

Updating Otitis Media

Richard Rosenfeld and Luiz Bellizia Neto

Introduction

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Acute Otitis Media (AOM) is a frequent reason for medical visits in children younger than 15 years of age. Despite being a prevalent disease, it presents low incidence of complications and mortality, and it is a self-limiting disorder. It is important to complete a precise diagnostic workup, and to prescribe judiciously, on the basis of guidelines, avoiding unnecessary use of antibiotics, that can have harmful consequences for the patient and the community as a whole.

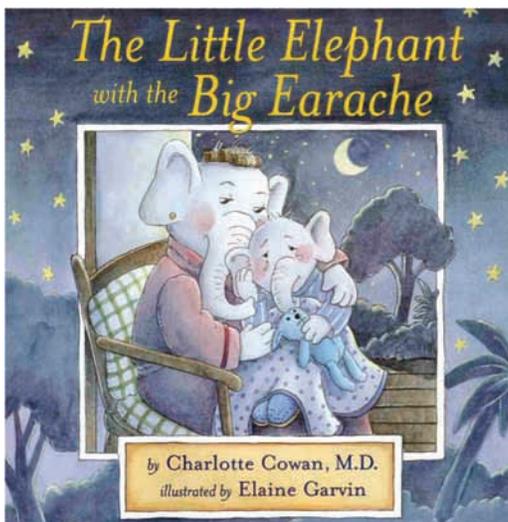
Richard Rosenfeld

Otitis media is so common that it may be called an “occupational hazard” of early childhood. Babies and children in daycare centers have a lot of otitis media.

Acute Otitis Media

Let us start with acute otitis media (AOM). See this book “Little elephant with the big earache” (**Figure 1**). Of course, otitis media is painful, very painful (little babies, big earache). But is good to remember that in most cases it is a self-limited disease. It is limited. For 70% to 80% of patients, the natural history is extremely favorable.¹

Figure 1. Little elephant with the big earache



How do I know? The best way to study the natural history of a disease is by examining prospective cohorts and control groups in randomized trials. If we analyze control groups, we can see that the majority of these children (60-80%) with acute otitis media (AOM) after two or three days became much better. Effusion also disappears, two or three months after an acute episode.

There is an important study, an individual patient data (IPD) meta-analysis (it is hard to do

this kind of study) from Rovers of the Netherlands.² It is important to explain this natural history to the parents during an office-based visit with a baby one to two years of age, especially when there is bilateral acute otitis media. When there is spontaneous otorrhea, which is a different story. We need to treat that with analgesics for five or six days if there is ear pain. This result does not represent antibiotic failure, only the natural history of the disease. If children older than two years of age continue to have symptoms after three or four days, that does mean treatment- failure, and we will need to switch antibiotics, because older children quickly become better, faster than younger children.

The same study, in addition to describing the natural history, demonstrates the effect of antibiotics (Abx). It is interesting that it is not an age-dependent, as was previously thought. Usually we think that the youngest children have more problems with AOM, and we are more prone to treat them with antibiotics. In fact there is no difference in antimicrobial benefit when children under age two years are compared to older children, because this systematic review adjusted for bilateral compared to unilateral cases, and for cases with otorrhea compared to those with no otorrhea.

First, which children have bilateral AOM, the natural history is worse, the antibiotic benefit is greater, and there is an increase in the rate of success toward a cure – 14%. Similarly, children with AOM accompanied by otorrhea derive a much greater benefit when treated with antimicrobials than do children without otorrhea. Why otorrhea? In my opinion, in cases with otorrhea the certainty of the diagnosis is greater, because there is certainly fluid in the middle ear. In AOM we need effusion to establish the diagnosis. Many times it is hard for general practitioners (GPs) to see effusion and so correctly diagnose. But when there is otorrhea, there is AOM.

