cohort study). Though conventionally CHADS2 score in patients with atrial fibrillation (AF) estimates the risk of ischemic stroke and thromboembolic events, but it also estimates the risk of major bleedings.[2] More than a decade ago, when vitamin K antagonists were commonly used to minimize the risk of ischemic stroke and thromboembolic events; to estimate bleeding risk HAS-BLED risk score was shown to have better discriminatory power than CHADS2/CHA2DS2VASc risk scores.[3] Now in the contemporary practice as dual anticoagulant agents, are commonly used in patients with AF; CHADS2 score is shown to be as good as other bleeding specific risk scores like HAS-BLED, ORBIT, ATRIA to predict the risk of major bleedings.[4]

The risk of major bleeding increases pari passu with an increasing CHADS2 score.[2] Whether the CHADS2 or CHA2DS2-VASc score calculates the risk of bleeding in patients without AF is an open question, in search of an answer.

Neelesh Gupta, MD
Krunalkumar Patel, MD
Rajeev Gupta, DM*
Department of Cardiology, Mediclinic Airport Road Hospital, Al Ain, Abu Dhabi, UAE

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Statin Prescription Rates in Children With Severe Dyslipidemia in the United States

Low density lipoprotein cholesterol (LDL-C) in children has been shown to predict development of atherosclerotic disease in adulthood.[1] Statins are primarily used for lowering LDL-C exerting its effect through inhibition of hydroxymethylglutaryl coenzyme A reductase.[2]

Along with lifestyle modification, statins have been recommended for prevention of atherosclerotic cardiovascular disease (ASCVD) in adults. In children, although its use in specific conditions like familial hypercholesterolemia has been warranted, long-term safety issues have been one of the concerns in using it as a pharmacological agent to prevent ASCVD for children with severe dyslipidemia. There have been various guidelines on use of statin in children, with the 2011 National Heart, Lung, Blood Institute (NHLBI) guidelines being the most widely used in practice.[3] Therefore, we sought to examine rates of statin prescription in children screened for dyslipidemia to identify treatment gaps in a real-world contemporary setting.

Methods

For our analysis, we used a deidentified, cloud-based national clinical database named Explorys (IBM) that collects data from inpatient and outpatient encounters from more than 360 medical centers covering 26 heathcare networks across the United States. Use of the Explorys registry has been deemed exempt from institutional review board approval by Rainbow Babies and Children's Hospital. We included all patients between age 10 and 19 years who had both LDL-C and pharmacy records documented between 2011 and 2019. We identified patients with 1 or more statin indications and analyzed them according to groups which were stratified based on 2011 NHLBI guidelines[3]: patients with LDL-C of 190 mg/dl or greater, LDL-C ≥160 to 189 mg/dl with either 1 high risk factor or ≥2 medium risk factor, LDL-C ≥130 to 159 mg/dl with either ≥2 high risk factor or ≥1 high risk factor + ≥2 medium risk factor. Positive family history of early ASCVD could not be ascertained. We described statin use as prescription of any statin at any dose during the study period. Logistic regression was performed using IBM SPSS Statistics, version 24 (IBM Inc.) with age, sex, race, and insurance status acting as covariates with statin prescription as dependent variable.

Results

Of the 1,750,980 patients with a qualifying lipid analysis, 4,000 children were eligible for a statin prescription for severe dyslipidemia as per NHLBI guidelines. Among those who were eligible, 1,100 children (27.5%) had an LDL-C of 190 mg/dl or greater. Only 1 in 8 children (n = 500, 12.5%) with severe dyslipidemia were noted to have been started on a statin. The statin prescription rate was higher for patients aged 15 to 19 years and among females (Figure 1). With more severe elevations in LDL-C levels (LDL-C >250 mg/dl), statin use almost doubled with 23.4% (110/470) of patients being prescribed a statin. Presence of comorbidity significantly increased the rate of prescription of a statin to 33.3% in diabetes, 30.8% in hypertension, and 20% in obesity. With combination of comorbidities, prescription rates were higher (Figure 2). Multivariable logistic regression demonstrated that males (adjusted odds ratio [aOR] 0.45, confidence interval [CI] 0.33 to 0.63,p <0.001) and Caucasian race (aOR 0.53, CI 0.38 to 0.74, p <0.001) with dyslipidemia were less commonly associated with statin prescription and those with public insurance were 1.4 times more commonly associated with statin prescription than private insurance or self-pay (aOR 1.4, CI 1.01 to 1.91, p = 0.03).

