

Diagnosis & Treatment

Of

Cough

a. Diagnosis :

- Details History
- Physical Examination
- Investigation

b. Treatment of cough

Detail history provides valuable clues for etiology of the cough

- Acute or chronic
- Ass. Symptoms s/o. of Respiratory infection
- Seasonal or ass. with wheezing
- Ass. with symptoms suggestive of post nasal drip or GER
- Ass with fever or sputum? If sputum what's its character?
- Having any ass. Disease or risk factors
 - like – Cigarette Smoking, Environmental Exp.
- Patient taking an ACE inhibitor?
- Change of voice, weight loss & anorexia

Physical Examination

- Examination of Nose
 - DNS
 - Polyps
 - Nasal Discharge
- Examination of oro-pharynx
 - Erythema of mucosa
 - Post Nasal Drip
- Examination of Chest
 - Inspection
 - Palpation
 - Percussion
 - Auscultation

Investigation

1. Evaluation of Infection

(a Microbiological Studies,

(b Imaging Studies

(c Routine Blood Tests

2. Allergological & Physiological Examination

(a Physiological Studies

(b Bronchoscopy

(c Sputum Examination

(d Blood Tests

e) Chest CT

(f Misc. Studies

1. Evaluation of Infection

Diagnostic tests to identify pathogens in respiratory tract infections

- Blood cultures
- Sputum smears, e.g. Gram stain
- Sputum cultures
- Culture of throat swabs
- Test performed during bronchoscopy: smears and cultures
 - Endobronchial sampling, bronchial washing, BAL, transbronchial biopsy, protected specimen brush
- Transtracheal aspiration: smears and cultures
- Transthoracic needle aspiration: smears and cultures
- Open lung biopsy: smears and cultures
- Immunofluorescence: various samples
- Antigen assays
 - Samples include nasal swabs, nasal washings, throat swabs and tonsillar swabs

- Serum antigen detection
Fungi, cytomegalovirus
- Urine antigen detection
Legionella, Pneumococcus
- Genetic testing
DNA probes
PCR
- Serum antibody detection
Viruses, *Mycoplasma pneumoniae*, *Chlamidophila*,
Legionella, Coxiella burnetii, Bordetella pertussis and
fungi

PCR polymerase chain reaction

Microbiological Studies

i. Collection of Sample : Collect prior to starting Antimicrobial
t/t

Indirect Sample :-

Sputum

Urine

Blood

Direct Sample :-

Tracheal Aspiration

Bronchial washing

Bronchoalveolar lavage

Transbronchial lung Biopsy

ii. Rapid Diagnostic Test : Useful in t/t decisions & Outpatient settings.

Sputum Gram Stain :- - Useful in Rapid Identification of Bacteria
- Based on Morphology & staining

Special Stains :- - Pathogens don't stain with gram stain
- T.B. & Non T.B. Mycobacterium – Z.N. stain
- Fungi – PAS Stain
- Legionella – Gimenez Stain

Immuno fluorescence :- Ag - Ab. Complex illuminated under UV light

Emitted fluorescence examine with a fluorescence microscope e.g. Legionella, Pnemocystitis

Antigen Tests :-

- Detection of Ag in Samples
- Kits are available Commercially for e.g. Pnemococcal Urinary Antigen, Influenza, RSV

Genetic Tests_:-

- DNA probes & PCR

iii. Culture & Identification Test :- Sample collect prior to Antimicrobial t/t

- Not suitable for Rapid clinical diagnosis
- Perform to Isolate pathogen and do drugs sensitivity

Bacteria :-

- $10^6 - 10^7$ CFU / ml in Sputum Culture -> +
- $10^3 - 10^4$ CFU / ml in BAL, Bronchial washing -> +

Medium for -> Mycobacterium -> Ogawa medium

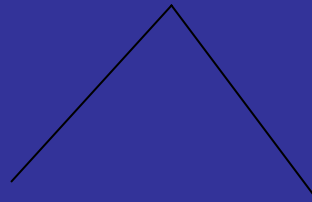
Legionella -> BCYE alpha medium

Fungus -> Sabourauds medium

Imaging Studies

- Typical findings on CXR can help confirm a diagnosis of infection.

a. Lung field Infiltration :- Lobar or Brochopneumonia



Infectious Pneumonia

Pneumonia Like infiltrates

- CHF

- Eosinophilic Pneumonia

b. Nodules (with or without cavitations) – T.B.

