



Definitions, Terminology, and Classification

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Otitis media (OM) is a multifactorial, multifaceted disease that manifests as an inflammatory process in the middle ear, mastoid, and Eustachian tube. It is the result of prevailing aggression against the body's immunological defense system, the degree of which depends on the interactions between the two opposing forces (aggressive and defensive). It is a dynamic disease, often used to describe a continuum of related diseases [1], in which some forms lead to others (Figs. 1.1 and 1.2), resulting at times in complications and

sequelae (Table 1.1). In addition to local factors, this process is directly influenced not only by the neighboring anatomical structures but also by the host's relationship with the environment.

The term "otitis media (OM)" itself describes an inflammation of the middle ear and includes not only the middle ear cavity but also the Eustachian tube and the mastoid.

This disease can be classified on a clinical or histopathological basis [3].

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Fig. 1.1 The continuum of otitis media (Copyright Marcos Y. Goycoolea 2023; all rights reserved)

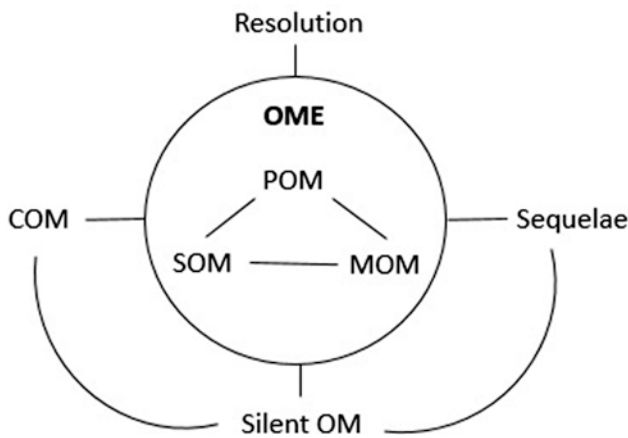
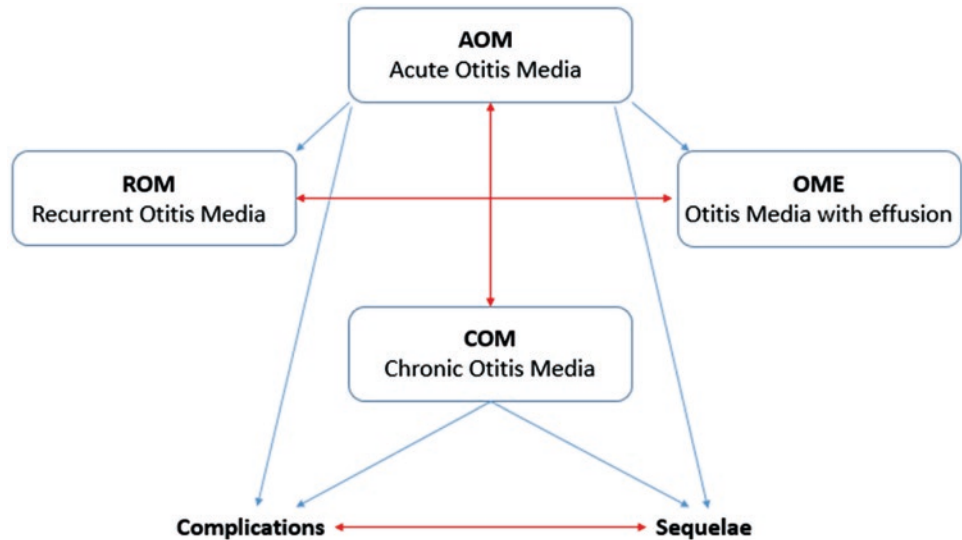


Fig. 1.2 Classification and continuum of otitis media. (Copyright Marcos Y. Goycoolea 2023; all rights reserved). Classification and continuum of otitis media with effusion (OME). *POM* purulent otitis media, *SOM* serous otitis media, *MOM* mucoid otitis media, *COM* chronic otitis media, *OM* otitis media

Table 1.1 Complications and sequelae of otitis media (from Goycoolea and Jung 1991 [2])

