

# COVID-19 versus Allergic Rhinitis

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**How to cite this paper:** Salehi-Abari, I. and Khazaeli, S. (2020) COVID-19 versus Allergic Rhinitis. *Advances in Infectious Diseases*, 10, 168-174.  
<https://doi.org/10.4236/aid.2020.103017>

**Received:** August 7, 2020

**Accepted:** September 5, 2020

**Published:** September 8, 2020

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## Abstract

COVID-19 is a new contagious, deadly viral/immunological systemic disorder with predominantly respiratory features caused by human infection with SARS-CoV-2, which is rapidly spreading from person-to-person all around the world as a pandemic, whereas, Allergic Rhinitis is an old non-contagious, non-deadly, and non-viral disorder with nasal inflammation which occurs when the immune system overreacts to allergens. Mild to moderate COVID-19 can be mistaken with Allergic Rhinitis. Fever, dry cough, dyspnea, fatigue, body ache, anosmia, and lack of taste are the cardinal feature of COVID-19, whereas runny nose, stuffy nose, sneezing, postnasal discharge, itchy eyes, and itchy skin are the cardinal feature of Allergic Rhinitis. Some of the cardinal feature of COVID-19 can be accessory feature of Allergic Rhinitis and *vice versa*. These two diseases are usually distinguishable by an expert physician. At the same time, an inexperienced physician will easily confuse them. The known cases of Allergic Rhinitis have allergies in this spring or year similar to previous years, not COVID-19, unless this time the symptoms are sudden, new, or more severe, and with previous conventional allergy treatment; don't give up and get even worse. In fact, the mission of this article is to provide the easiest way to differentiate these two diseases. In the SARS-CoV-2 epidemics in the Red zones, when we cannot differentiate these two diseases; Allergic Rhinitis should be discarded in favor of COVID-19.

## Keywords

COVID-19, Allergic Rhinitis, SARS-CoV-2, RT-PCR

## 1. Introduction

The novel Coronavirus disease or COVID-19 is a new contagious, dangerous, and deadly viral/immunological systemic disorder with predominantly respiratory features caused by human infection with SARS-CoV-2, which is rapidly

spreading from person-to-person all around the world as a pandemic, whereas, Allergic Rhinitis is an old non-contagious, non-dangerous, non-deadly, and non-viral/allergic non-systemic disorder with nasal inflammation which occurs when the immune system overreacts to allergens/irritants. These two diseases are similar in a significant number of clinical findings and they can easily be confused with each other, and this error can lead to irreparable damages, therefore, it is important to distinguish between the two diseases. In fact, the mission of this article is to provide the easiest/main way to differentiate these two diseases.

## 2. Method

Clinical and laboratory judgement of an experienced and knowledgeable physician in the field of these two diseases is the main method of distinguishing them from each other.

## 3. Study Approach

COVID-19 is a viral systemic disorder with various presentations including; general features, ENT and lung involvement, cardio-vascular findings, kidney involvement, gastrointestinal and liver involvement, CNS involvement, and skin manifestations. From the time the virus enters the body to the time of initial symptoms of the disease, it is called the incubation period which ranges from one day to fourteen days. About 40% of patients with COVID-19 are asymptomatic and, 40%; mild, 15%; severe, and 5% are critical COVID-19 [1] [2] [3] [4]. Asymptomatic patients are almost all missed and they can carry the virus for about 2 weeks. Initial cardinal presentation in the patients with mild COVID-19 is including; mild fever, dry cough, fatigue and then body ache, anosmia, and lack of taste, but due to other features including; runny nose, stuffy nose, sneezing, and sore throat, this group of patients is often mistakenly diagnosed with Allergic Rhinitis, cold or flu. They can carry the virus for up to three weeks. Unfortunately, about 15% of cases with severe COVID-19 and 50% of cases with critical COVID-19 eventually die and all other patients carry the virus for approximately 4 to 6 weeks [1] [2] [3] [4]. Lung involvement can be presented with high fever, severe dry cough, shortness of breath, sputum expectoration, chest pain, tachypnea, expulsion of blood along with intractable cough and cyanosis due to; pneumonia, pneumonitis, acute respiratory distress syndrome (ARDS), diffuse small vessel vasculitis, and respiratory failure. Many cases of COVID-19 with lung involvement require artificial respiration by ventilator machine and must go to the ICU, but they do not necessarily come out of the ICU alive [5] [6]. Other causes of death in COVID-19 are including; acute myocarditis, acute heart failure, acute myocardial infarction, cardiogenic shock [7] [8], acute renal failure due to acute tubular necrosis [9], hepatitis and hepatic failure [10], sudden cerebrovascular accident or stroke [11], and hemo-phagocytic lympho-histiocytosis (HLH) [12]. Skin manifestations of cases with severe COVID-19 such as; erythematous rash, generalized urticaria, livedo-reticularis, petechial rash, acute generalized pustulosis, Raynaud

