TABLE 1 Characteristics and outcomes of patients included in the study according to RDW at admission

Variable	Entire group (n = 477)	Group 1 RDW ≤ 14.7% on admission (n = 331)	Group 2 RDW > 14.7% on admission (n = 146)	Difference between groups 1 and 2 *P*-value
Age (years)	64.0±18.7	60.5±18.5	71.7±16.8	**001. >**
Male sex	240 (50.3%)	(51.1%) 169	(48.6%) 71	63.
Comorbid conditions				
Hypertension	(54.5%) 260	(46.5%) 154	(72.6%) 106	**001. >**
Diabetes mellitus	(37.9%) 181	(30.2%) 100	(55.5%) 81	**001. >**
Anemia on admission	(32.3%) 154	(22.1%) 73	(55.5%) 81	**001. >**
Renal failure	(27.3%) 130	(19.6%) 65	(44.5%) 65	**001. >**
Cerebrovascular disease	(26.8%) 128	(18.7%) 62	(45.2%) 66	**001. >**
Obesity	(26.2%) 125	(26.0%) 86	(26.7%) 39	87.
Coronary artery disease	(13.8%) 66	(11.2%) 37	(19.9%) 29	**01.**
Heart failure	(12.2%) 58	(6.3%) 21	(25.3%) 37	**001. >**
Chronic lung disease	(11.3%) 54	(8.8%) 29	(17.1%) 25	**008.**
Complex nursing care	(18.4%) 88	(12.1%) 40	(32.9%) 48	**001. >**
Symptoms on admission				
Fever	(66.5%) 317	(67.7%) 224	(63.7%) 93	39.
Cough	(47.0%) 224	(52.3%) 173	(34.9%) 51	**001. >**
Dyspnea	(43.0%) 205	(39.0%) 129	76 (52.1%)	**008.**
Weakness	(39.2%) 187	(40.2%) 133	(37.0%) 54	51.
Headache	(11.5%) 55	(14.2%) 47	(5.5%) 8	**006.**
Nausea or vomiting	(11.7%) 56	(13.6%) 45	(7.5%) 11	06.
Diarrhea	(10.9%) 52	44 (13.3%)	8 (5.5%)	**01.**
Mialgia	(9.4%) 45	39 (11.8%)	6 (4.1%)	**008.**
Chest pain	(8.8%) 42	(10.0%) 33	(6.2%) 9	18.
Other	(15.5%) 74	(17.2%) 57	(11.6%) 17	12.
Signs on admission				
Body temperature (°C)	37.4±0.8	37.4±0.8	37.5±0.8	36.
Pulse rate (beats/min)	87.2±17.1	87.5±17.5	86.4±16.2	49.
Systolic blood pressure (mm Hg)	128.6±21.9	128.3±20.5	129.3±24.8	65.
Diastolic blood pressure (mm Hg)	72.6±13.0	73.7±12.7	70.0±13.3	**004.**
Oxygen saturation (%)	94.4±5.8	95.0±5.2	92.9±6.6	**001. >**
Radiographic findings on admission				
Pulmonary infiltrates	(60.0%) 286	(58.6%) 194	92 (63.0%)	20.
Pleural effusion	(8.8%) 42	(7.6%) 25	17 (11.6%)	15.
Severity of COVID-19 on admission				
Mild-moderate	(74.8%) 357	(79.5%) 263	94 (64.4%)	**001. >**
Severe	(25.2%) 120	(20.5%) 68	52 (35.6%)	
Treatment during hospitalization				
Beta-lactam antibiotic	(58.9%) 281	(55.0%) 182	99 (67.8%)	**009.**
Macrolide antibiotic	156 (32.7%)	(35.0%) 116	40 (27.4%)	11.
Remdesivir	103 (21.6%)	(21.5%) 71	32 (21.9%)	91.
Anticoagulant	328 (68.8%)	(64.4%) 213	115 (78.8%)	**002.**
Corticosteroid	224 (47.0%)	(43.5%) 144	80 (54.8%)	**02.**
Convalescent plasma	124 (26.0%)	(25.4%) 84	40 (27.4%)	64.
Tocilizumab	72 (15.1%)	(16.0%) 53	19 (13.0%)	40.
Hydroxychloroquine	49 (10.3%)	(9.4%) 31	18 (12.3%)	33.
Laboratory data on admission				

