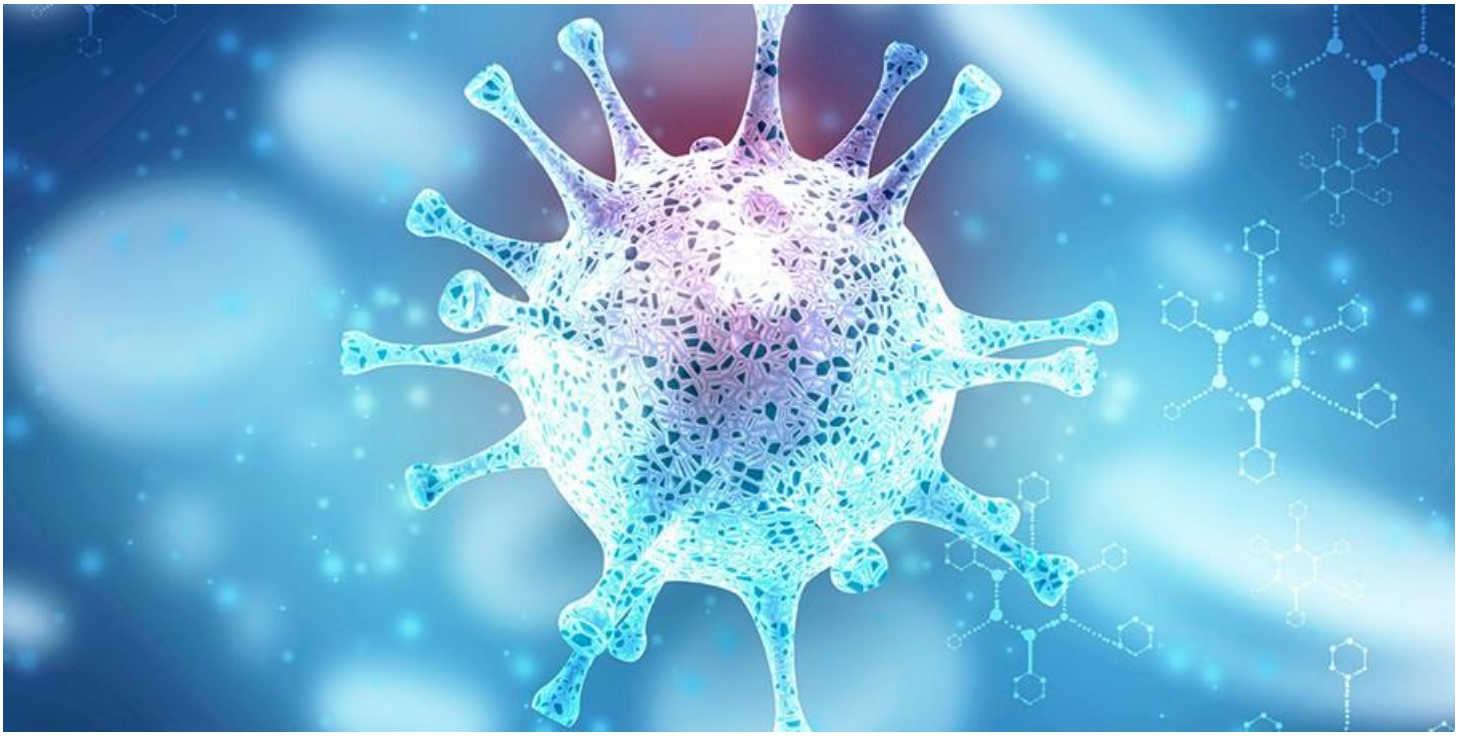
Literature list – haematology parameters in COVID-19

Customer information



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Note: Whether references are given in British or American English depends on the original.

NEW New entries are highlighted by this icon.

COVID-19 is an emerging, rapidly evolving pandemic.

Available literature is changing quickly, and studies summarised here may not represent the latest status of knowledge. Please consider that conclusions of articles of this list may be based on low sample numbers or manuscripts that are not peer-reviewed yet (pre-prints).

