

1-Year Mortality in Solid Organ Transplants as Compared to Non-Immunocompromised Patients with COVID-19 Related Respiratory Failure: a Cohort Study



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INTRODUCTION

Critically ill solid organ transplants (SOT) with COVID-19 may be at increased risk for poor outcomes. We aim to compare 1-year mortality of critically ill SOT with non-immunocompromised (non-IC) patients with COVID-19 related respiratory failure.

METHODS

Single center retrospective study including adults admitted between March 2020 and March 2022 to the University Hospitals Leuven ICUs. Characteristics of SOT and non-IC patients were compared with Mann-Whitney U, Chi-Square or Fisher's exact. 1-year survival was visualized with Kaplan-Meier plots. Mortality risk was quantified with Cox-regression analysis, adjusting for baseline factors.

RESULTS

538 out of 641 unique COVID-19 patients were admitted because of respiratory failure. As shown in table 1, 74 of these were SOT, 77 were other immunocompromised, and 387 were non-IC patients. Baseline characteristics were similar except for lower BMI and higher comorbidity burden in SOT versus non-IC patients. The need for, and duration of invasive mechanical ventilation, prone ventilation and hemodynamic support was similar. However, SOT patients less frequently received ECMO [7% vs 16%], but when provided, ECMO runs were longer [26 vs 14 days]. SOT patients also more frequently received renal replacement therapy [26% vs 11%]. ICU and hospital length of stay was similar but ICU [38% vs 14%] and hospital mortality [43% vs 16%] were higher among SOT patients. This mortality excess persisted up to 1-year [47% vs 19%], as appreciated in the Kaplan Meier curve (figure 1). SOT remained independently associated with 1-year mortality after adjusting for age, gender, BMI, CCI and admission SOFA score [aHR: 2.92 (1.95-4.38), p<0.01].

CONCLUSION

1-year mortality was increased in SOT as compared to non-IC patients with COVID-19 related respiratory failure, independent of demographics, illness severity and comorbidities.

