Differential diagnosis and Clinical management of Acute Respiratory Viral Infections

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Irresponsible approach

“Primary-care medicine is just as much art as science...”

Most often clinicians forget about clinical thinking and use empirical and symptomatic treatment instead of making an etiotoric prescription.
To verify the diagnosis a physician must know how to conduct a differential diagnosis, which includes the knowledge of:

- Clinical manifestation of a disease
- Etiopathogenetic peculiarities
Most cases of bronchitis are caused by viruses, but many clinicians prescribe antibiotics at their patients' insistence. Patients may explain that they are going on a long-planned vacation and just can't afford to be sick, or they are getting married that weekend and desperately need to get over an annoying cold. After a while, the clinician caves in, prescribes something, and vows this exception will be the last one.
<table>
<thead>
<tr>
<th>Symptom</th>
<th>Allergy</th>
<th>URI</th>
<th>Influenza</th>
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</thead>
<tbody>
<tr>
<td>Itchy, watery eyes</td>
<td>common</td>
<td>rare; conjunctivitis may occur with adenovirus</td>
<td>soreness behind eyes, sometimes conjunctivitis</td>
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<tr>
<td>Nasal discharge</td>
<td>common</td>
<td>common</td>
<td>common</td>
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<tr>
<td>Nasal congestion</td>
<td>common</td>
<td>common</td>
<td>sometimes</td>
</tr>
<tr>
<td>Sneezing</td>
<td>very common</td>
<td>very common</td>
<td>sometimes</td>
</tr>
<tr>
<td>Sore throat</td>
<td>sometimes (postnasal drip)</td>
<td>very common</td>
<td>sometimes</td>
</tr>
<tr>
<td>Cough</td>
<td>sometimes</td>
<td>common, mild to moderate, hacking cough</td>
<td>common, dry cough, can be severe</td>
</tr>
<tr>
<td>Headache</td>
<td>uncommon</td>
<td>rare</td>
<td>common</td>
</tr>
<tr>
<td>Fever</td>
<td>never</td>
<td>rare in adults, possible in children</td>
<td>very common, 100-102 °F or higher (in young children), lasting 3-4 days; may have chills</td>
</tr>
<tr>
<td>Malaise</td>
<td>sometimes</td>
<td>sometimes</td>
<td>very common</td>
</tr>
<tr>
<td>Fatigue, weakness</td>
<td>sometimes</td>
<td>sometimes</td>
<td>very common, can last for weeks, extreme exhaustion early in course</td>
</tr>
<tr>
<td>Myalgias</td>
<td>never</td>
<td>slight</td>
<td>very common, often severe</td>
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<tr>
<td>Duration</td>
<td>weeks</td>
<td>3-14 days</td>
<td>7 days, followed by additional days of cough and fatigue</td>
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<tr>
<td>Symptom</td>
<td>Viral</td>
<td>Bacterial</td>
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<tr>
<td><strong>Nasal symptoms</strong></td>
<td>Rhinorrhea, congestion or obstruction of nasal breathing due to swelling of mucosa, and sneezing early in stage. Secretions often evolve from clear to opaque white to green to yellow within 2-3 days of symptom onset. Thus, color and opacity do not reliably distinguish viral from bacterial illness.</td>
<td>Congestion or obstruction of nasal breathing due to secretions. Nasal secretions may be thick or yellow; however, these features do not differentiate a bacterial infection from a viral one.</td>
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<td><strong>Pharyngeal symptoms</strong></td>
<td>Scratching throat, odynophagia, or dysphagia. Sore throat is typically present in the first days of illness, although it lasts only a few days. If the uvula or posterior pharynx is inflamed, the patient may have an uncomfortable sensation of a lump when swallowing. Nasal obstruction may cause mouth breathing, which may result in a dry mouth, especially after sleep.</td>