In the United States there is a Clinical Practice Guideline (Observation option for acute otitis media. AAP & AAFP, 2004, www.aap.org. NYS DOH 2002, www.abxuse.state.ny.us) (**Figure 2 A**). I always show this to the parents. It is possible to wait and watch older children who have an uncertain diagnosis, a presumed diagnosis. This is old-fashioned. It will change. Bilaterality is a landmark that indicates a more severe disease and also shows that there are more benefits to treating bilateral AOM. The column on your right will disappear (**Figure 2 B**). Why use the words “presumed diagnosis”? It is not worth it. Many feel that allowing a presumed or uncertain diagnosis contributes to antibiotic overuse, by allowing the clinician to “justify” treatment even when unsure if AOM is actually present. To avoid this problem, the new guidelines will likely eliminate this diagnostic category, and instead focus on improving diagnostic accuracy by emphasizing findings (e.g., distinct bulging of the tympanic membrane) characteristic of AOM.

Figure 2A (left). Observation option for AOM Figure 2B (right). Observation option for AOM.

AAP & AAFP 2004, www.aap.org
NYS DOH 2002, www.abxuse.health.state.ny.us

Age	Certain AOM dx	Uncertain AOM dx
<6 mos.	Antibiotics	Antibiotics
6-23 mos.	Antibiotics	Antibiotics if severe Observe if non-severe
≥24 mos.	Antibiotics if severe Observe if non-severe	Observe

Non-severe implies mild otalgia and fever <39C orally (102F) or 39.5C rectally
Severe implies moderate-severe otalgia, higher fever, or toxic-appearing child
Observation is appropriate only when timely follow-up can be assured

AAP & AAFP 2004, www.aap.org
(modified by Rosenfeld)

Age	Certain AOM dx	Uncertain AOM dx
<6 mos.	Antibiotics	Antibiotics
6-23 mos.	Antibiotics if severe Observe if non-severe	Antibiotics if severe Observe if non-severe
≥24 mos.	Antibiotics if severe Observe if non-severe	Observe

Non-severe = mild otalgia and temperature <39C orally (102F) or 39.5C rectally
Severe = moderate-severe otalgia, fever ≥ 39C, bilateral AOM, or otorrhea
Observation is appropriate only when timely follow-up can be assured

The most important element in AOM is the diagnosis, making the correct diagnosis, as early as possible.

A new Guideline will come, for sure (Figure 2C), and it will be pretty much similar to the one from the UK (Recommendations for Acute Otitis media from the UK 2008 Guideline).

Figure 2C. Immediate antibiotics (ABX) and Observation options for AOM. Suggested new Guideline.

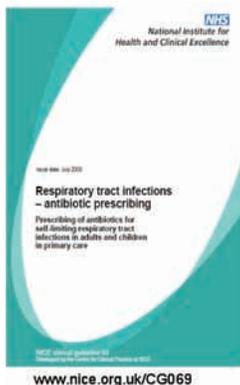
Suggested New Guideline with Certain AOM Dx

Age	Otorrhea with AOM	Bilateral without Otorrhea	Unilateral without Otorrhea
<6 mos.	Immediate ABX	Immediate ABX	Immediate ABX
6-23 mos.	Immediate ABX	Immediate ABX	OBSERVATION
≥24 mos.	Immediate ABX	OBSERVATION	OBSERVATION

ABX=Antibiotic Dx= Diagnostic

This is a very good guideline edited by a government agency (NICE) www.nice.org.uk/cg069 9 (Figure 3). It says that **we do not ALWAYS need an antibiotic**. It is worthwhile to wait and watch instead of giving antibiotics right away.

