






ORIGINAL RESEARCH

Ticagrelor is Not Superior to Clopidogrel in Patients With Acute Coronary Syndromes Undergoing PCI: A Report from Swedish Coronary Angiography and Angioplasty Registry

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BACKGROUND: Ticagrelor reduces ischaemic end points in acute coronary syndromes. However, outcomes of ticagrelor versus clopidogrel in real-world patients with acute coronary syndromes treated with percutaneous coronary intervention (PCI) remain unclear. We sought to examine whether treatment with ticagrelor is superior to clopidogrel in unselected patients with acute coronary syndromes treated with PCI.

METHODS AND RESULTS: We used data from SCAAR (Swedish Coronary Angiography and Angioplasty Registry) for PCI performed in Västra Götaland County, Sweden. The database contains information about all PCI performed at 5 hospitals (~20% of all data in SCAAR). All procedures between January 2005 and January 2015 for unstable angina/non-ST-segment-elevation myocardial infarction and ST-segment-elevation myocardial infarction were included. We used instrumental variable 2-stage least squares regression to adjust for confounders. The primary combined end point was mortality or stent thrombosis at 30 days, secondary end points were mortality at 30 days and 1-year, stent thrombosis at 30 days, in-hospital bleeding, in-hospital neurologic complications and long-term mortality. A total of 15 097 patients were included in the study of which 2929 (19.4%) were treated with ticagrelor. Treatment with ticagrelor was not associated with a lower risk for the primary end point (adjusted odds ratio [aOR], 1.20; 95% CI, 0.87–1.61; $P=0.250$). Estimated risk of death at 30 days (aOR, 1.18; 95% CI, 0.88–1.64; $P=0.287$) and at 1-year (aOR, 1.28; 95% CI, 0.86–1.64; $P=0.556$) was not different between the groups. The risk of in-hospital bleeding was higher with ticagrelor (aOR, 2.88; 95% CI, 1.53–5.44; $P=0.001$).

CONCLUSIONS: In this observational study, treatment with ticagrelor was not superior to clopidogrel in patients with acute coronary syndromes treated with PCI.

CLINICAL PERSPECTIVE

What Is New?

- Different from the results from PLATO (Study of Platelet Inhibition and Patient Outcomes), ticagrelor was not superior to clopidogrel in this observational all-comer analysis of patients with acute coronary syndromes undergoing percutaneous coronary intervention in Western Sweden.
- In the present analysis treatment with ticagrelor was not associated with any mortality benefits in comparison with clopidogrel while the incidence of in-hospital bleeding was significantly increased.

What Are the Clinical Implications?

- Benefits of ticagrelor, as demonstrated in the PLATO trial, may not be externally valid when applied to unselected patients with acute coronary syndromes undergoing percutaneous coronary intervention.

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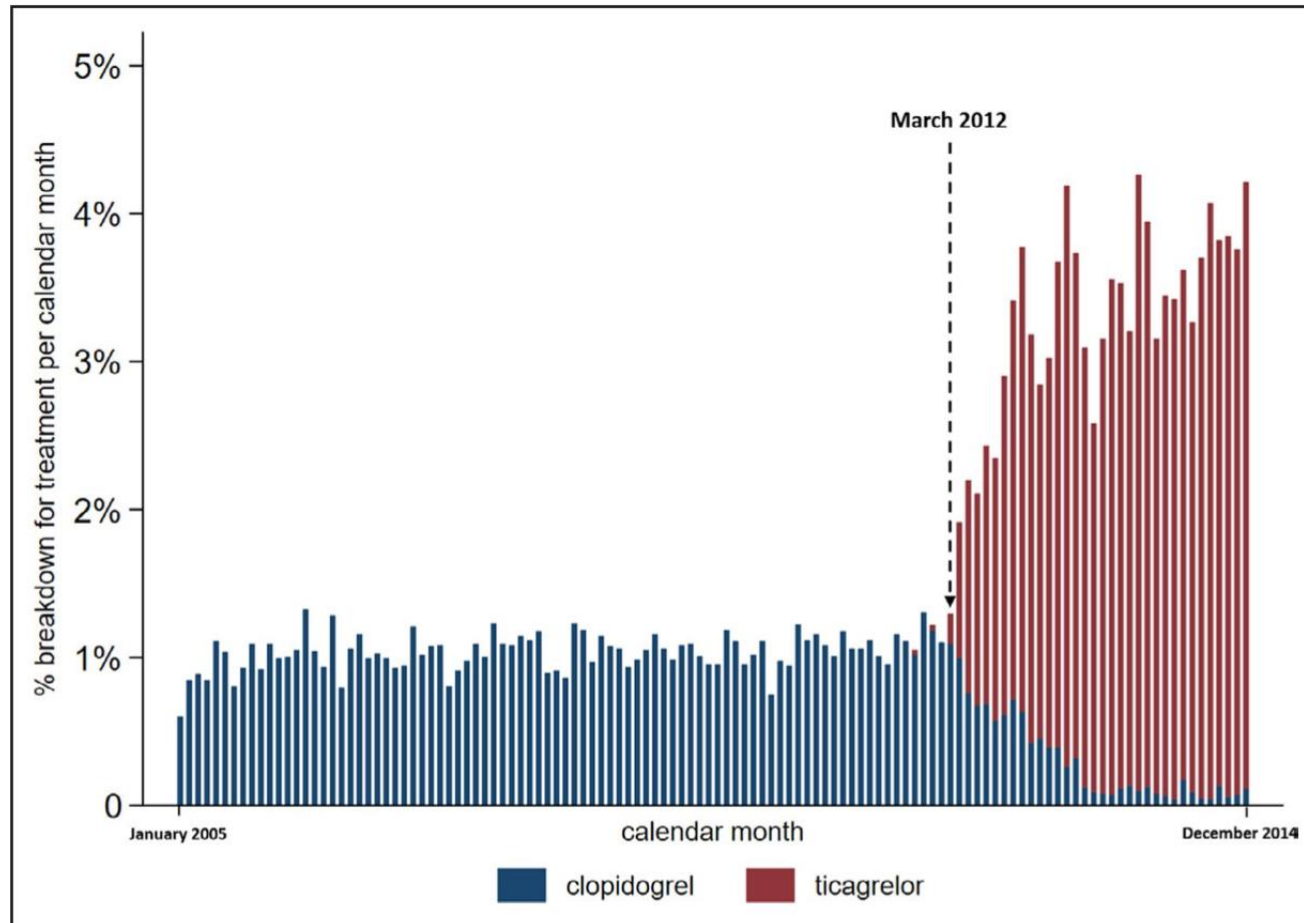


