Incidence, Patterns, and Impact of Dual Antiplatelet Therapy Cessation Among Patients With and Without Chronic Kidney Disease Undergoing Percutaneous Coronary Intervention

Results From the PARIS Registry (Patterns of Non-Adherence to Anti-Platelet Regimens in Stented Patients)

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Background—Patients with chronic kidney disease (CKD) experience high rates of ischemic and bleeding events after percutaneous coronary intervention (PCI), complicating decisions surrounding dual antiplatelet therapy (DAPT). This study aims to determine the pattern and impact of various modes of DAPT cessation for patients with CKD undergoing PCI.

Methods and Results—Patients from the PARIS registry (Patterns of Non-Adherence to Anti-Platelet Regimens in Stented Patients) were grouped based on the presence of CKD defined as creatinine clearance <60 mL/min. After index PCI, time and mode of DAPT cessation (discontinuation, interruption, and disruption) and clinical outcomes (major adverse cardiac events, stent thrombosis, myocardial infarction, and major bleeding [Bleeding Academic Research Consortium type 3 or 5]) were reported. Over 2 years, patients with CKD (n=839) had higher adjusted risks for death (hazard ratio, 3.16; 95% confidence interval, 2.26–4.41), myocardial infarction (hazard ratio, 2.43; 95% confidence interval, 1.65–3.57), and major bleeding (hazard ratio, 2.21; 95% confidence interval, 1.53–3.19) compared with patients without CKD (n=3745). Rates of DAPT discontinuation within the first year after PCI and disruption were significantly higher for patients with CKD. However, DAPT interruption occurred with equal frequency. Associations between DAPT cessation mode and subsequent risk were not modified by CKD status. Findings were unchanged after propensity matching.

Conclusions—Patients with CKD display high and comparable risks for both ischemic and bleeding events after PCI. Physicians are more likely to discontinue DAPT within the first year after PCI among patients with CKD, likely reflecting clinical preferences to avoid bleeding. Risks after DAPT cessation, irrespective of underlying mode, are not modified by the presence or absence of CKD. **(*Circ Cardiovasc Interv*. 2018;11:e006144. DOI: 10.1161/CIRCINTERVENTIONS.117.006144.)**

Key Words: blood platelets ■ follow-up studies ■ hemorrhage ■ percutaneous coronary intervention ■ renal insufficiency, chronic

Renal impairment is a prevalent comorbid risk factor among patients with obstructive coronary artery disease undergoing percutaneous coronary intervention (PCI).[1–4] Unlike risk factors that predominantly predict ischemic or bleeding complications, chronic kidney disease (CKD) has emerged as a common contributor to both types of adverse events, in turn contributing to

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WHAT IS KNOWN

- Cardiovascular risk is substantial in patients with chronic kidney disease.
- Not only the duration but also the mode of dual antiplatelet therapy cessation influences the risk of ischemic and bleeding complications after percutaneous coronary intervention.

WHAT THE STUDY ADDS

- Patients with chronic kidney disease exhibit increased and comparable risks for both thrombotic and bleeding complications after percutaneous coronary intervention.
- Physicians are more likely to discontinue dual antiplatelet therapy at 1 year after percutaneous coronary intervention in patients with chronic kidney disease, with no increased risk in adverse outcomes.
- Association between dual antiplatelet therapy cessation and cardiovascular risk is not modified by the presence or absence of chronic kidney disease.

mortality.[3,5–11] This duality of risk presents a management challenge when clinicians are faced with prescribing the optimal course of dual antiplatelet therapy (DAPT) after PCI.

There are currently no consensus recommendations on the optimal DAPT strategy to balance the ischemic and bleeding risks in patients with CKD. Early cessation of DAPT can potentially mitigate the risk of bleeding, but increase the risk of ischemic complications, and vice versa. Previous studies investigating the ischemic benefit of prolonged DAPT in patients with CKD have yielded mixed results with some indicating an advantage, whereas others did not.[1,3,12,13] With regard to bleeding, it is known that both CKD and prolonged DAPT are independent predictors of increased bleeding complications, but it is unclear whether prolonged DAPT potentiates bleeding risk in patients with CKD.[3,12–14]

To better characterize the pattern and impact of DAPT cessation in patients with CKD after PCI, we conducted a post hoc analysis of the PARIS registry (Patterns of Non-Adherence to Dual Antiplatelet Therapy in Stented Patients)—a multinational observational PCI cohort evaluating the incidence and risks after DAPT cessation.

