

Management of otitis media with effusion in children

I. Dhooge*, C. Desloovere**, A. Boudewyns***, M. Van Kempen* and J. P. Dachy****

*Ghent University Hospital, Gent; **Catholic University of Leuven, Leuven; ***Antwerp University Hospital, Edegem; ****Civil Hospital, Tournai

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Abstract. *Otitis media with effusion in children: B-ENT Guidelines.* OME is highly prevalent among young children, with peak prevalences at around two and five years of age. Although serious complications are rare, the burden of OM is large with impaired quality of life and high direct and indirect socio-economic costs. To date, medical treatment of OME is not recommended because of the limited scientific evidence that this treatment is effective in the long term. Surgical candidacy for OME depends largely on hearing status, associated symptoms, the child's developmental risk and the anticipated chance of spontaneous resolution of the effusion. Ultimately, the recommendation for surgery must be individualized.

1. Introduction

Otitis media (OM) is the most frequently diagnosed disease in infants and young children. Almost all children experience one or more episodes of otitis media before the age of six years. Otitis media is a dynamic disease. The clinical spectrum may extend from a benign self-limiting condition to a prolonged and sometimes complicated disease. Although in the industrialized countries serious complications are rare, the burden of OM is large with impaired quality of life and high direct and indirect socio-economic costs.¹

2. Definitions, terminologie

Otitis media is an inflammation of the middle ear, without reference to etiology or pathogenesis.

Acute otitis media is the rapid onset of signs and symptoms of acute infection in the middle ear.

Otitis media with effusion is an inflammation of the middle ear in which a collection of liquid is present in the middle ear space; the

tympenic membrane is intact. Signs or symptoms of an ear infection are lacking.

Middle ear effusion is the liquid resulting from otitis media. The effusion may be *serous*-thin, watery liquid; *mucoïd*-thick, viscid, mucus-like liquid; or *purulent*-pus-like liquid. The effusion can be the result of either acute otitis media or otitis media with effusion.

Otorrhea is a discharge from the ear.

The duration of the effusion can be acute (less than three weeks), subacute (three weeks to two to three months), or chronic (longer than two to three months).²

3. Physiology, pathophysiology and pathogenesis

Development of otitis media

The most important factors related to the increased incidence of otitis media in infants and young children are a functionally and structurally immature eustachian tube (ET) and an immature immune system. A genetic predisposition

is also critical in many infants and children.³

Theoretical model of the aetiology of OME

In the pathogenesis of OME, two mechanisms are involved, either in succession or through interaction: impairment of the function of the Eustachian tube and inflammation of the middle ear (ME).

In general, following events can be envisaged: pathogens must enter the ME cavity through the Eustachian tube (ET). This is facilitated by the presence of a bacterial or viral load in the rhinopharynx and by disturbances in mucociliary clearance. Gastroesophageal reflux may contribute to inflammatory changes in the ET. Viruses in the nasopharynx facilitate nasopharyngeal bacterial adherence and colonization and subsequent entry into the ET, due to viral destructive interference in the mucociliary system.^{4,5} Mucus accumulation enables the replication of invaded micro-organisms, such as *Streptococcus pneumoniae* and *nontypable Haemophilus*

influenza. An obstructed ET (mechanical obstruction e.g. enlarged adenoid or functional obstruction e.g. cleft palate) also leads to transudation of fluid because reduced ventilation causes negative pressure in the ME. Prolonged negative pressure induces mucosal transformation that increases the number of mucus-producing cells in the ME. Once in the middle ear, the pathogens must be able to withstand and overcome the defensive mechanisms of the tubotympanum (anatomic and immunologic). The normal tubotympanum is immunologically protected not only by the adaptive immune system but also by the mucociliary system and the secreted molecules of innate immunity.⁶ An important factor in overcoming this defensive system is the local excretion by bacteria of products such as endotoxin. This substance results in impaired mucociliary activity, induces effusion, enhances mucus production and induces mucosal metaplasia which leads to increased numbers of secretory cells in the mucosal lining of the middle ear. Due to those changes, pathogens transform from a planktonic state to biofilm formation. The mucosal biofilm paradigm of middle ear disease is a theoretical model that provides a consilience among conflicting observations (culture negative/DNA RNA positive middle ear fluid; AB failure in treatment).⁷ Biofilm bacteria are difficult to culture, are recalcitrant to antibiotic treatment, and are the preferential bacterial phenotype for indolent, long-term persistence. If the immune system fails to eliminate the bacteria and in addition the clearance function of the Eustachian tube is impaired, otitis media will result.

4. Epidemiology

OME is highly prevalent among young children, with peak prevalences at around two and five years of age. At least 80% of children will have experienced one or more episodes of OME by the age of four years. OME is characterized by a high rate of spontaneous recovery. The natural course of OME shows a constant improvement rate of about 50% every three months. However, OME is also characterized by a high rate of recurrence, with a cumulative recurrence rate in natural course of 50% within 24 months.