- Non T.B.

Mycobacteriosis

Routine Blood Test

- Peripheral Leukocyte count
- CRP
- ESR
 - 3 parameter helps in knowing degree & course of inflammation & t/t effects.

2. Allergological & Physiological Exam.

Table 5.2 Allergy, imaging and physiologic tests in evaluation of cough

- Pulmonary function tests
- Peak flow monitoring
- Airway reversibility
- Airway responsiveness
- Cough receptor sensitivity
- Cough scores, visual analogue scale, QOL questionnaire
- Bronchoscopy
 - Direct visualization, biopsy/brush cytology
- Sputum (Spontaneous, or induced)
 - Cell differential, cytology bacterial smears and culture

- Exhaled nitric oxide
 - Exhaled breath condensate
 - Blood tests
 - Eosinophil count/percentage
 - Eosinophilic cationic protein (ECP)
 - Total IgE, specific IgE antibody titres
 - Allergy skin tests
 - Prick test, scratch test, intradermal test
 - Imaging studies
 - Upper GI studies
 - Barium swallow, upper GI endoscopy, 24-h pH monitoring
-

GI, gastrointestinal; QOL, quality of life.

2. Allergological & Physiological Exam.

Physiological Studies

i. PFT :

- FEV₁

- FEV₁ / FVC Ratio

- PEF

Mildly decrease in cough
variant Asthma

Suggestive Central airways obstruction

- MMF :- Often decrease in peripheral airway
obstruction

- VC

- FVC

- DLCO

- PAO₂

decrease in

- Interstitial Pneumonia

- Hypersensitivity Pneumonitis

ii. Airway reversibility Test : FEV₁ is measure before and 15-30 minutes after inhalation of B2 agonist

- Cough variant asthma :- Pre FEV₁ > then Pre FEV₁ of classic asthma

- Improvement of coughing after inhalation of B2 agonist is diagnosis

- iii. Airway responsiveness test : Evaluate threshold of Bronchial contractility by bronchoconstrictor like {Methacholine, histamine} given by inhalation starting at low dose to higher dose
- Not always specific for diagnosis of cough variant asthma
- a. Air sensitivity :- Assess by the threshold when constriction first occur
- b. Airway Reactivity :- Assess, magnitude of subsequent constriction from the slope of dose – response curve

Bronchoscopy

Visual Examination of

- Central Lung tumors
- Endobronchial T.B.
- F.Bodies

If any abnormality found

- Do Endo bronchial Biopsies
- Brush cytology
- Bronchial wash cytology
- Bacteriology Tests

Blood Test

ECP (Eosinophilic cationic protein) – Marker of airway Inflammation

- Increase in atropic asthma& cough variant asthma
- Blood Eosinophil counts are also use but less specific then ECP

CHEST CT

Central Airway Lesion

- Tumors
- Endobronchial T.B

Parenchymal Lung disorder – Interstitial pneumonia

- Hyper sensitivity pneumonitis

OTHERS

-Sinus X-Ray

--24 Hours esophageal ph monitoring

TREATMENT

According to – Duration of Cough
- Type of Cough

a. Duration of Cough – Acute
- Sub acute
- Chronic

b. Type of Cough – Dry
- Productive

Duration of Cough

Guideline for Treating the common causes of Acute Cough

CAUSE	THERAPEUTIC OPTIONS
Common cold	Dexbrompheniramine, 6 mg, plus pseudoephedrine, 120 mg, twice daily for 1 wk, or naproxen, 500-mg loading dose, then 500 mg 3 times daily for 5 days, or ipratropium (0.06%) nasal spray, 2 42- μ g sprays per nostril 3 to 4 times daily as needed for 4 days
Allergic rhinitis	Avoidance of offending allergens Loratadine, 10 mg once a day
Acute bacterial sinusitis	Dexbrompheniramine, 6 mg, plus pseudoephedrine, 120 mg, twice daily for 2 wk Oxymetazoline, 2 sprays twice daily for 5 days Antibiotic directed against <i>Haemophilus influenzae</i> and <i>Streptococcus pneumoniae</i>