<td>Sore or scratchy throat, odynophagia, or dysphagia. If the uvula or posterior pharynx is inflamed, the patient may have an uncomfortable feeling of a lump when swallowing. Nasal obstruction may cause mouth breathing, which may result in dry mouth. Group A streptococcal infections and H. influenza often cause sore throat.</td>
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<td><strong>Cough</strong></td>
<td>Laryngeal involvement, or it may result from upper airway cough syndrome related to nasal secretions (postnasal drip). Cough typically develops on the fourth or fifth day, subsequent to nasal and pharyngeal symptoms. Development of tracheaitis, bronchitis or pneumonia.</td>
<td>It may be due to laryngeal involvement or upper airway cough syndrome related to nasal secretions (postnasal drip). Bacterial bronchitis or pneumonia.</td>
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<td><strong>Foul breath</strong></td>
<td>This occurs as resident flora process the products of the inflammatory process. Foul breath may also occurs with allergic rhinitis.</td>
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<td><strong>Hyposmia</strong></td>
<td>Also termed anosmia, it is secondary to nasal inflammation.</td>
<td>Rare, could be due to specific infections: Klebsiella, Treponema, etc.</td>
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<td><strong>Headache</strong></td>
<td>This symptom is common to many types of viral infections, due to intoxication syndrome.</td>
<td>While common with group A streptococci and mycoplasma infections, it also may be caused due to primary bacteremia.</td>
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<td><strong>Sinus symptoms</strong></td>
<td>These may include congestion or pressure and are common with viral URIs.</td>
<td>S aureus, P. aeruginosa, S. pneumoniae, H. influenza, Moraxella catarrhalis, Streptococcus pyogenes, Staphylococcus aureus, and anaerobes are less commonly associated with acute bacterial rhinosinusitis.</td>
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<td><strong>Photophobia or conjunctivitis</strong></td>
<td>These may be seen with adeno-viral and other viral infections. Influenza may evoke pain behind the eyes, pain with eye movement, or conjunctivitis. Itchy, watery eyes are common in patients with allergic conditions.</td>
<td>Most commonly caused by streptococci, staphylococci, and corynebacteria.</td>
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<td><strong>Fever</strong></td>
<td>This is usually slight or absent, but temperatures can reach 39.4°C (103°F) in infants and young children. If present, fever typically lasts for only a few days. In influenza infection, fevers may result in temperatures as high as 40°C (104°F).</td>
<td>These may occur with any URTI. Extreme exhaustion is typical of influenza infection. Usually sub febrile, may reach high points to 39 - 40°C.</td>
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<td><strong>Gastrointestinal symptoms</strong></td>
<td>Symptoms such as nausea, vomiting, and diarrhea may occur in persons with seasonal or H1N1 influenza, adeno-viral or metapneumoviral infection especially in children. Nausea and abdominal pain may be present in individuals with strep throat and viral syndromes.</td>
<td>Abdominal pain may occur in streptococcal disease or with influenza and other viral conditions.</td>
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<tr>
<td><strong>Severe myalgia</strong></td>
<td>This is typical for influenza infection, especially in the sudden-onset sore throat, fever, chills, nonproductive cough, and headache.</td>
<td>Rare, mostly due to secondary complications such as rheumatic fever.</td>
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<tr>
<td><strong>Fatigue or malaise</strong></td>
<td>Any type of URTI can produce these symptoms. Extreme exhaustion is typical of influenza infection.</td>
<td>These may occur with any bacterial infection.</td>
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</table>
Epiglottitis