Figure 3. NICE Guideline

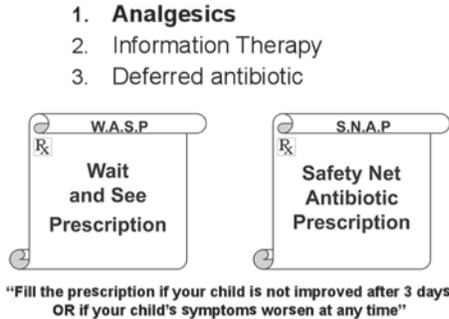


Recommendations for Acute Otitis Media from the UK 2008 Guideline

- A no antibiotic prescribing strategy or delayed antibiotic prescribing should be offered for acute otitis media
- An immediate antibiotic should be considered if:
 - Bilateral AOM and age <2y
 - AOM with otorrhea
 - Serious illness and/or complications
- When a delayed antibiotic prescribing strategy is adapted, give parents:
 - Reassurance that antibiotics are not needed immediately and have side effects
 - Advice about using the delayed prescription if no improvement
 - Advice about re-consulting if worsening occurs despite using the prescription

However, when it is needed, treat immediately: bilateral AOM, young kids, AOM with otorrhea if is a severe disease or high fever or possible complications. Whenever you give a safety-net antibiotic prescription (SNAP) or a wait-and-see prescription (WASP), it is important to explain to the parents and assure them that it is not a problem not to treat (**Figure 4**). They can use the prescription if the child does not improve in two or three days. It is important to educate the parents. That is a smart way to deal with AOM.

Figure 4. Observation vs No Treatment



It is important to remember that observation is very different from no treatment. This approach I've learned from our colleagues in The Netherlands. Since 1989 they have used a watch and wait policy for most children with AOM, which is part of an official government-sponsored guideline that emphasizes symptomatic relief. It is important to emphasize treatment of otitis media with analgesics, for a long period of time. In young children with bilateral otitis media, treatment should last between four and six days. Give "information therapy" and postpone the introduction of antibiotics. There are two possibilities: the ***wait and see prescription (WASP)*** and the ***safety net*** use of antibiotic prescriptions (SNAP). You explain to the parents that if the child does not quickly improve in three or four days, or if the child becomes worse, **the parents can either come back to the office for a second look or start the antibiotic by filling the prescription.**

Of course there are many children **not suitable for observation of AOM.**

Absolute contraindications:

- age under six months;
- immune deficiency or disorder;
- high fever, severe illness, or failure of previous treatment;
- inability to ensure follow-up and administer rescue antibiotic.

Relative contraindications:

- relapse within 30 days;
- bilateral AOM and otorrhea;
- syndromes, craniofacial malformation, other criteria that result in exclusion from trials studying AOM.

Why do we have relative contraindications? Because these children are almost always excluded from randomized, placebo-controlled trials, and we do not know for sure the results of observation of AOM in them.

In August 2009 The Wall Street Journal (Health & Wellness Section) published an article called Gut reaction: “good” microbes under attack. To quote: "Add to the list of reasons you should be cautious taking antibiotics: some may permanently wipe out the “good” bugs in your gut that fight off the “bad” ones".

In tests of mice at the University of Michigan, researchers found that a certain antibiotic permanently decreased the diversity of animals’ “microbiota” – the trillions of microscopic bugs that inhabit the gut and which may be very beneficial. **The gut is an ecosystem just as much as the rainforests and the ocean.** Whenever we use antibiotics, the local flora also changes: besides those in the gut those in the nasopharynx as well. There are more and more evidences that some bacteria have beneficial effects. *Helicobacter pylori*, for instance, protects from diseases like asthma and obesity. There is a project to map the genome of bacteria in our body, and we are only now starting to learn the beneficial effects of trillions of bacteria in our bodies.

Let us comment about **mastoiditis**. There is a study from the United Kingdom on the incidence of acute mastoiditis before and after antibiotics.³ The authors reviewed 856 cases of mastoiditis (1990-2006) in children aged three months to 15 years, despite a 60% decrease in giving antibiotics for otitis media in the period studied. Also, 65% of these cases did not have antecedent otitis media. They concluded that there was an stable incidence at 1.2 per 10,000 child-years. The incidence of mastoiditis after otitis media doubled from 0.02% after antibiotics were given, to 0.04% in those without antibiotics, and increased with age. Their conclusion, however, was that **general practitioners would need to treat 4,831 episodes of otitis media with antibiotics to prevent one case of mastoiditis.** Even considering that the incidence of mastoiditis doubled (from 0.02% to 0.04%), it is necessary to treat so many cases (around 5,000) in order to prevent a single case of mastoiditis. Imagine with 5,000 courses of antibiotics how many allergic reactions, cases of resistance and the like we would have. Five thousand courses, to prevent one case of acute mastoiditis, is not worthwhile.

