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SARS-CoV-2 a relation with other Acute Respiratory Tract Infectious (ARTI) diseases: A short communication

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Abstract

The short study implicates few basic similarities of COVID-19 such as diseases origination, symptoms, diagnosis with other relatable viral diseases viz SARS-CoV, common Flu, pneumonia etc. In the present situation, other viral diseases are frequently chaotic and misled with COVID-19 disease because of few clinical features similarities in signs and symptoms and also due to lack of specific diagnostic test. To avoid unnecessary suspects, quarantines of false positive results and to prevent the spread of COVID-19 diseases, the scientific technical research field are highly encourage to implement an efficient, rapid and sophisticated superior test for early stages of infection detection. It will be of significant convenient for physician, laboratory technicians and most importantly the common population facing a psychological disturbance.

Keywords: SARS-CoV-2, SARS-CoV, Influenza, Pneumonia, Respiratory tract infectious diseases

Article

Today, the main subject of discussion is on Coronavirus disease 2019 (COVID-19) a global pandemic causing a worldwide disturbance in different sectors. COVID-19 is cause by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) a single-stranded, positive-sense RNA viral pathogen belonging to the genus Beta-Coronavirus [1]. The SARS-CoV-2 is no different from a seasonal flu 'Common Cold' or Respiratory viral infections and pneumonia. The similarities and differences between the viral diseases are listed on

Table 1. A seasonal flu is not hard to recognize because of their symptoms such as cough, nasal stiffness, sore throat, chilled feelings etc. Common cold is the most common infectious diseases till date as we all know. Like novel SARS-CoV-2, common cold is a major cause of morbidity and mortality rate worldwide [2]. There are distinct viruses associated with common cold such as Rhinovirus, Coronavirus, Influenza virus, Respiratory syncytial virus, para-influenza virus which cannot be distinguished from SARS-CoV-2 [3]. The spread of infection is by direct contact with infected person through aerosol, through contaminated skin, environmental surfaces, sometimes airborne transmission when duration of exposure is limited with infected person [4]. In the late 2000, there was a widespread pandemic caused by SARS-CoV type 1 over 25 countries causing thousands of death [5]. Recently, using a detective genome computation tool it revealed nearly 80% of gene pool of SARS-CoV shares similarities with SARS-CoV-2 [6], hence we can say that SARS-CoV-2 is no new diseases but a possible mutation of type 1 SARS-CoV. Anti-Viral drug research has been initiated since 2003 to prevent the re-emergence of the viruses. The novel SARS-CoV-2 is detected by a combination of nucleic-acid detection RT-PCR and computed tomography (CT) scan which are a qualitative, rapid and only

reliable test available till date. Despite of their specificity, rapid detection there are chances of false positive results due to variation, rapid evolution of viral RNA sequences [7]. The gene diversity and possible evolution of SARS-CoV-2, mutation or mismatch between the primer and probe in RT-PCR have been discussed in different studies and the molecular diagnostics experts has advice the laboratory technician to avoid delay in test after sample collection to avoid false results [7]. Due to lack of diagnostic resources for large-scale detection for SARS-CoV-2 apart from RT-PCR, nasal swab samples from infected individual have been detected by other machine such as Matrix-assisted laser desorption/ionization Mass spectrometry (MALDI-MS) with 93.9% accuracy [8]. The outbreak during the month of December 2019 in Wuhan City, Hubei province China, pneumonia with unknown etiology was reported to the WHO due to signs and symptoms similarities [9]. The serious complications till date are no vaccine, no treatment or cure, no efficient COVID-19 test available which have the ability to differentiate the virus from the other viral diseases such as influenza A, SARS-CoV, pnuemonia. A specific test which is highly complementary to SARS-CoV-2 viral RNA detection has to be urgently implemented to reduce the inaccurate results and avoid confusion with other viral diseases showing symptoms-similarities with COVID-19. A substitute drugs such as remdesivir, ribavirin, protease inhibitors lopinavir, ritonavir, chloroquin phosphate, Arabidol [10] are beneficial for a mild to moderate infection with numerous side effects. These drugs might only decrease or stabilized the viral load. They also revealed, patients who have recovered from SARS-CoV-2 having severe side effects with lung, kidney damage. These damages might be due to high dose of the anti-viral drugs.