This condition is more often found in children aged 1-5 years who present with a sudden onset of symptoms:

Sore throat
Drooling, odynophagia or dysphagia, difficulty or pain during swallowing, globus sensation of a lump in the throat
Muffled dysphonia or loss of voice
Dry cough or no cough, dyspnea
Fever, fatigue or malaise (may be seen with any URI)
Laryngotracheitis

Nasopharyngeal symptoms: Nasopharyngitis often precedes laryngitis and tracheitis by several days. Odynophagia or dysphagia may be reported. Swallowing may be difficult or painful. Patients may experience a globus sensation of a lump in the throat.

Hoarseness or loss of voice: This is a key manifestation of laryngeal involvement.

Dry cough: In adolescents and adults, laryngotracheal infection may manifest as severe dry cough following a typical URI prodrome. Mild hemoptysis may be present.

Barking cough: Children with laryngotracheitis or croup may have the characteristic brassy, seal-like barking cough. Symptoms may be worse at night. Diphtheria also produces a barking cough.

Whooping cough: The classic whoop sound is an inspiratory gasping squeak that rises in pitch, typically interspersed between hacking coughs. The whoop is more common in children. Coughing often comes in paroxysms of a dozen coughs or more at a time and is often worst at night. The cough may persist for several weeks.
Posttussive symptoms: Posttussive gagging or emesis may be present after paroxysms of whooping cough. Subconjunctival hemorrhage may result from severe cough. Rib pain, with pinpoint tenderness worsening with respiration, may result from rib fracture associated with severe cough.

Dyspnea: Symptoms may be worse at night because of changes in airway mechanics while the patient is recumbent. Apnea may be a chief feature in infants with pertussis, or whooping cough. Apnea may also result from upper airway obstruction due to other causes.

Other symptoms: Myalgia is characteristic in influenza infection, especially in the setting of hoarseness with sudden sore throat, fever, chills, nonproductive cough, and headache. Fever may be present, but it is not typical in whooping cough. Fatigue or malaise may
Management of influenza and other ARVI
Etiotropic therapy

Among antiviral agents which are indicated at influenza type A, Remantadin is recommended in such doses: at 1-st day 0,1 gr. 3 times per day, at 2-nd and 3-rd day 0,1 gr. 2 times, at 4-th 0,1 gr after meal.

The positive effect at influenza of type A and B is at using Adampromin. Synthetic preparation Ribamidil (Ribavirin) has positive influence on viruses of influenza A and B which is indicated at a daily dose 0,3 - 0,6 gr. during 5 days, however in clinical conditions rather inconsistent data are received.

Perspective combined indication of Ribavirin with Remantadin or Adampromin as medical aerosols is represented. Adampromin influences on viruses of an influenza A and B. Similar antiviral property have Midantan, Deitiforin, Arbidole.

Tilorone (Amixin IC) is the first recognized synthetic, small molecular weight compound that is an orally active interferon inducer. It is used as an antiviral drug.

• Treatment: 125 mg/day first 2 days, 125 each 48 hours. 750 mg for the whole period of treatment.
• For prophylaxis: 125 mg per week for 6 weeks. 750 mg for
Inosine pranobex (Isoprinosine or Methisoprinol) - is a combination of inosine, acetamidobenzoic acid, and dimethylaminoisopropanol. Inosine pranobex has no effect on viral particles itself. It acts as an immunostimulant, an analog of thymus hormones.

Metisoprinol
Groprinosin
Novirin

Imidazolyl ethanamide pentandioic acid

Treatment:
Leukocytic interferon:

3 - 5 drops in each nasal meatus through 1 - 2 hours not less than 5 times per day during 2 - 3 days or as aerosole with the same frequency (Anaferon, Laferobion, Viferon) 5 drops (0,25 ml) 50 000 - 100 000 ME into each nasal each 60 - 120 min, but not less 6 times per day, 2 - 3 days.

Treatment of virus rhinitis includes: Unguent of Oxolini, apply on nasal mucosa 2 - 3 times per day 3 - 4 days.

The preparation is indicated at herpetic superinfection, however its efficiency is low. The specified antiviral agents should be applied in the first days of disease, later
In connection with the expressed toxicosis infuse Reopolyglucin, solution of Albumin, isotonic solution of Sodium chloride, 5% a solution of glucose (I.V.).

For prevention of hypertension in a small circle of a circulation and a fluid lungs, it is necessary to infuse no more than 500 - 800 ml of liquids slowly and simultaneously to use diuretic preparations - Furosemid, Diacarb, Etacrinic acid. Appoint Corglykon.
Patients with especially serious (hyper toxic) form of influenza should be treated in ICU. Antiinfluenza gamma-globulin or a serum polyglobulin indicated: 3 - 6 ml. in 4 - 6 hours (intra muscle or even intra vein).

Infuse (I.V.) admixture of the following structure:

blood plasma – 150 - 200 ml;
solution of glucose 40 % - 20 ml,
Mesaton 1 % or Noradrenalinin 0,2 % 1 ml.;
Strophanthin 0,05 % or Corglykon 0,06 % 0,5-1 ml.;
Furosemid (Lasix) 40 - 80 mg;
Hydrocortizon 250 - 400 mg;
Euphyllin 2,4 % 1 ml;
ascorbic acid solution 5 % 5 - 10 ml;
calcyl chlorid solution 10 % – 10 ml;
- At disorders of cardiac activity use - Corglykon or Strophanthsin.

