Otitis media with effusion (serous otitis media) in children: Management

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INTRODUCTION — Otitis media with effusion (OME), also called serous otitis media, is defined as middle-ear effusion without acute signs of infection [1]. The term “glue ear” is sometimes used as a synonym for OME, but should be reserved for cases in which the effusion is long-standing and the fluid in the middle ear has become thick and glue-like [2]. OME often occurs after acute otitis media (AOM), but it also may occur with eustachian tube obstruction in the absence of AOM. Some children, specifically as described in indigenous populations, may have relatively few symptoms despite the presence of an opaque and bulging tympanic membrane. These children usually have a purulent otitis despite the absence of systemic signs such as fever [3].

The management of OME will be reviewed here. The clinical features and diagnosis of OME and the clinical features, diagnosis, treatment, and prevention of AOM are discussed separately:

● (See "Otitis media with effusion (serous otitis media) in children: Clinical features and diagnosis".)
● (See "Acute otitis media in children: Epidemiology, microbiology, clinical manifestations, and complications".)
● (See "Acute otitis media in children: Diagnosis".)
● (See "Acute otitis media in children: Treatment".)
● (See "Acute otitis media in children: Prevention of recurrence".)

NATURAL HISTORY — Otitis media with effusion (OME) usually resolves spontaneously [4-7]. Approximately 30 to 40 percent of children have recurrent episodes [4,5].
Although OME associated with acute otitis media (AOM) usually persists beyond the resolution of the acute symptoms of AOM, it generally resolves spontaneously within three months (figure 1) [7]. (See "Acute otitis media in children: Treatment", section on 'Clinical course'.)

Newly diagnosed OME of unknown duration also usually resolves spontaneously. In a meta-analysis of cohort studies and randomized trials of OME in children aged 0 to 18 years, the episodes usually cleared within six weeks [6]. The cumulative rates of spontaneous resolution (defined liberally by a change from a type B tympanogram to a nontype B tympanogram (figure 2)) were as follows:

- 3 months – 56 percent (95% CI 51-61 percent)
- 6 months – 72 percent (95% CI 68-76 percent)
- 9 months – 81 percent (95% CI 77-85 percent)
- 12 months – 87 percent (95% CI 80-94 percent)

The rates of spontaneous resolution were lower when more stringent criteria were used to define resolution [6]. When resolution was defined by a change from a flat (type B) tympanogram to a normal (type A) tympanogram (figure 3), the resolution rates were 20 and 28 percent at three and six months, respectively. When resolution was defined by a change from a flat to a normal tympanogram or a tympanogram demonstrating negative pressure between 100 and 199 mmH₂O (type C1), the resolution rates were 28, 42, and 56 percent at three, six, and nine months, respectively.

**OVERVIEW OF MANAGEMENT** — Otitis media with effusion (OME) resolves without medical intervention in the majority of patients [4-7]. However, some children develop chronic OME, defined as OME that persists for three months or longer. Patients with chronic OME may have problems related to the associated hearing loss. Rarely, the chronic eustachian tube dysfunction that results in OME persists for years and the patient may develop long-term problems due to tympanic membrane retraction, ossicular erosion, tympanic membrane perforation, or cholesteatoma. (See "Otitis media with effusion (serous otitis media) in children: Clinical features and diagnosis", section on 'Complications and sequelae'.)

The goal of management is to eliminate the effusion, restore normal hearing, and when feasible, prevent future episodes. The recommendations provided in this topic review are generally consistent with those of the 2004 American Academy of Pediatrics, American Academy of Family Physicians, and American Academy of Otolaryngology-Head Neck Surgery clinical practice guideline and of the 2008 National Institute for Clinical Excellence guideline (NICE) [1,2].

**Hearing evaluation** — Children with OME who have, or are at risk for, speech, language, or learning disorders should undergo hearing evaluation at the time of diagnosis of OME [1]. The conductive hearing loss associated with OME may have a more significant impact in children with disabilities. The type of testing depends upon the age of the child and his or her ability to cooperate with testing. (See "Hearing impairment in children: Evaluation".)

