

ASYMPTOMATIC CONTACT OF ACUTE RESPIRATORY SYNDROME ASSOCIATED WITH A NOVEL CORONAVIRUS (COVID-19) TRANSMISSION IN ETHIOPIA: A REVIEW

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Abstract

Since December 2019, acute respiratory syndrome due to novel coronavirus (COVID-19) emerged in Wuhan city (China) and rapidly spread throughout the world. We report the epidemiological, clinical findings, treatment and prevention.

The objective of this review article was to have a preliminary opinion about the disease and prevention in early stages of outbreak.

Keywords: *Coronavirus, COVID-19, Ethiopia*

Introduction

Coronavirus disease 2019 (COVID-19) is a respiratory tract infection caused by a newly emergent coronavirus, SARS-CoV-2, that was first recognized in Wuhan, China, in December 2019. Genetic sequencing of the virus suggests that SARS-CoV-2 is a betacoronavirus closely linked to the SARS virus[1].

While most people with COVID-19 develop mild or uncomplicated illness, approximately 14% develop severe disease requiring hospitalization and oxygen support and 5% require admission to an intensive care unit[1]. In severe cases, COVID-19 can be complicated by acute respiratory disease syndrome (ARDS), sepsis and septic shock, multiorgan failure, including acute kidney injury and cardiac injury[2]. Older age and co-morbid disease have been reported as risk factors for death, and recent multivariable analysis confirmed older age, higher SOFA score and d-dimer > 1 µg/L on admission were associated with higher mortality. This study also observed median duration of viral RNA detection was 20.0 days (IQR 17.0–24.0) in survivors, but SARS-CoV-2 virus was detectable until death in non-survivors. The longest observed duration of viral shedding in survivors was 37 days[3,4].

Coronaviruses are a group of highly diverse, enveloped, positive-sense, single-stranded RNA viruses[5]. They cause several diseases involving respiratory, enteric, hepatic and neurological systems with vary severity among humans and animals[5,6]. Human coronavirus (CoV) infections have traditionally caused a low percentage of annual respiratory infections. Over the past two decades, two novel coronaviruses, severe acute respiratory syndrome CoV (SARS-CoV) and Middle East respiratory syndrome CoV (MERS-CoV), have emerged and cause severe human diseases[7,8]. The main symptoms of COVID-19 included fever, fatigue, and cough, which are similar to that of SARS-CoV and MERS-CoV infected cases. There are some overlapping and discrete aspects of the pathology and pathogenesis of these coronaviruses which cause severe diseases in humans[9].

We are reporting a case of 2019-nCoV infection acquired outside Asia in which transmission appears to have occurred during the incubation period in the index patients of Ethiopia.

Study identification

We performed a systemic review of the PubMed and EMBASE databases from inception to March-2020 to find articles providing information on COVID-19.

2019-nCoV infection was diagnosed in Ethiopia on March 13th 2020 (Fig.1)[11,12]. However, it is notable that the infection appears to have been transmitted during the incubation period of the index patients, in whom the illness was brief and non-specific[10]. (Table 1)

Epidemiology

There are evidences suggest that transmission mode is human to human[13,14]. The major route of transmission of COVID-19 is droplet and close contact[14]. Whether infection can occur through the oral or conjunctival routes is unknown, but SARS-CoV-2 has been detected in tears[15], which is resemble to SARS-CoV[16]. Reproductive number (R0) was estimated by some studies. Based on the clinical data of patients in COVID-19 early outbreak, the mean R0 was ranging from 2.20 to 3.58, meaning that each patient has been spreading infection to 2 or 3 other people[13,17]. It is still too early to develop an accurate R0 estimate or to assess the dynamics of transmission. The mean incubation period is about 5 days, ranging from 1-14 days and 95% of patients are likely to experience symptoms within 12.5 days of contact[13,18]. These data suggest a 14-day medical observation period or quarantine for exposed and close contact persons. However, an asymptomatic carrier was reported and the incubation period was 19 days, suggesting the complicated challenge to contain the outbreak[19].

