The essential role of laboratory diagnostics in SARS-CoV-2 infection

**Essential lab testing**

**Daily labs**
- CBC with differential (trend total lymphocyte count)
- Comprehensive metabolic panel:
  - Electrolytes: Na, K, Total CO₂, Chloride
  - Total protein and Albumin
  - Creatinine
  - Bilirubin, ALT, AST
  - CPK (total creatine kinase)
  - Lactate

**Risk stratification**
- D-dimer, Ferritin, CRP, ESR, LDH, Cardiac troponin

**Viral serologies**
- HBV, HCV, HIV 1/2/0

---

**Additional essential lab testing**

<table>
<thead>
<tr>
<th>Test</th>
<th>Potential clinical significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH, PaCO₂, PaO₂, and aHCO₃</td>
<td>For ventilator adjustments</td>
</tr>
<tr>
<td>Lymphopenia with atypical lymphocytes</td>
<td>Decreased immunological response to the virus</td>
</tr>
<tr>
<td>Leukocytosis, Neutrophilia, low eosinophils</td>
<td>Bacterial (super) infection</td>
</tr>
<tr>
<td>Thrombocytopenia: Platelet count</td>
<td>Consumption (disseminated) coagulopathy</td>
</tr>
<tr>
<td>Prothrombin time, D-Dimer</td>
<td>Activation of blood coagulation and/or disseminated coagulopathy</td>
</tr>
<tr>
<td>CRP, Ferritin, IL6, TNFɑ, SAA, Procalcitonin</td>
<td>Severe viral infection/viremia</td>
</tr>
<tr>
<td>High-sensitivity troponin, CK-MB, BNP/INT-proBNP</td>
<td>Increased levels may be associated with higher mortality</td>
</tr>
<tr>
<td>Albumin, ALT, AST, Bilirubin</td>
<td>Impairment of liver function, Liver injury</td>
</tr>
<tr>
<td>Creatinine, Cystatin C</td>
<td>Kidney injury</td>
</tr>
</tbody>
</table>

---

**Frequent laboratory abnormalities in patients with COVID-19**

**Decreased**
- Blood lymphocyte count (35–75%)
- Albumin (50–98%)
- Hemoglobin (41–50%)

**Increased**
- Neutrophil count
- Erythrocyte sedimentation rate (ESR, up to 85%)
- C-reactive protein (CRP, 75–93%)
- Lactate dehydrogenase (LDH; 27–92%)
- Alanine aminotransferase (ALT)

**Aspartate aminotransferase (AST)**
- Total bilirubin
- Cardiac troponin
- Procalcitonin (6–25%)
- Prothrombin time (PT)
- D-dimer (36–43%)

---

References:
4. March 22, 2020 Content source: National Center for Immunization and Respiratory Diseases (NCIRD) Division of Viral Diseases
13. ifcc.org/ifcc-news/2020-03-26-ifcc-information-guide-on-covid-19