Children with OME who are not at risk for speech, language, or learning problems typically undergo hearing evaluation if OME has persisted for three months or longer (ie, chronic OME) [1,8]. Waiting for three months to evaluate the hearing of children who are not at high risk for
speech, language, or learning problems allows sufficient time for spontaneous resolution in many cases [2].

**Speech and language evaluation** — Children in whom there is concern for speech delay should be referred for speech and language evaluation. In addition, speech and language evaluation may be warranted for children with OME for ≥3 months’ duration and for children in whom hearing loss ≥21 dB is detected [1]. (See "Evaluation and treatment of speech and language disorders in children".)

**Choice of approach** — The primary management options are “watchful waiting” and tympanostomy tube (ventilation tube, grommet) placement. Which option is undertaken, and when, depends upon comorbid conditions that increase the impact of conductive hearing loss on speech, language, or learning problems; the severity of OME-associated hearing loss; and the duration and laterality of the effusion [1,2,9]. When all factors are considered, the balance of risks and benefits will favor watchful waiting for most children and placement of tympanostomy tubes in some. (See 'Watchful waiting' below and 'Tympanostomy tubes' below.)

**MANAGEMENT STRATEGIES FOR SPECIFIC PATIENTS**

**At-risk children** — “At-risk” children are those who have or are at risk for speech, language, or learning problems. This includes children with hearing loss independent of otitis media with effusion (OME), neurodevelopmental disorders (eg, Down syndrome, autism spectrum disorder), craniofacial abnormalities (eg, cleft palate), and uncorrectable visual impairment (who depend on hearing more than children with normal vision) [1,2,8].

We agree with the 2004 American Academy of Pediatrics, American Academy of Family Physicians, and American Academy of Otolaryngology-Head Neck Surgery clinical practice guideline recommendation for early surgical referral (ie, within three months) for children with OME who are at risk for speech, language, or learning problems [1]. At-risk children typically have been excluded from studies evaluating the short- and long-term consequences of OME [10]. However, it is reasonable to assume that the conductive hearing loss associated with middle ear fluid may increase the risk of speech, language, or learning problems in children with baseline risk factors. (See 'Tympanostomy tubes' below.)

At-risk children also may be candidates for speech and language therapy or hearing aids or amplification devices for hearing loss independent of OME [1]. (See "Evaluation and treatment of speech and language disorders in children", section on 'Treatment' and "Hearing impairment in children: Treatment".)

**Children not at risk** — Among children without risks for speech, language, or learning problems, the management strategy depends upon the condition of the tympanic membrane and middle ear, the results of the hearing evaluation, the laterality and duration of the effusion, the risk of recurrence, and the preferences of the parents or caregivers.

**Structural damage to TM or middle ear** — Prompt surgical referral is warranted for children with structural damage to the tympanic membrane (eg, retraction pocket (picture 1), tympanosclerosis (picture 2)) or middle ear (eg, cholesteatoma (picture 3A-B), ossicular damage) [1]. Such children may require surgery independent of otitis media with effusion. (See "Cholesteatoma in children", section on 'Surgical treatment'.)
**Hearing loss ≥40 dB** — We recommend that children with persistent OME-associated conductive hearing loss ≥40 dB be referred for surgical evaluation. (See 'Tympanostomy tubes' below.)

There are few studies evaluating the long-term outcome of children with OME associated hearing loss at this level. However, permanent hearing loss of this magnitude may affect speech, language, and academic performance [11-13].

**Hearing loss 21 to 39 dB** — The management of children without speech, language, or learning problems and OME-associated conductive hearing loss of 21 to 39 dB (ie, mild hearing loss) is determined on a case-by-case basis, after a discussion of the risks and benefits of watchful waiting versus tympanostomy tube placement with the parents/caregivers and/or the patient [1,2]. (See 'Tympanostomy tubes' below and 'Watchful waiting' below.)

The balance of risks and benefits is determined largely by the willingness to tolerate mild hearing loss and other symptoms of OME for six to nine months (the period during which the primary benefit of tympanostomy tubes is realized), however systematic reviews have found no compelling evidence that early insertion of tympanostomy tubes impacts speech and language development in children with mild conductive hearing loss [10,14,15].