Clinical features

Most case patients were 30-79 years of age[20]. The median age is ranging from 49 to 59 years[13,14,21,22]. There were few cases in children below 15 years of age. More than half the patients were male. Nearly half the cases had one or more coexisting medical conditions, such as hypertension, diabetes and cardiovascular disease[13,14,21,22]. A large cases study indicated that the case-fatality rate was elevated among those patients with coexisting medical conditions[20].

The spectrum of clinical presentations of COVID-19 have been reported ranging from asymptomatic infection to severe respiratory failure[13,14,18,20,22]. The main symptoms include a self-reported fever, fatigue, dry cough, myalgia, and dyspnea.

Although pneumonia is present in most SARS-CoV-2 infected patients, few cases complained of pleuritic chest pain[14,21].

According to the severity of symptoms, patients can be classified as mild, severe, and critical types[20]. (Table 2) Critical patients had severe conditions, such as respiratory failure, septic shock, and/or multiple organ dysfunction or failure[20]. If the disease progressed, the median duration period from illness onset to dyspnea was 8.0 days, and to mechanical ventilation was 10.5 days[22].

Diagnosis

Although a good contact history, systemic symptoms, and radiographic changes of pneumonia make the diagnosis likely, the laboratory diagnosis is more reliable. RT-PCR is routinely used to detect causative viruses from respiratory secretions[23,24]. During COVID-19 transmission events, RT-PCR has served as the primary clinical laboratory diagnostic test[13,14,18,21].

The positive rate of RT-PCR for throat swab samples was reported to be about 60% in early stage of COVID-19[25].

Treatment

Until the diagnosis is confirmed, SARS-CoV-2 infected patients are treated in single rooms[13,18]. As SARS-CoV-2 is an emerging virus, an effective antiviral treatment has not been identified. The main treatment of COVID-19 is symptomatic treatment. The antiviral drugs, have been used in attempts to reduce the viral load and to prevent the likelihood of respiratory complications in several studies[13,14,18,21,22]. Remdesivir was reported in the treatment of a patient with COVID-19 in the United States and got an effective result[26].

The antibiotics used generally covered common pathogens and some atypical pathogens. When secondary bacterial infection occurred, medication was administered according to the results of bacterial culture and drug sensitivity[21].

Prevention

Hand Hygiene: The risk of transmitting or acquiring 2019-nCoV infection can be reduced by the correct application of hand hygiene. Hand hygiene refers to the frequent washing of hands with soap and water or cleaning of hands with alcoholic solutions, gels or tissues. Hands should be washed regularly using soap and water for 20–40 seconds[27].

Face mask: Facemasks range from simple, even homemade masks, to cloth and surgical (medical) masks. They vary in thickness and permeability. They can protect against larger respiratory droplets but are not guaranteed to protect users from airborne infection. Cloth/gauze masks may induce moisture retention and poor filtration and it is unclear whether they confer clinical protection[28].

Self-Isolation: Self-isolation of individuals with symptoms of a respiratory infection is one of the most important measures for reducing disease transmission and limiting the spread of the virus in the community during an epidemic[29].

Our study has stratified patients with 2019-nCoV ARD based on the severity on admission according to international guidelines[41]. Our study has some notable limitations, First, some cases had incomplete documentation of the exposure history, symptoms and laboratory testing given the variation in the structure of electronic database among different participating site and the urgent timeline for data extraction.

The fact that asymptomatic persons are potential sources of 2019-nCoV may warrant a reassessment of transmission dynamics of the current outbreak. In this context, the detection of 2019-nCoV and a high spectrum viral load in a convalescent patient arouse concern about prolonged shedding of 2019-nCoV after recovery.

Despite these concerns, all twenty five patients who were seen in Ethiopia have mild cases and were hospitalized primarily for public health purposes. Since hospital capacities are limited- in particular, research is needed to determine whether such patients can be treated with appropriate guidance and oversight outside the hospital.

