Clinical Management Issues

Brief Report

# Coronavirus Disease 2019 (COVID-19): A Brief Report

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## Abstract

*Severe acute respiratory syndrome ("SARS-CoV-2", previously provisionally named "2019 novel coronavirus" or "2019-nCoV") disease (COVID-19) in China, at the end of 2019, resulted in a large global outbreak.*

*Among patients with pneumonia caused by SARS-CoV-2, fever is the most common symptom, followed by dry cough. Bilateral lung involvement with ground-glass opacities (GGOs) is the most common finding from computed tomography (CT) images of the chest.*

*At present, there are no specific antiviral drugs against SARS-CoV-2 infection for potential therapy of humans. Current treatments are mainly focused on symptomatic and respiratory support in patients with COVID-19. Preventive measures are the current strategy to limit the spread of cases.*

*The present report summarizes the point of the situation about this global emergency.*


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## INTRODUCTION

Since December 2019, an increasing number of cases of pneumonia of "unknown etiology" have been identified in Wuhan, a large city of 11 million people, in mainland China [1]. These patients were epidemiologically linked to Huanan Seafood Wholesale Market, where wild and live animals were sold and, on January 1, 2020, Wuhan Public Health Authorities shut it down. A week later, on January 7, 2020, a new *Betacoronavirus* was isolated from bronchoalveolar-lavage fluid samples of three patients with severe pneumonia. This virus was initially identified as "novel coronavirus 2019" (2019-nCoV) and the illness likely to have been caused by 2019-nCoV was named "novel coronavirus infected pneumonia" (NCIP) [2]. On February 11, 2020, the World Health Organization (WHO) announced a new name for the epidemic disease caused by 2019-nCoV: "coronavirus disease 2019" (COVID-19) [3]. The Coronaviridae Study Group (CSG) of the International Committee on Taxonomy of Viruses (ICTV) has renamed the previously provisionally named 2019-nCoV as "severe acute respiratory syndrome coronavirus-2" (SARS-CoV-2) [4]. The human-to-human transmission of SARS-CoV-2 is presumed to be primarily through droplets and fomites.

$R_0$, used to measure the transmission potential of a communicable disease in epidemiology, is the average number of secondary infections produced by an infectious case in a population where everyone is susceptible [5]. Early epidemiologic studies estimate an $R_0$ value of 2.2 [6] for SARS-CoV-2. Due to the progressive spread of the virus to over 110 countries, with more than 118,000 cases and over 4200 deaths, SARS-CoV-2 infection was declared a pandemic by WHO on March 11, 2020 [7].

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## EPIDEMIOLOGY

As of March 31, 2020, there have been 750,890 cases of COVID-19 globally, with 101,739 of those in Italy; there have been 36,405 confirmed deaths globally with 11,591 of those in Italy [8]. The Chinese Center for Disease Control and Prevention recently published the largest case series to date of COVID-19 in mainland China (72,314 cases, updated through February 11, 2020). Among a total of cases records:

- 44,672 were classified as "confirmed cases of COVID-19" (diagnosis based on positive viral nucleic acid test results on throat swab samples: 62%);
- 16,186 as "suspected cases" (diagnosis based on symptoms and exposures only: 22%);
- 10,567 as "clinically diagnosed cases" (15%);
- 889 "asymptomatic cases" (1.2%).

Most patients were 30 to 79 years of age (87%), 1% were aged 9 years or younger, and 3% were aged 80 years or older. Most cases were classified as mild (81%), 14% as severe, and 5% as critical. The overall case-fatality rate (CFR) was 2.3% (1023 deaths among 44,672 confirmed cases). CFR was 8% in the group aged 70-79 years and 14.8% in the group aged 80 years and older. No deaths were reported among mild and severe cases. The CFR was 49.0% among critical cases. CFR was elevated among those with preexisting comorbid conditions: 10.5% for cardiovascular disease, 7.3% for diabetes, 6.3% for chronic respiratory disease, 6.0% for hypertension, and 5.6% for cancer [9,10].