Methods

Study Population

The data, analytic methods, and study materials will not be made available to other researchers for purposes of reproducing the results or replicating the procedure. The methods and main findings of the PARIS study have been previously described.[15] In brief, PARIS was a multicenter, prospective observational study that enrolled patients undergoing PCI with stent implantation at 15 clinical sites in the United States and Europe between July 1, 2009, and December 2, 2010. Adult patients (≥18 years of age) undergoing successful implantation of a stent in at least 1 native coronary artery and discharged on DAPT were eligible for enrollment. The study was approved by the institutional research board at each participating site. All patients provided written, informed consent. Patients were followed up via telephone at 30 days, 6 months, 12 months, and 24 months. Information regarding time of DAPT cessation and the reason for stopping treatment was collected. Source documents were obtained for any adverse events or any DAPT cessation. All adverse events were adjudicated by an external clinical events committee.

Study Definitions

For purposes of the present analysis, we grouped PARIS participants by presence or absence of CKD, defined as a creatinine clearance <60 mL/min.[16] DAPT cessation was categorized into 3 prespecified modes, physician-guided withdrawal of antiplatelet therapy (discontinuation), temporary (<14 days) cessation of antiplatelet therapy because of surgery (interruption), and cessation of antiplatelet therapy because of bleeding or noncompliance (disruption).

Major adverse cardiac events (MACE) 1 were defined as a composite outcome of cardiac death, probable or definite stent thrombosis, spontaneous myocardial infarction (MI), and clinically indicated target lesion revascularization. A restricted definition of MACE 2 excluding target lesion revascularization was also examined. Death, stent thrombosis, and target lesion revascularization were defined according to the Academic Research Consortium criteria.[17] Spontaneous MI was defined as the presence of clinical or electrocardiographic changes consistent with myocardial ischemia in the setting of increased cardiac biomarkers above the upper limit of normal. Major bleeding was defined as Bleeding Academic Research Consortium type 3 or 5.[18]

Statistical Analysis

Baseline, procedural characteristics, and rates of clinical outcomes were reported for patients with and without CKD. Continuous variables are reported as mean±SD and compared using the Student *t* test. Categorical variables are reported as natural frequency with percentages and compared using the χ^2 test. Kaplan–Meier estimates representing cumulative incidence were compared using the log-rank test. Hazard ratios and 95% CIs were generating using Cox regression to examine associations between CKD and DAPT cessation modes with clinical outcomes. The DAPT cessation variable was modeled as a time-updated covariate in the following categories from the least to most severe: no DAPT cessation (referent), discontinuation, interruption, disruption. The variable changed according to this hierarchy in the event of DAPT cessation and did not revert to a less severe state, even if the cessation was temporary.[15] Additional covariates included age, sex, region, body mass index, dyslipidemia, hypertension, smoking exposure, diabetes mellitus, prior MI, prior coronary artery bypass graft, prior cerebrovascular accident, peripheral vascular disease, acute coronary syndrome, thrombotic lesion, GP (platelet glycoprotein) IIb/IIIa inhibitor use, and warfarin at discharge. As a sensitivity analysis, all adjusted associations were repeated after propensity matching on the exposure of CKD versus no CKD. A propensity model was generated in an iterative fashion as previously described with the dependent outcome of CKD.[19] Covariates included all variables demonstrating baseline imbalance between CKD groups. Nearest neighbor 1:1 propensity matching with trimming was then implemented to generate a matched cohort of patients with and without CKD (n=1406). The C statistic of the propensity model was 0.88.

Results

Study Population

Of the 5018 patients studied in the PARIS registry, CKD status was available for 4584 patients, all of whom were included in this subanalysis. In the study population, 839 (18%) patients had CKD. Patients with CKD were older (74.0±9.9 versus 61.8±10.6 years) and more often women (45.4% versus 21.4%) with a higher prevalence of diabetes mellitus (40.4% versus 31.6%) and previous MI (28.8% versus 22.2%; Table 1). The median (25th–75th percentile) for creatinine clearance among patients with and without CKD were 47.1

(37.6–53.8) and 96.5 (77.8–120.1), respectively. Patients with CKD had fewer thrombotic lesions compared with patients without CKD (3.9% versus 10.0%) but had no differences in the number of vessels treated and the proportion of bifurcation lesions and chronic total occlusions. Procedurally, there were no significant differences in the distribution of the PCI vessel between patients with and without CKD. Patients with CKD received more bare metal stent (22.3% versus 16.8%) and fewer second-generation drug-eluting stent (69.6% versus 74.9%). Patients with CKD were less likely to receive GP IIb/IIIa inhibitors (9.1% versus 15.7%) and were more likely to be discharged on warfarin (8.8% versus 5.8%; Table 2).

