p=0.01) (Table 9). As expected, the PVD patients who received DES had higher rates of DAPT use at 30 days and 12 months (95.2% vs. 89.3%, p<0.001 and 79.8% vs. 51.4%, p<0.001 respectively) (Tables 10 and 11).

Compared with PVD patients who received DES, patients who received BMS had a significantly higher incidence of in-hospital complications including; MACE (6.4% vs. 2.8%, p=0.004), death (4.2% vs. 1.9%, p=0.022) and new or recurrent MI (2.0% vs. 0.2%, p=0.004) (Table 12). At 30-days, patients with PVD who received DES had significantly less MACE (4.8% vs. 10.1%, p<0.001), death and MI than those who received BMS. However, the rates of TVR did not differ significantly between the two groups (1.5% vs. 2.2%, p=0.96) (Table 12).

At 12-months, there was a significantly lower incidence of MACE (19.4% vs. 26.4%, p=0.005) and death (8.5% vs. 14.6%, p<0.001) amongst patients treated with DES. However, there was no longer a difference in the rate of MI, and TVR continued to be similar (Table 12).

Over a mean follow-up period of 4.9 ± 2.6 years patients with PVD who received BMS had the highest mortality (38.4%) when compared to patients with PVD who received DES (29.1%) and those without PVD (15.3% and 12.0% with BMS and DES respectively, p<0.001) (Figure 1).

5. Discussion

This is one of the largest registries examining outcomes in patients with PVD following PCI in the DES era. This study has shown that patients with PVD have an increased risk of short-, medium- and long-term adverse outcomes following PCI. Furthermore, PVD is an independent predictor of adverse outcomes following PCI in the DES era, despite advances in stent technology and medical therapy. Finally, an important finding of this study is that patients with PVD who were treated with DES had lower rates of death and overall major adverse cardiac events than those who received BMS.

Several studies in the BMS era concluded that PVD was an independent predictor of adverse outcomes after PCI [7-11, 13-15, 26, 27]. Nikolsky *et al* examined 12-month outcomes in 10,440 consecutive patients undergoing PCI in the BMS era, 1,969 of whom had symptomatic lower extremity PVD. The PVD group had a significantly higher 12-month mortality rate (13.6% vs. 5.2%, $p<0.001$), and after multivariate analysis, PVD was independently associated with increased 12-month mortality (OR 1.71, 95% CI 1.42-2.07, $p<0.001$) [15]. Similarly, Singh *et al* found that, even after adjustment for concomitant risk factors, patients with PVD treated with PCI in the BMS era had an 84% relative-risk increase in in-hospital mortality and a 48% relative-risk increase in death at 3 year follow-up compared to patients without PVD [7]. Analysis of the Tirofiban and Reopro Give Similar Efficacy Outcome Trial (TARGET) showed that PVD was independently associated with a 2 to 3 fold increase in mortality 12 months after PCI [10]. Amongst patients undergoing PCI for MI, PVD was independently associated with a doubling of in-hospital

mortality, and the number of diseased vascular beds in patients with PVD was associated with a graded increase in the risk of adverse outcomes [26].

Similar to findings in the BMS era, our study suggests that PVD continues to be independently associated with roughly a two-fold increased risk of 12-month mortality post-PCI in the DES era.

This study also examined differences in outcomes between patients with PVD who received DES and those PVD patients receiving BMS. Interestingly, we found that patients with PVD who received DES had reduced short-, medium- and long-term MACE and mortality despite no difference in TVR. The difference in mortality was seen out to mean follow-up of 4.9 ± 2.6 years. In stent-restenosis and the need for TVR are greatest in the first year after stent insertion and this is when DES have been shown to be superior to BMS in reducing the need for TVR, but not mortality [28]. In the absence of a reduction in TVR, there is no clear explanation for the reduced short- and long-term MACE and mortality in our PVD patients who received DES compared to those who received BMS. However, in this cohort we found a significantly higher rate of PCI performed for in-stent restenosis in the PVD group. Our data suggests that outcomes for patients with PVD undergoing real world PCI could possibly be improved by greater use of drug-eluting stents over bare-metal stents in this particular group of patients.

Prior to our registry, only two other studies have compared outcomes between patients with PVD and those without PVD in the DES era [16, 29]. Midwall *et al* investigated outcomes amongst 173 patients with PVD and 2,282 patients without a history of PVD who

underwent PCI in the early-DES era [16]. The PVD group had significantly higher unadjusted rates of death than the non-PVD group in-hospital (1.8% vs. 0.1%, p=0.006), at 12-months (8.2 vs. 2.9, p=0.001) and 4-years (23.8% vs. 10.8%, p<0.001). However, after adjustment for differences in the patient's clinical and angiographic characteristics, PVD was no longer an independent predictor of mortality [16]. In contrast, our study found that PVD remained an independent predictor of adverse outcomes after multivariate adjustment. Of note, the study by Midwall *et al* had a smaller number of patients and may have been underpowered to detect a true mortality difference after multivariate adjustment. Additionally, the definition of PAD in Midwall's study allowed for the inclusion of patients without PAD of the aorta, renal arteries or extremities, but who had only carotid artery disease or a history of cerebrovascular accident. These patients were not included in our PVD cohort, all of whom had PVD involving the aorta, renal arteries or extremeties. There is some evidence that cerebrovascular disease may be a lesser risk factor for adverse outcomes after PCI than peripheral arterial disease [11, 14] hence their inclusion in the PVD cohort may have reduced the apparent overall increased risk amongst their PVD group.

More recently, an analysis of the Assessment of Dual AntiPlatelet Therapy with Drug Eluting Stents (ADAPT-DES) study was conducted to determine the relationship between PVD, platelet reactivity and subsequent adverse outcomes. There was a 10.2% prevalence of PVD amongst the 8,582 patients included in the analysis, all of whom received drug-eluting stents. In-line with our findings, PAD was found to be an independent predictor of MACE (adjusted HR 1.34, p=0.003), mortality, MI and bleeding at

two year follow-up. The increased risk amongst PVD patients was not mediated by heightened platelet reactivity (HPR), which affected both PVD and non-PVD patients similarly [29].

The increased rate of adverse outcomes observed in our PVD group may be related to their higher rate of periprocedural bleeding events (3.8% vs. 2.4%, p=0.004). Amongst the general population of patients undergoing PCI, periprocedural bleeding has been associated with a 3 to 10-fold increased risk of in-hospital and 30-day mortality [30-34] and a 2 to 4.5-fold increased risk of 12-month mortality [30, 34-37]. Bleeding has also been associated with a greater risk of myocardial infarction and stroke [30, 34]. Analysis of the Harmonizing Outcomes with Revascularization and Stents in Acute Myocardial Infarction (HORIZONS-AMI) trial found an increased risk of MACE and mortality that persisted out to 3 years post-PCI in STEMI patients who had an in-hospital major bleed [38]. Patients with vascular disease may be less able to control the systemic amplification of local clotting mechanisms triggered by bleeding because the counter regulatory pathways are primarily active within endothelial cells. This may predispose them to a hypercoagulable state following a bleeding event [39]. In addition, periprocedural bleeding may lead to antiplatelet or antithrombotic therapy being withheld, which may contribute to the risk of thrombotic complications. Of the patients who experienced bleeding in the Global Registry of Acute Coronary Events (GRACE) registry, there was higher in-hospital mortality in those who had their aspirin, thienopyridine or low-molecular-weight heparin ceased, compared with those in whom the medications were continued in spite of bleeding [40]. Furthermore,

blood transfusion after PCI may itself independently increase risk of 12-month mortality (RR=2.42, p=0.0045) amongst patients with severe bleeding [41].