Every day we see more and more high rates of adverse effects from the use of antibiotics.⁴ In the JAMA study, of the 6,614 presentations to emergency departments for antibiotic-related adverse events, 79% were for allergic reactions (such as rash and anaphylaxis), 19% were for diarrhea, dizziness, and headache, and 6% of patients were admitted or observed. As physicians we need to consider the potential side-effects of what we are offering to our patients.

Another interesting aspect to consider after antibiotic treatment for otitis media is **recurrence**. To evaluate recurrence, Bezáková and colleagues did a three-year prospective follow-up of 160 Dutch children aged six months to two years from 53 general practices, randomized to treatment with amoxicillin (AMX) 40 mg/kg/day or to a placebo.⁵ Their results show that recurrence of AOM (at least six month after enrollment in the trial) was found in 63% of children in the group treated with AMX and in 43% of the group receiving a placebo. **The**

group receiving antibiotics had 2.5 times higher risk of recurrence of AOM (95% CI 1.2-5.0) adjusted for sex, allergies, and history of otitis media. There was no difference related to referrals from specialists or insertion of tympanostomy tubes.

Conclusions on AOM

Immediate treatment with antibiotics is good whenever we get more benefits. The children who will benefit are those (a) < 2 years of age with bilateral disease, (b) children of any age with AOM accompanied by otorrhea, and (c) children with severe AOM (high fever, severe earache, toxic appearance), or (d) those with a prolonged evolution of the disease. These children are a minority of cases of AOM. In a majority of cases it is possible to postpone antibiotic treatment, wait and watch, but parents should be aware of this, and if they do not agree, okay. Antibiotics are good if you are 100% sure of the diagnosis of AOM. **If we do not have the correct or precise diagnosis, it is not worth it to use antibiotics;** instead, wait a few days and reassess the child if there is no improvement. But it is very important to use analgesics two, three, or even up to five days (especially in very young children). But first physicians must be educated about the natural history of AOM.

Failure of Treatment for AOM

Let us now consider **failure of treatment for acute otitis media and relapse**. In about every eight cases of AOM, we will have one treatment-failure or relapse. Trends in failure of treatment and relapse in otitis media were reviewed in 111,355 children aged two months to 12 years who had AOM treated in a Boston group practice **between 1996 and 2004**.⁶ The **incidence of decrease in AOM over the period studied was 385 visits per 1,000 enrollees in 1996 and 189 visits per 1,000 enrollees in 2004**. Rates of **failure of treatment and relapses also decreased**: failure in 2004 was 2.6% (in 1996, it had been 3.9%); relapse in 2004 was 8.9% (in 1996 it was 9.2%).

The study showed no difference in odds of failure of treatment or relapse when standard treatment was compared with use of high-dose amoxicillin. There is an explanation for that: **Pevnar vaccine (PCV7)**. Since 2000 this vaccine is mandatory for the U.S. population. So, right now, only sometimes do we have treatment-failures or relapses. Pathogens in the middle ear are changing over time in the U.S., and this is due to universal pneumococcal vaccination. **Today there is more non-typable *Haemophilus influenzae* and less *Streptococcus pneumoniae*, and maybe increased resistance.**

Between 2003 and 2006, Pichichero and coworkers did a review of 244 isolates of AOM from children < 2 years old who received PCV7.⁷ They had a 51% incidence of *Haemophilus influenzae* (55% betalactamase producers), a 39% incidence of *Streptococcus pneumoniae* (42% penicillin-non-susceptible) and non-significant trends were reported for increasing *S. pneumoniae*, especially penicillin-non-susceptible strains.