Complications	
Temporal bone	Extratemporal
<i>Middle ear</i>	<i>Intracranial</i>
Facial nerve paralysis	Extradural abscess
Ossicular lesions	Subdural abscess
Perforations of the TM ^a	Brain abscess
	Meningitis
<i>Mastoid</i>	Lateral sinus thrombophlebitis
Reduced pneumatization	Otitis hydrocephalus
Coalescent mastoiditis	
	<i>Extracranial</i>

Table 1.1 (continued)

Complications	
<i>Inner ear</i>	Bezold’s abscess
Labyrinthitis	Zygomatic abscess
Sensorineural hearing loss	Postauricular abscess
	<i>Others</i>
	Developmental
	Behavioral
Sequelae	
<i>Active</i>	
Recurrent attacks of otitis media	
Chronic otitis media with effusion	
Silent otitis media	
Masked mastoiditis	
Continuum of POM-SOM-MOM-COM ^b	
<i>Inactive</i>	
Atelectasis	
Tympanosclerosis	
Adhesive otitis media	

^a Tympanic membrane

^b *POM* purulent otitis media, *SOM* serous otitis media, *MOM* mucoid otitis media, *COM* chronic otitis media

Clinical Classification

The Task Force of the Fourth International Symposium of Otitis Media, held in June 1987, at Bal Harbor, Florida, classified otitis on clinical grounds [4], as did the Task Force of the Seventh Symposium in 1999 [5].

For purposes of communication and uniform reporting, we have followed this classification, with a clear understanding, however, that it is a working classification that allows a “common language” in the subject. It is important to men-

tion that this is more than just a “final classification” written in stone; it has represented, over the years, a “consensus or working agreement” between different clinicians and investigators who have different viewpoints and perspectives. In other words, as Cicero stated centuries ago: “Every rational discussion of anything whatsoever should begin with a definition in order to make clear what is the subject of dispute.”

The classification is as follows:

1. **Myringitis**, which is an inflammation of the tympanic membrane that occurs alone or in association with external otitis or otitis media
2. **Acute suppurative otitis media** (acute purulent otitis media (POM) or acute otitis media), which refers to a clinically identifiable infection of the middle ear with sudden onset and short duration
3. **Otitis media with effusion or secretory otitis media** (chronic otitis media with effusion, otitis media with effusion, nonsuppurative otitis media, catarrh, serous otitis media (SOM), serotympanum, mucoid otitis media (MOM), mucositis, or mucotympanum), which refers to the presence of middle ear effusion (MEE) behind an intact tympanic membrane without any acute signs or symptoms. This broad term includes nonsuppurative or clinically noninfectious forms of OM. However, evidence suggests that effusions are, for the most part, infectious. Cultures of serous effusions yield between 22% and 52% positively, percentages that increase to 77.3% if PCR is used [6].
4. **Chronic suppurative otitis media** (chronic otitis media), which refers to a chronic discharge from the middle ear through a perforation of the tympanic membrane. Suppurative refers to an active clinical infection. A perforation without discharge can be an inactive stage of the infection (but not of the underlying histopathological process).

Over time, a new entity was incorporated:

5. **Recurrent otitis media**, which refers to repeated episodes of acute otitis media in between periods of “apparent remission” (three episodes in 6 months or four episodes in 1 year)

In addition, the definition of “chronic” can also be applied to otitis with an intact tympanic membrane, as in the cases of **masked mastoiditis** [7] and **silent otitis media** [8, 9].

Based on its duration, this disease can be divided into acute (up to 3 weeks), subacute (from 3 weeks to 3 months), and chronic (more than 3 months) [10].

Middle Ear Effusions

Otitis media is associated with the presence of middle ear fluid (effusion). Basically, three types of effusions are found: (1) serous otitis media (SOM), (2) mucoid otitis media (MOM), and (3) purulent otitis media (POM).