Definitive long-term evidence of improvement for most outcomes following tympanostomy tube placement is lacking. Decreased duration of effusion and short-term improvement in hearing and quality of life have been demonstrated, but longer term benefits have not. Another potential benefit is a small reduction in recurrent episodes of acute otitis media. (See 'Potential benefits' below and "Acute otitis media in children: Prevention of recurrence", section on 'Potential benefits'.)

Factors that should be considered in the decision include [2,8,9,16]:

- Delayed or abnormal language in the young child or poor school performance associated with behavioral abnormalities in the older child
- Bilateral OME of ≥3 months’ duration; in observational studies, bilateral OME has been associated with more severe hearing loss and decreased rates of spontaneous resolution (approximately 25 percent at six months and 30 percent at 12 months) [2,9,17]
- Unilateral OME of ≥6 months’ duration, or cumulative OME duration of >6 of the previous 12 months; there is limited evidence from observational studies that the likelihood of spontaneous resolution decreases with increasing duration of effusion [6]; prolonged duration also may be associated with increased risk of structural damage to the tympanic membrane [18]
- Age <3 years (a critical time for speech and language development) [19]
- Recurrent episodes of acute otitis media (AOM) (increasing the cumulative duration of middle ear effusion)
- Poor quality of life (eg, disturbed sleep, behavior change) as perceived by parents or caregivers [20-22]
- Associated symptoms (eg, vestibular disturbance, behavior, ear pain, sleep disturbance)
- Home environment that is not conducive to language development (eg, does not provide academic and language stimulation) [23]
**Normal hearing** — We recommend that children without speech, language, or developmental problems and normal hearing (i.e., hearing loss ≤20 dB) be managed with watchful waiting for an additional three months (the first three months of watchful waiting typically occurs before the hearing evaluation) [1,2]. OME is likely to resolve spontaneously in such children, and there is no demonstrated risk to watchful waiting. (See ‘Natural history’ above and ‘Watchful waiting’ below.)

**Recurrence after tympanostomy tube extrusion** — Recurrence of OME is common after tympanostomy tube extrusion. In observational and randomized trials, up to 50 percent of children who have undergone tympanostomy tube placement for persistent OME required a second procedure [24-26].

For children who develop recurrent persistent OME after extrusion of tympanostomy tubes and require repeat surgery, we suggest concurrent adenoidectomy in addition to myringotomy (with or without tympanostomy tube placement) [1]. In randomized trials, the addition of adenoidectomy was associated with improved rates of resolution and decreased rates of additional surgery [27-29]. (See "Tonsillectomy and adenoidectomy in children: Indications and contraindications".)

**PRIMARY INTERVENTIONS**

**Watchful waiting** — "Watchful waiting" for three months from the onset of the effusion (or the diagnosis of effusion if the date of onset is not known) is recommended for children who have otitis media with effusion (OME), are not at risk for speech, language, or learning problems, and otherwise have normal hearing (i.e., hearing loss ≤20 dB) [1,2,8]. Watchful waiting is also an option for children who have OME, are not at risk for speech, language, or learning problems, and whose OME-associated hearing loss is mild (i.e., 21 to 39 dB). The recommendation for watchful waiting is based upon the high likelihood of spontaneous resolution of OME during the first three to six months [6]. (See ‘Natural history’ above.)

During the period of watchful waiting, mild conductive hearing loss (i.e., 21 to 39 dB) can be addressed by speaking in close proximity to the child, facing the child and speaking clearly, repeating phrases when misunderstood, and providing preferential classroom seating [30].

For the majority of children with OME who are managed with watchful waiting, clinical evaluation (including pneumatic otoscopy and developmental surveillance) and hearing test should be repeated every three to six months [8]. Developmental surveillance and hearing evaluation are discussed separately. (See "Developmental-behavioral surveillance and screening in primary care", section on 'Components' and "Hearing impairment in children: Evaluation", section on 'Formal audiology'.)

Observation should continue until the effusion has resolved or the child develops an indication for surgical referral. (See 'Potential indications' below.)