In the U.S. *Haemophilus influenzae* is a common cause of failure of treatment for AOM. It is important to remember that there is no direct relation between the pathogen and failure of treatment or relapse. Leibovitz and colleagues

studied 108 Israeli children aged three to 36 months who had **recurrent AOM within 3-4 weeks**.⁸ They found that 18% of ears with fluid in the middle ear had no bacterial growth; 28% had true bacterial relapse with the initial pathogen; and **54% had a new infection with a different pathogen**. So it is important to remember that there is not always a direct relation to the pathogen in those with failure of treatment or relapse.

Another kind of problem occurred after universal immunization with PCV7. Between 2000 and 2006 in Massachusetts, cultures of nasopharyngeal pneumococci obtained from children aged three months to six years showed an increase (from 15% to 19%) in carriage of non-vaccine serotypes. Carriage of vaccine serotypes was < 3% in 2006-2007. Prevalence of 19A, 6A, 15B, 15C, 35B and 11A increased, and there was virtual disappearance of vaccine serotypes, with rapid replacement by non-vaccine serotypes, especially 19A and 35B.⁹ For that reason we have right now a new 10-valent pneumococcal non-typable *H. influenzae* Protein D conjugate vaccine. It is a good vaccine for otitis media.

In a study in 2009, O'Brian and coworkers projected benefits of new vaccines for otitis media.¹⁰ With PCV7 the projected reduction in AOM was 6%; with a pneumococcal-non-typable *H. influenzae* vaccine the reduction of AOM could be increased to 27% (because of *H. influenzae* protection); with a pneumococcal-non-typable *H. influenzae-Moraxella catarrhalis* vaccine the reduction could be 31%. As we see with this analysis, with PCV7 there is no big effect, but with non-typable *H. influenzae* yes, there is great impact in reduction of AOM, but it does not change as much with *M. catarrhalis*.

Recurrent AOM

Casselbrant and Mandel, analyzing cumulative incidence of AOM, verified a peak incidence at six to 11 months of age. By age three years, 50% to 85% of children have had AOM; cumulative incidence is about 60% to 90% by age five years; **10-20% have three or more episodes of AOM by age one year and 40% eventually have six or more total episodes**.¹¹

We analyzed the natural history of recurrent AOM and antimicrobial prophylaxis.¹ The systematic review was also to evaluate expected prognosis based on untreated cohorts and control groups receiving placebos in randomized trials of prophylactic antibiotics. The results showed that the natural history of AOM is important. We observed in clinical situations **future incidence of episodes of AOM** per child-month (time up to two years, N=14 studies) and the rate (95% CI) was **0.23** (.18 - .28); the clinical situation of **future chance of having no episodes of AOM** (median age six months, N=13 studies), the rate (95% CI) was **41%** (32 - 51%); the clinical situation of **future chance of having two or fewer episodes of AOM** (median six months, N=8 studies) the rate (95% CI) was **83%** (74 - 91%). Importantly, almost none of the studies included in this review included children with baseline middle-ear effusion between AOM episodes, so the results do not apply to this situation.

Regarding gastroesophageal reflux disease (GERD): Although several studies have shown the presence of pepsin or pepsinogen in the middle-ear of

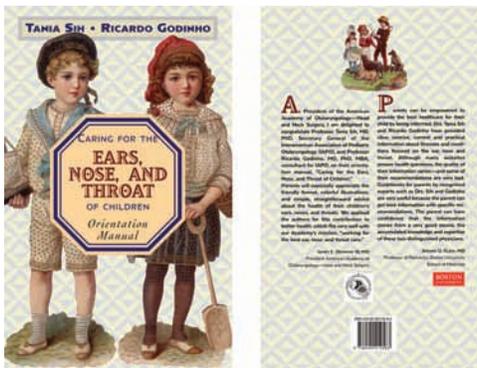
children with otitis media, the relationship between GERD and recurrent AOM remains speculative. In so many studies about it nobody has been able to establish a correlation or evidence of causality. There is an over-diagnosis of GERD, and nowadays it looks as if everybody is taking medicines against reflux. These medicines have significant side effects, and in the absence of proven benefit for AOM should not be used as treatment.