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Original articles

NEW

Jha B *et al*. (2023)

Value of new advanced hematological parameters in early prediction of severity of COVID-19.
Int J Lab Hematol; 45(3): 282

https://onlinelibrary.wiley.com/doi/10.1111/ijlh.14035

Summary: In this prospective observational study the intensive care infection score (ICIS) and the COVID-19 prognostic score showed similar performance in identifying critical illness in a cohort of COVID-19 positive patients (AUC 0.778 and 0.781). All EIP (except for NEUT-GI) exhibited significant differences in critically ill versus non critical patients and RE-LYMP# was found as independent risk factor.

Urrechaga E *et al*. (2021)

Leukocyte differential and reactive lymphocyte counts from Sysmex XN analyzer in the evaluation of SARS-CoV-2 infection.
Scand J Clin Lab Invest; 81(5): 394

Free online: https://www.tandfonline.com/doi/abs/10.1080/00365513.2021.1929445?journalCode=iclb20

Summary: This prospective observational study aimed to assess the diagnostic performance in distinguishing SARS-CoV-2 infections from other viral or bacterial infections in emergency room (ER) patients presenting with fever. NLR > 3.3 and RE-LYMP >0.6% correctly distinguished 95.6% of SARS-CoV-2 infection patients in the validation group (bacterial and viral infected ER patients).

Cohen A *et al.* (2021)

Immature platelets in patients with Covid-19: association with disease severity.
J Thromb Thrombolysis; 52(3): 708

Free online: https://link.springer.com/article/10.1007/s11239-021-02560-x

Summary: In this study of patients with COVID-19 patients (56 mild cases, 80 severe) showed that immature platelet parameters (IPF, IPF# and maximal IPF#) were elevated in severe disease. Maximal IPF# was an independent prognostic factor for prolonged hospitalisation length.

Incir S *et al.* (2021)

Immature platelet fraction: is a novel early predictive marker for disease severity in patients with Covid-19 pneumonia?
Turk J Biochem; 46(4): 359

Free online: https://www.degruyter.com/document/doi/10.1515/tjb-2021-0070/html?lang=de

Summary: This study of COVID-19 patients (110 non-severe cases, 44 severe) showed that IPF at admission was higher in severe disease. IPF was an independent predictor for disease severity with an AUC of 0.88 at a cut-off of > 9.5% (sensitivity 69.5% and specificity 92.4%).

Kilercik M *et al.* (2021)

A new haematocytometric index: Predicting severity and mortality risk value in COVID-19 patients.
PloS ONE; 16(8) e0254073

Free online: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0254073

Summary: This retrospective analysis of 97 COVID-19 positive patients identified monocyte-to-neutrophil ratio (MNR), MCV, RDW, and PLT as independent risk factors for mortality. A mortality risk score comprised of MNR, neutrophil-to-lymphocyte ratio (NLR), RDW, and PLT achieved an AUC of 0.91 and a specificity of 0.94.

Boulanger M *et al.* (2021)

Peripheral Plasma Cells Associated with Mortality Benefit in Severe COVID-19: A Marker of Disease Resolution.
Am J Med; 134(8): 1029

Free online: https://www.amjmed.com/article/S0002-9343(21)00197-2/fulltext

Summary: This multicentric study investigated the association of plasma cells (HFLC) in peripheral blood of severe COVID-19 patients for morbidity. Retrospective analysis showed that patients exhibiting plasma cells were more likely to develop severe disease but also had a reduced risk of death. In most patients, plasma cells appeared after progression to severe disease and, thus, will not serve as an early marker for severe disease.

Dennison D *et al.* (2021)

Circulating activated neutrophils in COVID-19: An independent predictor for mechanical ventilation and death.
Int J Infect Dis; 106: 155

Free online: https://www.ijidonline.com/article/S1201-9712(21)00284-8/fulltext

Summary: The authors found that in multivariable regression analyses NEUT-RI (OR = 1.22) was a statistically significant predictor at admission for a later need of mechanical ventilation and death in COVID-19 positive patients among others. NEUT-RI cut-off value for mechanical ventilation was 52 FI (44% sensitivity, 88% specificity; AUC= 0.67).

