

disease; CRP - C-reactive protein; IL-6 - interleukin-6; LDH - lactate dehydrogenase;

IQR - interquartile range; OR - odds ratio; WBC - white blood cell count.

## PROGNOSTIC FACTORS FOR IN-HOSPITAL MORTALITY OF PATIENTS WITH SEVERE COVID-19 HOSPITALIZED IN THE UNIVERSITY MEDICAL CENTER, LITHUANIA



## leva Kubiliute<sup>1</sup>, Jurgita Urboniene<sup>2</sup>, Akvile Rudenaite<sup>2</sup>, Birute Zablockiene<sup>1</sup>, Giedre Gefenaite<sup>3</sup>, Ligita Jancoriene<sup>1</sup>

<sup>1</sup>Clinic of Infectious Diseases and Dermatovenerology, Institute of Clinical Medicine, Faculty of Medicine, Vilnius University, Vilnius, Lithuania; <sup>2</sup>Center of Infectious Diseases, Vilnius University Hospital Santaros Klinikos, Vilnius, Lithuania; <sup>3</sup>Department of Health Sciences, Faculty of Medicine, Lund University, Lund, Sweden

Contact information: **leva Kubiliute, MD** E-mail: <u>ieva.kubiliute@santa.lt</u> Phone: +370 527 52594



Table 1. Basic characteristics of patients by outcome					Table 2. Laboratory characteristics of patients by outcome			
<b>Background</b> Till September 2022 there were 1.22 million of COVID-19 cases and 9291 deaths caused by COVID-19 disease registered in Lithuania. The objective of the study was to evaluate prognostic factors for in- hospital mortality of patients with severe COVID-19 disease.	Characteristics, median (IQR) or n (%)	Patients with lethal outcome (n=21)	Recovered patients (n=270)	<i>p</i> -value	Laboratory analyte, median (IQR)	Patients with lethal outcome (n=21)	Recovered patients (n=270)	<i>p</i> -value
	Age, years	73 (58-81)	58 (48-66.25)	0.001	WBC, x10 <sup>9</sup> /I	7.38 (4.35 - 9.33)	5.59 (4.22 - 7.11)	0.106
	Male gender	12 (57.1)	155 (57.4)	0.981	Neutrophil count, x10 <sup>9</sup> /I	6.17 (3.26 - 8.17)	4.06 (2.82 - 5.45)	0.013
	Days from onset of	2.5 (0-7)	7 (4-9)	<0.001	Lymphocyte count, x109/I	0.78 (0.44 - 1.00)	1.07 (0.77 - 1.44)	0.001
Methods COVID-19 positive adults hospitalized in Vilnius University Hospital Santaros Klinikos, Lithuania, were included in the cohort study between March 2020 and December 2021. Severe COVID-19 disease was defined as pneumonia with objective respiratory failure symptoms. ROC curve analysis was used to evaluate prognostic value of a laboratory test, multivariable logistic regression was used to determine the prognostic factors for in-hospital lethal outcome. <i>p</i> - value <0.05 was considered significant.	Comorbidities				Platelets, x10 <sup>9</sup> /l	159 (128 - 232)	184 (144 - 232)	0.172
	Obesity	5 (71 4)	108 (59 0)	0 703	ALT, U/I	29.5 (18.0 - 97.7)	34.0 (21.9 - 55.1)	0.857
	Hematological disease	7 (33.3)	20 (7.4)	0.001	AST, U/I	43.5 (36.5 – 99.0)	37.5 (29.0 – 64.0)	0.040
	Asthma	2 (9.5)	9 (3.3)	0.184	Ferritin, µg/l	657.0 (299.5 - 1257.9)	471.0 (218.5 - 1111.9)	0.194
	COPD	3 (14.3)	10 (3.7)	0.058	IL-6, ng/l	19.90 (8.95 – 48.45)	21.20 (9.98 - 43.90)	0.813
	Other pulmonary disease	3 (14.3)	5 (1.9)	0.014	LDH, U/I	341 (251 - 468)	300.5 (247.6 - 389.7)	0.171
	Cancer	7 (33.3)	13 (4.8)	<0.001	D-dimer, µg/l	405.0 (215.0 - 987.5)	430 (270 - 665)	0.716
	Arterial hypertension	16 (76.2)	156 (57.8)	0.098	Fibrinogen, g/l	4.9 (3.7 - 6.2)	5.4 (4.6 - 6.3)	0.452
	Cardiovascular disease	8 (38.1)	64 (23.7)	0.141	CRP, mg/l	90.3 (32.9 - 147.7)	53.7 (25.2 - 106.2)	0.115
<ul> <li>Results</li> <li>Severe COVID-19 disease was diagnosed for 291 participants, 21 (7.2%) of them died.</li> <li>Descriptive characteristics, comorbidities and symptoms of participants according to outcome are provided in Table 1.</li> <li>Laboratory features of patients are shown in Table 2.</li> <li>The best prognostic features for lethal outcome possessed neutrophils count, AST, lactate, creatinine and urea (Figure 2).</li> <li>Multivariable regression revealed that hematological diseases, initial AST &gt;32.9 U/I, lactate &gt;1.46 mmol/I were associated with inhospital mortality of patients with severe COVID-19 adjusted for age (Figure 1).</li> </ul>	Diabetes	4 (19.0)	35 (13.0)	0.501	Lactate, mmol/l	1.89 (1.27 - 2.76)	1.33 (0.98 - 1.84)	0.014
	Chronic renal disease	4 (19.0)	18 (6.7)	0.062	Creatinine, µmol/l	87.0 (74.1 – 143.0)	79.4 (65.6 - 96.2)	0.028
	Symptoms				Urea, mmol/l	8.00 (4.25 - 22.50)	5.0 (3.8 - 6.5)	0.009
	Tachypnea	12 (57.1)	72 (26.7)	0.003				
	Dyspnea	17 (81.0)	145 (54.1)	0.017	1			
	Contusion	5 (25.0)	14 (5.2)	0.006	0,9			
	Cougn	11 (52.4)	204 (76.1)	0.016	0,8			
	Fever	7 (33.3)	126 (46.7)	0.237	0,7			
	Lactate >1.46 mmol/l ■	4,87 (1,04 - 22,86), p=0.045			10,0 10,0			
<b>Conclusions</b> Hematological diseases, elevated AST and lactate concentration are significant prognostic risk factors for in-hospital mortality of patients with severe COVID-19 disease at earlier stages of infection.	AST >32.9 U/I Hematological disease	8,68 (1,47 - 51,40),	p=0.017	•		0,2 0,4 0 1 - Specific Neutrophiles AST	0,6 0,8 1 ity Neu AUC 0.66, 0.51-0.82, p=0.0 AST AUC 0.64 0.51-0.77, p=0.0	13
Abbreviations: ALT – alanine aminotransferase; AST – aspartate aminotransferase; AUC – area under the ROC curve: CI – confidence interval; COPD – chronic obstructive pulmonary	Eigure 1. Risk factors ass	4	16 64	256		Lactate     Creatinine     Urea	Lactate AUC 0.69, 0.56-0.82, p Creatinine AUC 0.64, 0.52-0.77 Urea 0.68, 0.53-0.83, p=0.009	=0.006 , p=0.028

Figure 1. Risk factors associated with in-hospital mortality, multivariable logistic regression adjusted for age, OR (95%CI, *p*-value)