It is worthwhile to search for modifiable risk-factors:

- encourage breast feeding;
- reduce exposure to second-hand smoke;
- eliminate use of pacifiers by older children;
- avoid daycare;
- use vaccines;
- change your genes;
- grow up quickly.

As I mentioned before, it is extremely important to educate parents about risk- factors. We have a nice book that fulfills this purpose (**Figure 5**).

Figure 5. A nice book to educate parents

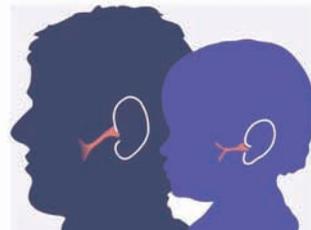


AOM has a strong genetic component, is a childhood disease, and is a disorder of the **Eustachian tube (ET)**. As Charles Bluestone says: a child's ET is too short, too horizontal, too floppy, and does not work properly (**Figure 6**). All the antibiotics in the world, all the anti-reflux drugs, all the steroids will not change this. The child has to grow, and then otitis media will disappear. It is a disease involving the ET.

Figure 6. Otitis media and the Eustachian tube

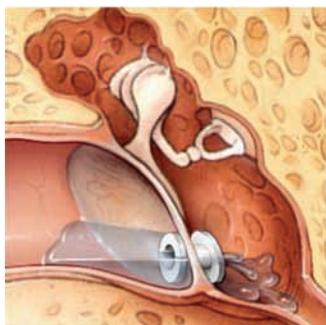
Is parental smoking related to an otitis-prone condition? That's interesting. The impact of parental smoking on nasopharyngeal (NP) pathogens was evaluated by Brooks.¹³ Smokers had a higher prevalence of NP pathogens (15-25%) than non-smokers (5%). Healthy children of smokers, according to this study, had more NP pathogens (15-20%) than children of non-smokers (10%). Concordance with pathogens in the parent was high (55%) for otitis-media-prone children of smoking parents¹².

A child's Eustachian tube is too short, too floppy, too horizontal, and doesn't work — Charles D. Bluestone



Another important aspect of recurrent AOM is to remember that tympanostomy tubes (TT) are not only good for promoting ventilation and to clear effusion, but are important also for delivery of drugs (**Figure 7**). When a tube is in place, the clinician can apply topical antimicrobial ear drops in the ear canal which are then delivered directly into the middle ear. Tubes are an ear-specific therapy and so allow up to 1,000 times higher concentrations of drugs, adequate concentration to kill bacteria in biofilms with a trivial risk of inducing antibiotic resistance; eardrops have almost no systemic absorption. Of note, tubes will also prevent recurrent AOM by equalizing the negative pressure in the middle ear that would otherwise attract bacteria from the child's nasopharynx.

Figure 7. Tubes as vehicle for drug delivery **Otitis media with effusion (OME).**



- Ear-specific therapy
- Up to 1,000 times higher drug concentration
- Adequate concentration to kill bacteria in biofilms
- Trivial risk of inducing antibiotic resistance
- Almost no systemic absorption

Case presentation

A two-year-old boy presented with bilateral OME as an incidental finding during an office visit. Tympanogram was flat (type B) bilaterally, hearing “borderline normal” at 20 dB HL. The child received speech therapy and special education for six months, but progress was limited. There were six prior episodes of AOM, but none past six months of age. What you would recommend for this child?

1. Watchful waiting
2. Medical therapy
3. Hearing aid
4. Tympanostomy tubes (TT)
5. Adenoidectomy
6. Something else

How many of you reading this chapter would go for TT? At the first visit, the child did not come for an ear problem, only rhinorrhea. The AOM was an old story. I strongly recommend TT. Why? To understand the reason we must know the natural history of OME.