Exacerbation of chronic obstructive pulmonary disease

Antibiotic directed against *H. influenzae* and *S. pneumoniae* for 10 days

Systemic corticosteroids tapered over 2-wk period

Continuous oxygen if $\text{PaO}_2 \leq 55$ mm Hg or $\text{SaO}_2 \leq 88\%$, or if $\text{PaO}_2 \leq 59$ mm Hg and there is evidence of erythrocythemia or cor pulmonale

Ipratropium, 2 18- μg puffs, plus albuterol, 2 90- μg puffs, 4 times daily by metered-dose inhaler with spacer

Cessation of smoking

Bordetella pertussis infection

Erythromycin, 500 mg 4 times daily for 14 days, or (if allergic) trimethoprim-sulfamethoxazole, 160 mg-800 mg twice daily for 14 days

Guidelines for Treating the most common causes of Subacute Cough

CAUSE	THERAPEUTIC OPTIONS
Postinfection	Dexbrompheniramine plus pseudoephedrine for 1 wk, or ipratropium (0.06%) nasal spray for 1 wk Ipratropium, 4 18- μ g puffs 4 times daily by metered-dose inhaler with spacer for 1–3 wk Systemic corticosteroids tapered over period of 2–3 wk Central antitussives
<i>B. pertussis</i> infection	Erythromycin for 14 days, or (if allergic) trimethoprim-sulfamethoxazole

Subacute bacterial sinusitis	Dexbrompheniramine plus pseudoephedrine for 3 wk Oxymetazoline for 5 days Antibiotic directed against <i>Haemophilus influenzae</i> and <i>Streptococcus pneumoniae</i>
Asthma	Beclomethasone, 4 42- μ g puffs twice daily by metered-dose inhaler with spacer or other equivalent Albuterol, 2 90- μ g puffs as needed, up to 4 times daily by metered-dose inhaler with spacer

Guidelines for Treating the most common causes of Chronic Cough

CAUSE	THERAPEUTIC OPTIONS
Postnasal-drip syndromes Nonallergic rhinitis	Dexbrompheniramine plus pseudoephedrine for 3 wk, or ipratropium (0.06%) nasal spray for 3 wk
Allergic rhinitis	Avoidance of offending allergens Loratadine, 10 mg once a day
Vasomotor rhinitis	Ipratropium (0.06%) nasal spray for 3 wk and then as needed
Chronic bacterial sinusitis	Dexbrompheniramine plus pseudoephedrine for 3 wk Oxymetazoline for 5 days Antibiotic directed against <i>Haemophilus influenzae</i> , <i>Streptococcus pneumoniae</i> , and anaerobes in the mouth
Asthma	Beclomethasone by metered-dose inhaler with spacer Albuterol by metered-dose inhaler with spacer as needed

Gastroesophageal reflux disease	Modifications of diet and lifestyle† Acid suppression Prokinetic therapy
Chronic bronchitis	Elimination of irritant Ipratropium, 2 18- μ g puffs 4 times daily by metered-dose inhaler with spacer
Angiotensin-converting-enzyme inhibitors	Discontinuation of drug
Eosinophilic bronchitis	Inhaled budesonide, 400 μ g twice daily for 14 days

Type of Cough

- a. Dry Cough – Antihistamine,
 - Decongestant

- b. Productive Cough – Expectorant
 - Mucolytics
 - Decongestant
 - Antihistamine with Low Atropine like activity

Cough Suppresant

Expectorants

Mucolytics

Dextromethrophan

Ammonium Salts

Acetyl Cysteine

Guaiapate

Guacitisa

Ambroxol HCL

Noscapine

Guaiacol

Bromohexine

Pholcodine

Guaiphensin

Carbocistine

Piperidion

Ipecacuanha

Telmesteine

Sodium Dibunate

Complication of Cough

a. Non Specific Complaints – Fatigue

- Anorexia
- Nausea & Vomiting

b. Musculoskeletal Complaints – Ribs Fracture

- Stretching & Pulling of Intercostals muscles
- Frank rupture of muscles e.g. Rectus Abdominal muscles

c. Severe Coughing

- Pneumothorax
- Pneumomediastinum
- Cough Syncope

All the best.....