538 Impact of prior statin use on clinical outcomes in COVID-19 patients: data from tertiary referral hospital during COVID-19 pandemic in Italy

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Aims: Epidemiological evidence suggests that anti-inflammatory and immunomodulatory properties of statins may reduce the risk of infections and infection-related complications. In this observational multi-centre study, we aimed to assess the impact of prior statin use on coronavirus disease (COVID-19) severity and mortality.
Methods and results: Consecutive patients hospitalized for COVID-19 were considered and enrolled in four tertiary referral hospitals (Luigi Sacco Hospital, Milan; Policlinico Umberto I Hospital, Rome; Spedali Civili Hospital, Brescia; Humanitas

Table 1. Clinical variables and outcomes among unadjusted and propensity-matched cohorts, stratified by statin therapy

Variables	Overall population (N=842)	*Unadjusted data*			*Propensity score matched data*		
		Statin group (N=179)	No-statin group (N=663)	P-value	Statin group (N=145)	No-statin group (N=145)	P-value
Demographics							
Age, years,	64 (61-77)	73 (65-81)	61 (49-74)	**<.001**	71 (64-79)	72 (61-80)	0.707
Age > 65, N (%)		123	276	**<.001**	106 (73)	100 (69)	0.439
Male gender, N (%)	519 (62)	126 (70)	393 (59)	**0.006**	100 (69)	97 (67)	0.707
BMI (kg/m^2) ≥ 30 kg/m,N (%)	79 (9)	24 (13)	55 (8)	**0.037**	18 (12)	17 (12)	0.797
Comorbidities, N (%)							
Hypertension	380 (45)	138 (77)	242 (37)	**<.001**	106 (73)	101 (70)	0.517
Diabetes	140 (17)	63 (35)	77 (12)	**<.001**	44 (30)	52 (36)	0.319
Dyslipidemia	201 (24)	177 (98)	24 (4)	**<.001**			
Smoking	94 (11)	33 (18)	61 (9)	**<.001**	20 (14)	18 (12)	0.729
CAD	112 (13)	74 (41)	38 (6)	**<.001**	41 (28)	36 (25)	0.507
Atrial fibrillation	75 (9)	30 (17)	45 (7)	**<.001**	23 (17)	22 (15)	0.872
Heart failure	38 (5)	20 (11)	18 (3)	**<.001**	14 (10)	14 (10)	1.000
CKD	62 (7)	25 (14)	37 (6)	**<.001**	18 (13)	19 (13)	0.861
COPD	61 (7)	15 (8)	46 (7)	0.510	12 (8)	15 (10)	0.546
Cerebrovascular disease	32 (4)	14 (8)	18 (3)	**0.001**	8 (6)	9 (6)	0.804
Malignancy	66 (8)	20 (11)	46 (7)	0.062	14 (10)	8 (6)	0.185
Outcomes, N (%)							
NEWS	3 (2-5)	4 (2-6)	3 (2-5)	**<.001**	4 (2-6)	3 (2-5)	0.054
Moderate/severe disease (NEWS ≥ 5)		104 (58)	291 (44)	**<.001**	88 (61)	69 (48)	**0.025**
ICU admission	46 (5)	6 (3)	40 (6)	0.162	6 (4)	11 (8)	0.213
ARDS	155 (18)	41 (23)	114 (17)	0.080	24 (17)	32 (22)	0.235
Myocardial Injury	96 (11)	35 (20)	61 (9)	**<.001**	25 (17)	28 (19)	0.670
Death	182 (22)	**52 (29)**	**130 (20)**	**0.006**	38 (26)	41 (28)	0.185

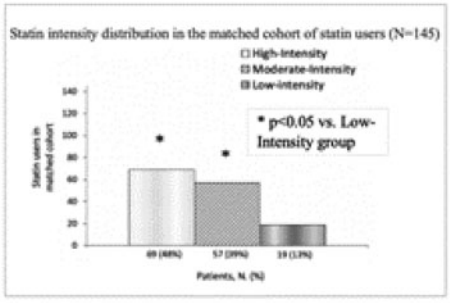

Table 2. Logistic regression of study outcomes according to Statin Intensity

Statin Intensity	Predictor	p	OR	95% Confidence Interval	
				Lower	Upper
Moderate Intensity *vs.* Low Intensity	Intercept	0.153	1.68	0.826	3.40
	Death	0.916	1.07	0.294	3.91
	NEWS ≥ 5	0.055	2.91	0.979	8.68
High Intensity *vs.* Low Intensity	Intercept	0.155	1.67	0.824	3.39
	Death	0.890	1.09	0.306	3.91
	NEWS ≥ 5	**0.015**	3.82	1.298	11.21
High Intensity *vs.* Moderate Intensity	Intercept	0.993	0.997	0.546	1.81
	Death	0.961	1.020	0.453	2.30
	NEWS ≥ 5	0.484	1.309	0.616	2.78

Gavazzeni Hospital; Bergamo) From 23 February 2020 to 31 March 2020, in-hospital mortality and severity of COVID-19 assessed with National Early Warning Score (NEWS) were deemed primary and secondary outcomes, respectively. Among 842 patients enrolled, 179 (21%) were treated with statins before admission. Statin patients showed more comorbidities and more severe COVID-19 [NEWS 4 (IQR: 2–6) vs. 3 (IQR: 2–5), $P < 0.001$]. Despite having similar rates of intensive care unit admission, noninvasive ventilation, and mechanical ventilation, statin users appeared to show higher mortality rates. After balancing pre-existing relevant clinical conditions that could affect COVID-19 prognosis with propensity score matching, statin therapy confirmed its association with a more severe disease (NEWS $\geq$ 5; 61% vs. 48%, $P = 0.025$) but not with in-hospital mortality (26% vs. 28%, $P = 0.185$). At univariate logistic regression analysis, statin use was confirmed not to be associated with mortality (OR: 0.901; 95% CI: 0.537–1.51; $P = 0.692$) and to be associated with a more severe disease (NEWS $\geq$ 5 OR: 1.7; 95% CI: 1.067–2.71; $P = 0.026$).

Conclusions: Our results did not confirm the supposed favourable effects of statin therapy on COVID-19 outcomes. Conversely, they suggest that statin use should be considered as a proxy of underlying comorbidities, which indeed expose to increased risks of more severe COVID-19.