

TIMING OF RENAL REPLACEMENT THERAPY IN AKI PATIENTS: STANDARDIZE OR PERSONALIZE?

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Background

Acute kidney injury (AKI) occurs in about 10-15 % of hospitalized patients and represents a significant cause of death. This percentage, during the Covid-19 pandemic, seems to have increased. A meta-analysis reports an overall incidence of AKI, in patients with SARS-CoV2 infection, of 20.4%. The determining cause is not yet clear: direct and indirect damage (from cytokines cascade, iatrogenic damage, organ cross-talk, sepsis, mechanical ventilation, endothelial dysfunction and hypercoagulation) participate in the determination of the loss of renal function.

Materials and methods

We have selected all patients, including patients with SARS-CoV2 infection, admitted to the AOU Polyclinic "G.Martino" from February 2022 to April 2022, who needed renal replacement therapy (RRT).

Results

Twelve patients (50%) had SARS-CoV2 infection.

Table 1 reports the characteristics of the patients divided according to SARS-CoV2 infection at admission; there are no significant differences into two groups.

Table 1: Data according to Covid-19

	All	Covid-19	No Covid-19	p-values
Overall data CKD				
N	24	12	12	
Age (years), median [Q1-Q3]	78.17 [60.03-84.32]	80.23 [68.71-84.32]	72.67 [58.4-83.21]	0.487
Baseline data				
Hemoglobin, median [Q1-Q3]	10.5 [8.65-12.7]	11.2 [9.5-14.15]	9.4 [8.55-12.05]	0.201
White blood cells, median [Q1-Q3]	10600 [7200-16465]	10950 [5775-18072.5]	10600 [8600-14215]	0.880
Serum Creatinine, median [Q1-Q3]	5.05 [2.1-7.13]	5.05 [2.05-6.88]	5.25 [2.48-8.45]	0.507
Urea, median [Q1-Q3]	212 [134-272.25]	202 [116.75-268.5]	218 [152-279.5]	0.617
Sodium, median [Q1-Q3]	134.5 [129.75-140.5]	134.5 [126-139.25]	135 [126-139.25]	0.813
Potassium, median [Q1-Q3]	4.85 [4.15-5.23]	4.7 [4.3-5.13]	4.95 [4.03-5.33]	0.922
C reactive protein, median [Q1-Q3]	12.07 [3.81-19.47]	9.54 [4.46-19.47]	13.18 [4.04-17.69]	0.976
Procalcitonin, median [Q1-Q3]	0.71 [0.36-6.09]	0.67 [0.29-5.84]	1.05 [0.37-7.44]	0.668
Timing				
Days from hospitalisation to dialysis, median [Q1-Q3]	1 [0.75-3.25]	1.5 [1-6]	1 [0-3.25]	0.555
Hospitalisation				
Hospitalisation days, median [Q1-Q3]	17.5 [8-22]	19 [8-27]	17.5 [8.75-19.5]	0.673

In accordance to the know negative prognostic value of AKI stage 3, 18 patients (75%) died during hospitalization. We then divided the patients into two groups according to death (tab.2). In survival patients median creatinine was higher than in death patients (p: 0.005), but, on the other hand, in death patients hemodialytic therapy was done later (p: 0.048).

Table 2: Data according to Death

	All	Survival	Death	p-values
Overall data CKD				
N	24	6	18	
Age (years), median [Q1-Q3]	78.17 [60.03-84.32]	72.67 [56.11-79.45]	79.04 [61.23-85.43]	0.464
Baseline data				
Hemoglobin, median [Q1-Q3]	10.5 [8.65-12.7]	9.4 [8.2-10.5]	11.2 [8.83-12.95]	0.289
White blood cells, median [Q1-Q3]	10600 [7200-16465]	9600 [9200-12500]	11450 [7150-17872.5]	0.745
Serum Creatinine, median [Q1-Q3]	5.05 [2.1-7.13]	7.25 [7.13-15.25]	3.1 [3.05-6]	0.005
Urea, median [Q1-Q3]	212 [134-272.25]	281.5 [255.5-321.75]	182.5 [88.25-249]	0.060
Sodium, median [Q1-Q3]	134.5 [129.75-140.5]	135.5 [125.75-137]	134.5 [130.25-141.5]	0.640
Potassium, median [Q1-Q3]	4.85 [4.15-5.23]	5.2 [4.15-6.25]	4.7 [4.25-5.1]	0.306
C reactive protein, median [Q1-Q3]	12.07 [3.81-19.47]	6.33 [3.4-12.81]	13.8 [5.8-21.04]	0.431
Procalcitonin, median [Q1-Q3]	0.71 [0.36-6.09]	3.32 [0.34-18.06]	0.71 [0.46-4.84]	0.768
Timing				
Days from hospitalisation to dialysis, median [Q1-Q3]	1 [0.75-3.25]	0.5 [0-1]	2 [1-10.75]	0.048
Hospitalisation				
Hospitalisation days, median [Q1-Q3]	17.5 [8-22]	19.5 [17.25-21]	15 [8-24.75]	0.791

Conclusion

Our data, relating to patients who needed hemodialysis treatment during hospitalization, show that, at admission, renal function indices did not differ between COVID and non-COVID patients.

Moreover, among patients who have developed stage 3 AKI during hospitalisation (regardless of COVID-19 infection) our data show that patients who have benefited early from hemodialytic treatment have better outcomes in terms of survival, despite the worst indices of kidney function at the admission.

These results underline the importance of timing in the initiation of renal replacement therapy and the impossibility of reducing the choice to laboratory indications. Patients with worse kidney function may be clinically more stable than patients with apparently not severely impaired kidney function, but, as in COVID-19 patients, with more complex clinical pictures. The latter could benefit, after an overall assessment, from the early start of renal replacement treatment.