

UPPER RESPIRATORY TRACT INFECTIONS: AN OVERVIEW

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Received: 02 May 2013, Revised and Accepted: 16 June 2013

ABSTRACT

Upper respiratory tract infections (URTIs) have been regarded as the most frequent illnesses affecting people worldwide. Several factors contributing to the widespread occurrence of URTIs may be attributed to breathing of contaminated air, direct contact with infected people, overcrowded places, cigarette smoking and exposure to pathogens. URTIs can be characterized by a group of disorders which include common cold, pharyngitis, tonsillitis, epiglottitis, sinusitis, bronchitis, rhinitis, and nasopharyngitis, which significantly occurs in upper respiratory tract. URTIs have been known to be caused by either viruses and bacteria; or combination of both. This review article has been aimed to discuss the incidences and types of various URTIs.

Keywords: Upper respiratory tract, Infections.

INTRODUCTION

Upper respiratory tract infection (URTI) has been recognized as one of the most common medical problems in the daily lives of people worldwide. A strong confirmation for the prevention of URTI is rather inadequate, and thus, the patients take preventive measures on the basis of their own experience or preferences.¹ However, an URTI is referred to as a viral infection causing inflammation and infection in the nose and throat. URTIs are contagious which remain for few hours to 2-3 days of exposure. Also, the symptoms have been known to last from 7-10 days, but reports have shown that the symptoms may last even longer. URTI has been regarded as a nonspecific term that is used to describe acute infections involving the nose, paranasal sinuses, pharynx, larynx, trachea, and bronchi.[1,2] Although, there have been a range of related conditions that may have similar or overlapping clinical presentations within each category of illness, and hence, judgment is required in determining the affected respiratory mucosal part. Various signs and symptoms of URTIs have been reported which include stuffy and runny nose, sneezing, coughing, sore throat, fever, vomiting, irritability, loss of appetite, and watery eyes.[3-5] However, URTI infections have been suggested to be mild and self limiting, but they have been reported to lead to life threatening complications. Further, the cause of URTIs have been attributed to viral, but studies have also suggested the cause to be bacterial. Viruses causing most URTIs include rhinovirus, parainfluenza virus, coronavirus, adenovirus, respiratory syncytial virus, coxsackievirus, and influenza virus in most cases, whereas beta-hemolytic streptococci, *Corynebacterium diphtheriae*, *Neisseria gonorrhoeae*, *Arcanobacterium haemolyticum*, *Chlamydia pneumoniae*, *Mycoplasma pneumoniae*, *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Bordetella pertussis*, and *Moraxella catarrhalis* are the most common bacteria causing URTIs.[6-8] The archetype of URTIs has been referred to as common cold, which has been discussed in the present review along with pharyngitis, sinusitis, and tracheobronchitis.

Pathophysiology of URTIs

URTIs have been characterized as acute febrile illnesses presenting with cough, coryza, sore throat, and hoarseness, which forms the prime reason to get affected by URTI.⁹ However, it has been suggested that the vast majority of URTIs cases have been benign, and thus, the exact etiology of URTIs has not been understood completely. The transmission of organisms causing URTIs has been known to occur by aerosol, droplet, and direct hand-to-hand contact with infected secretions. In addition, subsequent passage to the nares and eyes also forms the basic procedure of acquiring infections, and hence, it has been suggested that the transmission occurs more commonly in crowded conditions.[10] Moreover, the direct incursion of the respiratory epithelium has been noted to

result in symptoms corresponding to the endemic involved. Further, the sinusitis and acute bronchitis have been known to be preceded by common cold. Also, the sinonasal allergies, anatomic abnormalities, sinus ostial blockade, immunodeficiency disorders, human immunodeficiency virus infection, and cocaine abuse have been suggested to enhance the development and progression of URTIs.[11] URTIs can be categorized as epidemic and pandemic infections, which can be evidenced by the fact that most epidemics have been believed to spread from schoolchildren to their families. In support, the annual influenza epidemics has been suggested to result from the transmission of a mutated influenza virus for which most humans do not own the immunity. On the other hand, pandemic infections have been documented to occur when a totally new influenza virus is transmitted to humans from other species, for example swine and birds.[9-11]

