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Dayoub, Elias J.; Seigerman, Matthew; Tuteja, Sony; Kobayashi, Taisei; Kolansky, Daniel; Giri, Jay; and Groeneveld, Peter. Trends in P2Y12 Receptor Inhibitor Use and Adherence After Percutaneous Coronary Intervention, 2008-2016. LDI Research Briefs. 2018; No. 43. <https://ldi.upenn.edu/brief/trends-p2y12-receptor-inhibitor-use-and-adherence-after-percutaneous-coronary-intervention> " >
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Trends in P2Y12 Receptor Inhibitor Use and Adherence After Percutaneous Coronary Intervention, 2008-2016

Abstract

Post-angioplasty, patient adherence to recommended antiplatelet therapy decreased when newer, more expensive drugs were introduced. From 2008-2016, as the use of newer agents increased, the proportion of patients not filling any antiplatelet prescription within 30 days of discharge increased from 6.4% to 19.1%. In the subsequent 12 months, the newer drugs were associated with higher patient costs and lower adherence to recommended therapy.

Keywords

medication adherence, angioplasty, antiplatelet therapy, health disparities

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Research BRIEF

Research to Improve the Nation's Health System

2018 . No. 12

TRENDS IN P2Y₁₂ RECEPTOR INHIBITOR USE AND ADHERENCE AFTER PERCUTANEOUS CORONARY INTERVENTION, 2008-2016

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JAMA Internal Medicine — May 2018

KEY FINDINGS

Post-angioplasty, patient adherence to recommended antiplatelet therapy decreased when newer, more expensive drugs were introduced. From 2008-2016, as the use of newer agents increased, the proportion of patients not filling any antiplatelet prescription within 30 days of discharge increased from 6.4% to 19.1%. In the subsequent 12 months, the newer drugs were associated with higher patient costs and lower adherence to recommended therapy.

THE QUESTION

Percutaneous coronary intervention (PCI), or angioplasty, is a procedure that reopens blocked coronary arteries in patients with acute coronary syndrome. Almost all patients receive a stent, a small metal mesh that help keep the artery open. After PCI, patients must take antiplatelet therapy for 6-12 months to help prevent blood clots from forming, thereby reducing the likelihood of stroke, myocardial infarction, or cardiovascular deaths.

Current guidelines recommend two newer, more expensive antiplatelet agents—prasugrel and ticagrelor—over an earlier one, clopidogrel. Although there are some clinical trade-offs, the newer agents have been shown to be more efficacious in preventing serious adverse outcomes.

To be effective, drugs must be used. Adherence has been a problem in antiplatelet therapy, with 12-month adherence rates varying from 30% to 90%. Did the introduction of newer P2Y₁₂ inhibitors affect adherence to antiplatelet therapy? The authors used a large commercial claims database to assess use, trends, costs, and adherence rates for all three agents from 2008-2016, an interval that spans FDA approval for prasugrel (July 2009) and ticagrelor (July 2011).

THE FINDINGS

In this study of 55,340 patients who underwent PCI from 2008 to 2016, the proportion of patients filling a prescription for clopidogrel within 30 days of discharge decreased from 93.6% to 44%, while the proportion filling a prescription for prasugrel or ticagrelor increased from zero to 36.9% (**Figure 1**). During the same period, the proportion of patients who did not fill any P2Y₁₂ inhibitor prescription within 30 days increased from 6.4% to 19.1%. Patients not filling a prescription were less likely to be white, less likely to be male, and more likely to reside in the Southern United States.

Patients filling a prescription for clopidogrel had an average copayment of \$21.40 for a 30-day supply, compared to \$48.10 for prasugrel and \$48.60 for ticagrelor. Patients who did not fill a P2Y₁₂ inhibitor prescription within 30 days of discharge more frequently lived in areas with less household net worth. The proportion of non-adherent patients from the lowest net worth communities increased from 2008 to 2016 (10.8% to 15.7%), while the proportion decreased from the highest worth communities (13.6% to 9.8%) (**Figure 2**).

Nearly 80% of patients received a drug-eluting stent, where antiplatelet therapy is recommended for 12 months. In these patients, continuing adherence largely mirrored that of the initial fill, with patients less likely to continue prescriptions for the newer medications. At six months, patients who filled clopidogrel had the medication available 85% of the time,

compared to 79% for prasugrel and 76% for ticagrelor. At 12 months, these percentages dropped to 76%, 71%, and 68%, respectively. At 12 months, ticagrelor had the highest average copayments, \$557, compared to prasugrel (\$556) and clopidogrel (\$251).

Nonadherence was associated with poorer six-month outcomes, included recurrent acute coronary syndrome and hospitalizations for bleeding.

THE IMPLICATIONS

One implication of this study is that the introduction of new drugs may have exacerbated socioeconomic health disparities. Increased prescribing of new, more expensive agents can affect health outcomes by worsening adherence among patients with low socioeconomic status, thereby putting them at risk for further cardiovascular events.