In addition to carrying their own mortality risks, greater age and a higher proportion of co-morbidities may influence clinicians to treat residual CAD in these patients less aggressively. Results from the 'Get With the Guidelines' Program that included 37,633 ACS patients with a history of vascular disease found that these patients had a higher adjusted in-hospital mortality than those without a history of vascular disease, yet received less statins, ACE inhibitors and smoking cessation advice [42]. Our analysis suggests that patients with PVD are less often treated with medications that carry prognostic benefit (beta-blockers and ACE-inhibitors) and more often treated with those that portend a symptomatic benefit (nitrates and calcium channel blockers). The increased age and comorbidities among patients with PVD may also negatively impact their participation in exercise-based cardiac rehabilitation, which has been shown to improve medium and long-term mortality in patients after coronary revascularisation [43].

This study highlights the importance of identifying patients with PVD undergoing PCI. Asymptomatic PVD, as detected by non-invasive testing, is 3 to 4 times more common than symptomatic PVD [15]. In a substudy of the Bypass Angioplasty Revascularization (BARI) trial, asymptomatic PVD yielded the same increased mortality risk as symptomatic PVD amongst patients who underwent coronary revascularisation [9]. Seventy per cent of the patients with lower extremity arterial disease in that study would not have been identified without the use of ABI. Reflecting these findings, the 2005 ACCF/AHA guideline for the management of patients with peripheral artery disease was updated in 2011 to

include a class one recommendation for ankle-brachial index screening for all patients over 65 regardless of symptoms or risk factors [44]. The detection of PVD is important, as it can be a marker of other underlying comorbidities such as CAD and diabetes mellitus that may require intervention.

There were some limitations to this analysis. A registry-based observational study has inherent limitations with data collected prospectively but analysed retrospectively. The reliance on symptomatic reporting and historical evidence in identifying patients with PVD likely resulted in under-recognition of patients with the condition. Finally, patients with severe PVD may have been more likely to be treated medically, thus skewing the population of PVD patients included in our interventional registry.

6. Conclusion

PVD is an independent predictor of adverse outcomes following PCI in the contemporary setting. Further studies are warranted to elucidate the mechanisms responsible for this. The improvement in long-term outcomes seen with drug eluting-stent use was significantly greater for PVD patients than non-PVD patients, suggesting that operators should particularly preference the use of DES over BMS for this high-risk cohort.

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Figure Legend

Figure 1

Long-Term Kaplan-Meier Survival in patients; without Peripheral Vascular Disease (PVD) receiving Drug-eluting Stents (DES), without PVD receiving Bare-Metal Stents (BMS), with PVD receiving DES, and with PVD receiving BMS.

Table 1: Baseline characteristics

	PVD (N = 1,251)	No PVD (N = 17,129)	p value
Mean age – years	71.0 ± 10	64 ± 12	<0.001
Male gender	928 (74.2%)	12,956 (75.6%)	0.25
Medical history			
Diabetes mellitus	564 (45.1%)	3,998 (23.4%)	<0.001
Smoking (current)	244 (19.7%)	4,137 (24.3%)	<0.001
Chronic lung disease	219 (17.6%)	1,627 (9.5%)	<0.001
Hypertension	1,088 (87.0%)	11,206 (65.4%)	<0.001
Dyslipidaemia	1,076 (86.1%)	11,905 (69.6%)	<0.001
Family history of CAD	464 (37.9%)	6,596 (38.9%)	0.524
Cerebrovascular disease	282 (22.6%)	943 (5.5%)	<0.001
Heart failure	154 (12.32%)	557 (3.3%)	<0.001
Previous MI	608 (48.6%)	4,495 (26.3%)	<0.001
Previous PCI	441 (35.3%)	4,221 (24.65%)	<0.001
Previous CABG	311 (24.9%)	1,308 (7.6%)	<0.001
eGFR			<0.001
<30	163 (13.2%)	400 (2.4%)	
30-59	397 (32.2%)	3,273 (19.6%)	
>60	675 (54.7%)	13,065 (78.1%)	

Mean Baseline Serum Cr	140.8 ± 144.7	93.2 ± 66.3	<0.001
Mean BMI (kg/m^2)	27.8 (27.4-28.1)	28.4 (28.3-28.5)	<0.001
LVEF			
<30%	53 (5.0%)	350 (2.35%)	<0.001
30-45%	325 (30.8%)	3,384 (22.7%)	
>45%	677 (64.2%)	11,172 (75.0%)	
Indication for index PCI			
STEMI	217 (17.4%)	5,249 (30.7%)	<0.001
NSTEMI	413 (33.0%)	4,503 (26.3%)	
Unstable angina	127 (10.2%)	1,669 (9.8%)	
Non-ACS	493 (39.4%)	5,696 (33.3%)	
Out of hospital cardiac arrest	21 (1.7%)	437 (2.6%)	0.056
Cardiogenic shock	52 (4.2%)	550 (3.2%)	0.070
IABP	27 (2.2%)	422 (2.5%)	0.50
Medications			
Thrombolytics	22 (1.8%)	801 (4.7%)	<0.001
IIb/IIIa Blockade	263 (21.1%)	5,399 (31.5%)	<0.001
Heparin	1229 (98.2%)	16726 (97.7%)	0.21
LMWH	239 (19.1%)	3272 (19.1%)	0.99
Bivalirudin	13 (1.1%)	258 (1.6%)	0.15
Aspirin	1239 (99.0%)	16900 (98.7%)	0.28
Clopidogrel	1167 (93.4%)	15918 (93.0%)	0.55

Table 2. Angiographic characteristics

	PVD (N = 1,251)	No PVD (N = 17,129)	p value
Procedure status			
Elective	502 (40.3%)	5,866 (34.3%)	<0.001
Urgent	739 (59.1%)	10,985 (64.1%)	
Rescue	10 (0.8%)	278 (1.6%)	
Percutaneous entry location			<0.001
Femoral	1,079 (86.3%)	15,412 (90.0%)	
Radial	137 (11.0%)	1,671 (9.8%)	
Disease extent			<0.001
Single-vessel disease	293 (23.5%)	7,086 (41.6%)	
Multi-vessel disease	954 (76.5%)	9,963 (58.4%)	
Culprit vessel			
Left main coronary artery	51 (3.4%)	170 (0.8%)	<0.001
Proximal LAD	193 (12.7%)	3,302 (16.3%)	<0.001
LAD	415 (27.4%)	7,057 (34.8%)	<0.001
LCx	228 (15.1%)	2,668 (13.2%)	0.036
RCA	480 (31.7%)	6,496 (32.1%)	0.77
Grafts	145 (9.6%)	491 (2.4%)	<0.001
Type of coronary lesion			<0.001