Two other types can be added: hemorrhagic and any combination of the previously mentioned effusions. In practice, it is unusual to see a pure effusion because effusions reflect a dynamic process in which some forms evolve into others. This will depend on the interaction between defensive and aggressive forces (e.g., the aggressive forces prevail in the more infectious phases, whereas the defensive forces prevail in the noninfectious phases). Moreover, fluid composition represents what is going on in the underlying mucoperiosteum, as will be described in Chap. 5.

Histopathological Classification

Histopathologically an infiltration by polymorphonuclear cells is a sign of acute inflammation, and an infiltration by round cells is a sign of chronic inflammation. The term “chronic” implies infiltration of the mucoperiosteum by round cells or the cells of chronic inflammation. However, studies of the histopathological process of otitis media provide much more comprehensive knowledge and understanding that goes much further than the practical clinical terms “acute” and “chronic.” These histopathological changes are described in Chap. 5.

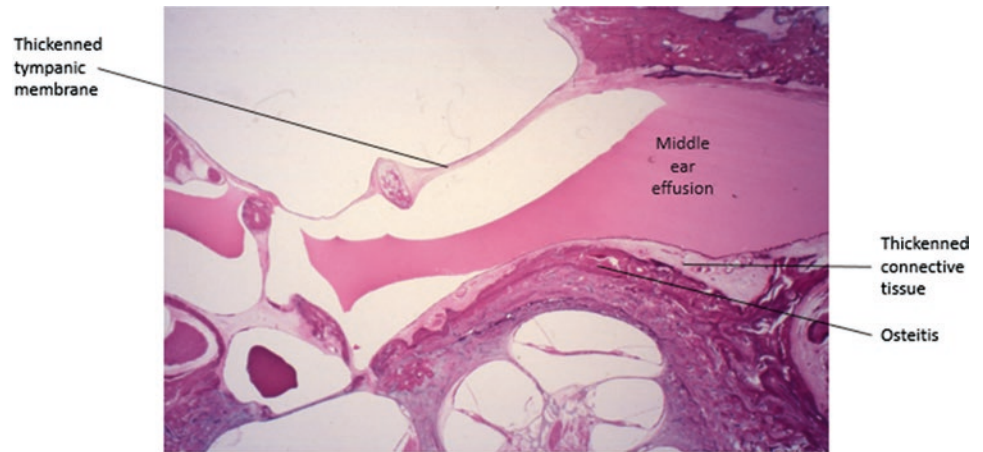
Complications and Sequelae

In addition to the acute and chronic involvement of the mucoperiosteum by the otitis media process, there are potential complications and sequelae. A complication occurs when the inflammatory process extends beyond the mucoperiosteum. Sequelae refer to histopathological changes that are secondary to the otitis media process that remain within the mucoperiosteum and have the capacity or potential to develop a complication [11]. For example, the granulation tissue is a sequela (active sequela), but erosion of bone and fistula by the granulation tissue is a complication. In addition, the overall consequences of a localized problem (e.g., ossicular disruption causing conductive hearing loss) can have significant effects on a person and their relationship with others (lack of communication, isolation, learning problems, and so forth). Complications and sequelae are described in Table 1.1.

The Concept of Overall Involvement

An essential concept in otitis media is that the otitis media process involves not only the middle ear cavity but also the Eustachian tube and the mastoid. This manifests by changes in the whole mucoperiosteum covering these cavities—including osteitis of the underlying bone—(Fig. 1.3) and in the fluids that the cavities contain (middle ear effusions). In addition, effusions are not stagnant spillage but are dynamic

Fig. 1.3 Middle ear cavity with middle ear effusion (Copyright Marcos Y Goycoolea 2023; all rights reserved). The inflammatory process involves all the walls, cavities, and anatomical structures that these contain as well as the mucoperiosteum that lines these cavities and structures



Middle ear cavity with middle ear effusion

forms that evolve and change in response to and as part of the overall mucoperiosteal changes [11, 12]. We see the inflammatory changes as a continuum, with some forms evolving or resolving into other forms and, at times, resulting in complications and sequelae, depending on the multiple factors involved. Viewed from this perspective, it becomes obvious that otitis media implies much more than fluid behind the tympanic membrane.

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