



Low versus High Dose Methylprednisolone in Adult Patients with COVID-19: Less is More



Seema Joshi MD¹, Zachary Smith², Sana Soman¹, Saniya Jain¹, Atheel Yako¹, Marwa Hojeij¹, Louis Massoud¹, Ayman Alsaadi³, Jonathan Williams¹, Rachel Kenney², Joseph Miller⁴, George Alangaden¹, Mayur Ramesh¹

1) Division of Infectious Diseases 2) Department of Pharmacy 3) Department of Internal Medicine 4) Department of Emergency Medicine
Henry Ford Hospital, Detroit, Michigan

Introduction

- Corticosteroids (CS) used in patients with severe COVID-19 is a well-known treatment which improves survival
- However, the optimal dose has not been established**
- We aim to evaluate clinical outcomes in patients with severe COVID-19 receiving high-dose corticosteroids (HDC) versus low-dose corticosteroids (LDC)

Methods

- This was a quasi-experimental **Inclusion criteria:** age >18, laboratory confirmed SARS-CoV-2, severe COVID-19 (hypoxia requiring supplemental oxygen)
- Exclusion criteria:** those who died <24 hours, received <48 hours of CS, lack of 28-day follow-up
- HDC:** methylprednisolone (MP) 80mg daily in two divided doses
- LDC:** MP 32-40mg daily in two divided doses
- Consecutive patients in the HDC group (1 September to 15 November 2020) were compared to the LDC group (30 November 2020 to 20 January 2021)
- Primary outcome:** all-cause 28-day mortality
- Secondary outcome:** See table 2
- Statistical analysis:** sample size was derived from all eligible consecutive hospitalized patients in each arm of the study. A bivariate and a priori multivariable regression analysis for 28-day mortality was completed

Results

- There was no difference in 28-day mortality in multivariate analysis** after adjusting for age >60, gender, race, CVD, baseline ICU status and tocilizumab use among the HDC and LDC groups (OR 0.947, [CI 0.515 – 1.742], p 0.861)

Results

Characteristics	Total (n = 470)	HDC (n = 218)	LDC (n = 252)	P value
Demographics				
Median age (IQR), y	64 (53-74)	63 (52-73)	65 (53-75)	0.295
Male sex, no. (%)	245 (52.1%)	110 (50.5%)	135 (53.6%)	0.518
Race, no. (%)				
Black	220 (46.8%)	98 (45.0%)	122 (48.4%)	0.454
White	103 (21.9%)	53 (24.3%)	50 (19.8%)	0.199
Other	147 (31.3%)	67 (30.7%)	80 (31.7%)	0.886
Median BMI (IQR) – kg/m ²	30.7 (26.3-36.2)	30.2 (26.2-35.7)	31 (26.6-37.1)	0.395
Coexisting conditions, no. (%)				
Cardiovascular disease	339 (72.2%)	140 (64.2%)	199 (79.0%)	<0.001
Chronic kidney disease	103 (21.9%)	42 (19.3%)	61 (24.2%)	0.197
Diabetes	195 (41.5%)	81 (37.2%)	114 (45.2%)	0.076
Immunodeficiency	50 (10.6%)	20 (9.2%)	30 (11.9%)	0.338
Lung disease	160 (34.0%)	65 (29.8%)	95 (37.7%)	0.072
Malignancy	61 (13.0%)	32 (14.7%)	29 (11.5%)	0.308
Severity of illness on admission				
Median qSOFA in ED (IQR)	2 (1-3)	2 (1-3)	2 (1-3)	0.870
Direct admission to ICU from ED, no. (%)	77 (16.4%)	41 (18.8%)	36 (14.3%)	0.187
Mechanical ventilation in ED, no. (%)	10 (2.1%)	4 (1.8%)	6 (2.4%)	0.688
Treatment				
Remdesivir, no. (%)	330 (70.2%)	147 (67.4%)	183 (72.6%)	0.220
Antibiotic, no. (%)	193 (41.1%)	120 (55.0%)	73 (29.0%)	<0.001
Tocilizumab, no. (%)	12 (2.6%)	12 (5.5%)	0 (0%)	<0.001
Corticosteroids				
Median time from diagnosis to CS administration (IQR), d	1 (1-2)	1 (1-2)	1 (1-2)	0.871
Oral corticosteroids, no (%)	342 (72.8%)	133 (61.0%)	209 (82.9%)	<0.001
Intravenous corticosteroids, no (%)	185 (39.4%)	125 (57.3%)	60 (23.8%)	<0.001
Median duration of corticosteroids (IQR), d	5 (3-7)	5 (3-7)	5 (3-6)	0.072

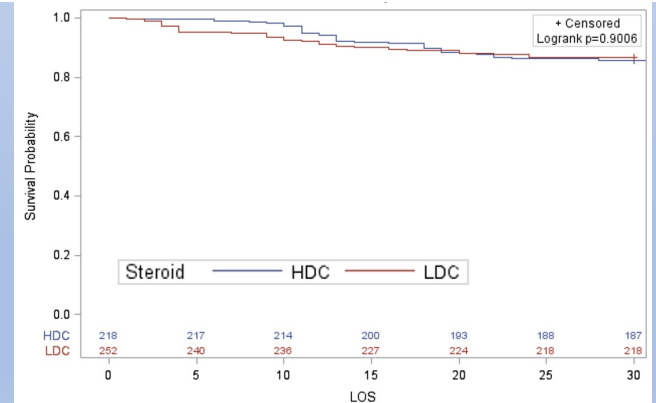
Table 1 (middle): Patient characteristics of the high dose and low dose CS groups

Table 2 (right): Patient outcomes

Figure 1 (right): Kaplan Meier curve for HDC vs LDC all-cause 28-day mortality

Results

Outcomes	HDC (n=218)	LDC (n = 252)	p-value
Primary outcome			
28-day mortality, no. (%)	32 (14.7%)	29 (13.5%)	0.712
Secondary outcomes			
Mechanical ventilation, no. (%)	28 (12.8%)	19 (7.5%)	0.056
Median hospital length of stay (IQR), d	6 (4-11)	5 (3-7)	<0.001
Discharged on supplemental oxygen, no. (%)	36 (16.5%)	51 (20.2%)	0.300
Adverse events			
Bacteremia, no. (%)	7 (3.2%)	10 (4.0%)	0.661
Candidemia, no. (%)	4 (1.8%)	1 (0.4%)	0.130
HAP/VAP, no. (%)	18 (8.3%)	18 (7.1%)	0.651
Hyperglycemia, no. (%)	93 (42.7%)	112 (44.4%)	0.697



Conclusions

- An early, short course of low-dose oral MP in hospitalized patients with severe COVID-19 had comparable outcomes to high-dose methylprednisolone**