Discussion

We sought to assess statin prescription rates among children with severe dyslipidemia using a real world population-based database. Overall, we demonstrate that statin has been underutilized among children, even in those with high LDL levels and multiple co-morbidities that predispose to early ASCVD.

Our findings raise the concern about the hesitancy among pediatric providers to start statin among children with severe dyslipidemia who are at high

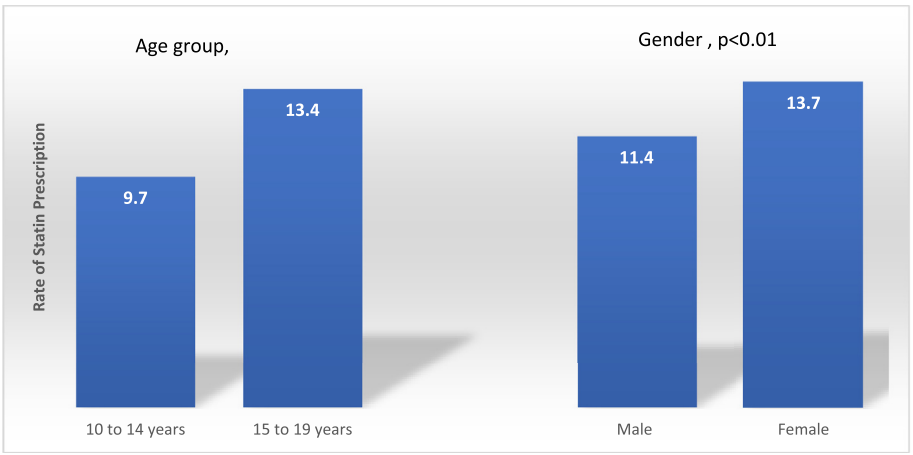

Figure 1. Age and gender difference in rates of statin prescription in U.S. children aged 10-19 years with dyslipidemia.

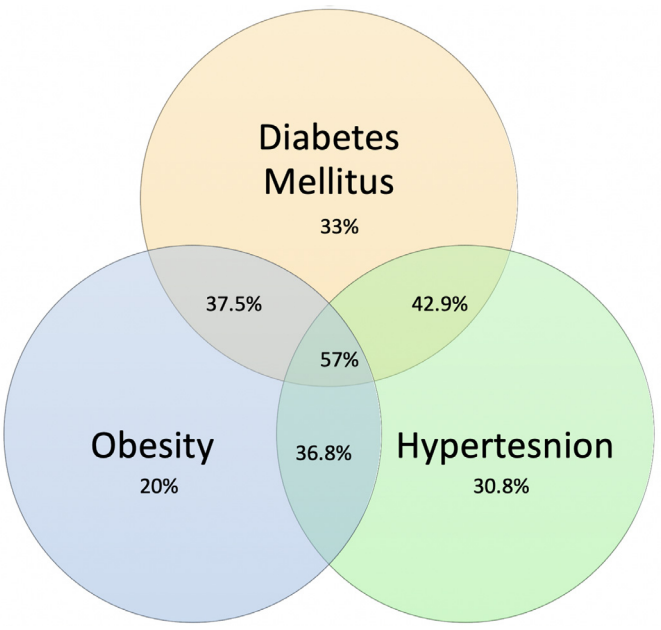

Figure 2. Statin prescription rates among U.S. children aged 10 to 19 years with dyslipidemia and comorbidities.

risk to develop ASCVD. Increased awareness among health care providers about potential risk factors and screening considerations for dyslipidemia is needed.[4] Randomized control trials that involve high-risk groups apart from familial hypercholesterolemia remain the need of the hour along with more studies demonstrating long-term safety and efficacy of statin therapy in children.

Disclosures

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Krishna Kishore Umapathi, MD[a,*]
Aravind Thavamani, MD[b]
[a] Rush University Medical Center, Chicago, Illinois
[b] UH Rainbow Babies and Children's Hospital, Cleveland, Ohio

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