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SYNOPSIS

03/23/2020

Review of "Viral dynamics in mild and severe cases of COVID-19"

Article citation: Liu Y, Yan L, Wan L, Xiang T, Le A, Liu J, et al. Viral dynamics in mild and severe cases of COVID-19. Lancet Infect Dis. 2020 Mar 19 [Epub ahead of print]. Available from: https://doi.org/10.1016/S1473-3099(20)30232-2

One-Minute Summary

- This study compares **viral RNA shedding patterns observed in mild (n=46) and severe (n=30) coronavirus disease 2019 (COVID-19) cases** admitted at a single hospital in Nanchang, China, from January 21 through February 4, 2020.
- The authors reported viral loads using real-time PCR (RT-PCR) performed on nasopharyngeal swabs with the **delta cycle threshold (Ct).** A lower delta Ct indicates higher viral load.
- **Demographics and clinical characteristics of mild and severe cases, respectively at admission:**
  - **Male patients:** 28/46 (60.9%) vs. 20/30 (66.7%)
  - **Age (average ± SD):** 43.6 ± 14.4 vs. 55.6 ± 15.1 *($p < 0.01$)*
  - **Fever:** 40/46 (86.9%) vs. 23/30 (76.6%)
  - **Cough:** 22/46 (47.8%) vs. 13/30 (43.3%)
  - **Dyspnea:** 5/46 (10.9%) vs. 4/30 (13.3%)
  - **Admitted to intensive care unit:** 0 (0%) vs. 23/30 (76.7%)
  - **Viral load (delta Ct, mean ± SD):** 4.4 ± 3.99 and -1.4 ± 3.62 *($p < 0.00001$)*
- **Severe cases were significantly older and had ~60 times higher viral load** than mild cases at admission.
- Viral loads in severe cases remained significantly higher than the viral loads in mild cases for 12 days after symptom onset.
- Serial sampling showed that **19/21 (90%) of mild cases had viral clearance by day 10 post-symptom onset compared to 0/10 (0%) of the severe cases**.
- The authors conclude that severe cases tend to have **higher viral loads that may be associated with severe clinical outcomes and a longer virus-shedding period.** This is similar to SARS.

Additional Information

- All cases were confirmed by RT-PCR on nasopharyngeal swabs performed at admission. The delta Ct was calculated from $Ct_{sample} - Ct_{reference}$, which is the difference in Ct between the COVID-19 target gene and a reference gene that is measured to ensure there is adequate specimen tested.
- Viral clearance was defined as two consecutive negative RT-PCR results.

- **Severe cases had at least one of the following at the time of or following admission:** respiratory distress (≥ 30 breaths per min), oxygen saturation at rest ≤ 93%, ratio of partial pressure of arterial oxygen to fractional concentration of oxygen inspired air ≤ 300 mm Hg or severe disease complications (e.g., respiratory failure, septic shock or organ failure).

PHO Reviewer's Comments

- RT-PCR detects viral RNA and it is not yet known how this correlates with infectivity for COVID-19, as the presence of RNA does not always indicate live virus.

Citation

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