De novo	1,362 (89.9%)	19,034 (93.9%)	
Restenosis (no prior stent)	9 (0.6%)	66 (0.3%)	
In stent restenosis	144 (9.5%)	1,165 (5.8%)	
Mean no of lesions treated/patient	1.2 ± 0.5	1.2 ± 0.4	0.02
Mean no. of stents deployed/procedure	1.2 ± 0.7	1.2 ± 0.6	0.90
Lesion type			
B2 and C	869 (57.4%)	10,960 (54.1%)	0.013
Mean stent diameter (mm%)	2.9 ± 0.5	2.9 ± 0.5	0.20
Mean stent length (mm%)	16.9 ± 5.3	17.3 ± 5.6	0.009
Bifurcation lesion	142 (9.4%)	2,197 (10.8%)	0.075
Ostial lesion	142 (9.4%)	1,368 (6.8%)	<0.001
Type of stent			
Balloon only	114 (9.1%)	1,066 (6.2%)	<0.001
Bare metal	595 (47.6%)	8,386 (49.0%)	
Drug eluting	542 (43.3%)	7,677 (44.8%)	
Procedural success rate	1357 (94.3%)	17,846 (95.9%)	0.004

Table 3. 30 Day Medication Use

	PVD (N = 1,090)	No PVD (N = 15, 601)	p value
Antiplatelet/Anticoagulant			
No AP and no AC	4 (0.4%)	34 (0.2%)	0.318
Aspirin only	52 (4.8%)	593 (3.8%)	0.108
Thienopyridine only	22 (2.0%)	193 (1.2%)	0.027
Aspirin and Thienopyridine	985 (89.6%)	14, 673 (93.2%)	<0.001
Anticoagulation only	6 (0.6%)	19 (0.1%)	<0.001
Single AP and AC	30 (2.8%)	213 (1.4%)	<0.001
Triple therapy	78 (7.2%)	813 (5.2%)	0.006
Statin	998 (91.6%)	14, 816 (94.7)	<0.001
Fibrate	24 (2.6%)	224 (1.8%)	0.070
Ezetimibe	100 (10.8%)	586 (4.6%)	<0.001
Beta Blocker	774 (71.3%)	12, 142 (77.9%)	<0.001
ACE inhibitor	599 (55.3%)	9, 942 (63.8%)	<0.001
ARB	287 (26.5%)	2, 722 (17.5%)	<0.001
Nitrate	200 (21.8%)	1, 056 (8.4%)	<0.001
Ca Channel Blocker	268 (29.1%)	1, 975 (15.7)	<0.001

Table 4. 12-Month Medication Use

	PVD (N = 966)	No PVD (N = 14, 696)	p value
Antiplatelet/Anticoagulant			
No AP and no AC	13 (1.4%)	167 (1.1%)	0.528
Aspirin only	231 (23.9%)	3, 890 (26.1%)	0.121
Thienopyridine only	39 (4.0%)	493 (3.3%)	0.230
Aspirin and Thienopyridine	619 (63.7%)	9, 785 (65.6%)	0.233
Anticoagulation only	14 (1.5%)	47(0.3%)	0.000
Single AP and AC	52 (5.4%)	520 (3.5%)	0.002
Triple therapy	34 (3.5%)	377 (2.5%)	0.006
Statin	882 (91.2%)	13, 828 (92.7)	0.079
Fibrate	25 (2.7%)	291 (2.1%)	0.211
Ezetimibe	114 (12.4%)	943 (6.8%)	<0.001
Beta Blocker	630 (65.8%)	10, 564 (71.3%)	<0.001
ACE inhibitor	490 (51.3%)	8, 718 (58.9%)	<0.001
ARB	276 (28.8%)	3, 154 (21.3%)	<0.001
Nitrate	153 (16.7%)	1, 160 (8.4%)	<0.001
Ca Channel Blocker	302 (33.2%)	2, 406 (17.5)	<0.001

Table 5. In-Hospital, 30-Day and 12-Month Clinical Outcomes

	PVD (N = 1,251)	No PVD (N = 17,129)	p value
In-Hospital			
MACE	71 (5.7%)	705 (4.1%)	0.008
Death	47 (3.8%)	357 (2.1%)	<0.001
New or recurrent MI	17 (1.4%)	199 (1.2%)	0.534
Repeat PCI	3 (0.2%)	108 (0.6%)	0.084
CABGs	10 (0.8%)	148 (0.9%)	0.806
New Renal Impairment	24 (1.9%)	196 (1.1%)	0.015
Bleeding event	47 (3.8%)	418 (2.4%)	0.004
Site of bleeding			0.698
Retroperitoneal	4 (8.7%)	24 (6%)	
Percutaneous entry site	16 (34.8%)	157 (39.4%)	
Other	26 (56.5%)	218 (54.6%)	
Vascular Complication			
Access Site Occlusion	0	6 (0.04%)	0.501
Loss of distal pulse	1 (0.1%)	17 (0.1%)	0.833
Peripheral Arterial Dissection	7 (0.6%)	29 (0.2%)	0.003
AV Fistula	1 (0.1%)	9 (0.1%)	0.688
Pseudoaneurysm	1 (0.1%)	56 (0.3%)	0.129

30-Days			
MACE	107 (8.6%)	996 (5.8%)	<0.001
Death	62 (5.0%)	416 (2.4%)	<0.001
Cardiac cause	48 (77.4%)	329 (79.3%)	0.737
Myocardial infarction	39 (3.12%)	339 (2.0%)	0.006
TVR	27 (2.2%)	418 (2.4%)	0.531
12-Months			
MACE	308 (24.6%)	2264 (13.2%)	<0.001
Death	153 (12.2%)	720 (4.2%)	<0.001
Cardiac cause	90 (58.8%)	431 (60.1%)	0.768
Myocardial infarction	123 (9.8%)	758 (4.4%)	<0.001
TVR	119 (9.5%)	1236 (7.2%)	0.003

Table 6. Predictors of 12-Month MACE

Variable	OR	95% CI	p value
PVD	1.35	1.14 – 1.60	<0.001
Age (per year)	1.01	1.00 – 1.01	<0.001
Diabetes	1.38	1.23 – 1.54	<0.001
PHx CABGs	1.47	1.15 – 1.89	0.002
Hypertension	1.29	1.14 – 1.44	<0.001
Reference vessel < 2.5mm	1.45	1.29 – 1.62	<0.001
LAD lesion	1.19	1.07 – 1.32	0.001
PHx MI	1.24	1.12 – 1.39	<0.001
B2/C lesion	1.52	1.37 – 1.69	<0.001
Ostial lesion	1.38	1.17 – 1.63	<0.001
eGFR			
<30	3.09	2.48 – 3.85	<0.001
30-59	1.21	1.08 – 1.37	0.002
LVEF			
<30%	2.61	2.05 – 3.32	<0.001
30-45%	1.44	1.29 – 1.60	<0.001
Cardiogenic shock	5.11	4.14 – 6.30	<0.001
Thrombolysis	0.68	0.52 – 0.88	0.003
DES	0.48	0.43 – 0.53	<0.001