Good knowledge of host (intrinsic) and environmental (extrinsic) risk factors for the development of otitis media is important in identifying a child at risk for recurrent and persistent OM. This could result in primary and/or secondary prevention of OM and decreasing complications and sequelae.⁸

I. Host-Related factors

1. Age

Several reasons (anatomical, physiological and immunological) account for the high incidence of otitis media in young children. A first episode before 6 months of age is a strong and independent risk factor for recurrent OM. An early first acute suppurative otitis media episode may predispose a child to recurrent or chronic otitis media by setting up an inflammatory process in the middle ear and the Eustachian tube. Alternatively, an early attack may reflect an innate (genetic?) predisposition for middle ear disease, in which the early affliction is a marker for the underlying predisposing factors.

2. Gender

In most studies on the incidence of otitis media there is a small but significant difference between males and females with a higher incidence in males.

3. Race

Native Americans and Canadian Inuits have a higher incidence of otitis media compared with similarly aged, predominantly white children. Also in Australian aboriginal children, the severity of middle ear infections is higher.⁹

Although the difference in disease incidence for the different racial groups may be real, variability in socio-economic status (housing, hygiene), climate differences, access to medical care and diagnostic facilities of the health care workers may contribute to regional differences in prevalence of OM.

4. Altered host defenses and underlying disease

Children with anatomical defects (cleft palate, submucous cleft), altered physiologic defenses (eustachian tube dysfunction, barotrauma), congenital or acquired immunologic deficiencies (immunoglobulin deficiencies, chronic granulomatous disease, AIDS, immunosuppressive drugs) are at risk for severe and recurrent acute otitis media and persistent OME.¹⁰

5. Genetic

Recent twin studies have confirmed that hereditary factors dominate.¹¹

6. Prenatal and perinatal factors

Recent studies suggest that very low birth weight (< 1500 g) or very preterm birth (< 33 weeks of

gestation) increases the risk of otitis media.¹² There is also a significant relationship between low levels of passively transferred maternal pneumococcal antibodies measured in cord blood and early OM.

II. Environmental factors

1. Season

There is a definite increase in the incidence of otitis media during colder months. Incidence follows that of upper respiratory tract infections.

2. Day care / home care, exposure to other children

Most studies evaluating child care and OM, report that exposure to other children at home or in a day care setting increases the risk of OM. A recent study from Rovers showed that center care compared to home care produced the largest increase, with less difference in risk between family care and home care.¹³

3. Passive smoking and environmental pollution

Two meta-analyses confirm the increased incidence of otitis media associated with exposure to passive smoke.¹⁴ Concerning environmental pollution, it was shown that concentrations of sulfur dioxide in air samples was significantly associated with an increased incidence of pneumococcal disease and otitis media.

4. Socio-economic status/poverty

Crowded living conditions, poor sanitation and inadequate medical care have been associated with otitis media.¹⁵

5. Pacifier use

Studies from Finland have shown that pacifier use is a risk factor for OM.¹⁶

6. Not breast fed

A meta-analysis reported a 13% reduction in OM associated with exclusive breast feeding lasting for 3 to 6 months.¹⁴

5. Diagnosis and screening

Correct diagnosis of otitis media with effusion requires an accurate understanding of subjective and objective measures.¹⁷ Data on the usefulness of subjective and objective procedures for the accurate diagnosis of otitis media with effusion (OME), the delineation of the accompanying hearing loss and the determination of risk for sequelae are critical to the development of quality screening, treatment and intervention programs.

Subjective Methods

Symptoms

In most cases, hearing loss is the major sign or symptom. Clumsiness and balance problems have been described in some children with OME.¹⁸ The most important distinction between OME and acute otitis media (acute "suppurative" otitis media) is that the signs and symptoms of acute infection (e.g. otalgia, fever) are lacking. Diagnosis cannot be based on symptoms alone because they are too vague.

Otoscopy

Microscopic otoscopy is of utmost importance for examination of the

ear. It also offers the possibility of documentation of the pathology. Pneumatic otoscopy is also a sensitive and specific method for the detection of otitis media in the hands of a skilled examiner. The most frequent otoscopic finding in OME is opacification of the tympanic membrane. Sometimes an amber or bluish effusion can be visualized through a translucent tympanic membrane. Pneumatic otoscopy reveals either a retracted or convex tympanic membrane with decreased mobility. However, fullness or even bulging may be visualized. In addition, an air-fluid level or bubbles, or both, may be observed through a translucent tympanic membrane.

Objective Measures

Middle Ear Status

(1) Conventional Tympanometry
Tympanometry has been an important adjunct to diagnosing otitis media with effusion for many years. It is an objective, quantitative method of assessing tympanic membrane mobility and middle-ear function. Most studies have used Type B or C² tympanograms to diagnose middle ear effusion.¹⁹ The sensitivity and specificity of tympanometry when compared to findings of middle ear effusion (MEE) at myringotomy are high. (sensitivity 94%, specificity 50-70%).

Hearing

(2) Conventional Audiometry
Pure-tone audiometry or visual reinforcement audiometry (VRA) can be used to diagnose mild hearing loss associated with OME in infants.

Additional diagnostic measures

(1) Other Diagnostic Procedures

In evaluating a child with recurrent OME other diagnostic procedures can be helpful: Xray of the nasopharynx or nasopharyngeal fiberoscopy to assess adenoid size, nasal examination (septum deviation, enlarged turbinates ...), immunologic evaluation, allergy testing.

