

Utilization of Statins in Primary Care Patients with Chronic Liver Disease

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Background

- Statins have historically been underutilized in patients with chronic liver disease (CLD) due to fears of liver toxicity¹⁻⁷
- Increasing prevalence of non-alcoholic fatty liver disease (NAFLD) and non-alcoholic steatohepatitis (NASH)⁸
- Cardiovascular disease (CVD) is the most common cause of death in NAFLD⁹⁻¹²
- Recent studies suggest statins may alter natural progression of liver disease¹³⁻¹⁵

Aim

- To determine whether prescriber tendencies have acclimated to the accrual of evidence supporting guideline indicated statin therapy in patients with CLD

Hypothesis

- The presence of CLD continues to hinder appropriate statin utilization when compared to non-CLD counterparts

Methods

- Retrospective cohort study comprised of patients in a primary care clinic
- Inclusion criteria: Recorded LDL value; 2 or more office visits from July 2012-December 2018
- Exclusion criteria: Statin prescription from July 2012-June 2013; missing LDL value from July 2012 to end of study or before statin prescription
- Indication for statin therapy determined using Third Adult Treatment Panel (ATP-III) criteria used prior to November 2016 and the ASCVD risk assessment according to ACC/AHA guidelines thereafter
- ICD 9/10 codes identified patients with CLD

RESULTS

Table 1. Cohort characteristics overall and by incidence of a CLD

Characteristics	Overall n=2,119 (%)	CLD n=354 (%)	No CLD n=1,765 (%)	p-value
Age (Mean ± SD)	58.9 ± 11.4	57.3 ± 10.6	59.2 ± 11.5	0.004 [†]
Sex				<0.001 [†]
Female	1,162 (54.8%)	145 (41.0%)	1,017 (57.6%)	
Male	957 (45.2%)	209 (59.0%)	748 (42.4%)	
Race				0.032 [†]
Black	1,045 (49.3%)	193 (54.5%)	852 (48.3%)	
Non-Black	1,074 (50.7%)	161 (45.5%)	913 (51.7%)	
Smoking history	397 (18.7%)	116 (32.8%)	281 (15.9%)	<0.001 [†]
Comorbidities [‡]				
Diabetes	658 (31.1%)	137 (38.7%)	521 (29.5%)	<0.001 [†]
Hypertension	1,760 (83.1%)	317 (89.6%)	1,443 (81.8%)	<0.001 [†]
CHF	223 (10.5%)	62 (17.5%)	161 (9.1%)	<0.001 [†]
CAD	138 (6.5%)	31 (8.8%)	107 (6.1%)	0.061 [†]
CVD	271 (12.8%)	55 (15.5%)	216 (12.2%)	0.090 [†]
Labs and Vitals [§]				
BMI (Mean ± SD)	30.9 ± 7.8	29.0 ± 7.5	31.3 ± 7.7	<0.001 [†]
A1c (Mean ± SD)	6.4 ± 1.9	6.3 ± 2.0	6.4 ± 1.9	0.565 [†]
LDL (Mean ± SD)	145.7 ± 44.2	136.7 ± 64.9	147.5 ± 38.6	0.003 [†]
HDL (Mean ± SD)	49.9 ± 15.6	48.6 ± 18.3	50.2 ± 15.0	0.086 [†]
Trig (Mean ± SD)	135.0 ± 70.2	143.9 ± 73.1	133.3 ± 69.5	0.010 [†]
AST (Mean ± SD)	27.7 ± 25.1	43.2 ± 41.5	24.6 ± 18.8	<0.001 [†]
ALT (Mean ± SD)	27.4 ± 26.4	38.4 ± 33.8	25.1 ± 24.0	<0.001 [†]
Bilirubin (Mean ± SD)	0.68 ± 1.0	0.94 ± 2.35	0.63 ± 0.31	0.013 [†]
Albumin (Mean ± SD)	3.8 ± 0.5	3.6 ± 0.6	3.8 ± 0.4	<0.001 [†]
Platelets (Mean ± SD)	246.0 ± 69.7	218.2 ± 76.9	251.5 ± 66.8	<0.001 [†]

[†]Two sample t-test. [‡]Chi square test. [§]Comorbidities acquired any time during the study period. [§]Labs and vitals nearest to the highest LDL value. CLD=chronic liver disease. SD=standard deviation. CHF=congestive heart failure. CAD=coronary artery disease. CVD=cerebrovascular disease. BMI=body mass index. Trig=triglycerides.