phenomenon, COVID-19 toes, and acro-ischemic lesions are usually due to vasculitis [13], Bilateral acute follicular conjunctivitis or pink eyes is the only ocular manifestation of this disorder [14]. Real-Time, Reverse Transcriptase Polymerase Chain Reaction test, or in short RT-PCR test is the gold-standard diagnostic test for the detection of COVID-19. A positive RT-PCR test in a patient with viral symptoms/signs in ENT and lung with or without other organ's involvement indicates the presence of an active COVID-19. However, a positive RT-PCR in an asymptomatic person suggests three conditions including; subclinical COVID-19, pre-symptomatic COVID-19 within the incubation period, and carrier state. It can also show false-negative results in; late phase of inactive COVID-19, very early phase of COVID-19 in which the virus replication has not yet started, a case of COVID-19 in which the sample is taken from a site that does not contain the virus or sample is collected with errors. A positive COVID-19 IgM antibody test shows both active COVID-19 and recently improved COVID-19, whereas a positive COVID-19 IgG antibody test not only shows the recent previous COVID-19 but also reveals the body's immune protection against re-infection. In overall, rapid antibody tests or Quick COVID-19 tests can show fast results within 5 - 15 minutes with 15% false negativity [1] [15]. All symptomatic individuals who are suspected of having COVID-19, should undergo Chest-X-Ray, and even if CXR is normal; in them HRCT scanning of lungs is recommended. All asymptomatic individuals who have a positive result for COVID-19 diagnostic test should undergo imaging too. Imaging of asymptomatic COVID-19 patients is abnormal in 50% of the cases. Any imaging abnormalities in lungs including; ground-glass opacification (GGO) or hazy lungs, crazy-paving pattern, consolidation, and linear opacities as peripheral or diffuse patterns especially bilateral multi-lobe (white lungs) is compatible with diagnosis of COVID-19, even if RT-PCR test is negative. It is important to know that during the first four days of the illness, lung involvement in imaging is limited to one lobe in one-third of cases and not seen at all in one-fifth of cases [16]. Elevated ESR/CRP along with low lymphocyte count and abnormal liver function tests are compatible with mild to moderate cases of COVID-19, but high level of LDH, very high blood ferritin, D-Dimer, blood oxygen saturation  $\leq$  93% and high serum level of IL-6 will be in favor of severe to critical cases [12]. We need to know that getting a very accurate history is the mainstay in the diagnosis of COVID-19, while COVID-19 diagnostic tests and HRCT scanning of lungs are tools to confirm or reduce it. A positive history including acute respiratory symptoms following a recent trip to a red zone in novel Corona epidemic or recent contact with a patient of COVID-19 strongly is in favor of the diagnosis of COVID-19 even if the COVID-19 diagnostic test is negative and lung imaging is normal.

Allergic Rhinitis is a chronic rhinitis that affects 10-20 percent of the population. The combination of runny nose, stuffy nose, sneezing a lot, itchy nose, red/itchy and watery eyes with puffy/swollen eyelids, along with itchy mouth-throat or skin and history of asthma, allergic conjunctivitis, and atopic dermatitis are classic features for Allergic Rhinitis. Stuffy nose or nasal congestion causes mouth

breathing and dark circle under the eyes, runny nose causes post nasal discharge which is why the patient repeatedly performs the maneuver of throat clearing, and frequent rubbing at the nose is due to itchy nose. It is called hay fever too, but you don't have to be exposed to hay to have symptoms, and hay fever does not necessarily cause fever. But it seems that the best name for this disease is constant cold [17] [18] [19]. Basically, we are dealing with two different forms of Allergic Rhinitis, including; seasonal (intermittent, <6 weeks), and perennial (persistent, all year round). Seasonal Allergic Rhinitis is usually seen in spring, summer, and early fall, and in late fall and winter its symptoms subside and almost all disappear. Outdoor allergens including; the pollens from grass, trees, and weeds and mold spores in the air are triggers for this form of Allergic Rhinitis. Symptoms of perennial Allergic Rhinitis can be seen throughout the year. Indoor allergens including; pet hair or dander, dust mites and mold along with irritants, such as cigarette smoke, perfume, hair spray and fumes, cosmetics, laundry detergents, cleaning solutions, pool chlorine and diesel exhaust are triggers for this form of Allergic Rhinitis. The occurrence of seasonal Allergic Rhinitis in the context of perennial Allergic Rhinitis can be called combined or mixed Allergic Rhinitis. If Allergic Rhinitis leads to severe nasal congestion and, in fact, nasal obstruction, it manifests as sleep disturbance followed by fatigue or tiredness. Allergic Rhinitis with nasal obstruction sometimes can lead to another complications including; nasal polyps, sinusitis, and middle ear infections [17] [18] [19]. Observing high serum IgE levels along with eosinophilia in peripheral blood can confirm the diagnosis of Allergic Rhinitis, although these tests are not highly sensitive and specific. Nasal smears under the light microscope indicate nasal eosinophilia in about 80% of cases with Allergic Rhinitis. This test can be considered a strong or useful diagnostic test due to its relatively high sensitivity and specificity. There are also other tests including Intradermal skin testing, Skin prick testing, and Radio-allergosorbent tests (RASTs) which are used to identify the cause of the allergy, not to diagnose Allergic Rhinitis [20] [21].