Table 7. Predictors of 12-Month Mortality

Variable	OR	95% CI	p value
PVD	2.01	1.56 – 2.59	<0.001
Age	1.04	1.03 – 1.05	<0.001
MVD	1.29	1.06 – 1.58	0.013
Diabetes	1.44	1.19 – 1.75	<0.001
Urgent or Rescue PCI	2.23	1.72 – 2.88	<0.001
CLD	1.58	1.25 – 2.01	<0.001
Dyslipidaemia	0.67	0.55 – 0.81	<0.001
CD	1.40	1.07 – 1.84	0.014
DES	0.66	0.54 – 0.80	<0.001
B2/C lesion	1.39	1.14 – 1.69	0.001
eGFR			
<30	5.44	4.03 – 7.34	<0.001
30-59	1.85	1.51 – 2.26	<0.001
LVEF			
<30%	5.23	3.83 – 7.14	<0.001
30-45%	1.82	1.50 – 2.20	<0.001

Reference vessel < 2.5mm	1.35	1.10 – 1.65	0.003
Cardiogenic shock	9.18	7.14 – 11.80	<0.001
RCA lesion	0.70	0.57 – 0.86	0.001

Table 8. Baseline characteristics in PVD patients with BMS vs. DES

	PVD + BMS (N = 595)	**PVD + DES (N = 542)**	**p value**
Mean age – years	72 ± 11	70 ± 10	<0.001
Male gender	442 (74.3%)	402 (74.2%)	0.96
Medical history			
Diabetes mellitus	209 (35.1%)	294 (54.2%)	<0.001
Smoking (current)	112 (19.0%)	121 (22.5%)	0.134
Chronic lung disease	121 (20.4%)	83 (15.4%)	0.029
Hypertension	501 (84.3%)	486 (89.7%)	0.008
Dyslipidaemia	496 (83.4%)	479 (88.5%)	0.012
Family history of CAD	201 (34.5%)	218 (41.1%)	0.023
Cerebrovascular disease	139 (23.4%)	117 (21.6%)	0.465
Heart failure	71 (12.0%)	65 (12.0%)	0.984
Previous MI	258 (43.4%)	273 (50.4%)	0.018
Previous PCI	161 (27.1%)	221 (40.8%)	<0.001
Previous CABG	118 (19.8%)	149 (27.5%)	0.002

eGFR			0.060
<30	73 (12.5%)	71 (13.2%)	
30-59	207 (35.4%)	155 (28.8%)	
>60	305 (52.1%)	312 (58.0%)	
Mean Baseline Serum Cr	138.6 ± 135.8	138.3 ± 142.5	0.969
Mean BMI (kg/m^2)	27.3 (26.9 - 27.8)	28.2 (27.7 - 28.7)	0.009
LVEF			
<30%	25 (5.0%)	23 (4.9%)	0.437
30-45%	159 (32.1%)	132 (28.3%)	
>45%	312 (62.9%)	311 (66.7%)	
Indication for index PCI			
STEMI	145 (24.4%)	51 (9.4%)	<0.001
NSTEMI	183 (30.8%)	201 (37.1%)	
Unstable angina	51 (8.6%)	65 (12.0%)	
Non-ACS	215 (36.2%)	225 (41.5%)	
Out of hospital cardiac arrest	15 (2.5%)	3 (0.6%)	0.008
Cardiogenic shock	35 (5.9%)	10 (1.9%)	<0.001
IABP	19 (3.2%)	5 (0.9%)	0.008
Medications			
Thrombolytics	15(2.5%)	6(1.1%)	0.077
IIb/IIIa Blockade	139 (23.4%)	104 (19.3%)	0.096
Heparin	586(98.5%)	530(97.8%)	0.380

LMWH	120 (20.2%)	101 (18.7%)	0.524
Bivalirudin	9 (1.6%)	3 (0.6%)	0.116
Aspirin	590 (99.2%)	535 (98.7%)	0.457
Clopidogrel	573 (96.5%)	518 (95.8%)	0.533
Ticagrelor	10 (1.7%)	16 (3.0%)	0.408
Prasugrel	9 (1.5%)	12 (2.2%)	0.652

Table 9. Angiographic characteristics in PVD patients with BMS vs. DES

	PVD + BMS (N = 595)	PVD + DES (N = 542)	p value
Procedure status			
Elective	217 (36.5%)	232 (42.8%)	0.056
Urgent	375 (63.0%)	305 (56.3%)	
Rescue	3 (0.5%)	5 (0.9%)	
Percutaneous entry location			0.890
Femoral	512 (86.1%)	469 (86.5%)	
Radial	66 (11.1%)	60 (11.1%)	
Disease extent			0.040
Single-vessel disease	156 (26.3%)	114 (21.1%)	
Multi-vessel disease	437 (73.7%)	426 (78.9%)	
Culprit vessel			
Left main coronary artery	17 (2.5%)	28 (4.1%)	0.096
Proximal LAD	105 (15.4%)	72 (10.6%)	0.008
LAD	193 (28.3%)	188 (27.6%)	0.750
LCx	100 (14.7%)	110 (16.1%)	0.460
RCA	249 (36.6%)	186 (27.3%)	<0.001
Grafts	54 (7.9%)	79 (11.6%)	0.023
Type of coronary lesion			<0.001

De novo	665 (97.7%)	585 (85.8%)	
Restenosis (no prior stent)	3 (0.4%)	4 (0.6%)	
In stent restenosis	13 (1.9%)	93 (13.6%)	
Mean no of lesions treated/patient	1.2 ± 0.4	1.3 ± 0.5	0.046
Mean no. of stents deployed/procedure	1.3 ± 0.6	1.4 ± 0.6	<0.001
Lesion type			
B2 and C	355 (52.1%)	403 (59.1%)	0.010
Mean stent diameter (mm%)	3.1 ± 0.5	2.8 ± 0.4	<0.001
Mean stent length (mm%)	15.7 ± 4.3	18.1 ± 6.0	<0.001
Bifurcation lesion	48 (7.1%)	75 (11.0%)	0.011
Ostial lesion	51 (7.5%)	70 (10.3%)	0.072
Procedural success rate	644 (99.4%)	636 (98.0%)	0.028

Table 10. 30 Day Medication Use in PVD patients with BMS vs. DES

	PVD + BMS (N = 595)	PVD + DES (N = 542)	p value
Antiplatelet/Anticoagulant			
No AP and no AC	3 (0.6%)	0 (0.0%)	0.088
Aspirin only	25 (4.9%)	4 (0.8%)	<0.001
Thienopyridine only	10 (2.0%)	10 (2.0%)	0.939
Aspirin and Thienopyridine	457 (89.3%)	472 (95.2%)	<0.001
Anticoagulation only	4 (0.8%)	1 (0.2%)	0.191
Single AP and AC	13 (2.6%)	9 (1.8%)	0.434
Triple therapy	59 (11.6%)	13 (2.6%)	<0.001
Statin	461 (90.8%)	453 (91.9)	0.523
Fibrate	17 (3.9%)	7 (1.7%)	0.056
Ezetimibe	36 (8.2%)	50 (12.2%)	0.058
Beta Blocker	351 (69.6%)	356 (72.4%)	0.345
ACE inhibitor	271 (54.0%)	278 (56.5%)	0.424
ARB	130 (25.8%)	139 (28.3%)	0.372
Nitrate	97 (22.4%)	85 (20.7%)	0.556
Ca Channel Blocker	118 (27.3%)	120 (29.3)	0.529

