Information leaflet and decision aid for antibiotic treatment of cough due to acute respiratory infections

This document, made for physicians, summarizes key research data that can be used to share decision-making with the patient.

Epidemiology

Epidemiology

- Cough is one of the most common reasons for consulting primary health care, accounting for 8% of all cases.[1,2]
- The prevalence of cough in the population ranges from 9 to 33%; 73-92% of these cases are caused by respiratory tract infections.[1,3-5]

Classification:

- There is no single definition for **acute infectious cough**. Cough can be caused by infection of either or both the upper (**URTI**) and/or lower respiratory tract (**LRTI**), often coexisting.[1,6] Correct diagnosis depends on careful history-taking and clinical examination.[7-9] In acute respiratory illness (incl. bronchitis), the main symptom is often cough with **at least one other** respiratory tract symptom (sputum production, wheezing, chest pain) and **no other explanation** for the symptoms.[8,10] The cough may last for about **4 weeks** (in 75% of the patients) or **more than 4 weeks** (in 25%).[1,3,4,7]

Pathogenesis[3,4,7,11,12]:

Viral: > 90%

- Rhinovirus (30-50%)
- Influenzavirus
- Adenovirus
- Coronavirus (even SARS-CoV-2)
- Other: RSV and Parainfluenzavirus

Bacterial: < 10%

- S. pneumoniae
- Haemophilus influenzae
- Mycoplasma pneumoniae
- Chlamydophila pneumoniae
- Bordetella pertussis / Bordetella parapertussis

Clinical presentation of acute bronchitis[1,3,4,7,13,14]

- Cough (productive or unproductive/dry)

Possible symptoms:

- Fever
- Nasal discharge / rhinorrhea / sneezing
- Sore throat / redness of the lymphatic pharyngeal ring
- Head and/or muscle ache
- Malaise / fatigue

Findings in clinical examination:

- Optional: Sputum / respiratory sounds (e.g. wheezing) / fever

Red flags[1,7,13]

- Poor overall clinical impress (LR^+ 6.3)
- Systolic blood pressure < 90mmHg
- Tachypnea (> 24 breaths/min.) (LR^+ 3.8)
- Hemoptysis
- Stridor
- Pulmonary diseases like severe COPD or tuberculosis
- Malignancy or immune deficiency

→ Further evaluation or referral

Diagnostics

Diagnostics[13-17]

Acute respiratory illness

Cough with low risk (< 1-3%) of pneumonia:
Presence of URTI-symptoms (≥ 2)
- nasal discharge
- sore throat or hoarseness
- mild fever (< 38.5°)

and no breathlessness, tachycardia, or crackles on auscultation (LR^- 0.25)[13,14,16,17]

→ No additional test

Cough with intermediate risk (3-20%) of pneumonia:
No URTI symptoms (LR^+ 1.5) **and ≤ 2** of the following findings are present:
- breathlessness (LR^+ 1.5)
- crackles on auscultation (LR^+ 2)
- temp < 3d of T> 38.5 (rectal / ear) (LR^+ 3.5)
- pulse > 100/min (LR^+ 2.1)

and overall clinical impression is good (LR^- 0.54)[10,13,14,17-20]

→ Explore patient preferences for treatment **(use CEST)**

Cough with high risk (> 20%) of pneumonia:
No URTI symptoms (LR^+ 1.5) **and ≥ 3** of the following findings are present:
- breathlessness (LR^+ 1.5)
- crackles on auscultation (LR^+ 2)
- ≥ 3 days of temp > 38.5 (rectal / ear) (LR^+ 3.5)
- pulse > 100/min (LR^+ 2.1)[13,14,17,20]

→ **Perform the test of your choice**

CRP[14,15,18,19,21,22]
- **< 50 mg/l** → Symptomatic treatment
- **> 50 or < 100 mg/L** → **CEST**
  - → Symptomatic treatment
  - → Antibiotics
- **> 100 mg/L** → Antibiotics

Infiltrate on chest X-ray or ultrasound[23,24]
- Yes → Antibiotics
- No → Symptomatic treatment

The positive likelihood ratio (LR^+) gives the change in the odds of having a diagnosis in patients (pneumonia in this case) with a positive test, e.g. if pre-test probability = 10%, post-test probability with LR+ of 6 means post-test probability = 40%.