DAPT Cessation

Physician-guided cessation of DAPT was more frequent in patients with CKD at 1 year (15.6% versus 10.9%) but was similar at 2 years (37.2% versus 35.9%). There were no significant differences in the rates of DAPT interruption between patients with and without CKD at any follow-up interval. Lastly, patients with CKD had higher rates of DAPT disruption at 1 and 2 years of follow-up (Figure 1; Table 3).

Table 1. Baseline Patient Characteristics

	No CKD	CKD	
	n=3745 (82%)	n=839 (18%)	*P* Value
Age, y	61.8±10.6	74.0±9.9	<0.0001
Women	800 (21.4%)	381 (45.4%)	<0.0001
BMI, kg/m^2	30.0±5.7	26.4±4.7	<0.0001
Dyslipidemia	2761 (73.7%)	684 (81.5%)	<0.0001
Hypertension	2908 (77.7%)	752 (89.6%)	<0.0001
Family history of CAD	1250 (33.4%)	211 (25.1%)	<0.0001
Current smoker	842 (22.5%)	66 (7.9%)	<0.0001
Diabetes mellitus	1182 (31.6%)	339 (40.4%)	<0.0001
Insulin	355 (9.5%)	154 (18.4%)	
Education level			0.0021
Advanced university degree	395 (10.5%)	69 (8.2%)	
Tertiary university degree	1081 (28.9%)	213 (25.4%)	
Secondary school	1813 (48.4%)	419 (49.9%)	
Less than secondary	413 (11.0%)	123 (14.7%)	
Ischemic history			
Previous MI	831 (22.2%)	242 (28.8%)	<0.0001
Previous CABG	453 (12.1%)	171 (20.4%)	<0.0001
Stroke	101 (2.7%)	53 (6.3%)	<0.0001
Peripheral vascular disease	251 (6.7%)	101 (12.0%)	<0.0001
Acute coronary syndrome	1675 (44.7%)	317 (37.8%)	0.0002
Hemoglobin	13.29±1.97	11.78±1.84	<0.0001
Admission medication			
Aspirin	2575 (68.8%)	641 (76.4%)	<0.0001
Thienopyridine	1356 (36.2%)	388 (46.2%)	<0.0001
Warfarin	146 (3.9%)	67 (8.0%)	<0.0001

BMI indicates body mass index; CABG, coronary artery bypass graft; CAD, coronary artery disease; CKD, chronic kidney disease; and MI, myocardial infarction.

Table 2. Procedural Characteristics

	No CKD	CKD	
	n=3745 (82%)	n=839 (18%)	*P* Value
PCI vessel			
Left main	108 (2.9%)	31 (3.7%)	0.22
LAD	1766 (47.2%)	376 (44.8%)	0.22
Proximal LAD	852 (22.8%)	170 (20.3%)	0.12
LCx	1127 (30.1%)	270 (32.2%)	0.24
RCA	1329 (35.5%)	283 (33.7%)	0.34
No. of vessels treated			
1	3198 (85.4%)	722 (86.1%)	0.61
2	509 (13.6%)	113 (13.5%)	0.91
3	38 (1.0%)	4 (0.5%)	0.14
Bifurcation lesion	438 (11.7%)	91 (10.8%)	0.49
Chronic total occlusion	124 (3.3%)	25 (3.0%)	0.63
Thrombotic lesion	373 (10.0%)	33 (3.9%)	<0.0001
Stent type			
Bare-metal stent	629 (16.8%)	187 (22.3%)	0.0002
DES first generation	464 (12.4%)	105 (12.5%)	0.92
DES second generation	2806 (74.9%)	584 (69.6%)	0.0015
No. of stents implanted			
1	2061 (55.0%)	460 (54.8%)	0.88
2	1062 (28.4%)	242 (28.8%)	0.79
>2	622 (16.6%)	137 (16.3%)	0.91
Total stented length, mm			0.54
≤20	1431 (38.2%)	311 (37.1%)	
>20	2314 (61.8%)	528 (62.9%)	
GP IIb/IIIa inhibitor	587 (15.7%)	76 (9.1%)	<0.0001
Discharge medications			
Aspirin	3745 (100.0%)	839 (100.0%)	1.00
Thienopyridine	3745 (100.0%)	839 (100.0%)	1.00
Thienopyridine type			<0.0001
Clopidogrel	3459 (92.4%)	798 (95.1%)	
Prasugrel	272 (7.3%)	32 (3.8%)	
Ticlopidine	14 (0.4%)	9 (1.1%)	
Warfarin	217 (5.8%)	74 (8.8%)	0.0012
Proton pump inhibitor	686 (18.3%)	194 (23.1%)	0.0014

CKD indicates chronic kidney diease; DES, drug-eluting stent; GP, glycoprotein; LAD, left anterior descending artery; LCx, left circumflex artery; PCI, percutaneous coronary intervention; and RCA, right coronary artery.