Table 11. 12-Month Medication Use in PVD patients with BMS vs. DES

	PVD + BMS (N = 595)	PVD + DES (N = 542)	p value
Antiplatelet/Anticoagulant			
No AP and no AC	10 (2.3%)	2 (0.5%)	0.018
Aspirin only	146 (33.3%)	57 (12.7%)	<0.001
Thienopyridine only	13 (3.0%)	21 (4.7%)	0.183
Aspirin and Thienopyridine	226 (51.4%)	360 (79.8%)	<0.001
Anticoagulation only	7 (1.6%)	3 (0.7%)	0.191
Single AP and AC	37 (8.5%)	6 (1.3%)	<0.001
Triple therapy	22 (5.0%)	10 (2.2%)	0.026
Statin	398 (90.7%)	407 (90.9)	0.923
Fibrate	17 (4.0%)	8 (1.9%)	0.069
Ezetimibe	41 (9.7%)	58 (13.8%)	0.067
Beta Blocker	280 (64.5%)	298 (67.1%)	0.417
ACE inhibitor	217 (49.9%)	231 (52.3%)	0.481
ARB	126 (28.9%)	132 (29.9%)	0.754
Nitrate	67 (16.0%)	67 (16.0%)	1.000
Ca Channel Blocker	125 (29.9%)	149 (35.7)	0.077

Table 12. In-Hospital, 30-Day and 12-Month Outcomes in PVD patients with BMS vs. DES

	PVD + BMS (N = 595)	PVD + DES (N = 542)	p value
In-Hospital			
MACE	38 (6.4%)	15 (2.8%)	0.004
Death	25 (4.2%)	10 (1.9%)	0.022
New or recurrent MI	12 (2.0%)	1 (0.2%)	0.004
Repeat PCI	1 (0.2%)	2 (0.4%)	0.507
CABGs	4 (0.7%)	1 (0.2%)	0.215
New Renal Impairment	13 (2.2%)	6 (1.1%)	0.158
Bleeding event	22 (3.7%)	20 (3.7%)	0.995
Site of bleeding			0.721
Retroperitoneal	2 (9.5%)	2 (10.0%)	
Percutaneous entry site	6 (28.6%)	8 (40.0%)	
Other	13 (61.9%)	10 (50.0%)	
Vascular Complication			
Access Site Occlusion	0	0	-

Loss of distal pulse	0 (0.0%)	1 (0.2%)	0.295
Peripheral Arterial Dissection	4 (0.7%)	3 (0.6%)	0.158
AV Fistula	1 (0.2%)	0 (0.0%)	0.340
Pseudoaneurysm	0 (0.0%)	1 (0.2%)	0.295
30-Days			
MACE	60 (10.1%)	26 (4.8%)	0.001
Death	35 (5.9%)	14 (2.6%)	0.006
Cardiac cause	25 (71.4%)	11 (78.6%)	0.609
Myocardial infarction	25 (4.2%)	9 (1.7%)	0.012
TVR	13 (2.2%)	8 (1.5%)	0.375
12-Months			
MACE	157 (26.4%)	105 (19.4%)	0.005
Death	87 (14.6%)	46 (8.5%)	0.001
Cardiac cause	44 (50.6%)	30 (65.2%)	0.106
Myocardial infarction	61 (10.3%)	44 (8.1%)	0.214
TVR	51 (8.6%)	46 (8.5%)	0.959

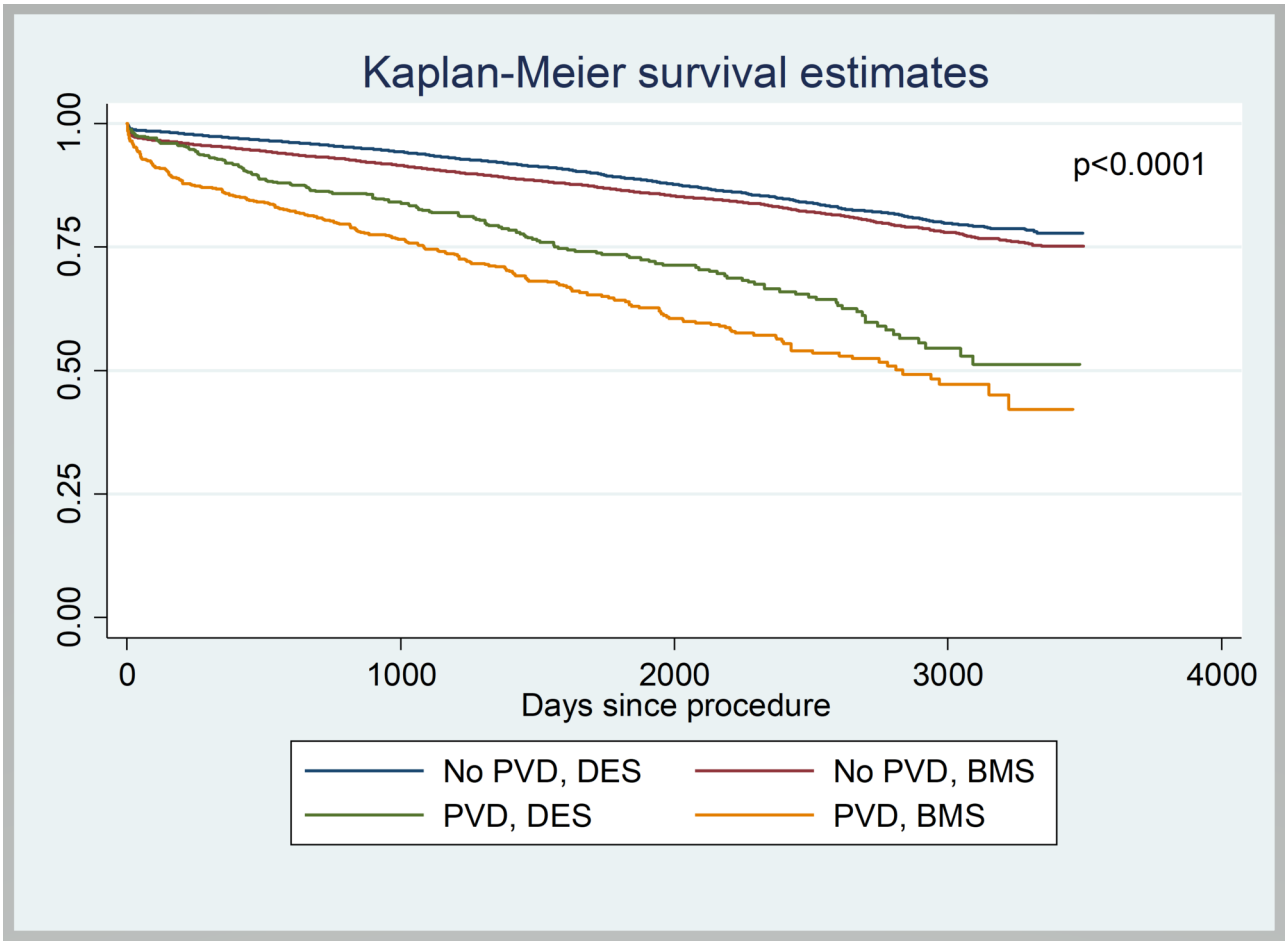

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Table 1: Baseline characteristics

