

Introduction

There is increasing evidence that non-alcoholic fatty liver disease (NAFLD) is a risk factor for cardiovascular disease, specifically for coronary artery disease (CAD), given the pathogenesis involving systemic inflammation. Our goal was to use the Nationwide Inpatient Sample (NIS) database of patients from 2016 to explore outcomes in patients who underwent PCI to determine whether the concurrent diagnosis of NAFLD led to worse in-hospital outcomes.

Methods

We used the NIS database to conduct a cross-sectional study that includes all patients greater than 18 years of age who underwent PCI with or without placement of drug-eluting stents (DES) during hospital admission in the year 2016. Patients with NAFLD were identified. Outcomes for the study included mortality, length of stay and total hospital charges, and major adverse cardiac events (MACE). Variables were analyzed using cross tabulation, Pearson χ^2 test, independent samples t-test. Data was adjusted for confounders using logistic and linear regression.

Results

Using the NIS database, 85,971 patients were found to have undergone PCI with or without placement of DES in the year 2016. Of these, 512 patients (0.6%) had a diagnosis of NAFLD (NAFLD group) and 85,459 patients did not have NAFLD (non-NAFLD group). There was no difference in mortality and MACE between the NAFLD and non-NAFLD groups. The NAFLD group had a longer hospital length of stay, and a younger age at admission. There was no difference in hospital charges upon adjustment for confounders. More patients in the NAFLD group had type 2 diabetes, hypertension, obesity, OSA, CKD, PVD and GERD. The non-NAFLD group had more patients who smoked tobacco.

Category	PCI with NAFLD (N=512)	PCI without NAFLD (N=85459)	Total (N=85971)					
Categorical Variable	Percentage	Percentage	Odds ratio	Confidence Interval	P-value	Adjusted Odds Ratio	Confidence Interval	P-value
Sex- female	35.7	32.9	1.136	1.048-1.232	0.002	1.255	1.04-1.514	0.018
Elective	8	10.6	<0.001	0.733	0.635-0.846	0.767	0.554-1.062	0.11
Non-elective	92	89.4	<0.001					

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Continuous Variables	Percentage	Percentage	Odds ratio	Confidence Interval	P-value	Adjusted Odds Ratio	Confidence Interval	P-value
Mortality	1.8	2.2	0.1	0.781	0.581-1.049	1.11	0.570-2.164	0.757
5pt MACE	2.7	2.9	0.554	0.931	0.733-1.181	1.115	0.653-1.905	0.69

Comorbidities	PCI with NAFLD	PCI without NAFLD	odds ratio (for NAFLD)		Confidence Interval	P-value	Adjusted Odds Ratio	Confidence Interval	P-value	
	N	%	N	%						
Pulmonary HTN	110	4.3	14,890	3.5	1.244	1.027-1.506	0.026	1.275	0.805-2.02	0.3
GERD	760	29.7	78910	18.5	1.864	1.71-2.030	<0.001	1.92	1.578-2.337	<0.001
OSA	425	16.6	37,015	8.7	2.099	1.890-2.33	<0.001	1.825	1.427-2.333	<0.001
Obesity	605	23.6	52,435	12.3	2.212	2.019-2.425	<0.001	1.738	1.401-2.157	<0.001
CKD stages 1-5	390	15.2	64,050	15	1.019	0.915-1.136	0.729	1.422	1.027-1.969	0.034
HLD	1670	65.2	271,855	63.3	1.073	0.989-1.164	0.091	0.981	0.811-1.186	0.841
Tobacco Use	25	1	10,17	2.4	0.404	0.273-0.6	<0.001	0.308	0.115-0.825	0.019
HTN	1,650	64.5	254,225	59.5	1.234	1.138-1.339	<0.001	1.307	1.042-1.639	0.02
Hx of old MI	455	17.8	72,160	16.9	1.064	.961-1.178	0.233	1.023	0.81-1.291	0.85
NSTEMI (acute)	1145	44.7	175,900	41.2	1.156	1.07-1.25	<0.001	1.143	0.956-1.367	0.143
STEMI (acute)	60	2.3	11,780	2.8	0.847	0.655-1.094	0.203	0.843	0.462-1.537	0.577
CHF	575	22.5	95,310	22.3	1.009	0.919-1.107	0.851	1.074	0.864-1.336	0.519
PVD	260	10.2	35,815	8.4	1.236	1.086-1.405	0.001	1.388	1.031-1.868	0.031
T2DM	1,205	47.1	156,975	36.7	1.531	1.417-1.655	<0.001	1.32	1.099-1.587	0.003

Discussion

Non-alcoholic fatty liver disease (NAFLD) is emerging as a risk factor for cardiovascular disease. Increasing evidence supports the idea that the pathogenesis of NAFLD contributes to systemic atherosclerosis and thus coronary artery disease. Our aim was to study the outcomes of patients with NAFLD who underwent percutaneous coronary intervention in order to determine whether they had increased mortality or rate of complications when compared to patients without NAFLD. This was the first large-scale retrospective cohort study to compare PCI outcomes between these two groups. Previously, Keskin et al. reported that in patients with ST segment elevation myocardial infarctions (STEMI), the presence of NAFLD led to worse clinical outcomes. They also found that the higher the grade of NAFLD, the higher the rate of mortality in STEMI patients.

We found that among patients who underwent PCI in 2016, those with NAFLD had a longer length of stay, were admitted at a younger age, and had significantly more cardiovascular co-morbidities compared to those without NAFLD.

Conflict of Interest and Financial Disclosure

We confirm that there are no known conflicts of interest associated with this publication and there has been no financial support required.

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