The Covid-19, Epidemiology, Clinic and Prevention

Alessandro Antonelli1,*, Giusy Elia1, Silvia Martina Ferrari1, Rudy Foddis2, Salvatore De Marco3, Alfonso Cristaudo2 and Poupak Fallahi2

1Department of Clinical and Experimental Medicine, University of Pisa, Pisa, Italy; 2Department of Translational Research and New Technologies in Medicine and Surgery, University of Pisa, Pisa, Italy; 3U.O. 5th Medicine, AOUP, Pisa, Italy

1. BACKGROUND

In December 2019, a cluster of pneumonia cases, due to a newly identified β-coronavirus, occurred in Wuhan, China (Covid-19, or SARS-CoV-2). This was a zoonotic coronavirus breakout, allowing human-to-human transmission, raised global health concerns [1]. On 26 February 2020, the rate of new cases begin to decline in China, but the tendency changed outside China, where new cases occurred, such as in Italy, South Korea, and Iran; and for the first time the number of new cases outside China surmounted those reported in China [2]. After China, Italy had the second largest number of Covid-19 cases, and the number is increasing every day.

2. VIROLOGY

SARS-CoV-2 is strictly related to SARS-CoV [5]. It is believed to have a zoonotic origin. Coronavirus genetically clusters with the genus Betacoronavirus, in subgenus Sarbecovirus (lineage B), together with two bat-derived strains. At the whole genome level, it is 96% identical to other bat coronavirus samples (BatCov RaTG13) [6, 7]. Similar to other viruses, SARS-CoV-2 infects lung alveolar epithelial cells through receptor-mediated endocytosis via the angiotensin-converting enzyme II (ACE2) as an entry receptor [4]. Also, the DPP4 receptor is implicated in viral entry [8].

3. TRANSMISSION

The disease is believed to spread mainly with close contacts (within 1 to 2 meters), and through small droplets originating by people during sneeze, cough, or talk [9]. The contagion can also occur by first touching a contaminated surface and then touching eyes, nose, or mouth [9]. The virus survives for hours to days on surfaces [10, 11]. The aerosol dispersion is also responsible for diffusion of the disease. Virus spread may happen before symptoms appear, however if people are symptomatic, the virus is most contagious [12]. As stated by the ECDC, it is still not known the ease of spreading of this disease; generally, one person is able to infect from two to three others [10].

4. CLINIC OF COVID-19

Within the subset of patients admitted to hospital, the most common symptoms at onset of illness were fever (90-98%), cough (70-80%), dyspnoea (60-50%) and myalgia or fatigue (40-50%). Notably, 20-30% of patients had upper respiratory tract symptoms such as coryza, or gastrointestinal symptoms such as nausea, vomiting, and diarrhoea. Other clinical features included sputum production, headache (8%) and haemoptysis. The median time from onset of symptoms to first hospital admission was 4-8 days. About 20-30% required intensive treatment unit (ITU) admission for respiratory support: 70-80% of patients are male and 30-50% had pre-existing comorbidities, such as hypertension (15-25%), diabetes (20-25%), obesity, and cardiovascular diseases (10-15%), or Chronic obstructive pulmonary disease (COPD). Laboratory features include leukopenia (20-40%), lymphopenia (20-45%) and raised aspartate aminotransferase (40%). Abnormalities on computed tomography (CT) of the chest were seen in all patients [13].

5. DIAGNOSIS

Two risk factors for Covid-19 are: having traveled to an area with community infection in the 14 preceding days, or having had tight relationships with infected people.