#### 4. Discussion

Because COVID-19 can lead to dry coughs, runny nose, stuffy nose, sneezing, and fatigue it should be differentiated from Allergic Rhinitis. In Allergic Rhinitis, sneezing, runny nose, stuffy nose and postnasal discharge, itchy eyes, and itchy skin are most common, while in COVID-19; itchy eyes and skin are not seen and sneezing, runny nose, and stuffy nose are less common. Allergic Rhinitis do not cause weakness, body aches, tingling all over the body, fever, chills, and gastrointestinal features such as nausea, vomiting, diarrhea, abdominal pain, and bowel obstruction although they do occur in COVID-19, within fever is very common [17] [18] [19]. Shortness of breath, the loss of smell, and the lack of taste occasionally occur in Allergic Rhinitis, while they are very important findings in COVID-19 [22]. Intractable cough accompanied by expulsion of blood from lungs and cyanosis along with respiratory distress are seen in severe to

critical cases of COVID-19, but they are not seen in Allergic Rhinitis. Tonsillitis and quinsy can be seen in COVID-19, but not in Allergic Rhinitis. Skin features such as; erythematous rash, generalized urticarial, livedo reticularis, petechial rash, acute generalized exanthematous pustulosis, Raynaud phenomenon, COVID-19 toes, acro-ischemic lesions, and extensive darkening of skin due to hemosiderosis in HLH secondary to COVID-19 can be seen in severe to critical COVID-19, but they are not seen in Allergic Rhinitis [13]. Severe headache, loss of speech, delirium, seizure, coma, loss of movement, stroke, meningitis, and encephalitis can be seen in severe to critical COVID-19, but they are not seen in Allergic Rhinitis [11]. Cardio-vascular involvements, acute renal failure, hepatitis and hepatic failure can be seen in severe to critical COVID-19, but they are not seen in Allergic Rhinitis [17] [18] [19]. Positive RT-PCR, positive Quick COVID-19 test, elevated ESR/CRP, low lymphocyte count, abnormal liver function tests, high serum level of LDH, ferritinemia, D-Dimer, blood oxygen saturation < 93%, and high serum level of IL-6 will be in favor of the diagnosis of COVID-19, whereas; high serum levels of IgE and blood/nasal eosinophilia are compatible with the diagnosis of Allergic Rhinitis [20] [21]. An abnormal lung imaging including each one of; GGO, crazy-paving pattern, consolidations, and linear opacities especially white lung is in favor of COVID-19, whereas, the lung imaging is usually normal in Allergic Rhinitis [16].

## 5. Conclusion

People with the past medical history of Allergic Rhinitis have allergies in this spring or year similar to previous years, not COVID-19, unless this time the symptoms are sudden, new, or more severe, and with previous conventional allergy treatment, don't give up and get even worse. These two diseases: COVID-19, and Allergic Rhinitis, have many common clinical findings, and it may be difficult to distinguish them clinically, so we usually need to use para-clinics to differentiate them from each other. Because COVID-19 is very dangerous, deadly, and pervasive, but Allergic Rhinitis is most often harmless; therefore, the corresponding author believes that in the SARS-CoV-2 epidemics in the Red zones, when we cannot differentiate these two diseases; Allergic Rhinitis should be discarded in favor of COVID-19. By this decision, we are preventing the spread of the SARS-CoV-2 epidemic as much as possible and significantly reducing COVID-19 mortality rate.

## Author Contributions

ISA conceptualized the study, overall guidance, and manuscript writing. SK reviewed the manuscript draft.

## Acknowledgements

Special thanks to Iraj Rasooli (Microbiologist, University of Calgary, Canada) for his useful comments on the virology aspects and editing of this article.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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