## CLINICAL FEATURES

According to WHO, a confirmed case of COVID-19 is a person with laboratory confirmation of infection with SARS-CoV-2, irrespective of clinical signs or symptoms (Box 1) [11].

The symptoms of SARS-CoV-2 infection appear after an incubation period of approximately 5.2 days [12]. The main clinical manifestations of COVID-19 are fever (90% or more), dry cough (around 75%), and dyspnea (up to 50%). Other symptoms include headache, fatigue, sputum production, and hemoptysis. A small but significant subset has gastrointestinal symptoms [13-16]. The majority of infected people have uncomplicated or mild illness (81%), but some of them will develop severe illness (including dyspnea, respiratory frequency >30/min, blood oxygen saturation <93%, partial pressure of arterial oxygen to fraction of inspired oxygen ratio <300, and/or lung infiltrates >50% within 24 to 48 hours), which requires oxygen therapy (14%). A minority of them, around 5%, will require intensive care unit (ICU) treatment (due to respiratory failure, septic shock, and/or multiple organ dysfunction or failure) (Box 2) [9,17].

The most common diagnosis in severe COVID-19 patients is severe pneumonia [9].

The currently available data suggest that the most frequent abnormalities were lym-

***Box 1. Definitions in COVID-19 [11]***

***Confirmed case***

*A confirmed case is a person with laboratory confirmation of infection with the COVID-19 virus, irrespective of clinical signs and symptoms*

***Probable case***

*A probable case is a suspected case for whom the report from laboratory testing for the COVID-19 virus is inconclusive*

***Suspected case***

- *a patient with acute respiratory illness (that is, fever and at least one sign or symptom of respiratory disease, for example, cough or shortness of breath) AND with no other etiology that fully explains the clinical presentation AND a history of travel to or residence in a country, area or territory that has reported local transmission of COVID-19 disease during the 14 days prior to symptom onset*
- *a patient with any acute respiratory illness AND who has been a contact of a confirmed or probable case of COVID-19 disease during the 14 days prior to the onset of symptoms*
- *a patient with severe acute respiratory infection (that is, fever and at least one sign or symptom of respiratory disease, for example, cough or shortness breath) AND who requires hospitalization AND who has no other etiology that fully explains the clinical presentation*

***Box 2. Clinical syndromes associated with COVID-19 in adult [17]***

***Mild illness***
*Uncomplicated upper respiratory tract viral infection may have non-specific symptoms such as fever, fatigue, cough (with or without sputum production), anorexia, malaise, muscle pain, sore throat, dyspnea, nasal congestion, or headache. Rarely, patients may also present with diarrhea, nausea, and vomiting*

***Pneumonia***
*Pneumonia but no signs of severe pneumonia and no need for supplemental oxygen*

***Severe pneumonia***
*Fever or suspected respiratory infection, plus one of the following: respiratory rate >30 breaths/min; severe respiratory distress; or $SpO_2 \leq 93\%$ on room air*

***Acute respiratory distress syndrome (ARDS)***
- *Onset: within 1 week of a known clinical insult or new or worsening respiratory symptoms*
- *Chest imaging (radiograph, CT scan, or lung ultrasound): bilateral opacities, not fully explained by volume overload, lobar or lung collapse, or nodules*
- *Origin of pulmonary infiltrates: respiratory failure not fully explained by cardiac failure or fluid overload. Need objective assessment (e.g. echocardiography) to exclude hydrostatic cause of infiltrates/edema if no risk factor present*
- *Oxygenation impairment in adults:*
  - *Mild ARDS: 200 mmHg < $PaO_2/FiO_2a \leq 300$ mmHg (with PEEP or CPAP ≥ 5 $cmH_2O$, or non-ventilated)*
  - *Moderate ARDS: 100 mmHg < $PaO_2/FiO_2 \leq 200$ mmHg (with PEEP ≥ 5 $cmH_2O$, or non-ventilated)*
  - *Severe ARDS: $PaO_2/FiO_2 \leq 100$ mmHg (with PEEP ≥ 5 $cmH_2O$, or non-ventilated)*