(2) Tympanocentesis

Tympanocentesis is the gold standard used to determine the presence of fluid in the middle ear. The fluid can be sent for culture or PCR typing.

(3) Imaging

In the routine evaluation of a child with OME, imaging of the temporal bone is not warranted. However, when there are associated malformations (e.g. craniofacial malformations), when the degree of hearing loss is not compatible with the clinical findings, or when there is a sensorineural hearing loss, high-resolution CT and MRI scans allows identification of middle and inner ear abnormalities.

Screening Programs

It is important to identify children at risk for possible developmental sequelae of OME, including speech-language delay, and behavioral problems. At-risk children are those who develop OME and have additional disabilities including sensorineural hearing loss, autism, syndromes (such as Down), learning disabilities as well as others that may make them more vulnerable to the presence of persistent OME and accompanying conductive hearing loss.

Quality of Life (QoL)

Identification of the impact of OM on the parents and siblings of children with OME is important.²⁰ Quality of Life (QoL) questionnaires have been developed and several recent studies have demonstrated the usefulness of examining QoL associated with OME.²¹

6. Management

Natural history of untreated otitis media

Clinical success when treating otitis media must always be considered against the background of high natural resolution.

Children with OME following an episode of AOM have the best prognosis with 60% resolution at 1 month and about 75% resolution after 3 months. Children with newly detected OME of unknown cause still do extremely well, with resolution rates increasing from 50% at 1 month, to 75% at 6 months, and 90 % at 1 year. Observation of OME lasting 3 months or longer yields disappointing resolution rates of about 25% at 1 year, 30% at 2 years and 50% at 3 years.²²

OME has a very dynamic course. About 30% to 40% of children have recurrent episodes when observed over several years.

Spontaneous improvement of OME is subject to seasonal variations. Effusions first detected in May through August have the best prognosis and those detected in September through February have the worst. Seasonal trends are less marked in subjects with long-standing OME.

A. MEDICAL THERAPY:

1. ANTIMICROBIAL THERAPY:

In the past 10 years, 3 meta-analysis reported a mild short term improvement following antibiotic therapy with rate differences of 22.8% favoring antibiotics. Approximately 7 children would need to be treated with antimicrobials to achieve one short-term response²³ (level of evidence I). However these initial benefits are only transient. Due to the lack of long-term efficacy, we do not recommend antimicrobials for routine management (Degree of recommendation A).

2. ANTI-INFLAMMATORY DRUG THERAPY:

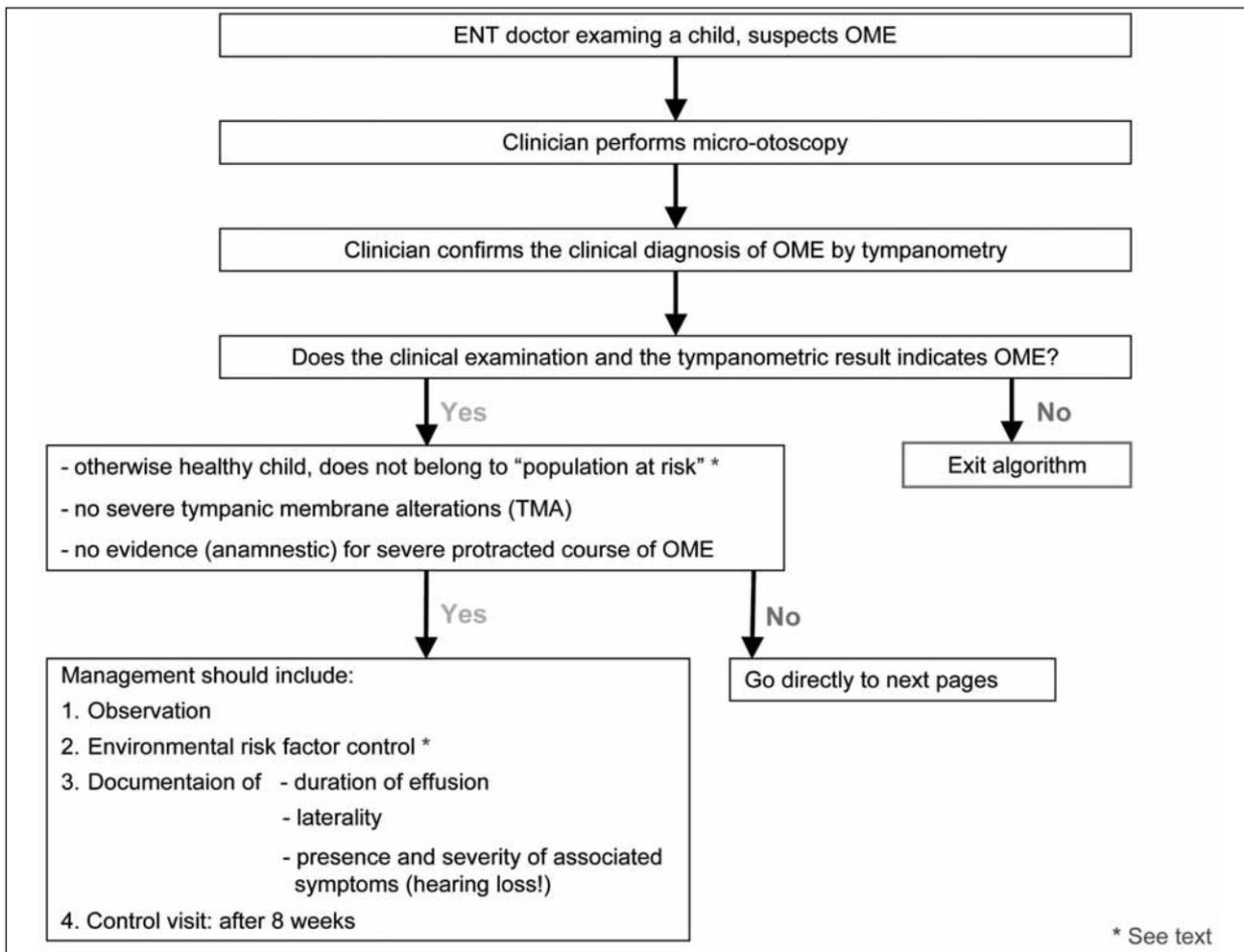
Oral steroid medication is not recommended in the treatment of OME because of the limited scientific evidence that this treatment is effective in the long term and the possible adverse effects. Although intranasal steroids have fewer adverse effects, limited evidence exists for short-term improvement of OME with intranasal steroids.²⁴ (Level of evidence I degree of recommendation A).

