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TABLE 369-1 VIRUSES ASSOCIATED WITH THE COMMON COLD

VIRUS GROUP	ANTIGENIC TYPES	PERCENTAGE OF CASES
Rhinoviruses	>100	40-50
Coronaviruses	5	10-15
Parainfluenza virus	5	5
Respiratory syncytial virus	2	5
Influenza virus	3	25-30
Adenovirus	47	5-10
Metapneumovirus	2	5
Other viruses: enteroviruses, bocavirus		

From Mandell GL, Bennett JE, Dolin R, eds. *Principles and Practice of Infectious Diseases*, 7th ed. Philadelphia: Churchill Livingstone; 2010:810.

that rhinoviruses may also be associated with bronchiolitis in young children.

The coronaviruses (Chapter 374), parainfluenza viruses (Chapter 371), respiratory syncytial virus (Chapter 370), metapneumoviruses, adenoviruses (Chapter 373), and influenza viruses (Chapter 372) may also cause common cold illnesses (Table 369-1). Bocavirus has recently been associated with the common cold, but these viruses are also frequently isolated from healthy control subjects, so their role as pathogens is uncertain. Bacterial pathogens such as *Bordetella pertussis* (Chapter 321) and group A streptococcus (Chapter 298) are occasionally associated with rhinorrhea, but these illnesses are generally readily distinguished from the common cold.

EPIDEMIOLOGY

The incidence of common colds decreases with age, from at least six episodes per year in young children to approximately two episodes per year in adults. The incidence of illness is higher in adults who have occupational or household exposure to children and in children who are cared for in childcare centers. Common cold illnesses occur year-round in temperate climates but have a substantially increased incidence between the early autumn and late spring. This common cold “season” consists of sequential outbreaks caused by the different respiratory viruses. In tropical climates, colds occur year-round without defined seasonality.

PATHOBIOLOGY

Respiratory pathogens are spread from person to person by direct contact with either infected individuals or contaminated objects in the environment, by large-particle aerosols, or by small-particle aerosols. The rhinoviruses appear to be spread most efficiently by direct contact. Respiratory syncytial virus (Chapter 370) may be spread by either direct contact or large-particle aerosols, and influenza (Chapter 372) may be spread by small-particle aerosols.

Regardless of the route of spread, the common cold syndrome is initiated by infection of the nasal epithelium. Influenza and adenovirus produce obvious damage to the respiratory epithelium. Rhinovirus and respiratory syncytial virus, in contrast, have little or no detectable impact on the epithelium. Regardless of the histopathology, all of these viruses stimulate a non-specific host inflammatory response that appears to be responsible for many of the symptoms associated with the common cold (Fig. 369-1).

The nasal obstruction of the common cold appears to result primarily from increased nasal blood flow and pooling of blood in the capacitance vessels of the nose. The increase in nasal secretion associated with the common cold may also contribute to the nasal obstruction. Rhinorrhea is primarily a result of increased vascular permeability with leakage of serum into the nasal secretions. Increased mucus production contributes to the secretions during the later stages of the illness.

Multiple factors may play a role in the pathogenesis of cough. Cough may be related to infection of the lower airway, irritation of upper airway receptors with neurologically mediated airway reactivity, or postnasal drip with pharyngeal irritation.

The risk of infection after exposure to the respiratory viruses is primarily dependent on the presence of specific neutralizing antibodies. Antibody responses to the rhinoviruses, adenoviruses, and influenza viruses are

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THE COMMON COLD

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DEFINITION

The common cold is an upper respiratory syndrome of rhinorrhea and nasal obstruction, frequently accompanied by sore throat, sneezing, and cough. This viral syndrome is among the most common illnesses of humankind.

The Pathogens

The rhinoviruses cause at least half of all common cold illnesses. The rhinoviruses, which are RNA viruses that infect the respiratory epithelium, have long been known as common cold viruses, but they also are important causes of exacerbations of chronic bronchitis and asthma. More recent data suggest

