

ACUTE RESPIRATORY DISEASES

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Abstract: Acute respiratory illnesses (ARDs) are a crew of infections that have an effect on the respiratory system, inflicting irritation and impairment of the lungs, airways, and air sacs. They can vary from slight to severe, and in some cases, can be life-threatening. This article pursuits to furnish an in-depth dialogue of the causes, symptoms, diagnosis, and cure of ARDs, with a center of attention on their influence on people and communities worldwide.

Keywords: ARI, mortality rate, epidemiology, life-threatening, viruses, history.

Introduction: The epidemiology of acute respiratory diseases (ARD) or acute respiratory infections (ARI) is widely discussed by the scientific community worldwide as an issue of concern due to the high morbidity and early mortality associated with the affected population. The upper and lower ARD is caused by various infectious agents, such as viruses, bacteria, and fungi. The principal signs of ARD are fever, headache, fatigue, myalgia, sneezing, nasal congestion, runny nose, itchy or sore throat, hoarseness, cough, dyspnea, and chest pain. Dissemination occurs mainly by direct or indirect contact with secretions from infected individuals and frequently by air, facilitating person-to-person transmission. Influenza is an ARI frequently related to higher rates of morbidity and mortality in different populations worldwide.

Several studies provide important information on many aspects of acute respiratory diseases. Currently, ARD estimates mortality of over 3 million people, more than 90% of which occur in low- and middle-income countries. This large number is considerable even in the pediatric age group, and ARD accounts for 20% of deaths in children under 5 years. Recognizing and diagnosing the responsible pathogens for the evolution of the diseases and the chronic impacts on health systems aim to minimize healthcare costs and optimize antiviral prescription. In this way, the constant surveillance of the viruses involved is necessary. The influenza virus is generally selected for analysis when studying ARD, including other respiratory viruses, as it is one of the most frequently available data sets for the detection and diagnosis of viruses. The basic distribution of influenza is worldwide and is widely observed in temperate climates. Flu epidemics cause deaths in extreme ages and increase the rate of hospitalization and outpatient visits and dramatically increase the number of medical prescriptions.

Definition and Classification

By acute respiratory disease, we understand an infectious disease that affects the upper (nasal passages, pharynx, larynx, and trachea) and lower respiratory tract (bronchi, bronchioles, and alveoli), as well as the adjacent structures, which represents approximately two-thirds of the infections existing in the world. The term also encompasses a group consisting of a specific disease with a characteristic clinical and epidemiological picture.

These diseases affect all age groups and affect a person throughout their life. The severity and degree of spread within a community depend on various factors and, in areas with a temperate climate, the incidence tends to be highest in the winter season and in the first six months of life, particularly at the end of the winter season. Worker attendance also depends on the existence of appropriate weather for the installation and maintenance of an epidemic or pandemic respiratory disease. These diseases, quite distinct from tuberculosis and other chronic lung diseases, are among the most common infections in the world.

Epidemiology and Global Burden

How large is the burden of acute respiratory disease globally? For which activities, behaviors, or exposures are people at higher risk? Demographic Health Survey (DHS) data show that during the 2-week period preceding the survey, an average of 11% of children under age 5 had an ARI. This number has been stable since 2001 when the first round of DHS with questions about ARIs was initiated. WHO data from 18 countries in the Eastern Mediterranean region indicated that 5.8% of all outpatient visits in 2015 were for ARIs. About 9% of all consultations in a primary care practice in Israel were for ARIs. In Hong Kong, 5.9% of all ED visits in the pediatric population were for ARIs. Workers in poultry processing lines have been reported to have an increased risk for ARI when compared against a control population. Risk factors for ARI in communities are reviewed by Jolly and Gelfman.

There is a scarcity of population-based studies about specific ARIs. As the infectious agents for ARIs are diverse, and most ARIs resolve rapidly with spontaneous or no treatment, there have been no specific general-purpose population-based surveys on the etiology of all ARIs in a defined area.

Multiple case definitions for acute respiratory infection exist. Any illness of acute onset, of short duration and with fever (or history of fever), and one or more symptom of cough, sore throat, rhinorrhea, or nose congestion are the cardinal signs of ARIs. Other syndromes have been analyzed to focus on different etiologies or clinical characteristics. Photo courtesy of Ana Bento. NASA image use policy.