3. ANTIHISTAMINE-DECONGESTANT PREPARATIONS

A meta-analysis of three randomised trials comparing antihistamine-decongestant preparations to placebo for OME showed an overall rate difference of 0% (95% CI: -7 to 7%), suggesting no efficacy.²³ So there is no evidence to support the prescription of these preparations. (Level of evidence I degree of recommendation A).

4. MUCOLYTIC DRUG THERAPY

There is no scientific evidence to support the prescription of these



Algorithm for otitis media with effusion in children, part 1.

preparations in the treatment of OM. (Degree of recommendation B).

5. IMMUNOTHERAPY:

At this moment the evidence showing that pneumococcal vaccination is beneficial in the prevention of OME is still too limited. Therefore we do not recommend routine vaccination with the conjugate pneumococcal vaccine as a treatment modality for OME. In selected cases with underlying predisposing factors for OME, it can be advised.²⁵ (Level of evidence I degree of recommendation A).

6. PREVENTION OF OME BY MODIFYING RISK FACTORS:

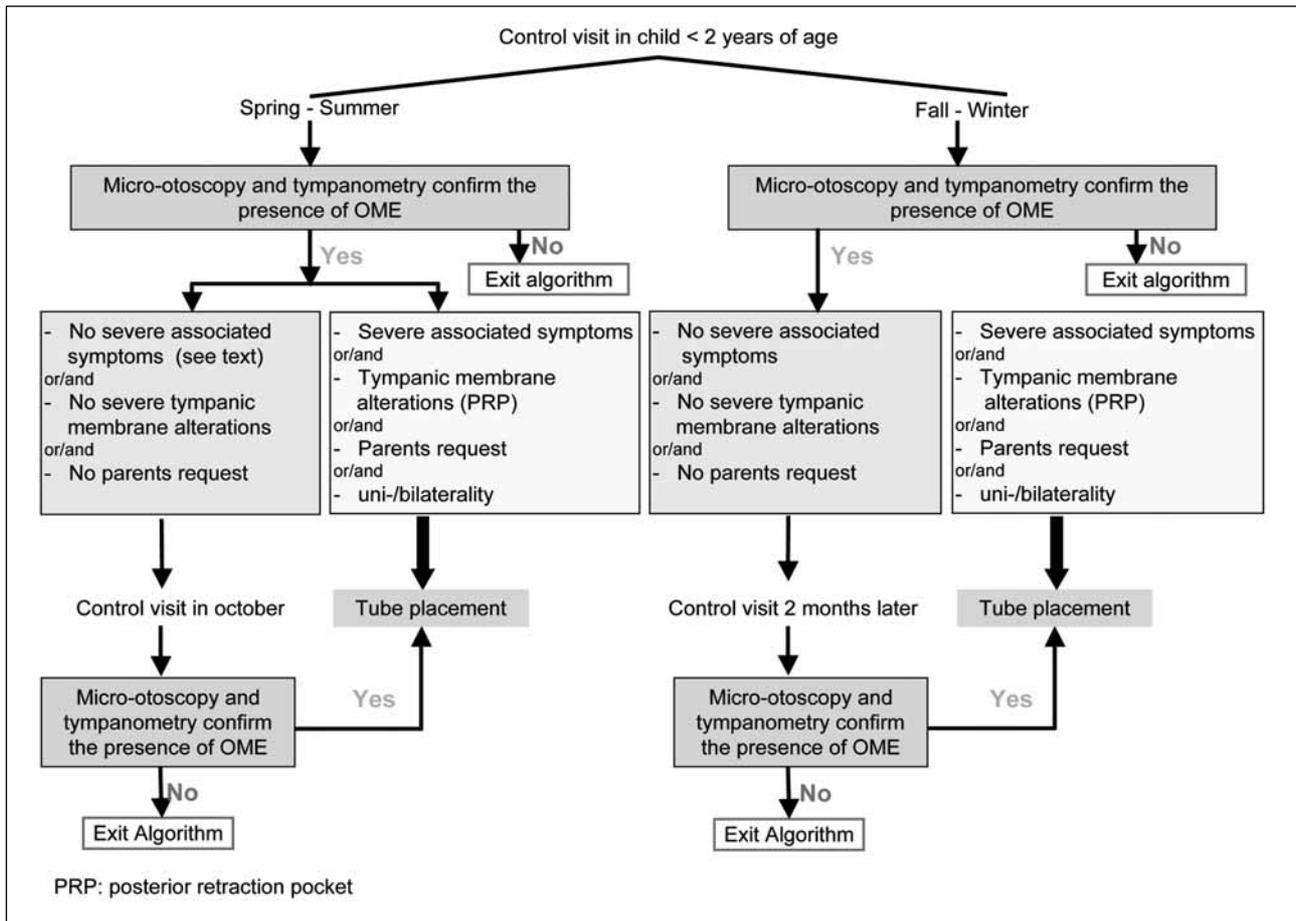
Despite the lack of evidence linking environmental control with better OME outcomes, control of environmental risk factors (breast-feeding, passive smoking, day-care) is an option in managing OME. (Level of evidence III degree of recommendation B) A causal relationship between allergy and OME has been suggested but to date remains unquantified.²⁶ Despite the lack of prospective trials regarding the efficacy of allergy treatment in the resolution or prevention of OME, management of inhalant and food allergy seems