	PVD (N = 1,251)	No PVD (N = 17,129)	p value
Mean age – years	71.0 ± 10	64 ± 12	<0.001
Male gender	928 (74.2%)	12,956 (75.6%)	0.25
Medical history			
Diabetes mellitus	564 (45.1%)	3,998 (23.4%)	<0.001
Smoking (current)	244 (19.7%)	4,137 (24.3%)	<0.001
Chronic lung disease	219 (17.6%)	1,627 (9.5%)	<0.001
Hypertension	1,088 (87.0%)	11,206 (65.4%)	<0.001
Dyslipidaemia	1,076 (86.1%)	11,905 (69.6%)	<0.001
Family history of CAD	464 (37.9%)	6,596 (38.9%)	0.524
Cerebrovascular disease	282 (22.6%)	943 (5.5%)	<0.001
Heart failure	154 (12.32%)	557 (3.3%)	<0.001
Previous MI	608 (48.6%)	4,495 (26.3%)	<0.001
Previous PCI	441 (35.3%)	4,221 (24.65%)	<0.001
Previous CABG	311 (24.9%)	1,308 (7.6%)	<0.001
eGFR			<0.001
<30	163 (13.2%)	400 (2.4%)	
30-59	397 (32.2%)	3,273 (19.6%)	
>60	675 (54.7%)	13,065 (78.1%)	
Mean Baseline Serum Cr	140.8 ± 144.7	93.2 ± 66.3	<0.001
Mean BMI (kg/m^2)	27.8 (27.4-28.1)	28.4 (28.3-28.5)	<0.001
LVEF			
<30%	53 (5.0%)	350 (2.35%)	<0.001

30-45%	325 (30.8%)	3,384 (22.7%)	
>45%	677 (64.2%)	11,172 (75.0%)	
Indication for index PCI			
STEMI	217 (17.4%)	5,249 (30.7%)	<0.001
NSTEMI	413 (33.0%)	4,503 (26.3%)	
Unstable angina	127 (10.2%)	1,669 (9.8%)	
Non-ACS	493 (39.4%)	5,696 (33.3%)	
Out of hospital cardiac arrest	21 (1.7%)	437 (2.6%)	0.056
Cardiogenic shock	52 (4.2%)	550 (3.2%)	0.070
IABP	27 (2.2%)	422 (2.5%)	0.50
Medications			
Thrombolytics	22 (1.8%)	801 (4.7%)	<0.001
IIb/IIIa Blockade	263 (21.1%)	5,399 (31.5%)	<0.001
Heparin	1229 (98.2%)	16726 (97.7%)	0.21
LMWH	239 (19.1%)	3272 (19.1%)	0.99
Bivalirudin	13 (1.1%)	258 (1.6%)	0.15
Aspirin	1239 (99.0%)	16900 (98.7%)	0.28
Clopidogrel	1167 (93.4%)	15918 (93.0%)	0.55

Table 2. Angiographic characteristics

	PVD (N = 1,251)	No PVD (N = 17,129)	p value
Procedure status			
Elective	502 (40.3%)	5,866 (34.3%)	<0.001
Urgent	739 (59.1%)	10,985 (64.1%)	
Rescue	10 (0.8%)	278 (1.6%)	
Percutaneous entry location			<0.001
Femoral	1,079 (86.3%)	15,412 (90.0%)	
Radial	137 (11.0%)	1,671 (9.8%)	
Disease extent			<0.001
Single-vessel disease	293 (23.5%)	7,086 (41.6%)	
Multi-vessel disease	954 (76.5%)	9,963 (58.4%)	
Culprit vessel			
Left main coronary artery	51 (3.4%)	170 (0.8%)	<0.001
Proximal LAD	193 (12.7%)	3,302 (16.3%)	<0.001
LAD	415 (27.4%)	7,057 (34.8%)	<0.001
LCx	228 (15.1%)	2,668 (13.2%)	0.036
RCA	480 (31.7%)	6,496 (32.1%)	0.77
Grafts	145 (9.6%)	491 (2.4%)	<0.001
Type of coronary lesion			
De novo	1,362 (89.9%)	19,034 (93.9%)	<0.001
Restenosis (no prior stent)	9 (0.6%)	66 (0.3%)	
In stent restenosis	144 (9.5%)	1,165 (5.8%)	
Mean no of lesions	1.2 ± 0.5	1.2 ± 0.4	0.02

treated/patient			
Mean no. of stents deployed/procedure	1.2 ± 0.7	1.2 ± 0.6	0.90
Lesion type			
B2 and C	869 (57.4%)	10,960 (54.1%)	0.013
Mean stent diameter (mm%)	2.9 ± 0.5	2.9 ± 0.5	0.20
Mean stent length (mm%)	16.9 ± 5.3	17.3 ± 5.6	0.009
Bifurcation lesion	142 (9.4%)	2,197 (10.8%)	0.075
Ostial lesion	142 (9.4%)	1,368 (6.8%)	<0.001
Type of stent			
Balloon only	114 (9.1%)	1,066 (6.2%)	<0.001
Bare metal	595 (47.6%)	8,386 (49.0%)	
Drug eluting	542 (43.3%)	7,677 (44.8%)	
Procedural success rate	1357 (94.3%)	17,846 (95.9%)	0.004

Table 3. 30 Day Medication Use

	PVD (N = 1,090)	No PVD (N = 15, 601)	p value
Antiplatelet/Anticoagulant			
No AP and no AC	4 (0.4%)	34 (0.2%)	0.318
Aspirin only	52 (4.8%)	593 (3.8%)	0.108
Thienopyridine only	22 (2.0%)	193 (1.2%)	0.027
Aspirin and Thienopyridine	985 (89.6%)	14, 673 (93.2%)	<0.001
Anticoagulation only	6 (0.6%)	19 (0.1%)	<0.001
Single AP and AC	30 (2.8%)	213 (1.4%)	<0.001
Triple therapy	78 (7.2%)	813 (5.2%)	0.006
Statin	998 (91.6%)	14, 816 (94.7)	<0.001
Fibrate	24 (2.6%)	224 (1.8%)	0.070
Ezetimibe	100 (10.8%)	586 (4.6%)	<0.001
Beta Blocker	774 (71.3%)	12, 142 (77.9%)	<0.001
ACE inhibitor	599 (55.3%)	9, 942 (63.8%)	<0.001
ARB	287 (26.5%)	2, 722 (17.5%)	<0.001
Nitrate	200 (21.8%)	1, 056 (8.4%)	<0.001
Ca Channel Blocker	268 (29.1%)	1, 975 (15.7)	<0.001

Table 4. 12-Month Medication Use

	PVD (N = 966)	No PVD (N = 14, 696)	p value
Antiplatelet/Anticoagulant			
No AP and no AC	13 (1.4%)	167 (1.1%)	0.528
Aspirin only	231 (23.9%)	3, 890 (26.1%)	0.121
Thienopyridine only	39 (4.0%)	493 (3.3%)	0.230
Aspirin and Thienopyridine	619 (63.7%)	9, 785 (65.6%)	0.233
Anticoagulation only	14 (1.5%)	47(0.3%)	0.000
Single AP and AC	52 (5.4%)	520 (3.5%)	0.002
Triple therapy	34 (3.5%)	377 (2.5%)	0.006
Statin	882 (91.2%)	13, 828 (92.7)	0.079
Fibrate	25 (2.7%)	291 (2.1%)	0.211
Ezetimibe	114 (12.4%)	943 (6.8%)	<0.001
Beta Blocker	630 (65.8%)	10, 564 (71.3%)	<0.001
ACE inhibitor	490 (51.3%)	8, 718 (58.9%)	<0.001
ARB	276 (28.8%)	3, 154 (21.3%)	<0.001
Nitrate	153 (16.7%)	1, 160 (8.4%)	<0.001
Ca Channel Blocker	302 (33.2%)	2, 406 (17.5)	<0.001