Martens R *et al.* (2021)

Hemocytometric characteristics of COVID-19 patients with and without cytokine Storm syndrome on the Sysmex XN-10 hematology analyzer.
Clin Chem Lab Med; 59(4): 783

Free online: https://www.degruyter.com/document/doi/10.1515/cclm-2020-1529/html

Summary: The study's results on the haemocytometric characteristics of COVID-19 patients revealed that a cytokine-storm syndrome was associated with higher AS-LYMPH, RE-MONO and monocyte fluorescence.

Linssen J *et al.* (2020)

A novel haemocytometric COVID-19 prognostic score developed and validated in an observational multicentre European hospital-based study.
Elife; 9: e63195

Free online: https://elifesciences.org/articles/63195

Summary: The intention of the prognostic score is to support the management of COVID-19 patients. In this study, score values generated within the first three days of hospital admission could predict clinical severity in COVID-19 patients over the next two weeks. The score performance was shown to be superior to single parameters or parameter ratios.

Foy B *et al.* (2020)

Association of Red Blood Cell Distribution Width With Mortality Risk in Hospitalized Adults With SARS-CoV-2 Infection.
JAMA Netw Open; 3(9): e2022058

Free online: https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2770945

Summary: This retrospective analysis from four US hospitals associated an elevated red cell distribution width (RDW) at admission and an increasing RDW during hospitalisation with increased mortality risk in COVID-19 patients and identified RDW as an independent mortality risk factor.

Rolla R *et al.* (2020)

Reduced activity of B lymphocytes, recognised by Sysmex XN-2000™ haematology analyser, predicts mortality in patients with coronavirus disease 2019.
Int J Lab Hematol; 43(1): e5

Free online: https://onlinelibrary.wiley.com/doi/10.1111/ijlh.13331

Summary: In this study, the antibody-synthesizing lymphocyte count (AS-LYMP#) together with age, C-reactive protein (CRP) and creatinine level was identified by the authors of this study as an independent predictor of in-hospital mortality in COVID-19 patients.

Lapic I *et al.* (2020)

Cell population data: Could a routine hematology analyzer aid in the differential diagnosis of COVID-19.
Int J Lab Hematol; 43(2): e64

Free online: https://onlinelibrary.wiley.com/doi/10.1111/ijlh.13368

Summary: This letter to the editor describes the detailed analysis of cell population data (CPD) from an XN-1000 in COVID-19 and non-COVID-19 patients. CBC parameters do not present with significant differences. The CPD parameters present with significant differences, with the most pronounced the elevated LY-WZ.

Urrechaga E *et al.* (2020)

Complete blood counts and cell population data from Sysmex XN analyser in the detection of SARS-CoV-2 infection.
Clin Chem Lab Med; 59(2): e57

Free online: https://www.degruyter.com/document/doi/10.1515/cclm-2020-1416/html

Summary: This letter to the editor describes a categorisation of patients with infection/fever into distinct groups based on statistical analyses of complete blood count and cell population data (CPD) from an XN analyser. 93.5% of COVID-19 patients and 100% of non-COVID-19 patients were correctly classified. The authors suggested a flag for COVID-19 infection, based on the neutrophil-to-lymphocyte ratio (NLR) and CPD values.

Santotoribio J *et al.* (2020)

Evaluation of Routine Blood Tests for Diagnosis of Suspected Coronavirus Disease 2019.
Clin. Lab; 66(9)

Free online: https://www.clin-lab-publications.com/article/3504

Summary: This descriptive diagnostic study evaluated several routine blood tests for the diagnosis of COVID-19 at hospital admission. Lymphocytes, eosinophils, ferritin, LDH, D-dimer and hsCRP were included in the diagnostic criteria that identified suspected COVID-19 patients with a sensitivity of 91% and a specificity of 47%.

Cohen A *et al.* (2020)

Immature platelets in patients hospitalized with Covid-19.
J Thromb Thrombolysis; 30: 1

Free online: https://link.springer.com/article/10.1007/s11239-020-02290-6

Summary: Patients with COVID-19 have increased immature platelets parameters (IPF, IPF#) compared to stable patients with cardiovascular risk factors. As the disease progresses IPF and IPF# are increased also compared to acute myocardial infarction patients.