***Sepsis***
*Life-threatening organ dysfunction caused by a dysregulated host response to suspected or proven infection. Signs of organ dysfunction include: altered mental status, difficult or fast breathing, low oxygen saturation, reduced urine output, fast heart rate, weak pulse, cold extremities or low blood pressure, skin mottling, or laboratory evidence of coagulopathy, thrombocytopenia, acidosis, high lactate, or hyperbilirubinemia*

***Septic shock***
*Persisting hypotension despite volume resuscitation, requiring vasopressors to maintain MAP ≥ 65 mmHg and serum lactate level > 2 mmol/L*

phopenia (35-75% of cases), increased values of C-reactive protein (75-93% of cases), lactate dehydrogenase (27-92% of cases), erythrocyte sedimentation rate (up to 85% of cases) and D-dimer (36-43% of cases), as well as low concentrations of serum albumin (50-98% of cases), and hemoglobin (41-50%) [18].

COVID-19 pneumonia is common. The early chest CT features are multiple patchy pure ground glass opacities (GGOs) or GGOs with consolidation in the peripheral zone of the lung, often with vascular thickening and the crazy paving pattern, air bronchogram sign, or halo sign (Figure 1) [19].

Lung ultrasonography is useful to manage COVID-19 with respiratory involvement due to several characteristics: safety, repeatability, absence of radiation, low cost, and point-of-care use. Chest CT may be performed in cases where lung ultrasonography is not sufficient to answer the clinical question. Using a 12-zone method, characteristic findings include thickening of the pleural line with pleural line irregularity, B lines in a variety of patterns including focal, multifocal, and confluent, consolidations in a variety of patterns including multifocal small, non-translobar, and translobar with occasional mobile air bronchograms [20].

**Figure 1.** *Chest CT: early features of COVID-19 pneumonia. Multiple patchy pure ground glass opacities (GGOs) may be seen.*

## DIAGNOSIS

Confirmation of cases of COVID-19 is based on real-time reverse transcription polymerase chain reaction (rRT-PCR). At minimum, respiratory material should be collected from the upper respiratory specimens (nasopharyngeal and oropharyngeal swab or wash in ambulatory patients) and/or from the lower respiratory specimens (sputum if produced and/or endotracheal aspirate or bronchoalveolar lavage in patients with more severe respiratory disease) [21].

## TREATMENT

Nowadays, there is no evidence from randomized clinical trials to support specific drug treatment against the new coronavirus in suspected or confirmed cases. Therefore, current treatments mainly focus on symptomatic and respiratory support.

## INFECTION CONTROL AND PREVENTION

The WHO recommend infection control interventions to reduce the general risk of transmission of acute respiratory infection with SARS-CoV-2, including avoiding close contact with people suffering from acute respiratory infections, frequent hand washing especially after direct contact with ill people or their environment, and avoiding unprotected contact with farm or wild animals [22].

## CONCLUSIONS

The outbreak of SARS-CoV-2 is a clinical threat to the general population and healthcare workers worldwide. Scientists have made progress in the characterization of the novel coronavirus but, at present, there is not a specific treatment. Preventive measures are the current strategy to limit the spread of cases.

***Key Points***

- *Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) is responsible for the current pandemic of coronavirus disease 2019 (COVID-19)*
- *This new virus was first discovered in Wuhan, China*
- *As of March 31, 2020, there have been 750,890 cases of COVID-19 globally*
- *Because of the absence of vaccinations and effective drugs, current treatments mainly focus on symptomatic and respiratory support*
- *The mainstays of prevention are avoiding contacts with people suffering from acute respiratory infections and frequent hand washing*

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### Conflicts of interests

The author declares he has no competing financial interests concerning the topics of this article.

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