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Background

The development of vaccination has shown high effectiveness in preventing severe disease, hospitalization, and death related to COVID-19. Thus, this study aimed at investigating whether any difference exists in clinical presentation, management, and mortality of COVID-19 critically ill patients requiring CRRT before and after the vaccination campaigns.

Methods

We performed a retrospective study on critically ill adult COVID-19 patients with AKI undergoing CRRT in the Intensive care Unit (ICU) before (from March 2020 to March 2021- 1st Group) and after (from April 2021 to March 2022- 2nd Group) the availability of COVID-19 vaccines.

Results

Fig. 1 Clinical characteristics and ICU management of critically ill COVID-19 patients undergoing CRRT

	All (n=111)	1 st group (n=88)	2 nd group (n=23)	P value
Age	63.6±0.97	64.4±0.99	60.6±2.66	0.1102
Female, n (%)	27 (24.32)	21(23.86)	6 (26.09)	0.825
Comorbidities, n(%)				
Lung diseases	22 (20.00)	18 (20.69)	4 (17.39)	0.725
CVD	36 (32.73)	31 (35.63)	5 (21.74)	0.207
Diabetes Mellitus	21 (19.09)	19 (21.84)	2 (8.70)	0.154
Hypertension	60 (54.55)	52 (59.77)	8 (34.78)	0.032
Lab examination at ICU admission				
sCr, (mg/dl)	1.53±0.13	1.57±0.16	1.38±0.18	0.5778
CRP (mg/l)	126.3±8.77	120.6±8.77	147.5±25.5	0.2129
PCT (µg/L)	4.0±1.93	1.65±0.49	13.0±9.04	0.0162
LDH (U/L)	415.0±20.6	388.7±19.1	514.5±63.8	0.0123
D Dimer (µg/L)	3733.5±876.4	3370±946.6	5137.7±2211.7	0.4176
ICU management, n(%)				
Respiratory support	63 (100)	28(100)	35 (100)	
Mechanical ventilation	105 (94.59)	84(95.45)	21 (91.14)	0.433
Non-invasive ventilation	67 (60.36)	52(59.09)	15 (65.22)	0.593
Decapneization	13 (11.71)	9(10.23)	4 (17.39)	0.341
Pharmacological therapy, n(%)				
Hydroxychloroquine	16 (14.41)	16(18.18)	0	0.027
Monoclonal Antibodies	4 (4)	0	4 (17.4)	
Steroids	70 (63.06)	53 (60.23)	17 (73.91)	0.226
Antivirals	49 (44.14)	42 (47.73)	7 (30.43)	0.137
LMWH	73 (65.77)	53 (60.23)	20 (89.96)	0.016
Days of hospitalization in the ICU	54.2±4.4	52.0±4.7	62.8±11.6	0.3290

Data are expressed as media ± DS

Abbreviations: ICU, intensive care unit; CRRT, Continuous Renal Replacement Therapy; CVD, Cardiovascular disease; ScR., Creatinine; CRP, C-reactive Protein; PCT procalcitonin; LDH, lactate dehydrogenase.

Fig. 2 Kidney function and kidney replacement management in critically-ill COVID-19 undergoing CRRT

	All (n=111)	1 st group (n=88)	2 nd group (n=23)	P value
sCr at the ICU admission, (mg/dl)	1.5 ± 0.13	1.6 ± 0.16	1.4 ± 0.18	0.5778
Days of ICU stay before CRRT	14.1 ± 1.2	15.4 ± 1.5	9.1 ± 1.9	0.0402
Days of CRRT	27.5 ± 3.2	25.8 ± 3.8	33.9 ± 5.8	0.3137
CVVHD	97 (87.4)	77 (87.5)	20 (87)	1.000
CVVHDF	13 (12)	13 (14.7)	0 (0)	0.0664
Hemodialysis membranes, n (%)				
av1000	78 (70.27)	62 (70.45)	16 (69.57)	0.934
st150	11 (9.91)	10 (11.36)	1 (4.35)	0.316
Sepsis devices	53 (47.7)	40 (45.5)	13 (56.5)	0.3603
Sorbent cartridges	35 (31.53)	31 (35.23)	4 (17.39)	0.101
Anticoagulation, n (%)				
Trisodium citrate	98 (88)	79 (89.8)	19 (82.6)	0.4642
Heparin	11 (10)	8 (9)	3 (13)	0.6945

Conclusions

Patients critically ill COVID-19 requiring CRRT after the availability of vaccines presented similar clinical characteristics and poor outcomes when compared with patients undergoing CRRT during the first phases of the pandemic. This population was characterized by a low vaccination rate, these data further reinforce the concept that in absence of established effective treatments, the most useful strategy to reduce COVID-19-related mortality is constituted by the prevention of the severe form of the disease, through the wide diffusion and universal implementation of vaccines.