Figure 1: Kaplan Meier survival plot in COVID-19 related respiratory failure

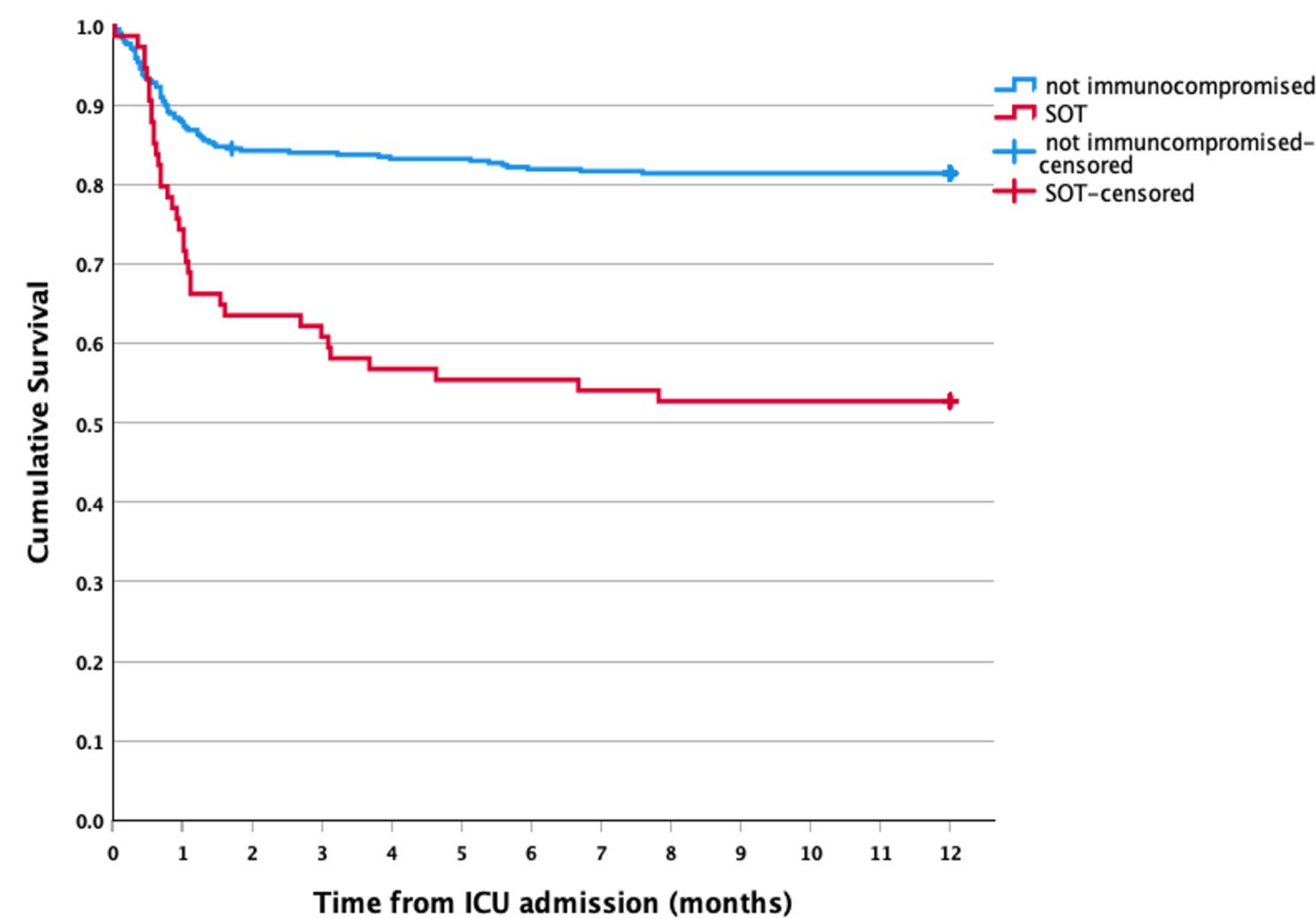


Table 1: Patient characteristics and outcomes of critically ill solid organ transplants versus non-immunocompromised patients with COVID-19 related respiratory failure

	SOT N= 74	Non-IC N= 387	p-value
Baseline characteristics			
Age (years)	64 (57-68)	64 (54-72)	0.494
Gender, male	52 (70.3%)	279 (72.1%)	0.750
BMI	25 (22 -28)	29 (26-33)	<0.001
Charlson Comorbidity Index	4 (3-7)	3 (1-4)	<0.001
Admission SOFA	5 (3-10) ^b	6 (3-10) ^c	0.927
Transplant history			
Heart	10 (13.5%)	NA	NA
Lung	38 (51.4%)		
Liver	5 (6.8%)		
Kidney	23 (31.1%)		
Received at least one vaccination dose	58 (81.7)	51 (13.2)	<0.001
ICU treatments and complications			
COVID treatments			
Remdesivir	6 (8.1%)	37 (9.6%)	0.694
Azithromycin	2 (2.7%)	13 (3.4%)	1.000
Convalescent plasma	3 (4.1%)	4 (1.0%)	0.086
Monoclonal antibodies	22 (29.7%)	4 (1.0%)	<0.001
Anti-IL1	0 (0.0%)	11 (2.8%)	0.226
Anti-IL6	0 (0.0%)	30 (7.8%)	0.008
Corticosteroids	71 (95.9)	332 (85.8)	0.016
Mechanical ventilation, yes	45 (60.8%)	245 (63.3%)	0.684
Duration (days)	9 (0-21)	8 (0-18)	0.680
Duration (days) if treated	18 (10-35)	15 (8-26)	0.131
Prone ventilation, yes	39 (52.7%)	161 (41.6%)	0.078
Duration (days)	2 (0-6)	0 (0-4)	0.065
Duration (days) if treated	5 (3-10)	5 (3-9)	0.613
ECMO, yes	5 (6.8%)	60 (15.5%)	0.048
Duration (days)	0 (0-0)	0 (0-0)	0.065
Duration (days) if treated	26 (18-37)	14 (9-24)	0.048
Vasopressors, yes	43 (58.1%)	226 (58.4%)	0.963
Duration (days)	2 (0-13)	3 (0-10)	0.940
Duration (days) if treated	7 (3-19)	9 (5-15)	0.942
Renal replacement therapy, yes	19 (25.7%)	44 (11.4%)	0.001
New bacterial infection, yes	55 (74.3%)	247 (63.8%)	0.082
New fungal infection, yes	30 (40.5%)	60 (15.5%)	<0.001
CMV reactivation	14 (18.9%)	17 (4.4%)	<0.001
Outcomes			
MRC sum score at ICU discharge	50 (39-59) ^d	51 (41-58) ^e	0.908
MRC sum score <48 at ICU discharge	16 (37.2%) ^d	94 (39.8%) ^e	0.746
ICU mobility scale^a at ICU discharge	2 (0-5) ^f	3 (2-6) ^g	0.025
ICU stay (days)	18 (8- 31)	13 (7-26)	0.072
ICU mortality	28 (37.8%)	53 (13.7%)	<0.001
HOS stay (days)	26 (16-48)	23 (12-39)	0.095
HOS mortality	32 (43.2%)	62 (16.0%)	<0.001
3-month mortality	28 (37.8%)	62 (16.1%) ^h	<0.001
1-year mortality	35 (47.3%)	72 (18.7%) ^h	<0.001

Abbreviations: BMI: body mass index; SOFA: sequential organ failure assessment; ICU: intensive care unit; HOS: hospitalization; ECMO: extracorporeal membrane oxygenation; MRC: Medical Research Council; ICUAW: Intensive Care Unit acquired weakness; IL: interleukine. Continuous variables are reported as median (IQR, categorical values as number (%)).

^a ICU mobility scale ranges between 0 and 10, with higher score indicating higher levels of mobility. Data missing in ^b 2 patients, ^c 8 patients, ^d 31 patients, ^e 150 patients among which 7 with pre-existing NMD, ^f 10 patients, ^g 50 patients, ^h 1 patient