The negative likelihood ratio (LR^-) gives the change in the odds of having a diagnosis in patients (pneumonia in this case) with a negative test, *e.g.* if pre-test probability 10%, post-test probability with LR+ of 0.4 means post-test probability = 4%.

Procalcitonin is not reimbursed in primary health care practices (18.08.2023)

Treatment options:

Symptomatic treatment

1. Symptomatic treatment

- **NSAIDs** like Ibuprofen are for adult patients with fever, head- and/or muscle ache.[25]
- **Antitussives / opioids**: Dextromethorphan might relieve an unproductive cough, but its efficacy is debated.[26] According to the NICE-Guidelines codeine is not more effective than placebo.[7,27]
- **Bronchodilators** should only be prescribed if infection aggravates cough caused by an underlying airways disease, e.g. asthma.[28]
- **Oral steroids**: no evidence was found to support the use of corticosteroids for URTI/LRTI in patients with clinically unrecognised asthma.[41,42]
- **Local steroids**: there is insufficient evidence to recommend the routine use of inhaled corticosteroids.[43]
- **Phytotherapeutics / Honey**: A combination of ivy and thyme may relieve cough.[29,30] Echinacea is not effective.[31] Honey may decrease the frequency and severity of cough and improve sleep quality.[32,33]
- **Antihistamines and decongestants** provide little clinical benefit.[25,26]
- **Mucolytic agents**: Acetylcysteine showed some benefit (e.g. reduction of cough at day seven), but level of evidence is low.[40]

Antibiotic treatment

2. Antibiotic treatment

- **Advantages**[3,4,27,29,34-37]:
  After **7 days**, antibiotics reduce cough in **4** *more people in 100* (62% in placebo group vs. 66% in treatment group).
  After **14 days,** antibiotics reduce cough in **6** *more out of 100 people* (75% in placebo group vs. 81% in treatment group), but do not reduce time to resolution of cough!
  Overall, antibiotics shortened duration of cough by **half a day** (mean: 0.46 days) more than placebo. Weigh this small advantage against possible side effects of antibiotics.[2]
  Antibiotics may reduce the risk of pneumonia for <1% of people < 65 years old (NNT >120) and for up to 3% of people > 65 (NNT >39).[7]
  Symptoms lasted the same amount of time antibiotics and placebo, when bacteria that might be susceptible to antibiotics were present.[26]
- **Disadvantages / risks**:
  Adverse effects, e.g. nausea, vomiting, diarrhea, headache, skin rash, and vaginitis occur in 5-29% (NNH 4-20).[29,35,38]

Choice, dosage and duration of antibiotics[24]

Ambulant setting (mild pneumonia): - Without comorbidities: Amoxicillin 1g / 8h p.o., daily dose max. 3g
- With comorbidities: Amoxicillin/Clavulanate 1g / 8h p.o.

Alternatively: ≥ 8 years old without comorbidities: Doxycyclin 100mg/12h p.o. (CAVE pregnancy) or Clarithromycin 500mg/12h

Duration of treatment: 2-3 days after the resolution of fever / clinical stabilization; usually 5 days. Shorter treatment possible, if pneumonia is mild or moderate and patient's overall clinical impression improves rapidly.[39]

Advantage of lowering antibiotic prescription rate

- Will not promote antibiotic resistance in bacteria; avoid potential adverse effects of antibiotic prescription.
- Immediate treating patients with antibiotics promotes the expectation they should receive another antibiotic treatment if they again fall ill.[35]

References: see https://www.biham.unibe.ch/research/tools_to_facilitate_shared_decision_making/index_eng.html