Systematic reviews of the use of tympanostomy tubes (grommets) for hearing loss associated with OME supports a strategy of watchful waiting rather than placement of tympanostomy tubes [10,15]. Children who received tympanostomy tubes spent 32 percent less time with effusion during the first postoperative year (a mean of 128 days in individual studies). However, mean improvements in hearing were modest and diminished after six to nine months. In otherwise healthy children, there were no proven short-term benefits in language development or cognition. (See 'Tympanostomy tubes' below.)
One of the included trials, in which children (younger than three years) with persistent middle ear effusion were randomly assigned to prompt or delayed insertion of tympanostomy tubes, provides additional support for an initial period of watchful waiting in children who are not at risk for speech, language, or learning problems [31]. Delayed insertion of tympanostomy tubes occurred up to nine months later if the effusion had not cleared spontaneously; by the 9- to 11-year follow-up, 55 percent had not received tubes [32]. Developmental (speech, language, cognition, and psychosocial) outcomes were assessed at 3, 4, 6, and 9 to 11 years of age and were the same between groups [31-34]. (See ‘Tympanostomy tubes’ below.)

**Tympanostomy tubes**

**Potential indications** — The decision regarding the placement of tympanostomy tubes should involve the otolaryngologist (ORL), parent(s) or caregiver(s), and the primary care provider. Potential indications for tympanostomy tubes include [1,2,8,9]:

- OME in children who are at risk of speech, language, or learning problems, regardless of hearing status (see ‘At-risk children’ above); referral within three months is recommended
- Structural damage to the tympanic membrane (eg, retraction pocket (picture 1), tympanosclerosis (myringosclerosis) (picture 2)) or middle ear (eg, cholesteatoma (picture 3A-B)); prompt referral is recommended (see ‘Structural damage to TM or middle ear’ above)
- Persistent OME-associated hearing loss ≥40 dB (see ‘Hearing loss ≥40 dB’ above)
- Bilateral OME for ≥3 months; unilateral OME for ≥6 months; or recurrent episodes of OME with cumulative duration of OME for ≥6 of the previous 12 months
- Symptomatic OME (eg, ear pain, sleep disturbance, tinnitus, vertigo or balance problems) (see "Otitis media with effusion (serous otitis media) in children: Clinical features and diagnosis", section on 'Clinical features')
- Signs of eustachian tube dysfunction (eg, fluctuating hearing loss, disequilibrium or vertigo, tinnitus, autophony [vibration and reverberation of the patient's voice], severe retraction pocket of the tympanic membrane, intermittent pain)
- Recurrent and severe acute otitis media (AOM) (see "Acute otitis media in children: Prevention of recurrence", section on 'Surgery')

When making a referral to an ORL specialist, the primary care provider should provide the specialist with the following information [1]:

- The duration and laterality of the effusion
- Results of hearing tests or tympanometry
- Child's history of AOM
- Whether the child has suspected or diagnosed speech and language problems, or any risks for hearing, language, or learning problems
- The specific reason for referral

The primary care clinician will usually be responsible for the follow-up care of the patient in consultation with the ORL specialist

**Potential benefits** — Myringotomy and placement of a tympanostomy tube is a definitive means of removing middle ear fluid, improving effusion-associated conductive hearing loss, and
maintaining an air-filled middle ear space as long as the tubes remain patent [24, 25].

Tympanostomy tubes help to reduce the symptoms of OME (including associated conductive hearing loss) during the natural course of resolution [2, 14, 35]. However, recurrence of OME after extrusion of the ventilation tube occurs in as many as 50 percent of patients and repeat surgery may be required. (See "Overview of tympanostomy tube placement, postoperative care, and complications in children").

A 2014 systematic review evaluated the use of tympanostomy tubes for hearing loss associated with OME compared with myringotomy or nonsurgical treatment [15]. Children who received tympanostomy tubes spent less time with effusion during the first postoperative year; however improvements in hearing loss diminished over time, as illustrated below:

- Children treated with tympanostomy tubes spent 32 percent (95% CI 17-48 percent) less time with middle ear effusion during the first year of follow-up than children treated with watchful waiting.
- Hearing levels were improved in children treated with tympanostomy tubes (mean hearing levels improved by 10 dB [95% CI 5-16 dB] after four to six months), but by 12 months there was no difference in hearing between children treated with tympanostomy tubes and those treated with watchful waiting.