Figure 1. Percentage breakdown per calendar month for use of the 2 P2Y₁₂ antagonists—clopidogrel and ticagrelor—over the study period between January 2005 and January 2015 in Västra Götaland County.

In February 2012, the regional executive board decided to replace clopidogrel with ticagrelor as the default P2Y₁₂ receptor antagonist for patients with ACS. Figure 1 depicts the percentage breakdown for all patients treated during the study period with either clopidogrel (n=12 168; blue) or ticagrelor (n=2929; red) per calendar month during the study period. Percentages for each column per month thus add up to the entire study population (100%) for each treatment group.

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Table 3. Clinical Outcomes

Clinical Outcome	Clopidogrel (n=12 168)	Ticagrelor (n=2929)	Adjusted Odds Ratio	95% CI	P Value	Missing n (%)
Primary end point						
Death or definite stent thrombosis at 30 d — n (%)	439 (3.6)	116 (4.0)	1.20	0.87–1.61	0.250	0
Secondary end points						
Death, myocardial infarction, or stroke at 30 d — n (%)	697 (6.5)	205 (8.1)	1.25	0.95–1.63	0.104	2128 (14.1) [‡]
Death, myocardial infarction, or stroke at 1 y — n (%)	1441 (13.4)	340 (13.4)	1.15	0.93–1.45	0.192	2128 (14.1) [‡]
Death at 30 d — n (%)	439 (3.6)	116 (4.0)	1.18	0.88–1.64	0.287	0
Definite stent thrombosis at 30 d — n (%)	45 (0.4)	8 (0.3)	1.30	0.54–3.10	0.556	0
Death at 1 y — no. (%)	729 (6.1)	115 (6.3)	1.28	0.86–1.93	0.222	0
Definite stent thrombosis at 1 y — no. (%)	76 (0.7)	10 (0.4)	1.18	0.54–2.56	0.682	0
In-hospital bleeding — no. (%) [*]	489 (4.2)	163 (6.6)	2.88	1.53–5.44	0.001	979 (6.5)
Neurologic complication — no. (%) [†]	19 (0.2)	5 (0.2)	0.95	0.44–2.02	0.891	778 (5.2)

*Major bleeding (Bleeding Academic Research Consortium type 3), minor bleeding (Bleeding Academic Research Consortium type 2).

[†]Stroke or transient ischemic attack.

[‡]Data missing for myocardial infarction and stroke.