Serum glucose (normal 80-115 mg/dl)	129.2±58.9	122.9±52.8	143.4±69.0	**001. >**
Serum creatinine (normal 0.5-0.9 mg/dl)	1.1±1.0	1.0±0.7	1.5±1.5	**001. >**
Serum albumin (normal 34-48 g/l)	36.0±5.3	36.9±5.1	34.1±5.1	**001. >**
Serum CRP (normal 0.3-5.0 mg/l)	78.2±85.7	77.5±85.9	79.6±85.4	81.
Blood hemoglobin (normal 11.7-18.0 g/dl)	13.0±1.8	13.4±1.6	12.0±2.0	**001. >**
Hematocrit (normal 40-52%)	38.9±5.2	39.9±4.5	36.7±5.9	**001. >**
RDW (normal 12.0-14.7%)	14.5±1.8	13.6±0.7	16.6±1.9	**001. >**
White blood cell count (normal 4-11x10^9/l)	6.9±4.1	6.8±3.8	7.3±4.8	20.
Neutrophil count (normal 2.0-7.7x10^9/l)	5.0±3.7	4.9±3.4	5.2±4.3	44.
Lymphocyte count (normal 1.0-4.0x10^9/l)	1.3±1.3	1.2±0.7	1.4±2.0	22.
Lymphopenia (<1.0x10^9/l)	209 (43.8%)	(41.4%) 137	72 (49.3%)	11.
In-hospital outcomes				
Pneumonia during hospitalization	299 (62.7%)	(60.3%) 199	100 (68.5%)	09.
Nosocomial infection	85 (17.8%)	(14.2%) 47	38 (26.0%)	**002.**
Acute coronary syndrome	13 (2.7%)	(2.7%) 9	4 (2.7%)	99.
Venous thromboembolism	11 (2.3%)	(2.4%) 8	3 (2.1%)	81.
Exacerbated heart failure	8 (1.7%)	(0.9%) 3	5 (3.4%)	06.
Stroke	7 (1.5%)	(0.9%) 3	4 (2.7%)	13.
Transfer to the intensive care unit	77 (16.1%)	(13.6%) 45	32 (21.9%)	**02.**
Mechanical ventilation	52 (10.9%)	(9.1%) 30	22 (15.1%)	**05.**
Length of hospital stay (days)	10.6±9.0	9.5±8.7	13.2±9.0	**001. >**
Death	60 (12.6%)	(9.1%) 30	30 (20.5%)	**001. >**
Mortality after discharge	12 (2.5%)	(0.9%) 3	9 (6.2%)	**001. >**
Total mortality	72 (15.1%)	(10.0%) 33	39 (26.7%)	**001. >**
Survival time (days)	95.0±60.4	99.9±60.3	83.8±59.4	**001. >**

.Data are presented as means ± SD or percentages of presented cases. Bold entries in the table idicate a *P*-value of ≤ .05

.RDW, red cell distribution width; COVID-19, coronavirus disease 2019; CRP, C-reactive protein

TABLE 2 Characteristics and outcomes of the patients included in the study according to changes in RDW during hospitalization

Variable	Group A No significant change in RDW (ΔRDW up to ± 0.4%, n = 262)	Group B Significant change in RDW (ΔRDW > ± 0.4%, n = 150)	Difference between groups A and B *P*-value
Age (years)	62.7±18.1	71.5±16.3	**001. >**
Male sex	(48.9%) 128	(49.3%) 74	93.
Comorbid conditions			
Hypertension	(51.5%) 135	(70.0%) 105	**001. >**
Diabetes mellitus	(37.0%) 97	(51.3%) 77	**005.**
Anemia on admission/discharge	(36.3%) 95/(26.7%) 70	(70.0%) 105/(50.7%) 76	**001. >/001. >**
Renal failure	(18.3%) 48	(51.3%) 77	**001. >**
Cerebrovascular disease	(26.3%) 69	(34.0%) 51	11.
Obesity	(22.9%) 60	(36.0%) 54	**004.**
Coronary artery disease	(12.2%) 32	(20.7%) 31	**02.**
Heart failure	(9.2%) 24	(21.3%) 32	**001. >**
Chronic lung disease	(13.4%) 35	(10.7%) 16	42.
Complex nursing care	(15.6%) 41	(27.3%) 41	**004.**
Signs			
Body temperature on admission/discharge (°C)	37.5±0.8/36.7±0.3	37.5±0.8/36.7±0.3	84./90.
Systolic blood pressure on admission/discharge (mm Hg)	129.3±21.2/128.1±19.0	128.3±23.8/129.5±18.3	53./68.
Diastolic blood pressure on admission/discharge (mm Hg)	72.8±13.0/72.2±13.1	70.0±12.7/69.8±12.0	11./**04.**
Pulse rate on admission/discharge (beats/min)	87.7±16.7/74.6±13.5	87.0±18.2/76.2±15.2	31./71.
Oxygen saturation on admission/discharge (%)	95.0±4.7/96.9±3.0	92.3±7.1/95.9±4.4	**02./001. >**
Radiographic findings on admission			
Pulmonary infiltrates/pleural effusion	(6.1%) 16/(58.3%) 153	114 (76.0%)/23 (15.3%)	**002./001.**
Severity of COVID-19 on admission			
Mild-moderate	(80.5%) 211	86 (57.3%)	**001. >**
Severe	51 (19.5%)	64 (42.7%)	
Treatment during hospitalization			
Beta-lactam antibiotic	(57.6%) 151	119 (79.3%)	**<001.**
Macrolide antibiotic	(34.4%) 90	58 (38.7%)	38.
Remdesivir	(19.8%) 52	49 (32.7%)	**004.**
Anticoagulant	(69.5%) 182	120 (80.0%)	**02.**
Corticosteroid	(46.2%) 121	96 (64.0%)	**001. >**
Convalescent plasma	(24.0%) 63	59 (39.3%)	**001.**
Tocilizumab	(15.3%) 40	32 (21.3%)	12.
Hydroxychloroquine	(9.2%) 24	25 (16.7%)	**02.**
Laboratory data			
Serum glucose on admission/discharge (normal 80-115 mg/dl)	126.3±57.8/126.7±64.9	141.4±64.9/152.9±84.0	**01.**/81.
Serum creatinine on admission/discharge (normal 0.5-0.9 mg/dl)	1.0±0.7/0.9±0.8	1.4±1.4/1.6±1.7	**001. >/001. >**
Serum albumin on admission/discharge (normal 34-48 g/l)	36.8±4.7/35.6±5.1	33.3±4.8/29.6±6.8	**001. >/001. >**
Serum CRP on admission/discharge (normal 0.3-5.0 mg/l)	67.8±72.9/34.2±48.9	113.7±101.7/80.1±102.9	**001. >/001. >**
Blood hemoglobin on admission/discharge (normal 11.7-18.0 g/dl)	13.2±1.6/12.8±1.7	12.3±2.0/11.2±2.1	**001. >/001. >**
Hematocrit on admission/discharge (normal 40-52%)	39.5±4.6/38.7±4.8	36.9±5.7/34.4±6.1	**001. >/001. >**
RDW on admission/discharge (normal 12.0-14.7%)	14.3±1.5/14.3±1.6	15.2±2.2/16.2±2.4	**001. >/001. >**
High RDW (>14.7%) on admission/discharge	(26.0%) 68/(25.2%) 66	69 (46.0%)/103 (68.7%)	**001. >/001. >**
White blood cell count on admission/discharge (normal 4-11x10^9/l)	6.3±3.3/7.2±4.2	8.1±5.4/10.9±9.0	**001. >/001. >**
Neutrophil count on admission/discharge (normal 2.0-7.7x10^9/l)	4.4±2.7/4.7±3.4	6.2±5.1/8.2±7.8	**001. >/001. >**
Lymphocyte count on admission/discharge(normal 1.0-4.0x10^9/l)	1.3±1.4/1.7±2.1	1.2±1.2/1.8±4.1	60./53.