Table 5. In-Hospital, 30-Day and 12-Month Clinical Outcomes

	PVD (N = 1,251)	No PVD (N = 17,129)	p value
In-Hospital			
MACE	71 (5.7%)	705 (4.1%)	0.008
Death	47 (3.8%)	357 (2.1%)	<0.001
New or recurrent MI	17 (1.4%)	199 (1.2%)	0.534
Repeat PCI	3 (0.2%)	108 (0.6%)	0.084
CABGs	10 (0.8%)	148 (0.9%)	0.806
New Renal Impairment	24 (1.9%)	196 (1.1%)	0.015
Bleeding event	47 (3.8%)	418 (2.4%)	0.004
Site of bleeding			0.698
Retroperitoneal	4 (8.7%)	24 (6%)	
Percutaneous entry site	16 (34.8%)	157 (39.4%)	
Other	26 (56.5%)	218 (54.6%)	
Vascular Complication			
Access Site Occlusion	0	6 (0.04%)	0.501
Loss of distal pulse	1 (0.1%)	17 (0.1%)	0.833
Peripheral Arterial Dissection	7 (0.6%)	29 (0.2%)	0.003
AV Fistula	1 (0.1%)	9 (0.1%)	0.688
Pseudoaneurysm	1 (0.1%)	56 (0.3%)	0.129
30-Days			
MACE	107 (8.6%)	996 (5.8%)	<0.001
Death	62 (5.0%)	416 (2.4%)	<0.001
Cardiac cause	48 (77.4%)	329 (79.3%)	0.737

Myocardial infarction	39 (3.12%)	339 (2.0%)	0.006
TVR	27 (2.2%)	418 (2.4%)	0.531
12-Months			
MACE	308 (24.6%)	2264 (13.2%)	<0.001
Death	153 (12.2%)	720 (4.2%)	<0.001
Cardiac cause	90 (58.8%)	431 (60.1%)	0.768
Myocardial infarction	123 (9.8%)	758 (4.4%)	<0.001
TVR	119 (9.5%)	1236 (7.2%)	0.003

Table 6. Predictors of 12-Month MACE

Variable	OR	95% CI	p value
PVD	1.35	1.14 – 1.60	<0.001
Age (per year)	1.01	1.00 – 1.01	<0.001
Diabetes	1.38	1.23 – 1.54	<0.001
PHx CABGs	1.47	1.15 – 1.89	0.002
Hypertension	1.29	1.14 – 1.44	<0.001
Reference vessel < 2.5mm	1.45	1.29 – 1.62	<0.001
LAD lesion	1.19	1.07 – 1.32	0.001
PHx MI	1.24	1.12 – 1.39	<0.001
B2/C lesion	1.52	1.37 – 1.69	<0.001
Ostial lesion	1.38	1.17 – 1.63	<0.001
eGFR			
<30	3.09	2.48 – 3.85	<0.001
30-59	1.21	1.08 – 1.37	0.002
LVEF			
<30%	2.61	2.05 – 3.32	<0.001
30-45%	1.44	1.29 – 1.60	<0.001
Cardiogenic shock	5.11	4.14 – 6.30	<0.001
Thrombolysis	0.68	0.52 – 0.88	0.003
DES	0.48	0.43 – 0.53	<0.001

Table 7. Predictors of 12-Month Mortality

Variable	OR	95% CI	p value
PVD	2.01	1.56 – 2.59	<0.001
Age	1.04	1.03 – 1.05	<0.001
MVD	1.29	1.06 – 1.58	0.013
Diabetes	1.44	1.19 – 1.75	<0.001
Urgent or Rescue PCI	2.23	1.72 – 2.88	<0.001
CLD	1.58	1.25 – 2.01	<0.001
Dyslipidaemia	0.67	0.55 – 0.81	<0.001
CD	1.40	1.07 – 1.84	0.014
DES	0.66	0.54 – 0.80	<0.001
B2/C lesion	1.39	1.14 – 1.69	0.001
eGFR			
<30	5.44	4.03 – 7.34	<0.001
30-59	1.85	1.51 – 2.26	<0.001
LVEF			
<30%	5.23	3.83 – 7.14	<0.001
30-45%	1.82	1.50 – 2.20	<0.001
Reference vessel < 2.5mm	1.35	1.10 – 1.65	0.003
Cardiogenic shock	9.18	7.14 – 11.80	<0.001
RCA lesion	0.70	0.57 – 0.86	0.001

Table 8. Baseline characteristics in PVD patients with BMS vs. DES

	PVD + BMS (N = 595)	PVD + DES (N = 542)	p value
Mean age – years	72 ± 11	70 ± 10	<0.001
Male gender	442 (74.3%)	402 (74.2%)	0.96
Medical history			
Diabetes mellitus	209 (35.1%)	294 (54.2%)	<0.001
Smoking (current)	112 (19.0%)	121 (22.5%)	0.134
Chronic lung disease	121 (20.4%)	83 (15.4%)	0.029
Hypertension	501 (84.3%)	486 (89.7%)	0.008
Dyslipidaemia	496 (83.4%)	479 (88.5%)	0.012
Family history of CAD	201 (34.5%)	218 (41.1%)	0.023
Cerebrovascular disease	139 (23.4%)	117 (21.6%)	0.465
Heart failure	71 (12.0%)	65 (12.0%)	0.984
Previous MI	258 (43.4%)	273 (50.4%)	0.018
Previous PCI	161 (27.1%)	221 (40.8%)	<0.001
Previous CABG	118 (19.8%)	149 (27.5%)	0.002
eGFR			0.060
<30	73 (12.5%)	71 (13.2%)	
30-59	207 (35.4%)	155 (28.8%)	
>60	305 (52.1%)	312 (58.0%)	
Mean Baseline Serum Cr	138.6 ± 135.8	138.3 ± 142.5	0.969
Mean BMI (kg/m^2)	27.3 (26.9 - 27.8)	28.2 (27.7 - 28.7)	0.009
LVEF			0.437
<30%	25 (5.0%)	23 (4.9%)	

30-45%	159 (32.1%)	132 (28.3%)	
>45%	312 (62.9%)	311 (66.7%)	
Indication for index PCI			
STEMI	145 (24.4%)	51 (9.4%)	<0.001
NSTEMI	183 (30.8%)	201 (37.1%)	
Unstable angina	51 (8.6%)	65 (12.0%)	
Non-ACS	215 (36.2%)	225 (41.5%)	
Out of hospital cardiac arrest	15 (2.5%)	3 (0.6%)	0.008
Cardiogenic shock	35 (5.9%)	10 (1.9%)	<0.001
IABP	19 (3.2%)	5 (0.9%)	0.008
Medications			
Thrombolytics	15(2.5%)	6(1.1%)	0.077
IIb/IIIa Blockade	139 (23.4%)	104 (19.3%)	0.096
Heparin	586(98.5%)	530(97.8%)	0.380
LMWH	120 (20.2%)	101 (18.7%)	0.524
Bivalirudin	9 (1.6%)	3 (0.6%)	0.116
Aspirin	590 (99.2%)	535 (98.7%)	0.457
Clopidogrel	573 (96.5%)	518 (95.8%)	0.533
Ticagrelor	10 (1.7%)	16 (3.0%)	0.408
Prasugrel	9 (1.5%)	12 (2.2%)	0.652