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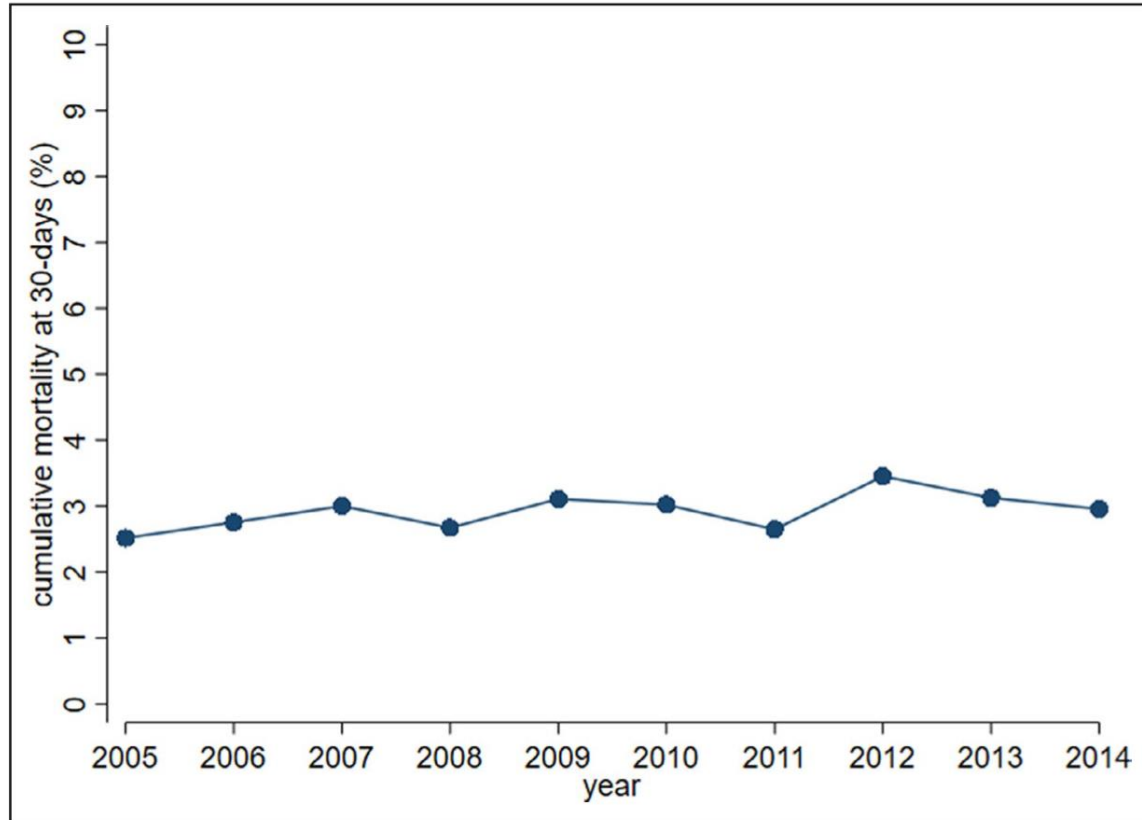


Figure 2. Cumulative incidence of mortality at 30-days in Västra Götaland County between 2005 and 2015.