For researchers to be able to contribute to control efforts by improving situation awareness via an explicit risk assessment, it is crucial that detailed epidemiological data are posted to a public domain in real-time. Stringent and timely epidemiological measures are crucial to curb the rapid spread. Ongoing efforts are needed to explore for an effective therapy (i.e protease inhibitors, remdesivir, beta interferon) for this emerging acute respiratory infection.

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Figure 1. Map of regions with confirmed (red) Coronavirus cases (as of 31 March, 2020)[11,12]

Table 1: Exposure to index patients with Asymptomatic COVID-19 Infection in Ethiopia[11,12]

PATIENTS	DATE OF INFECTION	NATIONALITY	TRAVEL HISTORY
Patient -1	March 13 th 2020	Japanese National	JAPAN
Patient -2	March 15 th 2020	Japanese National	JAPAN
Patient -3	March 15 th 2020	Japanese National	JAPAN
Patient -4	March 15 th 2020	Ethiopian national	NO Travel History
Patient -5	March 16 th 2020	Ethiopian national	DUBAI
Patient -6	March 17 th 2020	British Diplomat	DUBAI
Patient -7	March 19 th 2020	Japanese National	JAPAN
Patient -8	March 19 th 2020	Ethiopian national	NO Travel History
Patient -9	March 19 th 2020	Austria National	AUSTRIA
Patient -10	March 22 nd 2020	Ethiopian national	BELGIUM
Patient -11	March 22 nd 2020	Ethiopian national	DUBAI
Patient -12	March 24 th 2020	Ethiopian national	DUBAI
Patient -13	March 27 th 2020	Mauritian	CONGO BRAZZAVILLE
Patient -14	March 27 th 2020	Ethiopian	NO Travel History
Patient -15	March 27 th 2020	Ethiopian	Israel
Patient -16	March 27 th 2020	Ethiopian	NO Travel History
Patient -17	March 29 th 2020	Ethiopian	Brussels, Belgium and Cameroon
Patient -18	March 29 th 2020	Ethiopian	NO Travel History
Patient -19	March 29 th 2020	Ethiopian	NO Travel History
Patient -20	March 29 th 2020	Ethiopian	DUBAI
Patient -21	March 29 th 2020	Ethiopian	DUBAI
Patient -22	March 30 th 2020	Ethiopian	USA
Patient -23	March 30 th 2020	Ethiopian	UAE
Patient -24	March 31 st 2020	Ethiopian	DUBAI
Patient -25	March 31 st 2020	Ethiopian	DUBAI

Table 2: CLINICAL SYMPTOMS OF COVID-19:

Mild illness	Patients with 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 diarrhoea, nausea and vomiting[30,33-35].
Pneumonia	Adult with pneumonia but no signs of severe pneumonia and no need for supplemental oxygen. Child with non-severe pneumonia who has cough or difficulty breathing + fast breathing: fast breathing (in breaths/min): < 2 months: ≥ 60 ; 2–11 months: ≥ 50 ; 1–5 years: ≥ 40 , and no signs of severe pneumonia.
Acute respiratory distress syndrome[36-38]	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/oedema if no risk factor present.
Sepsis[31,32]	Adults: life-threatening organ dysfunction caused by a dysregulated host response to

	<p>suspected or proven infection.b Signs of organ dysfunction include: altered mental status, difficult or fast breathing, low oxygen saturation, reduced urine[31,39] 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.</p> <p>Children: suspected or proven infection and ≥ 2 aged based systemic inflammatory response syndrome criteria, of which one must be abnormal temperature or white blood cell count.</p>
Septic shock [31,32]	<p>Adults: persisting hypotension despite volume resuscitation, requiring vasopressors to maintain MAP ≥ 65 mmHg and serum lactate level > 2 mmol/L.</p> <p>Children: any hypotension (SBP < 5th centile or > 2 SD below normal for age) or two or three of the following: altered mental state; tachycardia or bradycardia (HR < 90 bpm or > 160 bpm in infants and HR < 70 bpm or > 150 bpm in children); prolonged capillary refill (> 2 sec) or feeble pulse; tachypnea; mottled or cool skin or petechial or purpuric rash; increased lactate; oliguria; hyperthermia or hypothermia[40].</p>