

# Information leaflet and decision aid for antibiotic treatment in case of acute otitis media for children > 6 months

This document, made for physicians, contains a summary of key research data for shared decision-making together with the patient.

## Epidemiology

- The peak age of acute otitis media (AOM) lies between 6 and 15 months of age.<sup>1</sup>
- With 22%, the incidence rate in the first year of life is the highest, followed by 15% in the second year, 10% at the age of 3-4 and 2% at the age of 8. By the end of the third year of life, 50% of all children in Europe have suffered at least once from AOM.<sup>2</sup>
- In adults AOM is rare.

## Pathogenesis and frequency of bacterial infection<sup>3-5</sup>

- AOM is most often caused by a viral upper respiratory tract infection which leads to a loss of function in the Eustachian tube. This allows the bacteria, which enter the middle ear through this tube, to propagate in the middle ear liquid.
- Most of the time, a viral AOM is caused by respiratory viruses.
- Combined infections are common in AOMs.

## Bacteria causing AOM:

- *S. pneumoniae*: 23-31% (shift in serotypes & decrease of incidence since PCV7/13)
- *H. influenzae*: 56-57% (increase in incidence since PCV7/13)
- *M. catarrhalis*: 20%

## Viruses causing AOM: 17-44%

- RSV, rhino-, corona-, para influenza-, influenza-, adeno- and enterovirus

## Clinical presentation<sup>4,6,7</sup>

### Symptoms

- Otalgia: acute ear pain and signs of it in children: grabbing or rubbing of the ear
- Symptoms of upper respiratory tract infection
- Reduced hearing
- Systematic signs of fever and stomach ache are possible

### Findings in clinical examination

- Redness (inflammation) AND protrusion of the ear drum
- Possible otorrhoea

## Differential diagnoses<sup>4,6</sup>

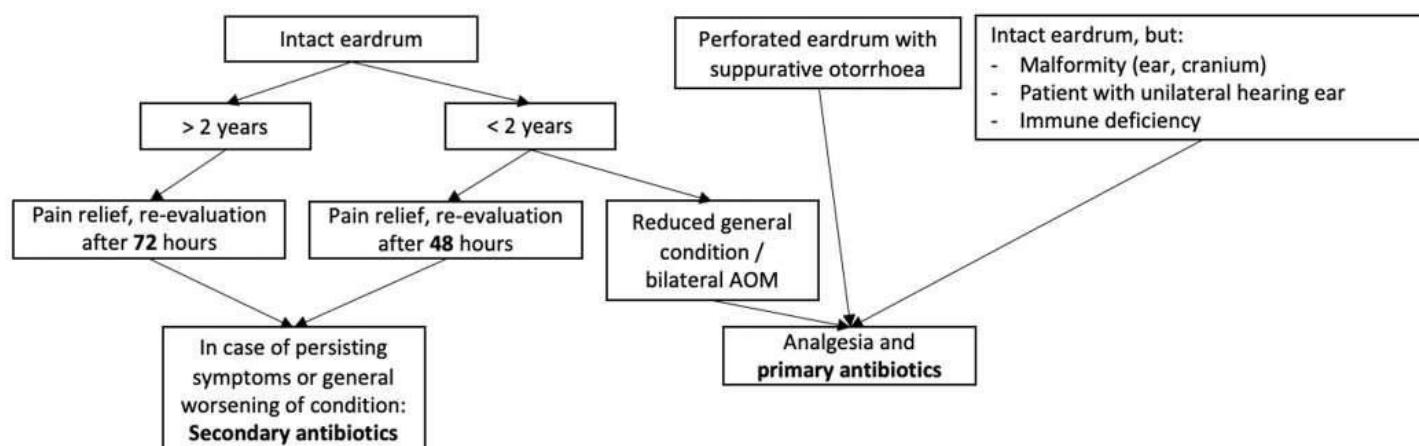
1. Obstruction of the Eustachian tube (no sign of acute inflammation, therefore no redness of the tympanum)
2. External otitis (tragus pain)
3. In babies and toddlers with highly reduced health condition, exclude a possible invasive infection
4. Secretory otitis media (painless swelling in the middle ear with reduced hearing)

## Red Flags<sup>4,7</sup>

- Decreasing general condition even after treatment, with increased fever and apathy.
- Immunosuppressed patients.
- Known anatomical deformity of inner ear.
- Mastoiditis or Bezold-mastoiditis.
- Vertigo (labyrinthitis, cranial nerve VIII).
- Perception of hearing impairment (cochleitis, cranial nerve VIII).
- Facial paresis (cranial nerve VII).
- Other neurological symptoms: meningitis, severe headache, seizures.
- Oto/rhinoliquorrhoea.

## Diagnostics<sup>7,10</sup>

- Typical symptoms with acute onset can help in diagnosing AOM but are not specific for the disease on their own.<sup>5</sup>
- The examination of the ear and ear drum is crucial to the proper diagnosis of AOM. Redness of the ear drum alone is not enough to diagnose AOM, the positive predictive value is only 7% in this case.<sup>8</sup>
- Other blood tests (CRP, blood panel, leukocytes) and microbiological testing are not helpful in diagnosing AOM and in the decision on a treatment.<sup>6,9</sup> Very sick patients are an exception, as well as increase in symptoms and prolonged symptoms. Please, consider the differential diagnoses in these cases.