URTIs: Types

URTIs can be characterized by a group of disorders which include common cold, pharyngitis, tonsillitis, epiglottitis, sinusitis, bronchitis, rhinitis, and nasopharyngitis, which significantly occurs in upper respiratory tract. The term common cold can be referred to as one of the upper respiratory infection whose first infectious site is nose, which further radiates to throat and sinuses. The common cold has been documented to be caused by approximately 200 viruses, with a developing time of symptoms of 7-10 days.[12] The occurrence of signs and symptoms depends on the patient's feedback to infection, which include coughing, runny nose, difficulty in breathing, sore throat, muscle ache, and headache. The causative agents suggested to be involved are coronavirus, rhinovirus, human parainfluenza virus, adenovirus, enterovirus, metapneumovirus, and human respiratory syncytial virus.[12-13] The infection has been known to spread progressively by direct contact, by circulation of air and by using contaminated things. Also, some viruses cause asymptomatic infections resulting in the yellowish green coloration of nasal secretions. In addition, different climatic conditions like rainy season, winter, low humidity conditions and immunological conditions have also been responsible for the occurrence of the disease. The pathophysiological mechanism has been attributed to the binding of rhinovirus with human intracellular cell adhesion molecules (ICAM-1) receptor after invading, causing the release of inflammatory mediators, ultimately leading to the occurrence of disease symptoms.[14] Various preventive measures have been employed that include maintaining personal care and hygienic conditions, washing of hands, use of face masks, gloves and proper vaccination. In addition, the treatment strategies involve intake of fluids, gargling with saline water, and steam inhalation. Also, drugs like analgesics and antipyretics, first generations antihistaminics and decongestants have been employed.[15-16]

Pharyngitis, the inflammation of pharynx or throat at back side, can be divided into two types, i.e., acute and chronic. In addition, the pharyngitis can be classified into viral pharyngitis and bacterial pharyngitis according to their cause, that has been known to occur at an age of 4-8 years.[17-18] Factors like cold, allergics, toxic fumes, accumulation of chemicals, and flu has been suggested to result in pharyngitis. Also, a number of viruses and bacterias have been noted to be involved in the origin and development of infectious pharyngitis. The viruses include adenovirus, influenza virus, cytomegalovirus, epstein- barr virus, herpes simplex virus, rhinovirus, coronavirus, and syncytial virus; whereas *streptococci*, *chlamydomphila pneumoniae*, *mycoplasma pneumoniae*, *corynebacterium diphtheriae*, and *neisseria gonorrhoeae* are the bacterias which have been known to cause pharyngitis.[19] Common symptoms of pharyngitis include rheumatic fever, red-sore throat, yellow coloured secretion from nose, hypertrophy of tonsils, coughing, conjunctivitis, severe pain, enlargement of lymphs, headache, malaise, and difficulty in swallowing. The various prevention and treatment approaches include regular washing of hands, ignorance of direct contact with infected person, and avoiding smoking.[17] In addition, gargling with saline water, intake of warm fluids, and use of lozenges have been documented to show beneficial effects in patients suffering from pharyngitis. Also, in order to overcome the sensation of pain, analgesics have been known to be used. Moreover, local anaesthetics like lidocaine and benzocaine alongwith antipyretics have been suggested to provide momentary relief.[20]

Sinusitis, another type of URTIs, can be defined as the occurrence of inflamed state of mucosal membrane and airfilled cavities. The sinuses have been classified into following subunits namely maxillary sinuses, frontal sinuses, ethmoid sinuses, sphenoid sinuses, anal sinuses, and dural venous sinuses.[21] In sinusitis, nasal endoscopy has been commonly referred for diagnostic purposes. In addition, sinusitis can be further classified into acute sinusitis and chronic sinusitis, based on the duration of occurrence and termination of symptoms.[21,22] Numbers of causative factors have been found to be involved in the occurrence of rhinosinusitis, which include immunological deficiency, seasonal and altitude variation, severe common cold condition, allergies, unusual changes in anatomy of nasal septum, and smoke.[23] Moreover, sinusitis may be of classified as viral, fungal or bacterial sinusitis based on the type of organism invaded. Generally, difference between viral, bacterial or fungal rhinosinusitis is identified by symptoms.[21] The common signs and symptoms of sinusitis include nasal septum congestion, migrain like headache, decreased smell sensation, sneezing, facial pressure, and toothache. Further, personal care strategies, steam inhalations, and humidification accounts for the preliminary preventive measures for sinusitis. In addition, various drug therapies like antibiotics, corticosteroids, decongestants, and analgesics have been reported to show beneficial effects in patients presented with sinusitis.[24]