Table 3. Indication for statin and statin prescribing by year in a primary care cohort.

Year (LDL)	2012	2013	2014	2015	2016	2017	2018
Incident patients with indication for statin	89	320	288	270	255	515	382
Cumulative patients with indication for statin	89	409	697	967	1222	1737	2119
Year (statin)	2012	2013	2014	2015	2016	2017	2018
Incident patients with statin Rx	50	221	196	187	164	254	161
Cumulative statin Rx	50	271	467	654	818	1072	1233
Year	2012	2013	2014	2015	2016	2017	2018
% of cumulative patients with indication for statin receiving a statin Rx	56.2%	66.3%	67.0%	67.6%	66.9%	61.7%	58.2%

LDL=low-density lipoprotein. Rx=prescription.

Table 2. Statin prescribing by chronic liver disease diagnosis

Chronic liver disease	Overall n=2,119	Statin Prescription	
		Yes	No
Yes	354 (16.7%)	212 (17.2%)	142 (16.0%)
No	1,765 (83.3%)	1,021 (82.8%)	744 (84.0%)

Chi square test: p=0.48

Table 4. Estimated odds ratios and 95% confidence intervals for logistic regression models for the outcome of receiving a prescription for a statin.

Predictors	Model 1		Model 2		Model 3	
	OR	95% CI	OR	95% CI	OR	95% CI
CLD	0.96	0.75-1.22	0.87	0.67-1.12	1.02	0.78-1.33
Age	0.99	0.98-1.00	1.00	0.99-1.01	1.00	0.99-1.01
Male	1.03	0.86-1.24	1.36	1.12-1.66	1.43	1.18-1.75
Black	1.81	1.51-2.17	1.70	1.39-2.08	1.66	1.35-2.03
CAD	2.12	1.38-3.25	1.97	1.26-3.07	1.99	1.28-3.11
CVD	1.96	1.46-2.63	1.92	1.42-2.61	1.91	1.40-2.60
CHF	1.53	1.10-2.13	1.28	0.91-1.81	1.34	0.95-1.90
Diabetes			1.95	1.56-2.43	1.99	1.59-2.49
Hypertension			2.40	1.85-3.10	2.42	1.87-3.14
LDL > 160 mg/dL			2.67	2.14-3.32	2.72	2.18-3.40
HDL < 40 mg/dL			0.94	0.75-1.18	0.95	0.75-1.19
Trig > 200 mg/dL			1.56	1.18-2.07	1.61	1.21-2.15
ALT > 45 IU/L					0.62	0.44-0.87
Platelets < 140 K/cumm					0.57	0.36-0.92
Bilirubin > 1.2 mg/dL					0.83	0.55-1.26

OR=odds ratio. CI=confidence interval. CLD=chronic liver disease. CAD=coronary artery disease. CVD=cerebrovascular disease. CHF=congestive heart failure. LDL=low-density lipoprotein. HDL=high-density lipoprotein. Trig=triglycerides. ALT=alanine aminotransferase.

Results

- Patients with CLD were significantly more likely to have diabetes, hypertension, CHF, CAD, and tobacco abuse (**Table 1**)
- 59.9% of patients with CLD received statin prescription vs 57.9% in non-CLD group (p=0.48) (**Table 2**)
- CLD was not significantly associated with statin prescription when adjusting for listed covariates (OR 1.02; 95% CI 0.78-1.33) (**Table 4**)
- ALT level >45 U/L associated with reduced odds of receiving a statin prescription (OR 0.62, 95% CI 0.44-0.87) (**Table 4**)

Discussion

- The presence of CLD did not significantly affect the decision to prescribe a statin, suggesting a possible deviation from historic tendencies
- Overall, our study suggest providers are more conscientious of numerical ALT values rather than the diagnosis of CLD when prescribing statin therapy in the primary care setting
- Adherence to guideline indicated statin therapy remains suboptimal in patients with liver disease
- Further research and concerted efforts to increase statin utilization in this high-risk population remain prudent

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