Clinical Outcomes

At 2 years of follow-up, patients with CKD experienced higher rates of MACE 1 (16.8% versus 10.2%), MACE 2 (13.6%

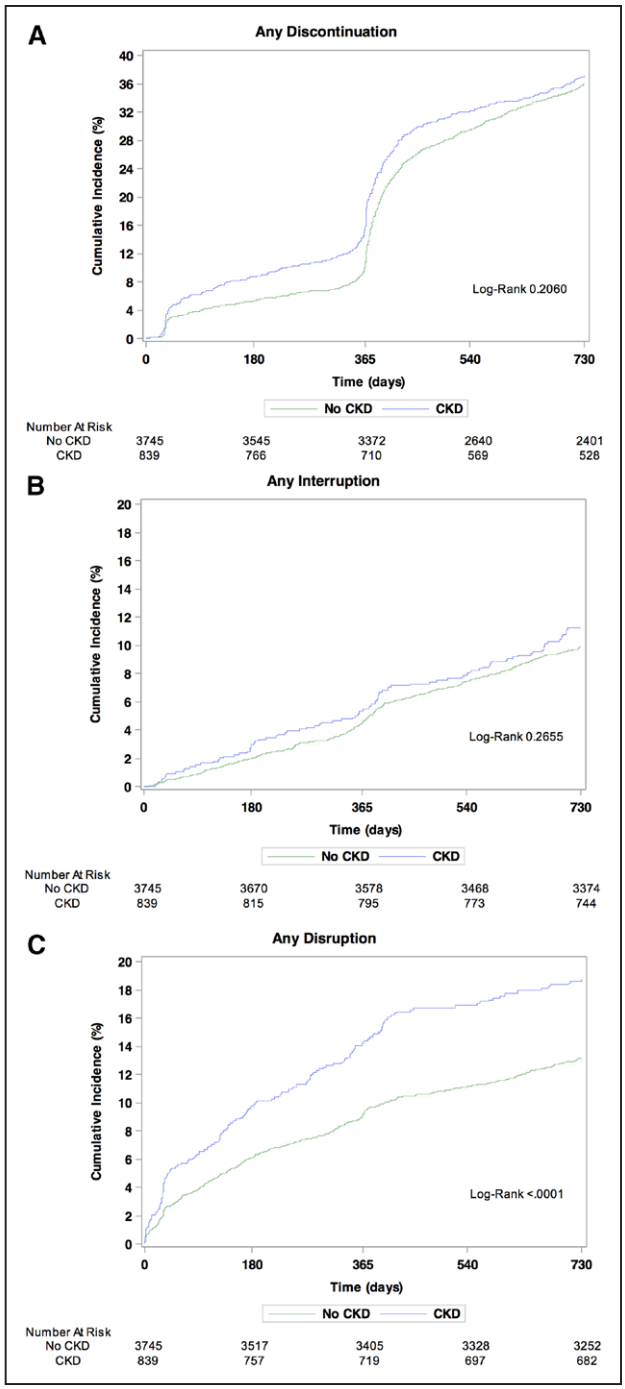

Figure 1. Cumulative incidence of dual antiplatelet therapy discontinuation (**A**), interruption (**B**), and disruption (**C**) through 2 years after percutaneous coronary intervention. CKD, chronic kidney disease; ST, stent thrombosis.

versus 5.1%), and death (12.2% versus 3.2%). With regard to ischemic outcomes at 2 years, patients with CKD displayed higher rates of MI (6.7% versus 3.1%) and cardiac death (8.3% versus 2.0%) but similar rates of stent thrombosis (1.8% versus 1.4%) and target lesion revascularization (7.3% versus 7.1%.) With respect to major bleeding, 2-year rates of Bleeding Academic Research Consortium type 3 or 5 bleeding were higher among those with CKD (8.9% versus 3.0%; Table 4). Associations were unchanged after multivariable adjustment with