In individual studies, in the first 12 months after tympanostomy tube placement, children with tympanostomy tubes had a mean of 128 fewer days with effusion than those who did not receive tubes [1, 24, 25, 27, 36].

These findings of modest and short-lived improvement are inconsistent with the parental and clinical observation that the effects of tympanostomy tubes are beneficial and often dramatic, with a rapid increase in speech following insertion, and observational studies suggesting improved quality of life [20-22, 35, 37]. As an example, in a prospective survey of parents of 123 children who underwent bilateral myringotomy and placement of tympanostomy tubes with or without adenoidectomy, post-operative symptom scores decreased by 75 and 60 percent at one and six months, respectively [20]. Parents also reported decreased worry about ear problems at both time points.

**Adverse effects** — The adverse effects of tympanostomy tubes include persistent tympanic membrane perforation, tympanostomy tube otorrhea, tympanosclerosis (myringosclerosis), focal atrophy of the tympanic membrane, and cholesteatoma. They are discussed separately. (See "Overview of tympanostomy tube placement, postoperative care, and complications in children", section on 'Complications and sequelae'.)

**OTHER INTERVENTIONS**

**Antibiotics** — We generally do not suggest antibiotics for the treatment of otitis media with effusion (OME). A 2012 systematic review concluded that the evidence does not support the routine use of antibiotics for children with OME [38]. Earlier meta-analyses found that antibiotics improved clearance of OME within the first month after treatment, but there were frequent relapses and no benefit beyond the first month [39, 40]. The included studies varied in quality. It is possible that the antibiotic therapy administered in some of the studies included in the systematic review and meta-analysis was insufficient in duration, dose, or spectrum to eradicate bacteria in biofilms. Nonetheless, given the high likelihood of spontaneous resolution and the potential to
contribute to antibiotic resistance, the risks of antibiotic therapy for persistent OME outweigh the benefits. Avoidance of antibiotics (unless there is adequate documentation of the rationale) is sometimes used as measure of quality performance in the care of children with OME [41,42].

The 2004 American Academy of Pediatrics (AAP), American Academy of Family Physicians (AAFP), and American Academy of Otolaryngology-Head Neck Surgery (AAOHNS) clinical practice guideline offers the option of providing a single 10- to 14-day course of antibiotics (typically amoxicillin) in some circumstances [1]. The 2008 National Institute for Clinical Excellence (NICE) guideline recommends that antibiotics not be used in the treatment of OME [2].

**Oral glucocorticoids** — We do not suggest oral glucocorticoids in the treatment of OME in children. The risk of adverse effects outweighs their potential short-term benefit.

In a 2011 systematic review of heterogeneous studies of glucocorticoids (with or without antibiotics) for the treatment of OME in children, oral glucocorticoids were associated with OME resolution at two weeks (pooled relative risk from three studies 4.4; 95% CI 1.5-13.2), but not thereafter [43]. In addition, in the only study that assessed hearing, oral glucocorticoids did not improve hearing [44]. Long-term hearing and speech development were not assessed. No serious adverse effects were reported, but there the number of patients was insufficient patients to adequately assess safety. Avoidance of oral glucocorticoids is sometimes used as measure of quality performance in the care of children with OME [41,42].

The 2004 AAP/AAFP/AAOHNS and the 2008 NICE guidelines recommend against the use of oral glucocorticoids for the treatment of OME [1,2].

**Intranasal glucocorticoids** — We do not suggest intranasal glucocorticoids in the treatment of OME unless they are necessary for the treatment of underlying allergic rhinitis. (See "Pharmacotherapy of allergic rhinitis", section on 'Approach to specific patient groups'.)

In a 2011 systematic review of heterogeneous studies of systemic and topical nasal glucocorticoids for the treatment of OME in children, intranasal glucocorticoids were not helpful in OME resolution or improving hearing in the short-term [43]. Long-term hearing and speech development were not assessed. Avoidance of intranasal glucocorticoids (unless there is adequate documentation of the rationale) is sometimes used as measure of quality performance in the care of children with OME [41,42].

