1. General. Otorrhea is defined as the presence of any kind of secretion in the external auditory canal (EAC). It is usually purulent, and must always be considered abnormal (not like earwax, which is only considered pathologic when is partially or totally obstructive, and in that case, it must be extracted).

Otorrhea can be abundant or scarce, its color can vary from transparent to yellowish, green or hematic, it can be purulent, mucopurulent or mucous and its consistency can be lighter or thicker depending on many factors.

When we classify it depending on its onset, we have acute onset otorrhea and insidious onset otorrhea, and both can be also classified in intermittent or persistent according to the evolution. Even some times we are not able to identify its presence. We must not mistake otorrhea with otorrhagia, which means presence of blood in the EAC; or with CSF otorrhea which means presence of cerebrospinal fluid (CSF) in the EAC.

The most common etiologies associated with otorrhea are: external otitis, suppurative acute otitis media and active chronic otitis media.

2. Anatomy. An anatomy reminder can be watched in the following figures where we can see the EAC in an axial macroscopic view of the ear (Figure 1) an histological view (Figure 2) and a CT axial image of the same view (Figure 3). The most relevant about the anatomy is to remember that the skin that covers the EAC varies from the lateral to the medial portion of the canal: it becomes very thin when it goes deeper in the EAC, and adjacent to the tympanic membrane is very sensitive and vascularized, so we must be very careful when manipulating that area.

3. Clinical History. We must ask about the moment it started, if it is associated with an upper respiratory disease, if it is associated with otalgia, the amount of otorrhea and its characteristics and the medical record of the patient.

4. Physical exam. We must search for signs of trauma, the presence of pain when pulling the tragus or
the auricle, inflammation of the EAC, the amount and type of otorrhea, the characteristics of the tympanic membrane and elements as granulations and polyps. The exam must be with a microscope and aspiration, otherwise we will not achieve the correct diagnosis.

5. Otoscopy. It is essential. The cartilaginous portion of the EAC is modifiable during the exam, but not the bony portion. The direction of the EAC is from lateral to medial, from dorsal to ventral and upwards.

The physical exam must begin with a macroscopic inspection of the auricle and the adjacent zones, and follow with the EAC. the auricle must be pulled backwards while the tragus must be pulled anteriorly, as shown in Figure 4. This way we can perform an an otoscopic observation without amplification.

When we use the otoscope we must remember that the image improves because of the amplification, but we lose the depth of the focus.

The external third of the EAC is less sensitive and more resistant. Even the minimum touch with the otoscope towards the skin of the EAC, can cause bleeding, so we suggest to use the wider otoscope as possible. (Figure 5)

If the EAC is abnormal and the tympanic membrane is not, we must think in an external otitis type, if otherwise, we must suspect in a middle ear disease as acute, recurrent or relapsing otitis media, chronic otitis media with or without cholesteatoma, congenital or granulomatous. The presence of otorrhea in patients with ventilatory tubes is included in the second group.

6. Classification
A very personal classification is based in the form the otorrhea begins. This can be of acute onset or a more progressive type. In this second group, we have some cases those are persistent and others that are intermittent. A typical example of the acute type is the external diffuse otitis (Figure 6), and in the other group, the typical examples are mycotic external otitis, which is also usually intermittent and the otorrhea of neoplasms of the EAC or an active chronic otitis media.
I. Causes of otorrhea: **acute onset otorrhea**
- Diffuse external otitis
- Localized external otitis
- Suppurative acute otitis media
- Recurrent suppurative acute otitis media
- Irritative inflammation of the EAC
- Earwax plug
- Tympanostomy tubes secondary otorrhea

The classical characteristic of the diffuse external otitis is the pain. After the pain, comes the otorrhea, usually purulent, sometimes scarce, and occupies the EAC, so it makes it impossible to perform a correct visualization to determine wether it is an external otitis or a suppurative otitis media. It makes it necessary to use the microscope and aspiration to difference between both entities. *(Figure 7)*.