Table 3. Patterns of DAPT Cessation

	No CKD n=3745 (82%)	CKD n=839 (18%)	*P* Value
Discontinuation, mo			
12	407 (10.87%)	133 (15.85%)	<0.0001
24	1343 (35.86%)	312 (37.19%)	0.21
Interruption, mo			
12	169 (4.51%)	45 (5.36%)	0.28
24	372 (9.93%)	94 (11.20%)	0.27
Disruption, mo			
12	344 (9.19%)	120 (14.30%)	<0.0001
24	492 (13.14%)	157 (18.71%)	<0.0001

CKD indicates chronic kidney disease; and DAPT, dual antiplatelet therapy.

comparable estimates observed for MI and major bleeding (adjusted hazard ratio, 2.4 and 2.2, respectively; Table 4).

Irrespective of CKD status, associations between modes of DAPT cessation and adverse events were similar in direction and magnitude, as shown in Figure 2. Disruption was consistently associated with higher risks for MACE among those with and without CKD. Conversely, interruption was not associated with increased risks for MACE. Similar findings were observed for physician-guided discontinuation, although the magnitude of association was larger for patients without CKD. Formal interaction testing between the main effects of CKD and DAPT cessation was nonsignificant for all outcomes (Figure 2).

Baseline characteristics in the propensity-matched cohort are shown in Tables I and II in the Data Supplement. Figure I in the Data Supplement displays the change in standardized bias in the matched versus unmatched cohort. Almost all parameters were adequately balanced, with the exception of age. As a result, age was retained as an additional covariate in the adjusted analyses involving the propensity-matched cohort. Adjusted risks associated with CKD for the outcomes of MACE, MI, death, and bleeding remained large and significant in the matched cohort, concordant with our results using covariate adjustment in the overall sample (Table 4). Similarly, associations between various DAPT cessation modes and clinical outcomes in the propensity-matched cohort were consistent in direction and magnitude as in the overall sample (Tables III and IV in the Data Supplement).

Discussion

In this analysis of the PARIS registry involving a PCI cohort treated primarily with clopidogrel, the following key findings were observed: (1) first, adjusted risks for both ischemic and bleeding complications are higher among those with versus without CKD with comparable estimates observed for MI and major bleeding; (2) second, DAPT cessation because of disruption was significantly higher among patients with CKD, whereas interruption occurred with similar frequency between groups; (3) third, the incidence of physician-guided DAPT discontinuation was higher among patients with CKD in the first year after PCI, whereas cumulative 2-year rates were

Table 4. Clinical Outcomes at 2-Year of Follow-Up by Presence of CKD

	No CKD	CKD		
	n=3745 (82%)	n=839 (18%)	aHR	HR (Propensity Matched)
MACE 1	382 (10.20%)	141 (16.81%)	1.83 (1.45–2.30)	1.48 (1.12–1.96)
MACE 2	191 (5.10%)	114 (13.59%)	2.76 (2.07–3.67)	2.22 (1.57–3.16)
MI	117 (3.12%)	56 (6.67%)	2.43 (1.65–3.57)	2.02 (1.27–3.23)
Death	118 (3.15%)	102 (12.16%)	3.16 (2.26–4.41)	2.39 (1.59–3.58)
Cardiac death	76 (2.03%)	70 (8.34%)	4.01 (2.66–6.03)	2.84 (1.7–4.69)
ST	51 (1.36%)	15 (1.79%)	1.79 (0.89–3.58)	1.75 (0.77–4.01)
TLR	264 (7.05%)	61 (7.27%)	1.21 (0.88–1.67)	1.08 (0.74–1.56)
BARC 3 or 5 bleeding	114 (3.04%)	75 (8.94%)	2.21 (1.53–3.19)	1.97 (1.26–3.07)

MACE 1: cardiac death, myocardial infarction, clinically indicated target lesion revascularization, or definite/probable stent thrombosis; MACE 2: cardiac death, myocardial infarction, or definite/probable stent thrombosis. aHR indicates adjusted hazard ratio; BARC, Bleeding Academic Research Consortium; CKD, chronic kidney disease; HR, hazard ratio; MACE, major adverse cardiac events; MI, myocardial infarction; ST, stent thrombosis; and TLR, target lesion revascularization.

nonsignificant; and (4) fourth, associations between DAPT cessation mode and subsequent risk did not vary by CKD status. Results remained consistent using several methods of adjustment, including covariate and propensity matching.