Bronchitis, the inflammatory state of bronchi, is another type of URTIs which has been commonly found to affect a large number of people worldwide. In bronchitis, chest X-ray is the main diagnostic procedures employed.[25] Moreover, bronchitis can be acute whose signs and symptoms terminate within 7-8 days; and chronic, whose signs and symptoms occur for 3-6 months. A number of causative agents have been found to be involved in the occurrence of bronchitis which include smoking, air pollution, decreased immunological response, and seasonal changes.[25] In addition, rhinovirus and adenovirus have been reported to cause bronchitis, whereas, bacterias known to cause bronchitis include *mycoplasma pneumoniae*, *chlamydomphila pneumoniae*, *bordetella pertussis*, *streptococcus pneumoniae*, and *haemophilus influenzae*. Various signs and symptoms have been suggested for bronchitis like coughing, coryza, sore throat, migraine like headache, typical fever, excess production of mucus, wheezing, difficulty in breathing, bronchospasm, fatigue, and chest pain.[26] Maintenance of personal hygienic care, avoiding smoking, employment of humidifier, avoiding mucous productive eatables, mask and gloves usage accounts for the initial preventive measures. In addition, various drugs like beta-adrenergic agonists, anticholinergics, decongestants,

expectorant, cough suppressants, and corticosteroids have been suggested to offer potential benefits.[25-27]

Tonsillitis, another common type of URTIs, can be defined as the state of inflamed condition of palatine tonsils, pharyngeal tonsils, tubal tonsils, and lingual tonsil.⁹ The inflammation leads to their enlarged size causing difficulty in swallowing alongwith difficulty in voice production. A number of viruses have been reported to cause tonsillitis which include adenovirus, rhinovirus, cytomegalovirus, epstein-barr virus, herpes simplex, measles virus, and respiratory syncytial virus.[28] In addition, *streptococcus pneumoniae*, *staphylococcus aureus*, *streptococcus*, *mycoplasma pneumoniae*, and *chlamydia pneumoniae* are the common bacterias involved in the pathogenesis if tonsillitis. The signs and symptoms which have been suggested to appear in tonsillitis include typical fever, lethargy, headache, earache, difficulties in swallowing, voice complications, tonsils inflammation, halitosis, and sore throat.[3,4] However, the pathophysiological mechanisms involved in the pathogenesis of tonsillitis involves the filtration of tonsils by the entry of viral and bacterial agents, which have been known to destruct the defensive mechanism of leucocytes with the release of inflammatory mediators like phospholipase A2, ultimately producing the symptoms of the disease. Further, various precautionary measures can be employed for prevention like maintenance of personal hygienic and sanitary conditions, intake of sufficient amount of liquid, ignorance of close contact with infected persons, and avoiding smoking.[29-30] In addition, various drug therapies have been suggested to offer beneficial effects like analgesics, antibiotics, antiseptics, and herbal astringents.

CONCLUSION

Upper respiratory tract infections can be referred to a group of disorders like common cold, pharyngitis, tonsillitis, sinusitis, bronchitis, and rhinitis. The cause these infections are viruses like rhinovirus, coronavirus, parainfluenza virus, adenovirus, enterovirus and syncytial virus, alongwith many bacterias like *streptococcus pyrogens*, *mycoplasma pneumoniae*, *chlamydomphila pneumoniae*, *bordetella pertussis*, *streptococcus pneumoniae*, and *haemophilus influenzae*. The infection show various symptoms like coughing, sore throat, sneezing, difficulty in breathing, runny nose, muscle pain, and weakness. A number of preventive measures have been suggested which involve washing hands, avoid sharing of eatables, and taking seasonal vaccines. However, various drugs like analgesics, antibiotics, and decongestants have been suggested to afford beneficial effects but thorough study of novel therapeutic targets is demanded in order to completely provide treatment and prevention of the patients presented with URTIs.

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