## Treatment options:

### 1. Symptomatic treatment

- Ear pain: paracetamol or ibuprofen should be offered to patients.<sup>4,11</sup>
- There is no evidence of antihistamines or de-swelling nose drops having a beneficial effect in children with AOM.<sup>12</sup>
- Topically applied local anaesthetics show a slight decrease in pain after 10-30 min but the scientific evidence is weak.<sup>13,14</sup>

#### Duration of symptoms:

- The rate of AOMs healing spontaneously in 24 hours is around 60%, during the first 2-3 days around 80-85%, and after 4-7 days 90%.<sup>4,10</sup>
- According to the Cochrane metanalysis 60% of children (age 6 months - 15 years) were symptom free after 24h, independently of antibiotic treatment or not. After 2-3 days antibiotic treatment decreased ear pain significantly, but the absolute difference of treatment with antibiotics and without was only small (89% pain free in the antibiotics group vs. 84% in the placebo group). This meant 5% (95% CI: 2-7%) fewer children suffered from ear pain after 2-3 days with antibiotic treatment ('number needed to treat' (NNT) = 20).<sup>10,15</sup>

### 2. Antibiotic treatment

- **Advantages:** 5% of children have less ear pain after 2-3 days with antibiotic treatment; adverse effects were not considered.
- **Disadvantages / risks:** adverse effects like diarrhoea, eczema, allergic reactions occur in 27% cases with antibiotic treatment and 20% without.<sup>10</sup>

Immediate antibiotic treatment is not necessary with children > 6 month and adults suffering from an AOM, as antibiotics have no effect on the duration of illness, recurrence rate and complications of the infection. Severe complications like mastoiditis are very rare.

Antibiotic treatment is useful in children < 2 years of age and with bilateral AOM or, additionally, perforated ear drum.<sup>6,10</sup>

#### Influence of antibiotic treatment on complications:

- **Perforation of ear drum and hearing loss:** there is no positive effect of antibiotics compared to a placebo on the incidence of ear drum perforation (2% in the antibiotics group vs. 5% in the placebo group) and abnormal tympanometry results (surrogatemarkers for loss of hearing) after 2-4 weeks (39% in the antibiotics group vs. 48% in the placebo group).<sup>10</sup>
- **Recurrence:** the number of children with late AOM recurrence is not significantly lower with antibiotic treatment (18% in the antibiotics group vs. 20% in the placebo group).<sup>10</sup>
- **Mastoiditis:** the incidence rate of mastoiditis after AOM is 2 per 10,000 episodes after antibiotic treatment compared to 4 per 10,000 episodes without antibiotics. This leads to a NNT of 5,000, to prevent mastoiditis in a child. This high NNT makes antibiotic therapy for purely preventive reasons inappropriate.<sup>15,16</sup>
- Other **rare complications**, like meningitis, abscess, sinus vein thrombosis and facial nerve paresis are rare in a simple AOM and there is no evidence of a preventive effect with early start of an antibiotic treatment.<sup>6,10,15</sup>

Evidence for optimal management of AOM in adults does not exist. French guidelines and UpToDate recommend antibiotic treatment in AOMs in adults. The evidence for this recommendation is weak and, in many countries, including Switzerland, antibiotic treatment is given cautiously. Treatment with antibiotics is not necessary if the patient is fully informed and understands that a reevaluation of the diagnosis has to occur if the symptoms worsen or do not improve.<sup>6</sup>

#### Choice & dosage of antibiotics<sup>6</sup>

- **Children:** amoxicillin 25mg/kg/12h per os; < 2 J.: 10 days / ≥ 2 J.: 5 (-7) days
- **Adults:** amoxicillin 1g/8h per os, 5 days; with ear drum perforation: 10 days
- Choose **amoxicillin-clavulanic acid** 40mg/kg/12h (adults 1g/8h) per os, if:
  - an antibiotic treatment occurred in the past 30 days or if the patient has a history of reoccurring AOM
  - risk for contact / colonization with penicillin resistant pneumococcus (PNSP) exists
  - the patient did not react to treatment with amoxicillin after 72 hours
- **Penicillin allergy:** cefuroxim 15mg/kg/12h per os (adults 500mg/12h) / clarithromycin 7.5mg/kg/12h per os (adults cotrimoxazol 160 TMP/800mg SMX/12h)

#### Advantage of a reduced prescription rate of antibiotics

- No further promotion of antibiotic resistance in bacteria and no adverse effects through antibiotic prescription.
- Immediate antibiotic treatment promotes the expectation in patients that they will receive another antibiotic treatment should they fall ill again.<sup>17</sup>

References: see [https://www.biham.unibe.ch/research/tools\\_to\\_facilitate\\_shared\\_decision\\_making/index\\_eng.html](https://www.biham.unibe.ch/research/tools_to_facilitate_shared_decision_making/index_eng.html)