Patients were less likely to fill prescriptions for newer P2Y₁₂ inhibitors, and less likely to continue to fill these prescriptions. The newer drugs partially replaced a lower-cost generic, resulting in higher out-of-pocket costs for patients. The most financially disadvantaged patients had higher rates of nonadherence, and nonadherence rates among those patients increased from 2008-2016. This suggests that increased prescribing of the newer, more expensive P2Y₁₂ inhibitors may be contributing to higher rates of nonadherence.

THE STUDY

The authors used administrative claims data from UnitedHealthcare to identify patients aged 18-64 hospitalized for PCI from January 1, 2008 to December 1, 2016. They identified filled prescriptions for a P2Y₁₂ inhibitor from pharmacy claims. They grouped patients by type of P2Y₁₂ inhibitor and compared baseline characteristics such as demographics, region, and household net worth. They measured the proportion of patients filling prescriptions for P2Y₁₂ inhibitors within 30 days of discharge for each year.

To assess whether patients continued to fill prescriptions, the authors looked at nonadherence in patients receiving drug-eluting stents, where P2Y₁₂ inhibitors are indicated for 12 months. They measured rates of recurrent acute coronary syndrome and bleeding complications for each P2Y₁₂ inhibitor, and compared patients' out-of-pocket costs across the agents.

Figure 1. Percentage of patients who underwent PCI and filled a prescription for clopidogrel, prasugrel, and ticagrelor within 30 days of discharge, 2008-2016.

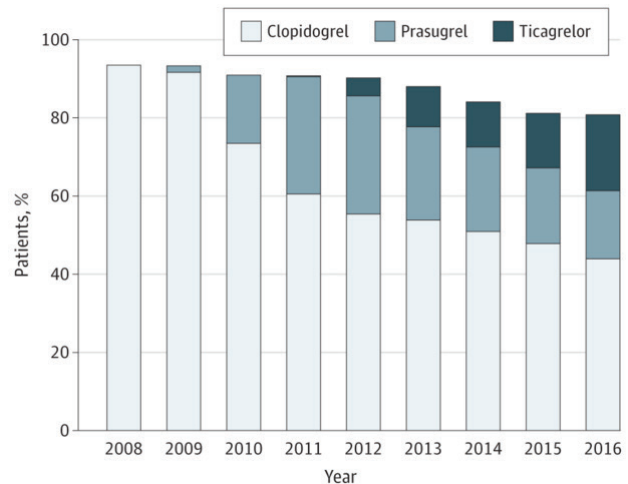
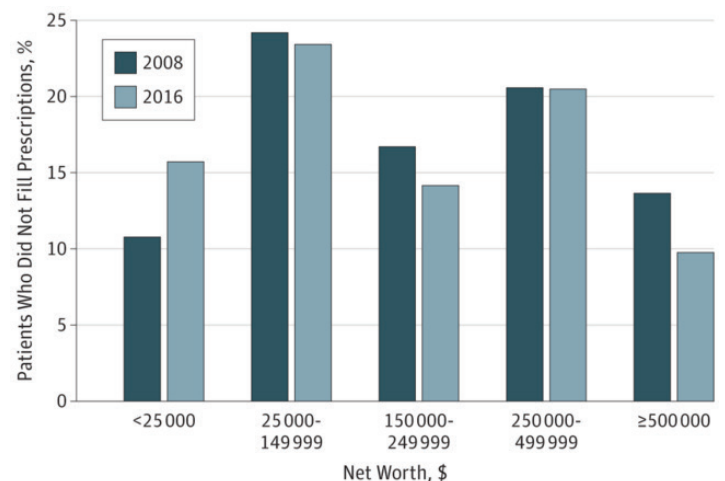
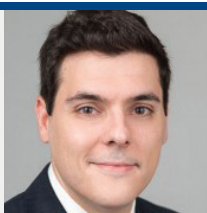


Figure 2. Community mean household net worth in patients who underwent PCI and did not fill any prescription for any P2Y₁₂ inhibitor within 30 days of discharge.



Dayoub EJ, Seigerman M, Tuteja S, et al. Trends in Platelet Adenosine Diphosphate P2Y₁₂ Receptor Inhibitor Use and Adherence Among Antiplatelet-Naive Patients After Percutaneous Coronary Intervention, 2008-2016. *JAMA Intern Med.* Published online May 21, 2018. [doi:10.1001/jamainternmed.2018.0783](https://doi.org/10.1001/jamainternmed.2018.0783)



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Elias Dayoub, MD, MPP is a National Clinician Scholar and VA Scholar at the University of Pennsylvania. He completed his internal medicine residency at Penn, after obtaining his medical degree from the University of Michigan and a Master in Public Policy from Harvard. Prior to beginning his medical training, he worked for an economic consulting firm advising clients in government and industry on cost issues in health care. His research focuses on how the adoption of innovations in cardiovascular pharmacotherapies and medical devices affects health care utilization and costs, as well as access to care and health disparities. Additionally, he explores policy solutions to address the economic and social implications of medical innovation.