What is the natural history of an effusion? This case is very well documented: type B tympanogram. In one month a change of only 20%, three months the same, six months a little better, one year later maybe a little better. The natural history is not very good for OME with a tympanogram of type B. In addition, the child may experience recurrent AOM during this period of waiting, which

would further decrease the chance of resolution. When the child has speech and language problems and is in therapy where progress is limited, in my opinion it is not worthwhile to wait one, two, four, or six months more if the natural history is not favorable. I would put in tubes.

Is prolonged observation of OME safe? In deciding whether or not to observe a child with OME there are 3 issues to consider (1) **effect on the middle ear (tympanic membrane and ossicles)**; (2) **effect on development (speech, language, learning, behavior)**; and (3) **effect on quality of life (physical, emotional, social)**. For example, a child with progressive retraction of the tympanic membrane associated with OME, especially when there is a localized pocket, should have prompt insertion of tubes. Similarly, a child with reduced quality of life because of fragmented sleep, balance problems, or chronic pain would benefit from tubes. In contrast, a child without any obvious problems or consequences from OME would be a candidate for observation, with a follow-up examination every 3-6 months to monitor the tympanic membrane. As noted by the American surgeon Stannley Hoerr, "It is difficult to make the asymptomatic patient feel better." Putting tubes in a child with *no* symptoms, except persistent effusion, is therefore not appropriate.

Zumach & Anteunis (Chapter 5, Hearing Section, in this Manual) have shown **long-term consequences of early otitis media on development of language**.¹⁴ They found reduced perception of speech in situations with background noise. The authors monitored for otitis media and hearing status a cohort of 250 Dutch children (until the age of two years, and reassessed at age seven years) for development of language. They concluded that early otitis media may impair the understanding of instructions given in a noisy classroom and may cause problems with performance and behavior¹³.

Another approach in dealing with OME is using bacteriotherapy (Chapter 3 General Considerations Section, in this Manual). Skovbjerg and colleagues did a study of 60 Swedish children aged one to 8 years with OME who received probiotics in the form of a nasal spray, using *Streptococcus sanguinis* or *Lactobacillus rhamnosus*.¹⁴ Their conclusion was that OME was cured or its evolution was much better at ten days. I do not know how it is in your country, but in the U.S. parents are afraid of bacteria, and they will not, for sure, use a bacterial spray in their child's nose. But it is interesting to see the benefits of adding "good" bacteria to a child's nasopharynx.

How about **gastroesophageal reflux disease (GERD)** and OME? Sudhoff and coworkers did a systematic review of *Helicobacter pylori* and OME.¹⁵ They analyzed two randomized trials and four cohort studies that included 203 patients and 27 controls. They concluded that there is poor evidence for the existence of an association between *H. pylori* and OME.

I think that there is something like an "epidemic" of treating everybody with anti-reflux drugs. Nobody mentions the side-effects that are growing due over-use of these kinds of therapy (proton-inhibitor pump [PIP], histamine-2 receptor antagonists, and so on) (**Figure 8**). They induce hypochlorhydria: since it is less acid inside the stomach, a lot of bacteria grow. The problem grows as

well. There are several recent publications about the risk of community-acquired pneumonia after acid-suppressive drugs,¹⁶ especially when used for two months or longer.

Figure 8. Adverse effects of anti-reflux therapy

- Histamine-2 Receptor Antagonists**
- Rapid tachyphylaxis with chronic use
 - Irritability, head banging, headache
 - Excessive tiredness
- Proton Pump Inhibitors**
- Diarrhea, headache, constipation, nausea
 - Drug interactions
 - Drug-induced hypergastrinemia (hyperplasia)
- Both Drug Categories: Hypochlorhydria**
- Lower respiratory tract infections
 - Gastroenteritis in children
 - Enterocolitis in adults and preterm infants
 - Acute interstitial nephritis in adults



