HAEMATOLOGICAL CHANGES AND MORTALITY IN SARS-CoV-2 PATIENTS

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INTRODUCTION

The severe acute respiratoy syndrome 2 (SARS-CoV-2) has been associated with leukopenia, lymphopenia and hypercoagulability. This study aims to clarify if we can use some blood parameters to facilitate diagnosis and estimate prognosis.

METHODS

We selected all patients who had a SARS-CoV-2 positive test and hemogram between the 15th of March and the 15th of April 2020. Clinical data were obtained from all 274 SARS-CoV-2 positive patients admited at two portuguese public hospitals. A multivariate analysis was then preformed using the clinical significant variables in SPSS v.26.0. Statistical significance defined at p<0,05.

RESULTS

	All cases (N=274)	Death		
		No (n=191)	Yes (n=83)	P value
Age, years	76.0 (63.0-85.5)	71.0 (52.0–82.0)	83.0 (77.0-88.5)	<0.001
Sex, % male	42.4% (n=114)	23.9% (n=44)	48.2% (n=41)	0.236
Leucocytes (x10^9/L)	6.7 (5.0-9.4)	6.2 (4.9-8.3)	8.9 (6.2-11.0)	<0.001
Neutrophils(x10^9/L)	3.5 (1.4-6.9)	3.4 (1.6-5.2)	4.9 (1.1-8.2)	0.146
Lymphocytes (x10^9/L)	1.7 (1.1-3.1)	1.7 (1.1-2.6)	1.6 (0.7-5.3)	0.901
Platelets (x10^9/L)	209.7 +/- 5.7	221.5 +/- 6.7)	184.1 +/- 9.9	0.002
Neutrophils/ leucocytes	4.1 (2.4-7.3)	3.5 (2.2-5.7)	7.1 (3.3-13.3)	<0.001
Erythrocytes (x10^{12}/L)	4.1+/- 0.5	6.0 +/- 1.8	3.8 +/- 0.1	0.214
Haemoglobin (g/dL)	12.0+/- 0.1	12.4 +/-0.1	11.2 +/-0.2	<0.001
MCHC (g/dL)	33.3 +/- 0.1	33.5 +/- 0.1	32.8+/- 0.1	<0.001
LDH (U/L)	315.0+/- 8.5	287.1 +/-8.5	371.8 +/- 17.3	<0.001

Tabel 1. Comparison between 'death' vs 'no death'.
MCHC (molecular corpuscular hemoglobin concentration) ; LHD (lactate dehydrogenase)

Analyzing the association between mortality and all studied variables we used unadjusted and adjusted models. The unadjusted model showed a correlation between mortality and: age, leukocyte count, neutrophil count, lymphocyte count, erythrocytes and platelets counts, neutrophil/lymphocyte ratio, hemoglobin concentration, MCHC and LDH levels.

In the adjusted model some independent predictors of mortality were evident: age (OR=0.046, p<0.001**), gender (**OR=0.2364, p=0.045**), platelets** OR=9.106, p=0.001**, lymphocyte count (**OR=0.194, p=0.033**), neutrophil count (**OR=0.062, p=0.003**), neutrophil/lymphocyte ratio (**OR=0.098, p=0.002**), erythrocytes count (**OR=9.021, p<0.001) **and MCHC are independently associated with mortality (**OR=7.016, p=0.007).

Patients with neutrophil counts higher than 5.91 x10^9/L have a risk of mortality 16 times higher than those with less than 1.36 x10^9/L; Patients with lymphocyte count higher than 3.05x10^9 have a risk of mortality 5 times higher than those with lymphocytes counts less than 1.04 x10^9/L; platelet counts less than 147 x10^9/L showed a mortality risk 9.1 times higher when compared with those with platelet counts higher than 257 x10^9/L.

CONCLUSION

Haematological data at admission in the health care system can predict mortality of SARS-CoV-2 infection and we recommend it's use in clinical decisions and patients' prognosis evaluation.

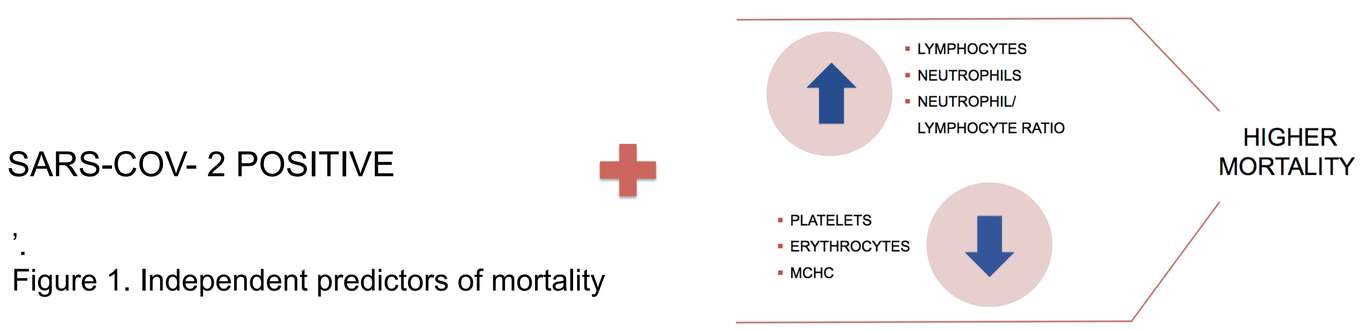

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Figure 1. Independent predictors of mortality

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