prudent. (Level of evidence III degree of recommendation C)

Inflammatory or infectious processes in the nose, nasopharynx or paranasal sinuses should also be controlled because secondary mucosal edema may compromise Eustachian tube function.

7. AUTOINFLATION THERAPY:

Autoinflation refers to the opening of the Eustachian tube by blowing up a balloon with the nose, which raises intranasal pressure.²⁷ We do not recommend autoinflation for routine clinical practice as a better designed, larger study is warranted. (Level



Algorithm for otitis media with effusion in children, part 2.

of evidence III degree of recommendation C).

8. ALTERNATIVE MEDICINE:

We do not recommend alternative medicine (homeopathy, osteopathic and chiropractic manipulation, dietary exclusions, acupuncture) as treatment for OME. None of these modalities have been subjected to a published, peer-reviewed, clinical trial. A systematic review of recent evidence found significant serious adverse effects such as allergic reactions to Echinacea. A general concern about herbal products is the lack of any governmental oversight into product quality and purity.²⁸

B. SURGICAL THERAPY

Surgical candidacy for OME depends largely on hearing status, associated symptoms, the child's developmental risk and the anticipated chance of spontaneous resolution of the effusion. Candidates for surgery include:

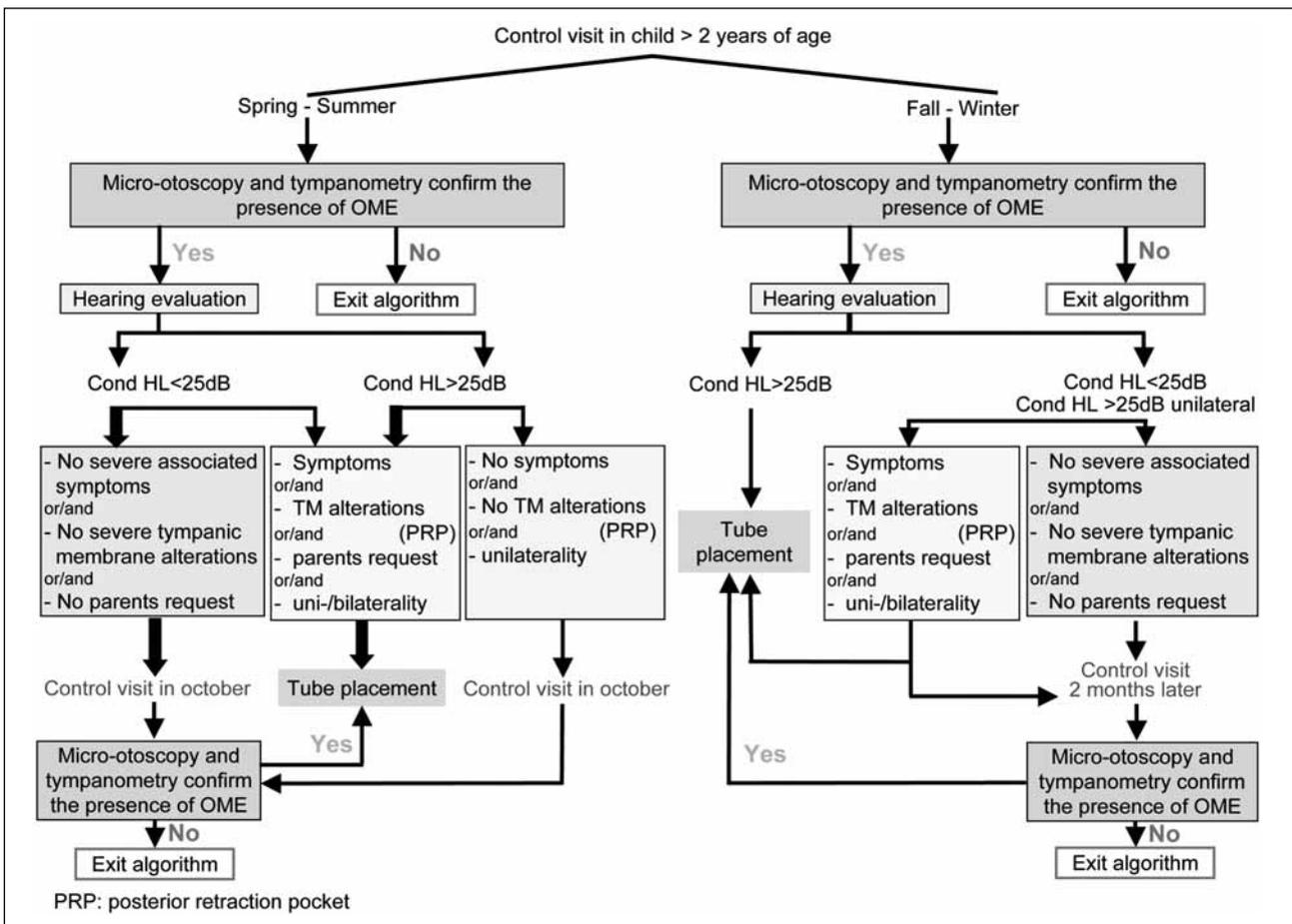
- children with OME lasting 4 months or longer with persistent hearing loss or other signs and symptoms
- recurrent or persistent OME in children at risk regardless of hearing status
- a child with intrinsic and/or extrinsic risk factors for deviant language development