We found that DAPT discontinuation within the first year after PCI was more common in patients with CKD—a result that might reflect clinical tendencies to avoid bleeding. In support of this rationale, patients with CKD received more bare-metal stents and less GP IIb/IIIa inhibitors, which indicate that physicians were possibly considering shorter DAPT durations to minimize bleeding risks at time of PCI. This tendency may change, however, with recent data showing that polymer-free drug-eluting stents are safer and more efficacious than bare metal stent in high bleeding risk patients.[20] The predilection toward less aggressive antiplatelet therapy is also seen in an analysis of the PROMETHEUS study, which showed that acute coronary syndrome patients versus without CKD were half as likely to receive prasugrel compared with clopidogrel.[21] Alternatively, this practice pattern might also reflect the uncertain ischemic benefit of prolonged DAPT in the setting of CKD. A post hoc analysis of the CREDO trial (Clopidogrel for the Reduction of Events During Observation) showed that for patients without

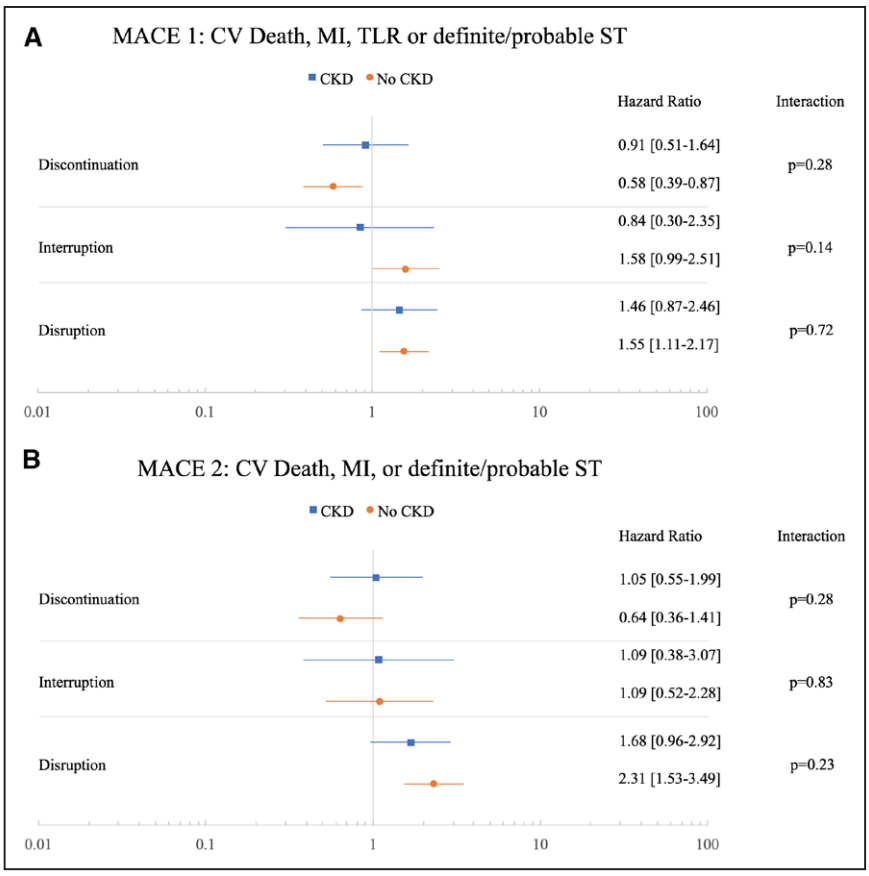

Figure 2. Adjusted risk for major adverse cardiac events (MACE) 1 (**A**) and MACE 2 (**B**) at 2 years after percutaneous coronary intervention based on modes of dual antiplatelet therapy cessation in patients with and without chronic kidney disease (CKD). CV indicates cardiovascular; MI, myocardial infarction; and TLR, target lesion revascularization.

CKD who underwent PCI, 1 year of clopidogrel versus 28 days was associated with a reduction in death, MI, and stroke. This trend, however, was not seen in patients with mild or moderate CKD.[13] In contrast, Siddiqui et al found that a prolonged DAPT duration was beneficial in US veterans with CKD—a finding that was confined to those receiving first-generation drug-eluting stent. The variability in clinical efficacy associated with prolonged DAPT in patients with CKD may reflect heterogeneity in underlying platelet function, particularly when renal impairment coexists with other risk factors, such as diabetes mellitus.[22] Notwithstanding clinical concerns for bleeding, we also found that adjusted risks for thrombotic events associated with CKD were comparable with that of major hemorrhage—an epidemiological link previously observed after PCI.[23,24] Hence it is plausible, albeit unproven, that the tendency to avoid harm with greater DAPT discontinuation early after PCI among those with CKD may occur at the expense of possible benefit.

