A Matched-Group Comparison of Interventions for COVID-19 during the First and Second Waves of the COVID-19 Pandemic in a County Hospital in Chicago.

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The COVID-19 pandemic continually challenges the scientific community to develop and evaluate viable treatments. In May 2020, remdesivir became the first medication to receive emergency use authorization for the treatment of COVID-19, while dexamethasone became standard of care for patients requiring supplementary oxygen in late 2020.

Methods

This was a retrospective observational study of hospitalized adult patients with confirmed coronavirus disease 2019 (COVID-19) admitted in the first wave (3/2020-7/2020) and second wave (10/2020-1/2021) at Cook County Hospital. Variables on demographic, clinical data and outcomes were extracted from the EMR. The measured intervention was use of dexamethasone with remdesivir during the second wave; patients were matched by age and diabetic status to patients in the first wave who had received only remdesivir. The primary outcome was mortality; secondary outcomes were ICU admission and intubation. Conditional logistic regression was used to examine associations between use of dexamethasone and each outcome, controlling for glucose levels, use of remdesivir, and severity of disease. Wilcoxon signed rank and Kruskal-Wallis tests were used to examine the relationship between dichotomous and continuous variables, chi-squared tests were used to examine the relationship between dichotomous and categorical variables when expected cell sizes were >5, Fisher's exact test was used to examine the relationship between dichotomous and categorical variables when expected cell sizes were <5.

Figure 1. John H. Stroger Jr. Hospital of Cook County

Results

621 patients were admitted in the first wave (3/2020-7/2020) versus 355 in the second wave (12/2020-1/2021). Median age was 55 years and 56 years, respectively. Most patients were Hispanic and Black. In the first wave, 296 patients (48%) were admitted with severe COVID-19 (defined as oxygen saturation on room air at or below 94%) versus 163 patients (46%) in the second wave. Logistic regression showed no association between use of dexamethasone and ICU admission, mortality or intubation. Use of remdesivir showed no association with any of the outcomes. Glucose and severe/critical disease were strongly associated with ICU admission (p=0.01 and p=0.003) and mortality (p=0.06 for both).

Table 1. Demographic characteristics and comorbidities.

Characteristics	Wave 1 n=621	Wave 2 n=355
	n (%)	n (%)
Age (median, IQR)	55 (44, 63)	56 (47, 66)
Gender		
Female	200 (32)	139 (39)
Male	421 (68)	216 (61)
Race/Ethnicity		
Non-Hispanic Black	222 (36)	90 (25)
Non-Hispanic White	27 (4)	36 (10)
Hispanic	360 (58)	211 (59)
Asian	11 (2)	14 (4)
Other	1 (<1)	4 (1)
Comorbidities		
Diabetes mellitus	247 (40)	160 (45)
Hypertension	283 (46)	184 (52)
COPD/asthma	26 (4)	21 (6)
Obstructive sleep apnea	35 (6)	22 (6)
Chronic kidney disease	76 (12)	50 (14)
HIV	19 (3)	9 (3)
Cancer (all types)	54 (9)	31 (9)
Congestive heart failure	38 (6)	29 (8)
Coronary artery disease	37 (6)	18 (5)

Table 2. Severity of disease

	Wave 1 n=621	Wave 2 n=355
	n (%)	n (%)
Critical	10 (2)	6 (2)
Severe	296 (48)	163 (46)
Moderate	204 (33)	134 (38)
Mild	111 (18)	52 (15)

*Classification of disease was done according to WHO criteria: moderate disease was defined as lung infiltrates with oxygen saturation ≥ 94% on room air; severe disease was defined as lung infiltrates with an oxygen saturation <94% on room air. Critical disease was defined as severe disease with evidence of failure of at least one major organ.

Table 3. Outcomes.

	Wave 1 (n=621)	Wave 2 (n=355)
	n (%)	n (%)
Death	73 (12)	46 (13)
ICU Admission	151 (24)	84 (24)
Intubation	82 (13)	49 (14)
Discharged with Supplementary Oxygen	42 (7)	81 (23)

Conclusions

Despite promising medications that have been developed or repurposed for the treatment of COVID-19, in our center the mortality and disease severity of COVID-19 was very similar to that seen in the first wave (before standardized treatment was available). This could be due to patients presenting with more advanced disease and undiagnosed or poorly-controlled comorbidities that may offset the potential benefit of these treatments. Enhancing access to care and decreasing health inequalities may be more worthwhile than trying to find a "miracle drug".

Table 4. Adjusted Conditional Logistic Regression: Factors Associated with ICU Admission, n=216

	Odds Ratio	95% C.I.	p-value
Use of dexamethasone	0.957	0.527, 1.738	**0.886**
Remdesivir (Any duration)	1.695	0.726, 3.958	0.223
Blood glucose level	1.005	1.001, 1.009	0.015
Severity of disease			
Mild	Ref.		
Moderate	1.321	0.365, 4.777	0.671
Severe/critical	7.789	2.055, 29.524	0.003

C.I. = Confidence Interval
Note: 165 groups (328 obs.) omitted because of all positive or all negative outcomes.

Table 5. Adjusted Conditional Logistic Regression: Factors Associated with Intubation, n=148

	Odds Ratio	95% C.I.	p-value
Use of dexamethasone	1.354	0.631, 2.905	0.436
Remdesivir (Any duration)	1.231	0.432, 3.508	0.698
Glucose	1.003	0.997, 1.009	0.292
Severity of disease			
Mild	Ref.		
Moderate	1.081	0.224, 5.209	0.923
Severe/critical	8.517	1.586, 45.727	0.012

C.I. = Confidence Interval
note: 199 groups (397 obs.) omitted because of all positive or all negative outcomes.

Table 6. Adjusted Conditional Logistic Regression: Factors Associated with Mortality, n=124

	Odds Ratio	95% C.I.	p-value
Use of dexamethasone	1.396	0.591, 3.296	**0.447**
Remdesivir (Any duration)	1.395	0.437, 4.454	0.574
Glucose	1.005	0.910, 1.011	0.066
Severity of disease			
Mild	Ref.		
Moderate	0.679	0.199, 3.866	0.663
Severe/critical	4.565	0.898, 23.214	0.067

C.I. = Confidence Interval
note: 211 groups (419 obs.) omitted because of all positive or all negative outcomes.