- OME with structural damage to the tympanic membrane or middle ear.

In unilateral cases with a normal hearing in the contralateral ear, tympanostomy tubes are recommended after the effusion has been present for 6 months. Ultimately, the recommendation for surgery must be individualized.

1. MYRINGOTOMY

Myringotomy alone is ineffective for chronic OME²⁹ because the incision closes within a few days. Laser-assisted myringotomy extends the ventilation period several weeks but randomised trials



Algorithm for otitis media with effusion in children, part 3.

with concurrent controls have not been conducted to establish efficacy.³⁰ (Level of evidence I, degree of recommendation A)

2. TYMPANOSTOMY TUBE INSERTION

The principal benefit of tube insertion is the restoration of hearing to the pre-effusion threshold and clearance of the fluid and possible feeling of pressure. Hearing levels improve on average 6-12dB.³¹ Moreover, tympanostomy tube placement induce large changes in quality of life (QoL). (Level of evidence I) Although there is insufficient evidence to prove that there are long-term deleterious effects of OME, concern about the possibility of such effects led us to recom-

mend surgery in selected cases. (Degree of recommendation A).

It seems most appropriate to insert the tube into the anterior (inferior) portion of the pars tensa. Tubes are made of various materials but no data are available to show the superiority of one type of biocompatible material over another. In general, tympanostomy tubes ventilate the middle ear for an average of 6 to 12 months. Biflanged tubes tend to stay somewhat longer. Tube extrusion rates are similar after radial versus circumferential myringotomy incision although we prefer the radial incision. Approximately 20 to 50% of children who have had tympanostomy tubes have OME

relapse after tube extrusion that may require additional surgery.^{29,31} Insertion of more or less "permanent" tubes (e.g. Good T Tube) is only warranted in selected patients in whom tympanostomy tubes have frequently been tried and in whom ET dysfunction appears to be not only chronic but also not likely to improve in the future, such as children who have had skull base surgery, or another permanent anatomical obstruction of the ET. Permanent tubes should rarely be used in children since the incidence of OME and atelectasis of the tympanic membrane progressively decreases with advancing age. This is true even for children with cleft palates.

Tympanostomy tube sequelae are common³² but are generally transient or do not affect function (tympanosclerosis, focal atrophy or shallow retraction pocket). Transient otorrhea occurs in 16% of patients in the post-operative period and later in 26%, but is infrequently chronic, recurrent or requires tube removal. Other sequelae of tubes include obstruction (7%), granulation tissue (5%), premature extrusion (4%) and medial displacement (<0.5%). Tympanic membrane perforations, which may require repair are seen in 2% of children after placement of short-term (grommet-type) tubes and 17% after long term tubes.³³ Long-term tubes more than doubled the risk of otorrhea, perforation and cholesteatoma.

Risk factors for early post-tympanostomy tube otorrhea is the presence of purulent MEF, bacteria in culture of MEF, young age, and marked mastoid cloudiness on radiographs.

Several controlled trials of prophylactic otic drop use after tube insertion show conflicting results and limited clinical benefits. Aspiration of MEF at tube insertion in another study did not influence the incidence of purulent otorrhea or tube obstruction within 1 month of surgery. Silastic® tubes impregnated with silver oxide yielded a lower postintubation otorrhea rate (5.1% versus 9.8%) when compared with non-impregnated identical tubes in a multicenter randomized clinical trial.³⁴ Increased costs per tube must be weighted against what is a possible clinical benefit.