Osman J *et al.* (2020)

Rapid Screening of COVID-19 Patients by White Blood Cells Scattergrams, a Study on 381 Patients.
Br J Haematol; 190(5): 718

Free online: https://onlinelibrary.wiley.com/doi/abs/10.1111/bjh.16943

Summary: The authors of this study investigated a specific pattern of WDF scattergram, the “sandglass shape” pattern of lymphocyte population in a cohort of 381 patients. It exhibited a sensitivity and specificity of 85.9% and 83.5% for identifying COVID-19 infection, respectively.

Yip CYC *et al.* (2020)

Temporal changes in immune blood cell parameters in COVID-19 infection and recovery from severe infection.
Br J Haematol; 190(1): 33

Free online: https://onlinelibrary.wiley.com/doi/10.1111/bjh.16847

Summary: According to the results of this study, the authors indicate that CBC including extended parameters about activated lymphocytes may be a valuable tool to triage patients with COVID-19. AS-LYMP%L (as a percentage of lymphocytes) yielded the best area under the receiver operating characteristic curve for predicting severe disease.

Wang Z *et al.* (2020)

High-fluorescent lymphocytes are increased in patients with COVID-19.
Br J Haematol; 190(2): e76

Free online: https://onlinelibrary.wiley.com/doi/10.1111/bjh.16867

Summary: This retrospective analysis of patients from the epicentre of the COVID-19 outbreak in Wuhan, China showed that while lymphocyte (L) counts were progressively decreased as disease severity increased, high-fluorescent lymphocyte (HFL) count and HFL/L ratio were increased in mild and severe cases compared to healthy controls.

Zhang C *et al.* (2020)

Decreased "WBC*LYM" was observed in SARS-CoV-2-infected patients from a fever clinic in Wuhan.
Chem Lab Med; 58(7): 1152

Free online: https://www.degruyter.com/view/journals/cclm/58/7/article-p1152.xml

Summary: Retrospective CBC+DIFF data analysis from a fever clinic in Wuhan from February 2020 (mid-Corona-pandemic in China) to evaluate the diagnostic value of haematologic parameters in suspected COVID-19 patients. The combination parameter of WBC and LYMPH (WBC*LYM) showed the best performance data for the quick evaluation of the patients' disease severity and whether the patient is likely to have COVID-19 or not.

Single case reports

Gérard D *et al.* (2020)

SARS-CoV-2: A New Aetiology for Atypical Lymphocytes.
Br J Haematol; 189(5): 845

Free online: https://onlinelibrary.wiley.com/doi/full/10.1111/bjh.16730

Fan BE *et al.* (2020)

COVID-19 and mycoplasma pneumoniae coinfection.
Am J Hematol; 95(6): 723

Free online: https://onlinelibrary.wiley.com/doi/full/10.1002/ajh.25785

Foldes D *et al.* (2020)

Plasmacytoid lymphocytes in SARS-CoV-2 infection (Covid-19).
Am J Hematol; 95(7): 861

Free online: https://onlinelibrary.wiley.com/doi/full/10.1002/ajh.25834

Mitra A *et al.* (2020)

Leukoerythroblastic Reaction in a Patient With COVID-19 Infection.
Am J Hematol; 95(8): 999

Free online: https://onlinelibrary.wiley.com/doi/full/10.1002/ajh.25793

Review articles

Khartabil TA *et al.* (2020)

A summary of the diagnostic and prognostic value of hemocytometry markers in COVID-19 patients.
Crit Rev Clin Lab Sci; 57(6): 415

Free online: https://www.tandfonline.com/doi/full/10.1080/10408363.2020.1774736

Nokhostin F *et al.* (2020)

Evaluation of Prognostic/Diagnostic Value of Hematological Markers in the Detection of Inflammation in Coronavirus Disease: A Review Study.
J Adv Med Biomed Res; 28(128): 171

Free online: http://zums.ac.ir/journal//article-1-5965-en.html