

COVID-19 parameter overview

Which quickly available lab results are suggestive of a SARS-CoV-2 infection?

	Parameter	Definition	Kinetics of parameter (compared to healthy individuals)	Reference	
CBC report	WBC	White blood cells	Major component of a complete blood count	Decreased in COVID-19 positive patients	3, 39
	NEUT	Neutrophils	Neutrophilic granulocytes; part of the 5-part differentiation of white blood cells	Decreased in COVID-19 positive patients	3, 39
	LYMPH	Lymphocytes	Mononuclear cells from the lymphoid lineage; part of the 5-part differentiation of white blood cells	Decreased in COVID-19 positive patients	3, 39
	MONO	Monocytes	Mononuclear cells from the myeloid lineage; part of the 5-part differentiation of white blood cells	Decreased in COVID-19 positive patients	3, 39
	HFLC	High-fluorescent lymphocytes	Represents the activated lymphocytes given that a haematologic disease has been excluded	Increased in COVID-19 patients	1, 14

What are early indicators for a severe course of SARS-CoV-2 infection?

	Parameter	Definition	Kinetics of parameter	Reference	
Haemostasis	DD	D-dimer	Biomarker for the dissolution of blood clots called fibrinolysis	Increased levels in severe compared to milder cases of COVID-19	7, 8,
	FDP	Fibrin degradation product	Biomarker for the dissolution of blood clots called fibrinolysis	Increased levels in severe compared to milder cases of COVID-19, highly increased levels indicate a poor outcome of the patient	7, 8
	FBG	Fibrinogen	Glycoprotein, which converted into fibrin by the serine protease thrombin (factor IIa) and calcium (factor IV) and forms the thrombus together with the platelets	Increased levels in hospitalized patients in the early to mid-term phase of the disease; Decreased in the critical phase (coagulopathy)	7, 11, 42-44, 46, 49
	FVIII	Factor VIII	Glycoprotein, which acts as a cofactor of factor IX in clot formation. Elevated factor VIII concentrations are associated with an increased risk of thromboembolic events	Increased concentration in patients requiring ventilation and in patients with an increased risk of early-onset thrombosis	42
	vWF	Von Willebrand Factor	Carrier protein of blood coagulation factor VIII Binds to collagen and platelets after vessel wall damage	Increased concentration in patients with an increased risk of early-onset thrombosis specifically if ADAMTS13 levels are decreased	42, 44-47
	AD-AMTS13	A disintegrin and metalloproteinase with a thrombospondin type 1 motif, member 13	Metalloprotease enzyme that cleaves von Willebrand factor (vWF)	Decreased with increasing intensity of care of the patient	42, 45, 47
	PAI-I	Plasminogen activator inhibitor-1	PAI-1 is a serine protease inhibitor that functions as the principal inhibitor of tissue plasminogen activator (tPA) and urokinase (uPA), the activators of plasminogen	Increased in severe compared to milder cases of COVID-19	42, 47-48
	AT	Antithrombin	Glycoprotein which inhibits the serine proteases of plasmatic coagulation, mainly thrombin (factor IIa) and factor Xa	Normal to slightly decreased in patients with hypercoagulopathy due to its consumption to inhibit thrombin formed by activated coagulation	42
	TAT	Thrombin-Antithrombin complex	Used to detect increased intravascular thrombin formation Elevated values in DIC, postoperatively, after trauma, in thromboembolic diseases, atherosclerosis and difficult blood collection	Increased in severe compared to milder cases of COVID-19	42, 47
	PIC (sometimes PAP)	Plasmin- α 2-plasmin inhibitor complex	Fibrinolytic marker	Increased in patients with increased fibrinolysis	42
	TM	Thrombomodulin	Protein that acts as a transmembrane receptor for thrombin in endothelial cells and increases the ability of thrombin to activate protein C by a thousandfold	Increased. Highly increased levels may indicate a poor outcome of the patient	42, 44
	PT	Prothrombin time	Global parameter to monitor the so-called extrinsic coagulation factors and treatment with vitamin-K antagonists	Increased time in severe cases, with a prolonged time indicating a poor outcome	7, 42-44, 47

What are early indicators for a severe course of SARS-CoV-2 infection?