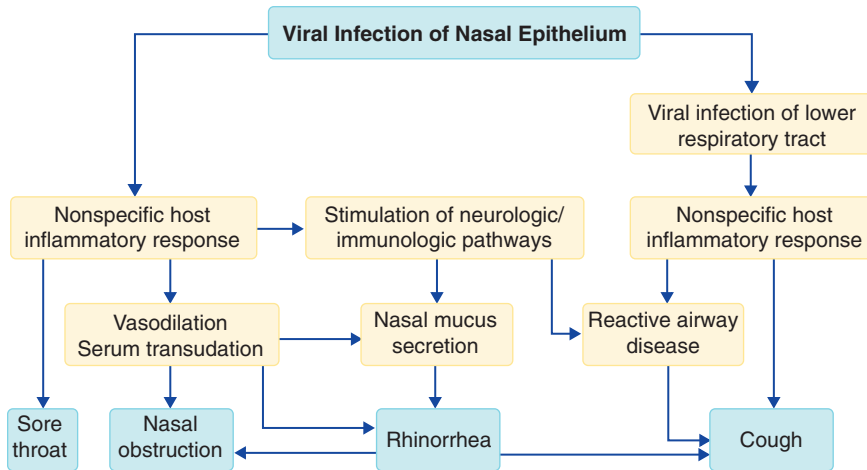


FIGURE 369-1. Proposed pathogenesis of common cold symptoms. (Modified from Richmond D, Hayden FG, Whitley R, eds. *Clinical Virology*, 3rd ed. Washington, DC: ASM Press; 2009:1073.)

protective against subsequent infection. The frequency of infection with these viruses is a result of the large number of distinct serotypes of rhinovirus and adenovirus and the ability of the influenza viruses to behave as though there are multiple virus serotypes by virtue of the rapid mutation of the antigens presented on the surface of the virus. The parainfluenza viruses, respiratory syncytial viruses, and metapneumoviruses do not produce protective immunity, so reinfection is common although preexisting antibody moderates the severity of illness.

Mannose-binding lectin deficiency has been associated with an increased incidence of common colds in young children. Protection by this innate response may become less important as children experience a variety of infections and develop specific immunity. Polymorphisms that enhance inflammatory cytokine responses may be associated with more severe respiratory illness.

CLINICAL MANIFESTATIONS

The incubation of common cold illness is generally short, ranging from 2 to 8 days, although the adenoviruses may have an incubation of as long as 13 days. A sore or scratchy throat is frequently reported as the first manifestation. Sneezing is also a common early symptom. Nasal obstruction and rhinorrhea develop rapidly and, by day 2 or 3 after the onset of illness, are the most bothersome symptoms. Cough generally develops later in the illness and frequently is the most bothersome symptom as the cold resolves. Common cold illnesses generally persist for about 1 week, although about 25% may persist for as long as 2 weeks.

Physical findings are restricted to the upper respiratory tract. Increased nasal secretion may be obvious to the examiner. A change in the color or consistency of nasal secretions is common during the course of the illness and is not indicative of sinusitis or bacterial superinfection.

DIAGNOSIS

The differential diagnosis of the common cold includes noninfectious disorders as well as other upper respiratory tract infections. Allergic rhinitis (Chapter 259) has a symptom complex similar to that of the common cold, although the presence of nasal or conjunctival itching suggests allergic disease. Most patients can reliably differentiate these illnesses.

Sinus involvement is present in uncomplicated cold illnesses, and superimposed bacterial sinusitis (Chapter 434) is difficult to differentiate from an uncomplicated cold. Rhinorrhea that persists without improvement for more than 10 days may suggest the presence of bacterial sinusitis that will respond to antibiotics.

Routine laboratory studies are not helpful for the diagnosis or management of the common cold. Although the viral pathogens associated with the common cold may be detected by culture, antigen detection, polymerase chain reaction, or serologic methods, these studies are of little value unless treatment with an antiviral agent is contemplated.

TREATMENT

Rx

Specific antiviral therapy is generally not useful for the treatment of common cold illnesses. The neuraminidase inhibitors oseltamivir and zanamivir (Chapter 368) have a modest effect on influenza virus infections, but the difficulty of distinguishing influenza from other common cold pathogens

TABLE 369-2 TREATMENTS FOR THE COMMON COLD

DRUG	DOSE AND DURATION	SIDE EFFECTS
Topical adrenergic agents: oxymetazoline	2-3 sprays of 0.05% soln every 12 hr as needed for up to 3 days	Rebound nasal congestion with prolonged use Nasal stinging or burning
Oral adrenergic agents: pseudoephedrine	60 mg every 4-6 hr up to 240 mg/day as needed for nasal congestion	Insomnia Agitation
Antihistamines: chlorpheniramine	4 mg orally every 4-6 hr up to 24 mg/day as needed for rhinorrhea or sneezing	Sedation
Anticholinergics: ipratropium bromide	2 sprays per nostril of 0.06% soln every 6-8 hr as needed for rhinorrhea	Nasal dryness

and the need to start treatment early in the illness for maximum benefit are practical limitations to the use of these agents for mild upper respiratory infections. Antibacterial therapy is of no benefit in the treatment of the common cold.

Management of the common cold relies on symptomatic remedies. Treatments for nasal obstruction, rhinorrhea, and sore throat have demonstrated efficacy in adults but are not clearly beneficial in children and are not recommended for children younger than 4 years.