Table 9. Angiographic characteristics in PVD patients with BMS vs. DES

	PVD + BMS (N = 595)	PVD + DES (N = 542)	p value
Procedure status			
Elective	217 (36.5%)	232 (42.8%)	0.056
Urgent	375 (63.0%)	305 (56.3%)	
Rescue	3 (0.5%)	5 (0.9%)	
Percutaneous entry location			
Femoral	512 (86.1%)	469 (86.5%)	0.890
Radial	66 (11.1%)	60 (11.1%)	
Disease extent			
Single-vessel disease	156 (26.3%)	114 (21.1%)	0.040
Multi-vessel disease	437 (73.7%)	426 (78.9%)	
Culprit vessel			
Left main coronary artery	17 (2.5%)	28 (4.1%)	0.096
Proximal LAD	105 (15.4%)	72 (10.6%)	0.008
LAD	193 (28.3%)	188 (27.6%)	0.750
LCx	100 (14.7%)	110 (16.1%)	0.460
RCA	249 (36.6%)	186 (27.3%)	<0.001
Grafts	54 (7.9%)	79 (11.6%)	0.023
Type of coronary lesion			
De novo	665 (97.7%)	585 (85.8%)	<0.001
Restenosis (no prior stent)	3 (0.4%)	4 (0.6%)	
In stent restenosis	13 (1.9%)	93 (13.6%)	
Mean no of lesions	1.2 ± 0.4	1.3 ± 0.5	0.046

treated/patient			
Mean no. of stents deployed/procedure	1.3 ± 0.6	1.4 ± 0.6	<0.001
Lesion type			
B2 and C	355 (52.1%)	403 (59.1%)	0.010
Mean stent diameter (mm%)	3.1 ± 0.5	2.8 ± 0.4	<0.001
Mean stent length (mm%)	15.7 ± 4.3	18.1 ± 6.0	<0.001
Bifurcation lesion	48 (7.1%)	75 (11.0%)	0.011
Ostial lesion	51 (7.5%)	70 (10.3%)	0.072
Procedural success rate	644 (99.4%)	636 (98.0%)	0.028

Table 10. 30 Day Medication Use in PVD patients with BMS vs. DES

	PVD + BMS (N = 595)	PVD + DES (N = 542)	p value
Antiplatelet/Anticoagulant			
No AP and no AC	3 (0.6%)	0 (0.0%)	0.088
Aspirin only	25 (4.9%)	4 (0.8%)	<0.001
Thienopyridine only	10 (2.0%)	10 (2.0%)	0.939
Aspirin and Thienopyridine	457 (89.3%)	472 (95.2%)	<0.001
Anticoagulation only	4 (0.8%)	1 (0.2%)	0.191
Single AP and AC	13 (2.6%)	9 (1.8%)	0.434
Triple therapy	59 (11.6%)	13 (2.6%)	<0.001
Statin	461 (90.8%)	453 (91.9)	0.523
Fibrate	17 (3.9%)	7 (1.7%)	0.056
Ezetimibe	36 (8.2%)	50 (12.2%)	0.058
Beta Blocker	351 (69.6%)	356 (72.4%)	0.345
ACE inhibitor	271 (54.0%)	278 (56.5%)	0.424
ARB	130 (25.8%)	139 (28.3%)	0.372
Nitrate	97 (22.4%)	85 (20.7%)	0.556
Ca Channel Blocker	118 (27.3%)	120 (29.3)	0.529

Table 11. 12-Month Medication Use in PVD patients with BMS vs. DES

	PVD + BMS (N = 595)	PVD + DES (N = 542)	p value
Antiplatelet/Anticoagulant			
No AP and no AC	10 (2.3%)	2 (0.5%)	0.018
Aspirin only	146 (33.3%)	57 (12.7%)	<0.001
Thienopyridine only	13 (3.0%)	21 (4.7%)	0.183
Aspirin and Thienopyridine	226 (51.4%)	360 (79.8%)	<0.001
Anticoagulation only	7 (1.6%)	3 (0.7%)	0.191
Single AP and AC	37 (8.5%)	6 (1.3%)	<0.001
Triple therapy	22 (5.0%)	10 (2.2%)	0.026
Statin	398 (90.7%)	407 (90.9)	0.923
Fibrate	17 (4.0%)	8 (1.9%)	0.069
Ezetimibe	41 (9.7%)	58 (13.8%)	0.067
Beta Blocker	280 (64.5%)	298 (67.1%)	0.417
ACE inhibitor	217 (49.9%)	231 (52.3%)	0.481
ARB	126 (28.9%)	132 (29.9%)	0.754
Nitrate	67 (16.0%)	67 (16.0%)	1.000
Ca Channel Blocker	125 (29.9%)	149 (35.7)	0.077

Table 12. In-Hospital, 30-Day and 12-Month Outcomes in PVD patients with BMS vs. DES

	PVD + BMS (N = 595)	PVD + DES (N = 542)	p value
In-Hospital			
MACE	38 (6.4%)	15 (2.8%)	0.004
Death	25 (4.2%)	10 (1.9%)	0.022
New or recurrent MI	12 (2.0%)	1 (0.2%)	0.004
Repeat PCI	1 (0.2%)	2 (0.4%)	0.507
CABGs	4 (0.7%)	1 (0.2%)	0.215
New Renal Impairment	13 (2.2%)	6 (1.1%)	0.158
Bleeding event	22 (3.7%)	20 (3.7%)	0.995
Site of bleeding			0.721
Retroperitoneal	2 (9.5%)	2 (10.0%)	
Percutaneous entry site	6 (28.6%)	8 (40.0%)	
Other	13 (61.9%)	10 (50.0%)	
Vascular Complication			
Access Site Occlusion	0	0	-
Loss of distal pulse	0 (0.0%)	1 (0.2%)	0.295
Peripheral Arterial Dissection	4 (0.7%)	3 (0.6%)	0.158
AV Fistula	1 (0.2%)	0 (0.0%)	0.340
Pseudoaneurysm	0 (0.0%)	1 (0.2%)	0.295
30-Days			
MACE	60 (10.1%)	26 (4.8%)	0.001
Death	35 (5.9%)	14 (2.6%)	0.006
Cardiac cause	25 (71.4%)	11 (78.6%)	0.609

Myocardial infarction	25 (4.2%)	9 (1.7%)	0.012
TVR	13 (2.2%)	8 (1.5%)	0.375
12-Months			
MACE	157 (26.4%)	105 (19.4%)	0.005
Death	87 (14.6%)	46 (8.5%)	0.001
Cardiac cause	44 (50.6%)	30 (65.2%)	0.106
Myocardial infarction	61 (10.3%)	44 (8.1%)	0.214
TVR	51 (8.6%)	46 (8.5%)	0.959

Author/s:
Ramzy, J;Andrianopoulos, N;Roberts, L;Duffy, SJ;Clark, D;Teh, AW;Ajani, AE;Reid, CM;Brennan, A;Freeman, M

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