	Parameter	Definition	Kinetics of parameter	Reference	
CBC report	WBC	White blood cells	Major component of a complete blood count	Increased levels in patients developing severe disease, and in patients admitted into the ICU	2, 18, 19, 36, 37
	NEUT	Neutrophils	Neutrophilic granulocytes; part of the 5-part differentiation of white blood cells	Increased levels in patients developing severe disease, and in patients admitted into the ICU	2, 15, 16, 36, 37
	LYMPH	Lymphocytes	Mononuclear cells from the lymphoid lineage; part of the 5-part differentiation of white blood cells	Decreased levels in patients developing severe disease, more prominent than during hospital admission, and in patients admitted into the ICU	8, 14, 36, 37
	NLR	Neutrophil to lymphocyte ratio	Calculated from the counts of neutrophils and lymphocytes	Increased levels in patients developing severe disease	15, 17, 36
	EO	Eosinophils	Eosinophilic granulocytes; part of the 5-part differentiation of white blood cells	Decreased levels in patients developing severe diseases, and in patients admitted into the ICU	2, 37
	PLT	Platelets	Thrombocytes	Decreased levels in patients developing severe disease, that can also indicate a poor outcome	7-11
	AS-LYMP	Antibody synthesising lymphocytes	Reflects the presence and levels of plasma cells that produce antibodies and indicate an adaptive immune response	Increased absolute counts or as percentage within lymphocytes in patients developing severe disease	2, 36, 40
	RE-LYMP	Reactive lymphocytes	Identifies the presence of activated CD4+ and CD8+ T lymphocytes [Rutkowska et al. 2021]	Increased as a percentage within lymphocytes in patients developing severe disease	2, 36, 40
	RE-MONO	Reactive monocytes	Quantitative assessment of the number of reactive monocytes present in infections	Increased levels in patients developing severe disease	36, 40
	NEUT-RI	Neutrophil reactive intensity	Indicates an early immune response by quantifying/measuring the activation of neutrophils	Increased levels in patients developing severe disease	36
Urinalysis	Cast* Hy.Cast* Path. Cast*	urinary granular cylinders	Aggregates of precipitated uromodulin, originated from renal tubular epithelial cells in the distal loop of Henle. Increased numbers of hyaline casts and pathological casts indicate nephrotic conditions	Increased in severe cases, indicating COVID-related renal impairment	22
	RTEC*	renal tubular epithelial cells	Cells that cover the renal tubules from the proximal tubule via the Henle Loop to the distal tubule. Increased numbers indicates active renal disease or tubular injury	Increased in severe cases, indicating COVID-related renal impairment	22
	WBC* LEU**	leucocyturia	Describes the presence of WBC in urine and indicates infections or inflammatory conditions	If present along with haematuria or albuminuria, risk for nephritis and ICU admission is elevated. Parameter combination serves for prognostic judgement of COVID-19 severity	23
	RBC* Dysm. RBC*** BLD**	haematuria	Describes the presence of RBC in urine. Whereas isomorphic RBC originate from bleedings along the urinary tract, dysmorphic RBC indicate glomerular damage	If present along with leucocyturia or albuminuria, risk for nephritis and ICU admission is elevated. Parameter combination serves for prognostic judgement of COVID-19 severity	23
	ALB****	albuminuria	Describes the presence of urinary albumin, a common and homeostatic protein component of the blood. Albuminuria indicates glomerular damage and serves as a parameter to detect renal impairment at early stages	If present along with haematuria or leucocyturia, risk for nephritis and ICU admission is elevated. Parameter combination serves for prognostic judgement of COVID-19 severity	23
	PRO****	proteinuria	Describes the presence of protein in urine	If present, along with haematuria, this parameter supports the early detection of renal impairment (e.g. AKI) in COVID-19 patients	41

* = Parameter on the UF-4000/UF-5000

** = Parameter on the UC-1000/UC-3500

*** = Flag on the UF-4000/UF-5000

**** = Parameter on the UC-1000/UC-3500, requiring Meditape 12S or Meditape 11A test strips, respectively.

Which markers are prognostic of mortality?

	Parameter	Definition	Kinetics of parameter	Reference	
Coagulation/ Haemostasis	DD	D-dimer	Biomarker for the dissolution of blood clots called fibrinolysis	Increased levels is associated with higher mortality	11
	PT	Prothrombin time	Global parameter to monitor the so-called extrinsic coagulation factors and treatment with vitamin-K antagonists	Modest increased time in patients that did not survive	11, 12
	PLG	Plasminogen	Proenzyme of plasmin, the key enzyme in fibrinolysis	Decreased levels in patients that did not survive	43
CBC report	WBC	White blood cells	Major component of a complete blood count	Increased levels were more frequent in patients that did not survive	18, 19, 30, 38
	NEUT	Neutrophils	Neutrophilic granulocytes; part of the 5-part differentiation of white blood cells	Increased levels in patients that did not survive	18, 19, 30, 38
	LYMPH	Lymphocytes	Mononuclear cells from the lymphoid lineage; part of the 5-part differentiation of white blood cells	Decreased levels in patients that did not survive	18, 19, 30, 38
	PLT	Platelets	Thrombocytes	Decreased levels is correlated with higher mortality rates	9, 12, 13



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