

## Coronavirus Disease 2019 (COVID-19): Emerging and Future Challenges in Toxicology Practice

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Coronavirus disease 2019 (COVID-19), originating in the late December 2019, in the city of Wuhan in China, has become a major public health challenge for all countries all over the world<sup>[1]</sup>.

The World Health Organization announced Corona virus as a pandemic on Wednesday March 11, 2020, with the number of cases and affected countries climbing higher over hours and days. The rapidly-spread virus recorded by April 18, 2020, 210 countries affected, with a total of 2160207 laboratory-confirmed cases and 146088 deaths. Hence, the latest fatality rate is 67.6%. The virus is continuing to spread dramatically over hours and days. The risk assessment of the virus is very high globally, as classified by the WHO<sup>[1]</sup>.

According to the latest WHO information on age and sex affection, the sex ratio (male to female) among the confirmed cases is 1.03:1, and the median age is 51 (interquartile range, IQR: 36-65) years. There are variations of age and sex ratios significantly in different affected countries<sup>[1]</sup>.

Infection control measures are necessary to prevent the virus from further spreading and to help control the epidemic situation. In Toxicology practice,

the risk of cross infection can be high among patients and practitioners. Strict and effective infection control protocols are urgently needed. Here are five essential principles about COVID-19 in Clinical Toxicology practice<sup>[2]</sup>.

As the emergence of COVID-19 demonstrated the shortage of most health systems nearly all over the world, five principles will be mandatory for Clinical Toxicology practice in the era of COVID-19 pandemic.

### *Susceptibility*

Drug abusers, chronic diseases like heart failure on chronic digitalis therapy with susceptibility to cumulative effects, other debilitating diseases, cancer, patients on immunosuppressive therapy and immunosuppressant poisons like cases of chronic Lead (Pb) poisoning<sup>[3]</sup>.

### *Transmission*

Changed from air-borne to droplet infection, which means more precaution about the distance with a suspected person. Infected persons during the incubation period (4-14 days), asymptomatic infected subjects and carriers constitute the main challenge, as it is difficult to identify and quarantine these subjects in

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time, and they remain a risk to spread their infection in their communities<sup>[4]</sup>.

In addition, it remains to be proved whether patients in the recovering phase are a potential source of transmission<sup>[5]</sup>.

#### *Fatality Rate*

According to current data, the fatality rate (cumulative deaths divided by cumulative cases) of COVID-19 is rising to be 5.87%, which is still lower than that of SARS (severe acute respiratory syndrome;  $\approx 10\%$ ) and MERS (Middle East respiratory syndrome;  $\approx 34\%$ <sup>[6]</sup>) and higher than that of seasonal influenza (0.01% to 0.17%) according to data for 2010 to 2017 from the US Centers for Disease Control and Prevention<sup>[7]</sup>.

People of all ages are generally susceptible to this new infectious disease. However, those who are in close contact with patients with symptomatic or asymptomatic COVID-19 infection, including health care workers and other patients in the hospital, are more susceptible to infection<sup>[8]</sup>.

The diagnosis of the infection is confirmed by RT-PCR of nasal, pharyngeal, throat swab, blood or sputum culture. It should be mentioned that a single negative RT-PCR test result from suspected patients does not exclude infection. Clinically, we should be alert of patients with an epidemiologic history, COVID-19-related symptoms, and/or positive CT<sup>[1]</sup>.

#### *Precautions<sup>[9]</sup>*

Standard precautions are to be taken and additional precautions when there is a case with a confirmed infection.

Standard precautions include: Hand hygiene, use of personal protective equipment (e.g., gloves, masks, eyewear, face shield, overheads and gowns), respiratory hygiene/ cough etiquette, sharps safety (needles and work tools), aseptic injection practices, sterile instruments and devices, clean and disinfected environmental surfaces.

Additional precautions are used immediately when a person shows suspected symptoms of infection. Waiting until laboratory confirmation may result in contamination of the environment or other people with the infectious agent. Additional precautions include: Use

of barriers (e.g. closed room doors), use of personal protective equipment, control of the environment (e.g. negative pressure ventilation, restriction of visitors), dedicated equipment (e.g. N95 Respirators), and extra-cleaning procedures.

#### *Notification*

To the national health authority, that will notify the WHO<sup>[10]</sup>.

#### *Treatment*

Should be done according to the most recent guidelines. Follow up of the WHO updates every few hours. The virus characteristics are not fully known and it may show mutations. Incorporating telemedicine as part of the COVID-19 outbreak response system is a wise choice<sup>[1]</sup>.

COVID-19 infection to an intoxicated patient may increase the need to mechanical ventilation, caused by many poisons, e.g. CO, botulism, TCA, opiates, barbiturates, salicylates, OPP,... etc.<sup>[11]</sup>.

COVID-19 is an emerging, rapidly evolving situation. Medical practitioners should keep getting the latest information from CDC: <https://www.coronavirus.gov>, and the latest research from NIH: <https://www.nih.gov/coronavirus><sup>[12]</sup>.

#### **Abbreviations**

CO; Carbon monoxide,

COVID-19; Coronavirus disease 2019, CT; Computed Tomography

RT-PCR; Real-time polymerase chain reaction, TCA; Tricyclic antidepressants

OPP; Organophosphate poisoning, WHO; World Health Organization.

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