Conclusion

The study is to encourage the scientific technical research field to implore a high quality and quantitative procedures for earlier, precise, sophisticated and accurate detection of COVID-19 to avoid mass confusion, misled and a distinguishable test from other viral diseases (influenza, adenovirus, rhinovirus, SARS-CoV, para-influenza) for earlier prevention and control of infected as well as suspect individuals. Like discussed earlier, the viral genome has the ability to evolve, mutate and a possible re-emergence of the long known SARS-CoV, therefore a highly specific, peculiar diagnostic tool for COVID-19 has to be urgently develop. Till date we have RT-PCR, Chest CT scan, Antigen test and MALDI-MS as substitute diagnostic test for COVID-19 with only 90-95% accuracy. Prior to treatment or cure, physician would suggest for diagnosis first to confirm cases rather than prescribe a medication with only clinical features. Hence, until a commercialized, validate or recommended vaccine or treatment is available for COVID-19, it is important to link and spot individuals who are infected and who have developed natural immunity against the diseases.

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Conflict of interest

The author declares no conflict of interest

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Table 1: A comparison of the undistinguishable acute respiratory tract infections with symptoms similarities with novel SARS-CoV-2

Diseases	SARS-CoV [5, 11, 12, 13]	SARS-CoV-2 [3]	Influenza Virus [14, 15, 16]	Pneumonia [17, 18, 19]
Origination	Zoonotic virus and originates from animals, bird species 87-92% identity to bat and considered group 2b coronaviruses	Zoonotic virus and originates from animals, bird species 96.2% identical to bat β-coronaviruses from lineage B	Zoonosis caused by avian influenza (HPAI) virus of H5NI subtype influenza A virus, a human influenza pathogens	Zoonotic infection caused by virus, multi-resistant bacteria and originates from animals, bird species
Genome type	enveloped single-stranded positive-sense RNA virus	Single-stranded positive-sense RNA virus	enveloped negative-strand RNA virus	enveloped non-segmented negative-strand RNA virus, Gram negative and Gram positive pathogenic bacteria
Symptoms	rapid respiratory deterioration, fever, chills, myalgia, nonproductive cough	non-specific but most common symptoms are fever, dry cough, fatigue, shortness of breath, mild pneumonia,	Respiratory infection, sudden fever, malaise, headache and cough, sore throat, chills and severe in elderly person with chronic heart disease, diabetes	cough, fever, dyspnea, acute respiratory tract infection (ARTI)
Receptor of entry	through endocytosis pathways which is pH-dependent	uses SARS-CoV ACE2 for entry to target cells	epithelial cells (epithelium of trachea, bronchi and pulmonary alveoli	singular receptor-mediated endocytosis (endothelial cells)
Incubation period	5-6 days but as long as 14 days	4-5 days and as long as 14 days	1-4 days	1-3 days after exposure
Age of infection	all ages but mostly under the age of 65 and severe in certain conditions of chronic heart diseases, diabetic patient	middle aged and older people with underlying diseases	all ages but mostly between the age group 20 to 40 and under the age of 65 accounts to influenza death	all ages but leading to child death, over age of 65 and certain conditions such as heart failure, diabetes and people with weak immune system
Mode of transmission	person to person transmission by direct or indirect contact of the	person to person transmission through virus-containing	person to person through coughing, sneezing	spread via airborne droplets from a cough and

	mucosal respiratory droplets	respiratory droplets and asymptomatic cases	airborne and small-particle aerosol	sneeze
Diagnosis	Nucleic acid amplification such as RT-PCR or antigen detection by EIA	Chest CT imaging, Reverse transcriptase-PCR, a combination of molecular and clinical features	Direct fluorescence microscopy using specific antibodies (Diagnosis hybrids), Real time Reverse transcriptase-PCR	conventional, CBC (complete blood count) Chest X-ray (CXR) syndrome determining, clinical examination, etiology by microbiological experiments, serological and molecular test such as multiplex PCR for both viral and bacterial pathogen
Drug/Vaccine	No clinically approved or recommended anti-viral drug for SARS-CoV supportive treatment using combination of ribavirin and corticosteroids, initial use of pulse methylprednisolone	no licence or proven vaccine but combination of IFNs and Ribavirin, chloroquine, Remdesivir is effective	Recommendation to prevent infection is by washing hands with soap and water, sanitizer, covering nose, mouth, avoid close contact and more recently developed drug neuraminidase (NA) inhibitors Oseltamivir, zanamivir	Glucocorticoids in acute bacterial pnuemonia, antibiotic, corticosteroid •pneumonococcal conjugate vaccine (PCV7) for children in 2000 •pneumonoccal conjugate vaccine including 13 serotypes (PCV13) in 2010 •23-valent non-conjugate vaccine or pneumovax23 (PPV23) recommended for all
Mortality rate	Higher (9.6%)	lower (3.4- 6 %) but have confirmed pathogenesis in diabetic and hypertension individual	0.77 – 5 %	1.3% (in patients <45 years) to 26% (in patients ≥ 85 years)