There were no significant differences in the frequency of DAPT interruption between patients with and without CKD, which is expected because there is not a clearly defined difference in the need for surgical intervention between the 2 groups and the presence of CKD may not factor into the decision to pursue surgery. Although risks after interruption were not increased, the overall rate of interruption was low and, therefore, these results warrant cautious interpretation.

Rates of disruption were significantly higher among those with CKD—a finding that is primarily attributable to the excess risk for bleeding among such patients. Indeed, absolute differences for major bleeding between CKD groups were almost identical to the corresponding difference in rates of disruption. Associations between disruption and excess ischemic risk were significant and comparable among those with or without CKD, highlighting the prognostic relevance of DAPT disruption irrespective of renal status.

The lack of interaction between CKD and DAPT cessation might seem somewhat counterintuitive because the biological effects of withdrawing antiplatelet therapy may be exacerbated in the prothrombotic milieu that exists with renal impairment. Although we found that angiographic indicators of lesion complexity were not greater in the setting of CKD, other studies using in vivo imaging have shown that atherosclerotic plaques in patients with CKD are more vulnerable, thereby potentiating thrombosis.[25,26] One explanation for lack of effect modification is that the associations between DAPT cessation and cardiovascular risk observed in the PARIS registry do not necessarily reflect cause and effect but rather reverse causality. For example, clinicians appropriately select low-risk patients in whom DAPT may be safely discontinued thereby accounting for the lack of increased risk with DAPT discontinuation. In contrast, the consistent associations between disruption and thrombotic risk may be partially attributable to epidemiological, rather than biological, phenomena. In support of this rationale, we have reported similar findings in other high-risk groups from the PARIS registry defined according to clinical or anatomic parameters.[27,28]

The clinical relevance of our findings is highlighted by the rising prevalence of renal impairment, coupled with the substantial risks for both ischemic and hemorrhagic complications after PCI in this patient population.[29] The lack of randomized evidence focused exclusively on CKD renders decision-making vis a vis DAPT complex and informed by observational, rather than experimental, data. Because our findings show no excess risk associated with DAPT discontinuation in the setting of CKD, it is plausible that evolving strategies focused on decreasing the exposure to or lessening the intensity of DAPT may be particularly beneficial in such patients.[30–32] As a corollary, novel tools to guide decision-making may be necessary to optimize therapeutic choices in patients with renal impairment, particularly because the determinants of cardiovascular risk change as renal function worsens.[33]

Limitations

The observational nature of the PARIS registry presents limitations on the causal conclusions that can be drawn. Importantly, this subgroup analysis of patients with CKD within the PARIS registry was not a defined a priori, thus findings should be interpreted with caution. There were a limited number of patients with advanced CKD, and thus our findings may not generalize to dialysis-dependent patients whose determinants of thrombosis and bleeding may be different. Furthermore, using creatinine clearance alone to define CKD can be limiting and may result in misclassification. Furthermore, DAPT compliance was self-reported and thus subject to recall bias. There are unmeasured confounders not accounted for in the study model, such as urine albumin, fibrinogen levels, C-reactive protein, and heart failure status. Lastly, more potent antiplatelet agents, such as prasugrel and ticagrelor, were not highly used in this population, which otherwise could have influenced the outcome of this study.

Conclusions

Patients with CKD exhibit higher risks for death, ischemic, and bleeding complications at 2 years after PCI compared with their non-CKD counterparts. Physicians are more likely to discontinue DAPT in the first year after PCI among such patients, likely reflecting the preferential avoidance of bleeding complications.

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Disclosures

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Incidence, Patterns, and Impact of Dual Antiplatelet Therapy Cessation Among Patients With and Without Chronic Kidney Disease Undergoing Percutaneous Coronary Intervention: Results From the PARIS Registry (Patterns of Non-Adherence to Anti-Platelet Regimens in Stented Patients)

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SUPPLMENTAL MATERIAL
For online data supplement