An acute upper respiratory infection is any illness that includes acute onset of at least two of the following symptoms: cough, sore throat, rhinorrhea, or nasal congestion. Illness of acute onset, of short duration, with fever (or history of fever), and one or more symptom of cough, sore throat, rhinorrhea, or nose congestion notified by the primary care physician to the sentinel survey is considered a primary care influenza-like illness. In each of these scenarios, an etiology — whether bacterial, viral, or viral subtype — is not implied.

The illness spread rapidly from the Guangdong province and Hong Kong globally to over 30 countries in Asia, Europe, and North America. China had the majority of cases (83%), while in the United States, there were only 27 probable cases identified and no noted deaths or secondary cases. The outbreak in total led to 8096 cases, with 774 deaths attributed. Higher mortality was associated with older age, with a mortality rate as high as 43% in patients over 60. SARS mostly affected adults. Children were affected though in lesser numbers and with similar or milder presentations, and no deaths reported. Of note, with regards to COVID-19, similar to SARS and Middle East respiratory syndrome (MERS), adults are affected more

severely, and children are relatively spared. Health care facilities were affected greatly and played a large role in amplifying transmission. Health care workers accounted for 21% of cases. By July of 2003, no new cases were reported worldwide, leading the WHO to lift a travel advisory it had placed and to declare the end of the pandemic. Since the middle of 2004, no cases of SARS have been reported. Of note, there was a brief reemergence of the virus at the end of 2003 into the beginning of 2004 from accidental lab exposure.

SARS-CoV, like many other respiratory viruses, is transmitted predominantly person to person by face-to-face contact suggesting a droplet spread mechanism though also by direct contact with fomites or contaminated secretions. After transmission, the incubation period is typically 2 to 7 days, with 95% of patients developing symptoms by day 10. Fecal-oral, as well as airborne spread mechanisms, have also been speculated and may occur. Peak viral shedding occurs in respiratory secretions 6 to 11 days after symptom onset.

Pathophysiology

The SARS coronavirus (SARS-CoV) uses the angiotensin-converting enzyme 2 (ACE2) receptor for entry into its host. SARS-CoV recognizes the host ACE2 receptor through the virus's receptor-binding domain. Mutation in this domain may allow this and other coronaviruses to cause new and increased cross-species infections. The virus concentrates in the lungs and small bowel, which are areas with a high density of its receptors. Specifically, the alveolar epithelium shows the highest focus of infection. The infection leads to serous pleural effusions, pulmonary edema, and consolidations with relative sparing of the upper respiratory tract. The lung injury is thought to be due to an out-of-control immune response by the host leading to excess quantities of pro-inflammatory cytokines. Some patients will develop bacterial (i.e., *Staphylococcus aureus*, *Streptococcus pneumoniae*), viral, or fungal (i.e., *Aspergillus*, *Candida*) superinfections. The histopathology features, which have been found during postmortem and may not be representative of all SARS cases, show epithelial cell proliferation, diffuse alveolar damage, and macrophage infiltration of the lung.

History and Physical

The typical clinical presentation of the severe acute respiratory syndrome (SARS) includes fever, myalgia, cough, fatigue, and headache, with fever being the most common symptom. SARS is unique among viral respiratory diseases in that it has a longer prodromal phase of 2 to 14 days, in which most patients have no respiratory symptoms. At the end of the prodromal phase, the respiratory phase begins with typically a dry cough followed potentially by shortness of breath progressing to acute respiratory failure. Productive cough and coryza are uncommon. About 20% of patients present with diarrhea in one study. The majority of patients (70%) develop shortness of breath, and while 30% of patients will improve within one week, many patients are ill into a second week. In severe cases, a wave of deterioration is seen towards the end of the second week. When a death occurs in SARS, it usually occurs late in the course and is often attributed to adult respiratory distress syndrome (ARDS), secondary infections, septic shock, and thromboembolic complications.

Conclusion.

Acute respiratory ailments are a big public fitness difficulty worldwide, affecting tens of millions of humans annually. Understanding the causes, symptoms, diagnosis, and cure of ARDs is necessary for figuring out and managing these infections effectively. Preventive measures, such as vaccination, excellent hygiene, and a wholesome lifestyle, can assist minimize the morbidity and mortality related to ARDs. By taking proactive steps to forestall and control ARDs, folks, and communities can decrease the burden of these illnesses and promote higher fitness outcomes.

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