**Time to proprotein convertase subtilisin-kexin type 9 inhibitor initiation in patients post myocardial infarction or stroke**

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**Background:**

The ACC/AHA Guideline on the Management of Blood Cholesterol recommends HMG-CoA reductase inhibitor as first-line therapy while adding ezetimibe or a proprotein convertase subtilisin-kexin type 9 (PCSK9) inhibitor as second- and third-line agents, respectively. Studies have shown PCSK9 inhibitors are highly effective in reducing LDL levels by approximately 68% as monotherapy whereas statins and ezetimibe alone reduce LDL levels by 22% and 40%, respectively. Adherence to PCSK9 inhibitors is much higher than oral lipid-lowering medications due to tolerability and dosing frequency. The safety, efficacy, and tolerability make PCSK9 inhibitors an ideal class to prevent recurrent episodes of myocardial infarctions (MI) or stroke.

Studies have shown that rapid LDL lowering reduces the risk of cardiovascular events; however, no studies discuss the recommended time frame required for optimal risk reduction. Many prescribers initiate step therapy with oral lipid-lowering medications due to financial burden and guideline recommendations. PCSK9 inhibitors usually require prior authorizations before coverage is considered by insurance companies. The approval process may delay the patient’s therapy making them vulnerable to having a subsequent MI or stroke. Despite the barriers, more prescribers are shifting towards prescribing PCSK9 inhibitors due to their favorable safety and efficacy profiles.

Specialty pharmacy services are expanding across the nation to encourage the continual use of medications such as PCSK9 inhibitors. The integrated Specialty Pharmacy services at the Medical University of South Carolina include referral of patients with known ASCVD events to lipid management clinics; address prior authorizations and appeal denials; provide financial medication assistance; manage refill reminders; monitor therapy; and offer counseling. Expanding specialty pharmacy services to deliver PCSK9 inhibitors to patients quicker optimizes the care of the patient.

**Objectives:**

This study will evaluate the total time from myocardial infarction or stroke to PCSK9 inhibitor prescription initiation, prior authorization approval, and medication delivery.

**Methods:**

This retrospective study collected information using medical records at a single-center academic health system from January 1, 2019 to June 30, 2021. The primary outcome is time (in days) to initiation of PCSK9 inhibitors in patients post MI or stroke. Secondary outcomes include Time (in days) to initiation of PCSK9 inhibitors in patients post ASCVD events aside from MI or stroke and compare difference between baseline to most recent LDL levels of patients post PCSK9 inhibitor initiation. Inclusion criteria included adults over the age of 18 with a known ASCVD event (as defined by ACC/AHA Guidelines on the Management of Cholesterol) and known date of ASCVD event who were initiated on alirocumab or evolocumab at MUSC. Those excluded from the study included pediatric patients, pregnant patients, those without known ASCVD event or date of ASCVD event, patients outside of the study time period, patients initiated outside of MUSC, deceased patients and those initiated on a PCSK9 inhibitor medication solely due to hyperlipidemia, mixed hyperlipidemia, dyslipidemia, or statin intolerance. Descriptive statistics were used to calculate the primary and secondary outcomes in terms of time and Wilcoxon Signed Rank Test was used to analyze pre- and post- initiation LDL levels.

**Preliminary Results:**

For the primary outcome, from January to June 2019, the time from ASCVD event to PCSK9 inhibitor initiation averaged at 264.08 days. This number decreased from July to December 2019 with the average time being 150.8 days. From January to June of 2020, the time drastically decreased to 37.46 days and continued to decrease to 17.66 days from June to December 2020. From January to June 2021, this number continued to decrease to 16.5 days showing a consistent decline in time frame between event and dispensing of PCSK9 inhibitor. Secondary outcome showed a similar decline with January to June 2019 averaged at 247.64 days, 199.58 days from July 2019 to December 2019, 44.33 days from January 2020 to June 2020, 34.67 days from July to December 2020, and finally 29.22 days averaged from January to June of 2021. The secondary outcomes of LDL change started with a baseline LDL level of 128 mg/dL, ranging from 106 to 154 mg/dL pre- initiation of PCSK9 inhibitor. Post-initiation showed a most recent LDL level at 52 mg/dL, ranging from 31 to 84 mg/dL. The value change was statistically significant with a p-value of <0.001.

**Conclusions:**

Many of the initial delays in 2019 in regards to access to PCSK9 inhibitors were due to insurance coverage, patient financial assistance and coordination of shipment or dispensing to the patient. As time progressed, coverage for these medications widen, specialty pharmacy services expanded and access to these medications came with greater ease to the medications. PCSK9 inhibitors are effective at lowering LDL levels which aligns with results from prior studies. This reduction can lower the risk of recurrent ASCVD events. Results from this study may provide evidence for further expansion of specialty pharmacy services as quicker coverage, dispensing, and shipment of these medications has proven outcomes that are clinically beneficial to patient’s health.