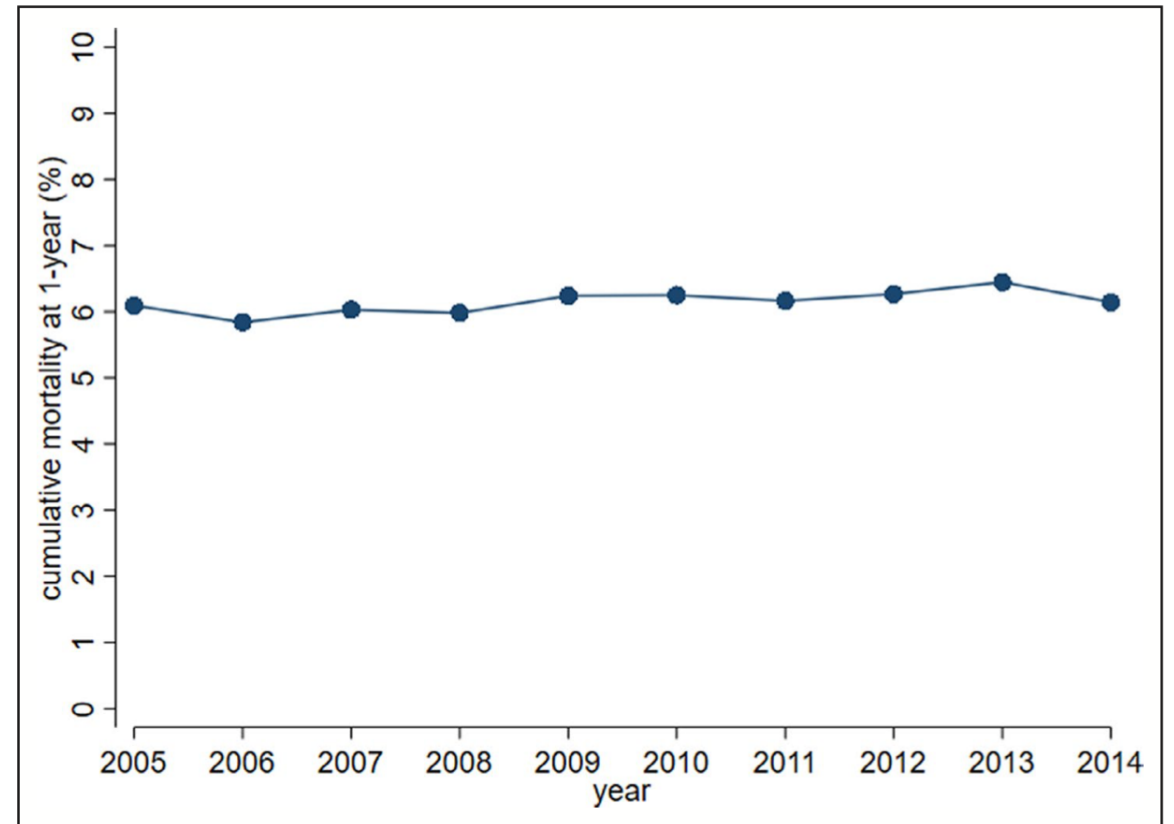


Figure 3. Cumulative incidence of mortality at 1 year in Västra Götaland County between 2005 and 2015.

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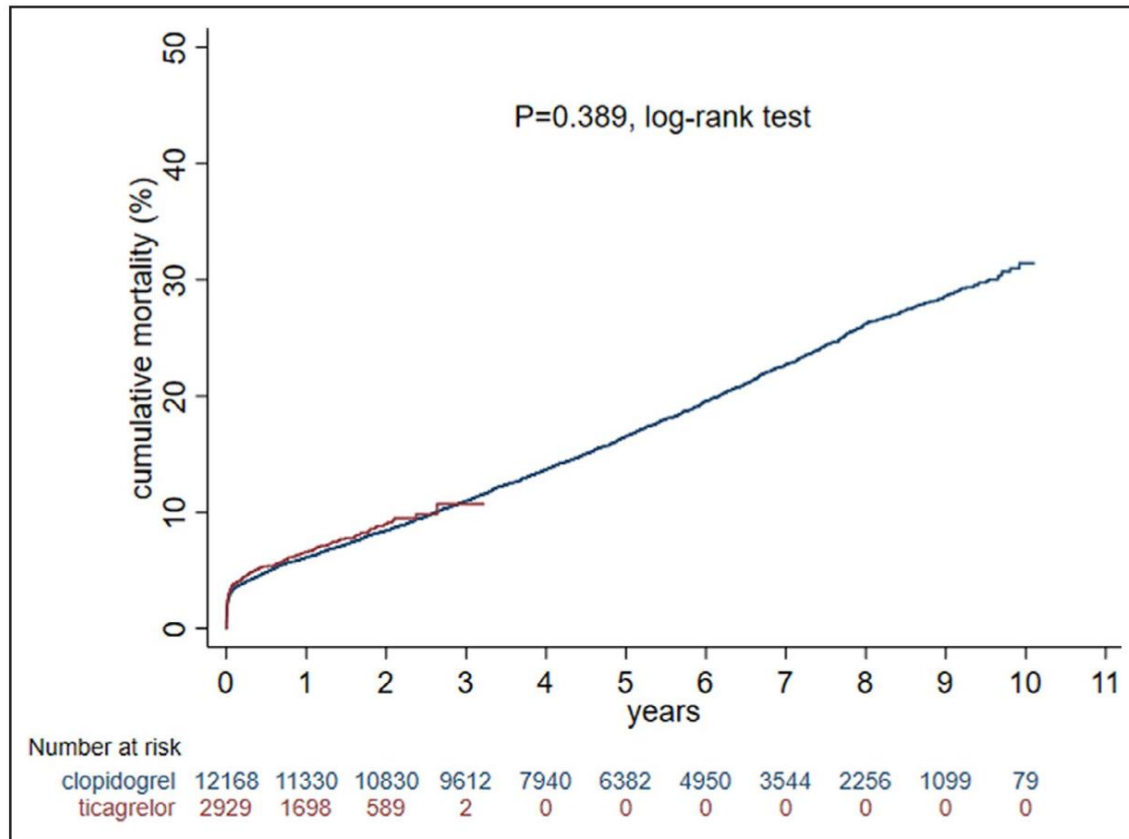


Figure 4. Long-term mortality in patients treated with ticagrelor and clopidogrel in Västra Götaland County between 2005 and 2015.

In conclusion, in this observational study, treatment with ticagrelor was not superior to clopidogrel in patients with ACS treated with PCI and was associated with an increased risk of bleeding. Benefits of ticagrelor, as demonstrated in the PLATO trial, may not be externally valid when applied to unselected patients with ACS undergoing PCI.