Pediatric Gastroesophageal Reflux Clinical Practice Guidelines: Joint Recommendations of NASPGHAN and ESPGHAN, 2009. In press

Tympanostomy Tubes

Keyhani and Kleinman did a study about overuse of TTs in the New York metropolitan area.¹⁷ They considered 30% of surgery “appropriate,” using their “expert” criteria and only 7.5% “appropriate when using criteria in the 1994 OME guideline from the US Agency for Healthcare Policy and Research. These concerns are completely unfounded because the “appropriateness” criteria are based on outdated concepts of fluid duration and laterality. Since these were retrospective chart reviews, there were also problems with the completeness and documentation of the source records. There is an epidemic of this kind of “overuse” publication, always from the same author: Professor Kleinman¹⁸⁻¹⁹.

Who needs surgery for otitis media? For the higher threshold: an otherwise healthy child in whom signs are favorable for spontaneous resolution. For the lower threshold: a child at-risk or who has delayed language/speech or risk of adverse sequelae in the tympanic membrane (adhesion, atelectasis, or retraction pockets).

There are **three kinds** of children that I consider the best candidates for **tympanostomy tubes**: **Group 1, susceptible children with anatomical problems** that cause otitis media (cleft palate, craniofacial disorders such as Down syndrome, immunodeficiencies, Australian aboriginals, native Americans, Eskimos). **The second subgroup is a child at risk** for delays in speech, language, learning or development because of middle-ear effusion. Children who have **increased risk for mental delay or disorder**: permanent hearing loss unrelated to otitis media; delay in cognitive, speech, or language abilities; autism-spectrum disorder or pervasive developmental delay (PDD); blindness or severe visual impairment. **The third group is a child suffering** poor quality of life or of functional health status: physical suffering, sleep disturbance, emotional distress, limitations in activity, problems at school, adverse effects of treatment²⁰.

Recurrent AOM

Case Presentation of Recurrent AOM.

A one-year-old with recurrent AOM was referred because “the child gets too many antibiotics.” The child had had six episodes of AOM in the prior six months, had bilateral purulent effusion upon examination, had mild hearing loss, and had had hernia repaired under anesthesia at four months of age. What would you recommend for this child?

- 1- Watchful waiting (2Ws)
- 2- Medical therapy
- 3- Hearing aid
- 4- Tympanostomy tubes (TT)
- 5- Adenoidectomy
- 6- Something else

Will this child benefit from TT? I think so. The parents are always afraid of general anesthesia (GA). Is GA bad for children? Wider and colleagues evaluated 5,357 children, of whom 583 had GA before age four (halothane, nitrous oxide) most often for ENT surgery (26%). The aim of the study was to see whether early exposure to anesthesia could influence learning-disabilities in a population-based birth-cohort. It showed that a single exposure to anesthesia did not alter risk for disability. Multiple exposures increased risk (1.59 [95% CI 1.06-2.37]), and the risk for disability increased with longer duration of anesthesia.²¹ No general anesthesia, a very quick procedure, takes me about eight minutes.

How to prevent purulent tubal otorrhea? Kocaturk and coworkers did a study showing that saline irrigation of the middle ear when you put tubes is effective.²² When I put in tubes at the hospital (not in my office) I always use saline irrigation because it helps to prevent purulent otorrhea later on.

To end this chapter I would like to mention that there are growing numbers of references for information, endless evidence about otitis media: 27,102 citations in SCOPUS; 14,437 citations in MEDLINE; 1,422 clinical trials in the Cochrane Registry; 23 entries in the International Guidelines network; 31 Cochrane Reviews and 28 others in DARE. The key message is that we are all Nature’s assistants. Our role is to help parents make informed choices about managing their child’s otitis media, which is essentially an occupational hazard of early childhood. The most important part of this role is to minimize or avoid ineffective drugs, treatments, and procedures, while, at the same time, identifying those children who are most likely to benefit from judicious use of antibiotics or surgery. All children eventually outgrow their otitis media; our role is to help them do it safely and gracefully.

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