Emergency Departments - Prognosis during COVID-19 Guideline32,33,34,88, 89,90, 91,92,93 - April 14, 2020 0745

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**Introductions**: Certain historical, clinical, and laboratory features likely correlate with a worse prognosis. Multiple imaging findings are possible through a wide spectrum of disease severity ([See "COVID One Page Diagnosis."]

### Historical Features with Worse Prognosis

<table>
<thead>
<tr>
<th>Age &gt;60</th>
<th>Hypertension Cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes Hypertension</td>
<td>Chronic kidney disease</td>
</tr>
<tr>
<td>Immunosuppression</td>
<td>Obesity (BMI &gt;40)</td>
</tr>
<tr>
<td>Cardiovascular disease</td>
<td>Liver Disease</td>
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<tr>
<td>Chronic lung diseases</td>
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### Clinical Features with Worse Prognosis Likely to Require Intubation

1. **Rapid progression** over hours
2. **Lack of improvement** on >40L/minute high flow nasal cannula (HFNC) with FiO2 >0.6
3. Evolving **hypercapnia**
4. Hemodynamic **instability** or **multigorgan failure**

### Ratio of Oxygen Saturation (ROX)

\[
\text{ROX} = \frac{(\text{SpO2/FiO2})}{\text{Respiratory Rate}}
\]

**ROX ≥ 4.88 at 2, 6, 12 hours on HFNC associated with lower risk of intubation.**

Example 1: SpO2 100%, FiO2 0.21, RR 20: ROX = \(\frac{100/0.21}{20} = 23.8\) (>4.88 = good, likely to avoid vent)

Example 2: SpO2 85%, FiO2 1.0, RR 30: ROX = \(\frac{85/1.0}{30} = 2.8\) (<4.88 = more likely to need vent)

### Laboratory Features with Worse Prognosis

- Lymphopenia: ALC < 800/microliter
- CRP > 100 mg/liter
- Elevated IL-6
- Ferritin >500 mcg/liter
- LDH >245 units/liter
- CPK > twice normal limit
- D-dimer >1000 ng/ml
- Acute kidney injury
- Elevated PT
- Elevated liver enzymes

- Elevated Neutrophil to Lymphocyte Ratio (NLR)
  - Calculate: (Absolute Neutrophil Count) / (Absolute Lymphocyte Count) OR (% Neutrophils) / (% Lymphocytes)

(NLR Normal 1-3, Mild Stress 6-9, Critically ill often >9)

(Note: NLR is a marker of severity of illness / stress, NOT specific to COVID-19.)

**References**