The 2004 AAP/AAFP/AAOHNS and the 2008 NICE guidelines recommend against the use of nasal glucocorticoids for the treatment of OME [1,2].

**Autoinflation** — Autoinflation refers to the process of opening the eustachian tube by raising intranasal pressure (eg, by forced exhalation with closed mouth and nose, blowing up a balloon through each nostril, or using a purpose-manufactured nasal balloon) [45,46].

Autoinflation is an alternative to watchful waiting for the older child who has continued problems with OME and is able to perform the technique [2]. Autoinflation has minimal adverse effects, but the benefits are uncertain, as illustrated below.
A 2011 systematic review found low-quality evidence (from two previously published systematic reviews that included small studies with methodologic flaws) that autoinflation may be more effective than no treatment in improving outcome (tymanogram and/or audiogram) [47]:

- In a meta-analysis of six studies, autoinflation (of any type) improved the composite measure of tympanogram or audiometry after one month (relative risk of improvement 2.2, 95% CI 1.7-2.8) compared with no autoinflation [46].
- In a systematic review of three studies, autoinflation with a purpose-manufactured nasal balloon improved middle ear effusion by tympanometric and audiometric criteria within two weeks to three months compared with no treatment (odds ratio 3.5, 95% CI 2.0-6.1) [45].

No adverse effects were reported with autoinflation [45,46]. However, some children may find it difficult to perform [47,48]. In one trial, 12 percent of children (3 to 12 years) were unable to use the balloon [49].

**Hearing aids** — We do not suggest hearing aids for children with OME-associated conductive hearing loss of short duration.

The 2008 NICE guideline indicate that hearing aids should be offered to children with persistent bilateral hearing loss as an alternative to surgical intervention when surgery is contraindicated or unacceptable [2]. In observational studies, hearing aids were well accepted by children with OME and their parents and associated with improvement in hearing, speech, and development (as perceived by parents and teachers) [50,51].

**Antihistamines and decongestants** — We do not recommend antihistamines and/or decongestants for the treatment of OME in children. In a 2011 systematic review of 16 randomized trials, treatment with antihistamines and/or decongestants neither reduced the duration of OME nor prevented complications (recurrent OME or acute otitis media) [52]. However, treatment with antihistamines and/or decongestants was associated with increased risk side effects (17 versus 6 percent among placebo recipients). Avoidance of antihistamines and decongestants is sometimes used as measure of quality performance in the care of children with OME [41,42].

The 2004 AAP/AAFP/AAOHNS and the 2008 NICE guidelines recommend that antihistamines and decongestants not be used in the treatment of OME in children [1,2].

**Complementary and alternative therapies** — We do not recommend homeopathic, probiotic, or other complementary and alternative therapies for the treatment of OME in children.

The few published studies of homeopathic remedies for middle ear infections or OME have defects in study design, including small sample size, lack of randomization or blinding, and lack of validation of the diagnosis [53,54]. In addition, there are no standardized homeopathic regimens for otitis media and no data on appropriate doses or schedules.

A study of probiotics for the treatment of OME had promising results, but needs to be replicated before probiotics can be recommended. In a randomized trial, children with prolonged OME who received twice daily intranasal *Streptococcus sanguinis* or *Lactobacillus rhamnosus* had increased rates of clinical recovery compared with those who received intranasal placebo [55]. No adverse effects were identified.
The 2004 AAP/AAFP/AAOHN guideline makes no recommendations regarding complementary and alternative therapies for OME based upon lack of sufficient evidence [1]. The 2008 NICE guideline recommends against homeopathy, cranial osteopathy, acupuncture, dietary modifications (including probiotics), immunostimulants, and massage [2].

**Adenoidectomy** — We do not suggest adenoidectomy as the initial approach for children with persistent OME unless they have a distinct indication for the adenoidectomy independent of OME (eg nasal obstruction, chronic adenoiditis, chronic sinusitis) [1,2]. Although adenoidectomy may be helpful in the resolution of middle ear fluid [56], the additional surgical and anesthetic risks outweigh the benefits [1,14]. (See "Tonsillectomy and adenoidectomy in children: Indications and contraindications".)