If the middle ear discharge continues for longer than a week despite appropriate (local) antibiotic, re-examination of the child is necessary. If the persistence of

otorrhea is not attributable to poor compliance to the treatment, more intensive therapy, including daily cleansing of the ear canal and combination of effective ototopical treatment with oral antibiotics is necessary. Sometimes the reason for the persistent discharge is biofilm formation on the tube or a cholesteatoma. In selected cases, even removal of the tube may be necessary to stop the discharge.

3. ADENOIDECTOMY

Two well designed studies have shown adenoideotomy to be effective in the treatment of chronic effusions. Gates and colleagues showed in 578 Texas children, aged 4 to 8 years with chronic OME that those who underwent adenoideotomy had significantly less time with effusion, better hearing, longer time to first recurrence and required fewer surgical re-interventions compared to those receiving myringotomy +/- tympanostomy tube insertion.^{35,36} We recommend adenoideotomy for OME (unless the child has an overt or submucous cleft palate) because it confers a 50% reduction in the need for future operations.³⁵ (Level of evidence I degree of recommendation A) Recently Coyte *et al.*³⁷ showed that the benefit of adenoideotomy is already apparent at age 2 years and is the greatest for children aged 3 years or older irrespective of adenoid size. Adenoideotomy has a 0.2% to 0.5% incidence of hemorrhage³⁷ and 2% incidence of transient velopharyngeal insufficiency.³⁸ Other potential risks of adenoideotomy such as nasopharyngeal stenosis and persistent velopharyngeal insufficiency, can be minimized with appropriate patient selection and surgical technique.

4. TONSILLECTOMY

Tonsillectomy has not been shown effective in treating OME.³⁶ (Level of evidence I)

7. Algorithm for managing OME

Management decisions in children with OME depend on the duration of effusion, the laterality, and presence and severity of associated symptoms. Therefore, these features should be documented at each assessment of the child with OME.

Ideally, the time of onset and laterality of OME can be defined through diagnosis of an antecedent AOM, a history of acute onset of signs or symptoms directly referable to fluid in the middle ear, or the presence of an abnormal audiogram or tympanogram closely after a previously normal test. Unfortunately, these conditions are often lacking, and the clinician is forced to speculate on the onset and duration of fluid in the middle ear(s) in a child found to have OME at a routine office visit or school screening audiogram.

Associated signs and symptoms of OME that should be documented are:

- Mild intermittent ear pain, fullness, or “popping”
- Secondary manifestations of ear pain in infants, which may include ear rubbing, excessive irritability, and sleep disturbances
- Failure of infants to respond appropriately to voices or environmental sounds, such as not turning accurately toward the sound source
- Hearing loss, even when not specifically described by the

child, suggested by lack of attentiveness, behavioral changes, failure to respond to normal conversational-level speech, or the need for excessively high sound levels when using audio equipment or viewing television

- Recurrent episodes of AOM with persistent OME between episodes
- Problems with school performance
- Balance problems, unexplained clumsiness, or delayed gross motor development
- Delayed speech or language development
- Tympanic membrane alterations (posterior retraction pocket)

The laterality (unilateral versus bilateral), duration of effusion, and presence and severity of associated symptoms should be documented in the medical record at each assessment of a child with OME. When OME duration is uncertain, the clinician must take whatever evidence is at hand and make a reasonable estimate.

Parents request: in deciding the management option the parents opinion concerning the health or disease of their child should be taken into account.

Management of populations at risk

In general:

- more frequent clinical evaluation;
- surgical intervention should be considered earlier

Infants and children with cleft palate

They are known to have a severe and protracted dysfunction of the ET. Therefore, the most reason-

able method of management for young infants with a cleft palate is the insertion of tympanostomy tubes as early in life as feasible.

Other craniofacial malformations

Any child with a congenital craniofacial malformation should be followed to detect the development of otitis media with effusion. A child with OME in this category might most reasonably be managed by tube insertion.

Immunocompromised Host

The possibility of unusual organisms should be considered. Culture and sensitivity testing of middle ear aspirate is helpful.

Immotile cilia syndrome

Concurrent permanent hearing loss or other sensory deficits.

Environmental risk factor control

Host related factors

Factors influencing ET function: Adenoid, reflux, immunologic, anatomical defects (clefts).

Environmental risk factors

Daycare, passive smoking, pacifier use.

8. Patient information - Grommets for otitis media with effusion

The function of the ear

The ear is divided into three parts: the outer ear, the middle ear and the inner ear. Sound waves entering the outer ear cause vibration of the eardrum. Behind the eardrum, in the middle ear space, three tiny ossicles are present. Eardrum vibrations are transmitted from the eardrum to these middle ear ossicles. These subsequently transmit vibrations to the cochlea, a major structure of the inner ear. The mid-

dle ear space located behind the eardrum is under normal circumstances filled with air. The middle ear communicates with the back part of the nose by means of the Eustachian tube, a tiny and very narrow channel especially in small children. It allows the passage of air into the middle ear and drains any fluid out. Otitis media with effusion is known as a condition in which the middle ear is gradually being filled with fluid. If present this fluid will dampen the vibrations of the ossicles.