Nasal Congestion

Both topical and oral adrenergic agents (Table 369-2) are effective nasal decongestants. Although direct comparison has not been performed in the common cold, it is generally accepted that topical agents, such as intranasal xylometazoline, are more effective than oral drugs for nasal congestion. Nevertheless, oral pseudoephedrine, 60 mg as a single dose or repeated for 3 to 5 days, is superior to placebo for relief of nasal congestion and is safe. A 30-mg dose, however, may be no better than placebo. Prolonged use of the topical adrenergic agents should be avoided to prevent the development of an apparent rebound effect when the drug is discontinued. Systemic absorption of oxymetazoline and xylometazoline has rarely been associated with bradycardia, hypotension, and coma. The antihistamines have no effect on nasal congestion.

Rhinorrhea

The treatment of rhinorrhea is primarily by blockade of cholinergic stimulation of glandular secretion. Intranasal ipratropium bromide reduces rhinorrhea in colds by 22 to 31% compared with placebo, and it can be used as a combined spray with xylometazoline to relieve both rhinorrhea and nasal congestion. The most common side effects of intranasal ipratropium are nasal irritation and bleeding.

The first-generation (sedating) antihistamines reduce rhinorrhea by approximately 25% compared with placebo. The second-generation or "nonsedating" antihistamines have had no effect on common cold symptoms in a limited number of studies. These observations, the absence of histamine in the secretions of most subjects with colds, and the similarity of the response to ipratropium and first-generation antihistamines suggest that any effect of antihistamines on rhinorrhea is related to their anticholinergic rather than

their antihistaminic properties. The major side effects associated with the use of the antihistamines are sedation and drying of the eyes, mouth, and nose.

Cough

Cough during colds is produced by several different mechanisms, and treatment should be directed at the most likely underlying cause. If cough is caused by nasal obstruction or postnasal drip, it may respond to treatment with an antihistamine or antihistamine-decongestant combination. If a more persistent cough is the result of virus-induced reactive airway disease or viral infection of the lower airways, patients may benefit from bronchodilator therapy (Chapter 87). Cough that persists after the resolution of other cold symptoms or that persists in association with unremitting rhinorrhea may be due to sinusitis and may respond to antibiotic therapy (Chapter 434). Nonspecific cough suppression with codeine or dextromethorphan hydrobromide has not been demonstrated to be efficacious, and expectorants such as guaifenesin are not effective antitussive agents.

Other Remedies

Many patients have a variety of other symptoms. Nonsteroidal anti-inflammatory agents are effective for headache, ear pain, and muscle and joint pain; however, they do not relieve nasal congestion, rhinorrhea, or cough.■

Zinc, which is an inhibitor of rhinovirus 3C protease that is essential for virus replication, does not have a significant antiviral effect and has shown either no or relatively modest effects in reducing the severity of the common cold.■ This uncertain benefit must also be viewed in light of zinc's side effects; oral zinc lozenges may be associated with sore mouth and occasional nausea, whereas intranasal zinc may cause nasal irritation.

Echinacea has not been shown to be beneficial in reducing symptoms of the common cold in several studies.■ Given the variation in echinacea products, however, it is possible that echinacea preparations with different phytochemical profiles might be helpful. The accumulating evidence, however, suggests that it is prudent to assume that echinacea has no beneficial effect until positive evidence of a treatment effect is produced.

SUGGESTED READINGS

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- Pappas DE, Hendley JO. The common cold and decongestant therapy. *Pediatr Rev.* 2011;32:47-55. Detailed review and practical guide to therapy.

PREVENTION

Chemoprophylaxis or immunoprophylaxis is generally not available for the common cold. Immunization or chemoprophylaxis against influenza (Chapter 372) may be useful for prevention of colds caused by this pathogen, but influenza is responsible for only a small proportion of all colds. Vitamin C, even in megadoses, is of no benefit.■ Other nonpharmacologic interventions touted as effective prophylaxis for the common cold but of unproven benefit include zinc, vitamin E, echinacea, ginseng, probiotics, exercise, and handwashing. Handwashing and exercise have undeniable benefits for health in general and can be recommended despite the paucity of evidence specific to common cold prevention. Other interventions, although probably safe, have no demonstrable benefit and simply contribute to the unnecessary health care expenditures related to the common cold.

PROGNOSIS

The common cold generally has little medical significance. However, these illnesses are frequently complicated by otitis media (Chapter 434) or sinusitis (Chapter 434) that may be a direct result of the viral infection or may be due to bacterial superinfection. Exacerbations of asthma (Chapter 87) and chronic bronchitis (Chapter 88) are also important complications of the common cold.



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