Lymphopenia on admission/discharge (<1.0x10^9/l)	(18.3%) 48/(41.6%) 109	78 (52.0%)/51 (34.0%)	**001. >/04.**
In-hospital outcomes			
Pneumonia during hospitalization	(60.5%) 158	122 (81.3%)	**001. >**
Nosocomial infection	(12.2%) 32	52 (34.27%)	**001. >**
Acute coronary syndrome	(1.9%) 5	8 (5.3%)	056.
Venous thromboembolism	(1.1%) 3	7 (4.7%)	**03.**
Exacerbated heart failure	(1.1%) 3	4 (2.7%)	25.
Stroke	(0.8%) 2	5 (3.3%)	064.
Transfer to the intensive care unit	(7.6%) 20	55 (36.7%)	**001. >**
Mechanical ventilation	(2.3%) 6	44 (29.3%)	**001. >**
Length of hospital stay (days)	9.6±6.9	15.9±10.7	**001. >**
Death	(4.2%) 11	44 (29.3%)	**001. >**
Mortality after discharge	(1.5%) 4	8 (5.3%)	**03.**
Total mortality	(5.7%) 15	52 (34.7%)	**001. >**
Survival time (days)	102.2±55.4	77.8±62.2	**001. >**

.Data are presented as means ± SD or percentages of presented cases. Bold entries in the table idicate a *P*-value of ≤ .05

-RDW, red cell distribution width; ΔRDW, RDW on discharge minus RDW on admission; COVID-19, coronavirus disease 2019; CRP, C .reactive protein

TABLE 3 Variables most significantly associated with low survival (Cox proportional-hazards model)

Variable	*P*-value	Relative risk	95% confidence interval
Model with RDW on admission (as a continuous variable) in the entire study population (n = 477)			
Age[a]	< .001	1.93	1.56−2.39
Renal failure	< .001	3.93	2.27−6.83
Male sex	< .001	2.73	1.67−4.45
Model with RDW on discharge (as a continuous variable) in the group with time-dependent RDW changes (n = 412)			
Age[a]	< .001	1.80	1.43−2.26
Renal failure	< .001	3.41	1.93−6.03
Male sex	< .001	2.30	1.37−3.85
RDW on discharge[b]	.010	1.13	1.04−1.23
Model with change in RDW (as a dichotomized variable) in the group with time-dependent RDW changes (n = 412)			
Age[a]	< .001	1.72	1.38−2.15
Significant change in RDW (ΔRDW > ± 0.4%)	< .001	1.50	1.29−1.75
Renal failure	< .001	3.29	1.84−5.87
Male sex	.006	2.04	1.22−3.42

RDW, red cell distribution width; ΔRDW, RDW on discharge minus RDW on admission. [a] For each 10 year increment. [b] For each 1% increment.