Complaints and treatment of otitis media with effusion

The main problem is hearing loss which ranges from mild to severe. Children tend to turn up the level of the TV or radio. Mild earache may occur and there is a higher risk of ear infections. The outcome is usually good. Many children only have symptoms for a short period of time, i.e. a few weeks. The fluid often drains away gradually and hearing improves to normal. In cases of prolonged OME with important hearing loss, your ENT doctor can suggest the placement of grommets. Grommets or ventilation tubes are very small either plastic or metal tubes inserted through a small opening in the eardrum. They help to drain any fluid and ventilate the middle ear. Hearing improves almost instantly.

The operation

The operation is performed under a short general anaesthesia. A small incision is made into the eardrum. Suction through this opening removes fluid out of the middle ear. The grommet is then positioned into the incision. After the operation children stay for

about one hour in the recovery room. There is no earache. Occasionally some discharge of fluid or blood can be seen.

After the operation

Children usually will be allowed to go home the same day. The grommet slowly moves outwards as the eardrum heals. After some six to twelve months it is then naturally pushed out of the eardrum into the outer part of the ear. It moves outwards with earwax until it falls out of the ear canal, often unnoticed.

Your child can have a swim and take a shower. However, deep diving and contact with soap or shampoo should be avoided. You could plug your child's ear with a cotton wool covered in Vaseline before taking a shower or a bath. A check-up every three to four months is advised to check whether the grommets "behave normal".

Complications

Most children with grommets do not get any ear infections. If a yellowish discharge from the ear is noticed this may point to an infection. It is advisable to contact an ENT specialist within a week.

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Ingeborg Dhooge
 ENT dept.
 Ghent University Hospital
 De Pintelaan 185
 9000 Gent, Belgium
 E-mail: ingeborg.dhooge@ugent.be

CME questions

1. The definition of otitis media is inflammation of the middle ear
 - A – Caused by allergy
 - B – Caused by bacteria
 - C – Caused by immune complexes
 - D – Without reference to etiology or pathogenesis
 - E – Caused by Eustachian tube dysfunction

2. The peak prevalence of otitis media for both sexes is found in ages
 - A – 0-6 months
 - B – Around 1 year
 - C – 12-18 months
 - D – At 36 months
 - E – Around 2 and 5 years

3. Epidemiologic factors that may be associated with an increased incidence of otitis media include all of the following except
 - A – Pacifier use
 - B – Male sex
 - C – Attendance at day care
 - D – Breast feeding
 - E – Immediate family history of otitis media

4. Underlying medical conditions (intrinsic factors) associated with an increased incidence of otitis media do not include
 - A – Cleft palate
 - B – Down syndrome
 - C – Mucoviscidosis
 - D – Craniofacial syndromes
 - E – Immotile cilia syndrome

5. What is not correct about otitis media with effusion?
 - A – Crowded living conditions have been associated with otitis media
 - B – Otitis media is associated with exposure to passive smoke
 - C – The onset of a first episode before 6 months of age is a risk factor for recurrent OM
 - D – Gastro-esophageal reflux may contribute to OME
 - E – The risk of OME after AOM increases with age

6. The most important symptom of OME is
 - A – Hearing loss
 - B – Clumsiness
 - C – Otagia
 - D – Fever
 - E – “Popping” of ears

7. What is not true about the natural history of OME?
- A – OME following AOM has a good prognosis
 - B – Spontaneous resolution rates increase from 50% at 1 month, to 75% at 6 months
 - C – 30% to 40% of children have recurrent episodes
 - D – Spontaneous improvement of OME is subject to seasonal variations
 - E – Seasonal trends are less marked in OME following an episode of AOM
8. Candidates for surgery for OME do not include
- A – Children with OME lasting 4 months or longer with persistent hearing loss
 - B – Recurrent or persistent OME in children at risk regardless of hearing status
 - C – Unilateral cases lasting longer than three months
 - D – A child with a risk factors for deviant linguistic development
 - E – OME with structural damage to the tympanic membrane or middle ear.
9. What is not true about the medical treatment of OME?
- A – Antimicrobial therapy gives a mild transient improvement of OME
 - B – Pneumococcal vaccination is beneficial in the prevention of OME
 - C – Intranasal steroids are not indicated in the treatment of newly diagnosed OME
 - D – Auto-inflation can be harmful for the middle ear
 - E – Antihistamine-decongestant preparations are not efficacious in the treatment of OME
10. What is not true?
- A – Adenoidectomy is effective in the treatment of chronic OME
 - B – Myringotomy alone is ineffective for chronic OME
 - C – Tympanostomy tube sequelae are not common but if present always affect the middle ear function
 - D – Tonsillectomy has not been shown to be effective in treating OME
 - E – The best place for tube insertion is the anterior (inferior) portion of the pars tensa of the ear drum

Answers: 1D; 2E; 3D; 4C; 5E; 6A; 7E; 8C; 9B; 10C