- At increase of hypoxia and fluid of lungs prescribe to inhale Oxygen-alcohol mixture on extremity impose venous garrotes, apply diuretic preparations.

- In case of development of acute edema and brain swelling in a vein infuse Mannit (or. Mannitole, Furosemid (or. Lasix), preparations of a potassium, glucocorticoids.

- Use antitussive (Glaucini hydrochloride, Libexin, Tusuprex), expectorating (terpin hydrate, Natrii benzoic, broth of a herb of Termopsis, a root of althaea, mucolytic (Acetylcystein, Bronchoclar, Bromhexin, Ambroxole, Lasolvan, Fluditec) agents,
As agent of a choice can be a human leukocytic interferon: 3 - 5 drops in each nasal meatus through 1 - 2 hours not less than 5 times per day during 2 - 3 days or as aerosole with the same frequency.

Treatment of virus rhinitis includes:
- Unguential of Oxolini, grease a mucosa of nose 2 - 3 times per day 3 - 4 days. The preparation is indicated at herpetic superinfection, however its efficiency is low. The specified antiviral agents should be applied in the first days of disease, later they are not effective.
To decrease a body temperature, and to reduce a headache and muscular pain Analgin, Ascofen, Upsarin with vitamin C, Eferalgan, Paracetamol are indicated. As a preparation of a choice you can use non narcotic analgetic Amison, rendering analgetic, anti-inflammatory, antipyretic and inferonogenic action.

The fever is the major adaptive and protective reaction of organism, induces synthesis of an endogenic interferon. Antipyretic preparations are indicated only at a hyperpyrexia and expressed cerebral and cardiovascular disorders in adegnote dose to lower a body temperature
As the stimulation of endogenic interferon transformation apply Amixin 0,125 - 0,25 gr. per day for 2 days, then on 0,125 gr. in 48 hours for one week or in the first 2 - 3 days prescribe Mefanam acid 0,5 gr. 2 times per day. For patients Polyvitamines, Ascorutin are indicated.

At excruciating tussis indicate Codein phosphat, Codterpin, tablets against tussis, at nasal congestion - Halazolin, Farmasolin or Naphthyzin, Efedrin hydrochloride, Pinosol, at exaltation and disorders of sleeping - mixture of Behterev, Fenobarbitalum for the night.

In serious cases of influenza and the weakened patient, with indicated specified agents, infuse antiinfluenza donor immunoglobulin 3 ml.
Antibiotics at an influenza are indicated in following cases:
1) at serious current of disease (the hypertoxical form with encephalitis if disease begins with a pneumonia);
2) to children of the first 2 years of the life, the pregnant, to weaken patients, to persons of elderly and senile age;
3) at bacterial complications;
4) at accompanying chronic diseases of inflammatory character which may become aggravated at influenza.

In other cases antibiotics contrindicative, as they strengthen allergization of organism and enlarge frequency of various complications.
At the pneumonia indicate benzylpenicillin or one of semisynthetic Penicillins.

At a hypersensibility of organism to these preparations use Erythromycin, Oleandomycin or Doxycyclin.

At ambulatory treatment also frequently indicate one of the combined preparations - Oletetrin, Tetraolen, and at more serious current of pneumonia - Vancomycin, Tienam and antiinfluenza a gamma-globulin or a polyglobulin. The expressed effect is spotted at a combination of preparations of Tetracyclines or Cefalosporines with semisynthetic Penicillins and Gentamicin, infused parenterally.

At unsuccessful treatment after 5 - 7 days choose antibiotic in view of sensitivity of
At serious bacterial complications of influenza apply Macrolides of II - III generations: Sumamed, Claritromicin, Cefalosporines of III - IV generations - Cefotaxim, Cefoperasone, Cedex, Cefpirom, combinations of Cefalosporines and Penicillins with inhibitors of β-lactamases (acid Clavulanic, Sulbactam, Tasobactam) and Aminoglicosides.