Supplemental Tables

Supplemental Table 1: Patient characteristics of propensity-matched cohort

	No CKD (n = 703)	**CKD (n = 703)**	**P-value**
Age (years)	71.3 ± 8.2	72.5 ± 9.5	0.014
Female	257 (36.6%)	293 (41.7%)	0.049
BMI (kg/m ^{2})	27.1 ± 4.0	26.9 ± 4.7	0.23
Dyslipidemia	569 (80.9%)	578 (82.2%)	0.54
Hypertension	638 (90.8%)	625 (90.3%)	0.79
Family History of CAD	170 (24.2%)	179 (25.5%)	0.58
Current smoker	73 (10.4%)	61 (8.7%)	0.28
Diabetes	290 (41.3%)	296 (42.1%)	0.75
Ischemic History			
Previous MI	184 (26.2%)	194 (27.6%)	0.55
Previous CABG	135 (19.2%)	143 (20.3%)	0.59
Stroke (CVA)	43 (6.1%)	43 (6.1%)	1.00
Peripheral Vascular Disease	79 (11.2%)	82 (11.7%)	0.80
Acute Coronary Syndrome	270 (38.4%)	265 (37.7%)	0.93

CKD: chronic kidney disease, BMI: body mass index; CAD: coronary artery disease; MI: myocardial infarction; CABG: coronary artery bypass graft; CVA: cerebrovascular accident

Supplemental Table 2: Procedural characteristics of propensity-matched cohort

	No CKD (n = 703)	CKD (n = 703)	P-value
PCI Vessel			
Left Main	33 (4.7%)	28 (4.0%)	0.51
LAD	318 (45.2%)	308 (43.8%)	0.59
LCx	233 (33.1%)	221 (31.4%)	0.49
RCA	235 (33.4%)	240 (34.1%)	0.78
Number of vessels Treated			
One	593 (84.4%)	612 (87.1%)	0.15
Two	104 (14.8%)	88 (12.5%)	0.21
Three	6 (0.9%)	3 (0.4%)	0.32
Bifurcation lesion	58 (8.3%)	68 (9.7%)	0.35
Chronic total occlusion	25 (3.6%)	17 (2.4%)	0.21
Thrombotic lesion	34 (4.8%)	31 (4.4%)	0.70
Stent Type			
Bare metal stent	120 (17.1%)	120 (17.1%)	1.00
DES 1st generation	83 (11.8%)	90 (12.8%)	0.57
DES 2nd generation	500 (71.1%)	493 (70.1%)	0.68
Number of stents implanted			
One	382 (54.3%)	391 (55.6%)	0.63
Two	198 (28.2%)	194 (27.6%)	0.81
More than two	123 (17.5%)	118 (16.8%)	0.72
Total stented length			
<= 20 mm	267 (38.0%)	254 (36.1%)	0.47
> 20 mm	436 (62.0%)	449 (63.9%)	0.47
GP Inhibitor	69 (9.8%)	68 (9.7%)	0.93
Discharge Medications			
Warfarin	54 (7.7%)	57 (8.1%)	0.77
Proton Pump Inhibitor	160 (22.8%)	177 (25.2%)	0.29

CKD: chronic kidney diease; PCI: percutaneous coronary intervention; LAD: left anterior descending artery; LCx: left circumflex artery; RCA: right coronary artery; DES: drug-eluting stent; GP: glycoprotein

Supplementary Table 3: Adjusted hazard ratios (HR) and 95% confidence intervals (CI) for MACE 1 associated with CKD in propensity-matched cohort*

	No CKD (n=703)	CKD (n=703)	P_{int}
Discontinuation	0.57 (0.27,1.19]	1.15 (0.62,2.14)	0.61
Interruption	1.82 (0.71,4.63)	0.91 (0.29,2.93)	0.15
Disruption	1.56 (0.83,2.94)	1.68 (0.99,2.84)	0.63

*MACE 1 defined as composite of cardiovascular death, myocardial infarction, definite/probably stent thrombosis or clinically-indicated target lesion revascularization. CKD – chronic kidney disease

Supplementary Table 4: Adjusted hazard ratios (HR) and 95% confidence intervals (CI) for MACE 2 associated with CKD in propensity-matched cohort*

	No CKD (n=703)	CKD (n=703)	P_{int}
Discontinuation	0.67 (0.26,1.69]	1.32 (0.67,2.62)	0.89
Interruption	1.19 (0.28,5.17)	1.24 (0.38,4.01)	0.63
Disruption	1.95 (0.87,4.37)	2.12 (1.22,3.68)	0.63

*MACE 2 defined as composite of cardiovascular death, myocardial infarction, definite/probably stent thrombosis. CKD – chronic kidney disease

Supplemental Figures

Supplemental Figure 1: Imbalance of covariates before and after propensity matching

Supplemental Figure 1