In systematic reviews of heterogeneous randomized trials, adenoidectomy (with or without myringotomy and with or without tympanostomy tube placement) was beneficial in resolving middle ear fluid compared with unilateral or bilateral tympanostomy tube placement (without adenoidectomy), myringotomy only, and nonsurgical treatment [15,56]. However, adenoidectomy had only a small effect (<5 dB) on hearing [56]. The effects of adenoidectomy on tympanic membrane changes or cholesteatoma were not studied.

**Myringotomy** — Myringotomy alone (ie, without tympanostomy tube placement or adenoidectomy) is ineffective in the management of persistent OME because the incision closes within a few days [24,25]. Laser-assisted myringotomy may extend the ventilation period to several weeks [57,58]. However, in randomized trials, patients treated with laser myringotomy alone had shorter duration of middle ear ventilation and fewer effusion-free follow-up visits than those who received tympanostomy tubes [59,60].

**AIRPLANE TRAVEL** — Airplane travel for children with otitis media (otitis media with effusion or acute otitis media) is discussed separately. (See "Acute otitis media in children: Treatment", section on 'Airplane travel'.)

**INFORMATION FOR PATIENTS** — UpToDate offers two types of patient education materials, “The Basics” and “Beyond the Basics.” The Basics patient education pieces are written in plain language, at the 5th to 6th grade reading level, and they answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials. Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are written at the 10th to 12th grade reading level and are best for patients who want in-depth information and are comfortable with some medical jargon.

Here are the patient education articles that are relevant to this topic. We encourage you to print or e-mail these topics to your patients. (You can also locate patient education articles on a variety of subjects by searching on "patient info" and the keyword(s) of interest.)

- Basics topic (see "Patient information: Ear tubes (The Basics)"
- Beyond the Basics topic (see "Patient information: Ear infections (otitis media) in children (Beyond the Basics)"

**SUMMARY AND RECOMMENDATIONS**
Otitis media with effusion (OME) is defined as middle-ear effusion without acute signs of infection (picture 4). OME usually resolves spontaneously within six weeks. Approximately 30 to 40 percent of children with OME have recurrent episodes. (See 'Introduction' above and 'Natural history' above.)

The primary management options are “watchful waiting” and tympanostomy tube placement. (See 'Watchful waiting' above and 'Tympanostomy tubes' above.)

Which option is undertaken, and when, depends upon coexisting conditions that increase the risk of hearing, speech, language, or learning problems; the severity of OME-associated hearing loss; and the duration and laterality of the effusion (see 'Choice of approach' above and 'Management strategies for specific patients' above):

- We suggest early surgical referral (ie, within three months) for tympanostomy tube placement for children with OME who are at risk for speech, language, or learning problems (Grade 2B). (See 'At-risk children' above.)
- We recommend prompt surgical referral for tympanostomy tube placement for children with persistent OME-associated hearing loss ≥40 dB (Grade 1B). Prompt surgical referral also is warranted for children who have structural damage to the tympanic membrane or middle ear (eg, retraction pocket (picture 1), tympanosclerosis (picture 2), cholesteatoma (picture 3A–B)). (See 'Hearing loss ≥40 dB' above and 'Structural damage to TM or middle ear' above.)
- The management of children without speech, language, or learning problems and OME-associated conductive hearing loss of 21 to 39 dB is determined on a case-by-case basis, after a discussion of the risks and benefits of watchful waiting versus tympanostomy tube placement. (See 'Hearing loss 21 to 39 dB' above.)
- We recommend watchful waiting for children without speech, language, or developmental problems and with hearing loss ≤20 dB (ie, normal hearing) (Grade 1A). Children who are managed with watchful waiting should be reevaluated (with pneumatic otoscopy, developmental surveillance, and hearing testing) every three to six months until the effusion has resolved or the child develops an indication for surgical referral. (See 'Normal hearing' above.)

We suggest not using antibiotics or oral or intranasal glucocorticoids in the management of children with OME (Grade 2B). (See 'Antibiotics' above and 'Oral glucocorticoids' above and 'Intranasal glucocorticoids' above.)

We recommend not using antihistamines or decongestants routinely in the management of OME in children (Grade 1A). (See 'Antihistamines and decongestants' above.)

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REFERENCES