Preparations of a choice may be Ftorhinolones - Ofloxacin, Ciprofloxacin, Pefloxacin and others, which have high antibacterial activity and wide spectrum of action, including influence on polyresistant of Gram-
Macrolides
azithromycin (500 mg on day 1 followed by four days of 250 mg a day, three days of 500 mg a day, or a single 2-g dose), clarithromycin XL (two 500-mg tablets daily for five days or until afebrile for 48-72 hours), or doxycycline (100 mg twice a day for 7-10 days). Erythromycin, though effective and inexpensive, is not well tolerated, requires multiple daily doses, and may cause fatal arrhythmias.
Special indications for Herpes virus
Conservative therapy includes nonsteroidal anti-inflammatory drugs (NSAIDs); wet dressings with 5% aluminum acetate (Burow solution), applied for 30-60 minutes 4-6 times daily; and lotions (such as calamine).

Oral acyclovir, famciclovir, and valacyclovir 0,2 g (chicken pox – 0,8 g) 5 times a day (excluding night) 5 – 10 days. I.V.: 5 mg/kg each 8 hours per 5 days.

In herpetic encephalitis: 10 mg/kg each 8 hours during 10 days
Special indications for Diphteria
Specific treatment will carry out by high purified horse hyper immune serum. For prevention of anaphylactic reactions infuse serum by Bezredko method.

First of all 0,1 mL diluted 1 : 100 of serum infuse intracutaneous of forearm. If after 20-30 min. on a place of injection there are not changes or the papule in diameter is not more than 0,9 sm, - reaction is negative, and infuse 1 mL undiluted Serum sub dermal, and at absence of reaction - after 30 min all prescribed dose intra muscular.
- ADS dosages depending on Diphtheria severity

<table>
<thead>
<tr>
<th>Disease severity</th>
<th>ADS dosage (IU)</th>
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<tbody>
<tr>
<td>Mild</td>
<td>20,000 – 40,000</td>
</tr>
<tr>
<td>Moderate</td>
<td>50,000 – 80,000</td>
</tr>
<tr>
<td>Severe</td>
<td>90,000 – 120,000</td>
</tr>
<tr>
<td>Very severe</td>
<td>120,000 – 150,000</td>
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</tbody>
</table>
At toxic diphtheria II-III stage and the hyper toxic form a serotherapy is carried out necessarily, under protection of hormonal preparations, and sometimes - narcosis. In case of positive intradermal assay or at presence of anaphylactic reactions further subdermal infusion of serum only behind unconditional indications. Serum in dilution 1: 100 is infused in a sub dermal fat of brachium in doses 0,5; 2; 5 mL consecutive with intervals 20 min. At absence of reaction to previous dose infuse 0,1 mL undiluted serum subcutaneously. If reaction is not present, through 30 min infuse all
Antitoxic serum neutralizes only a toxin, which circulates in a blood, and does not influence on fixed in tissues. Therefore specific treatment may be carried out as soon as possible (optimum in 1 – 3 rd day of disease).

The form of diphtheria determines doses of serum for the first introduction and course of treatment. At late (after 2 nd day of disease) beginning of treatment of patients with the widespread or toxic form the first dose of serum should be increased. The form of disease also determines frequency rate of infusion of serum. In case of localized diphtheria of a throat, nose, rare localization of process and early serotherapy is possible to be limited by disposable infusion of serum. If diphtheria of a throat is widespread, infuse Serum during 2-3
In case of diphtheritic croup the initial dose of Serum is determined by it’s stages - 15-20 thousand AUN, II stage - 30-40 thousand AUN, at III stage - 40 thousand AUN, through 24 hours this dose repeat, and the following one of these days if it is necessary, infuse half dose of Serum.
Pathogenetic treatment is directed on desintoxication, restoration of hemodynamic and elimination of adrenal gland insufficiency.

Desintoxication therapy provides intravenous infusion of 10% solution of glucose with insulin, albuminous preparations and colloid solutions in the ratio 1:1:1. A liquid is infused at the rate of 20-30 mL/kg of mass. Diuretic agents, are indicated under the control of arterial pressure and
Prednisolonum (2-3 mg/kg) or Hidrocortizonum (5-10 mg/kg per day) are prescribed to the patient with widespread and toxic forms of diphtheria with the purpose of replaceable, anti-inflammatory and hyposensibilisative treatment for 5-6 days. In the first 2-3 days Glucocorticoides are infused in vein, then per os. In case of hypertoxic and hemorrhagic forms the daily dose of Prednisolonum is enlarged up to 5-20 mg/kg according to stage of shock.