A non-suppurative acute otitis media (without perforation), presents with severe otalgia but doesn’t have otorrhea, as it is shown in the following figure *(Figure 8)*.

![Figure 7. Purulent otorrhea secondary to suppurative otitis media.](image1)

A type of otorrhea that is of acute onset and recurrent is the recurrent otitis media, but in a minor percentage it could be the first manifestation of a congenital cholesteatoma.

The otoscopy can show a white mass behind the tympanic membrane in a patient with conductive hipoacusia and it can be identified with a computed tomography or a magnetic nuclear resonance with diffusion technique (HASTE).
In the initial stage of diffuse external otitis (EO), the EAC is severely inflamed and otorrhea can be inapparent. The skin of the EAC looks edematous after the aspiration (Figures 9 and 10).

Another cause of acute onset otorrhea can be a localized infection, generally associated with an infection of the hair follicles in the outer third of the EAC, which also associates with severe pain and is followed by a purulent kind of otorrhea (Figure 11).

In some cases of acute onset otorrhea the cause is the infection of the earwax located in the EAC, which can lead to otalgia and hipoacusia (Figure 12). This figure could suggest an otomycosis, and it is using the microscope and aspirating the content that we will come to the right diagnosis.

We can find earwax in different ways in the EAC: it can occupy the walls of the EAC without obstructing (Figure 13) or occupying the EAC without producing significative discomfort as seen in Figure 14 or occluding the EAC (Figure 15).

Sometimes there is infectious inflammation of the EAC’s skin and in the skin of the tympanic membrane, without otorrhea, as shown in Figure 16.

An irritative phenomenon can affect the skin of the EAC, it is a non infectious process, like eczema, (Figure 17) which consists of a dermoepithelial process of a reactiva nature in response to local and systemic factors (cosmetics, idiopathic) secondary to hepatic or gastointestinal dysfunction.

In other cases, the cause is the inadequate manipulation of the EAC. Its manifestations are intense itching, burn sensation and the presence of serose otorrhea.

Also, in some occasions, there’s acute onset otorrhea in patients with tympanostomy tubes (Figure 18).

According to the literature, until 30% of this patients could have otorrhea directly related with the entrance of water into the middle ear through the tubes.

In some occasions, we can see granulation tissue around the tube, generating a foreign body reaction. Its treatment is to clean the site and the use of otic drops. In more severe cases, is necessary to extract the tube.

II. Causes of otorrhea: insidious onset-intermmitent
Otorrhea

- Otoymycosis
- Tumor of the EAC or the middle ear
- Foreign body

Otorrhea can be of slow onset, occasionally intermittent. It is usually prolonged and insidious. In this type of otorrhea there is not an important component of pain, but there is pruritus. In the otomycosis itching is very significant and recurrency is frequent if the treatment is short.

The otomycosis produces a thick otorrhea and sometimes the hyphae are clearly detected in the otoscopy or with the microscopic exam, as we can see in the following figures (Figures 19 and 20).

The tumors as granulomae are not very frequent, specially in children. In some occasions they show scarce symptoms and in some occasions they produce otorrhea of insidious onset. In the image we can see an inflammatory granuloma of the EAC’s floor, adyacent to the tympanic membrane (Figure 21).

We must pay extra attention if one or more of these are present: patient older than 60 years old,
diabetes mellitus 2, immunosuppressed patients, the presence of granulatory tissue in the exam and a bad response to treatment. In these cases we must suspect external necrotizing otitis or neoplasia.

The external necrotizing otitis usually occurs in diabetic patients, older than 60 years old and have otorrhea associated with ototagia and granulatory tissue in the EAC. It is generally produced by *Pseudomonas aeruginosa* and it can extend and compromise the skullbase or different cranial nerves. The right diagnosis starts with a high clinical suspicion and it’s confirmed with CT and MRI.

Endovenous fluoroquinolones or third generation cephalosporines must be administered, so the patient must be hospitalized for at least a couple of weeks and then he can complete the treatment orally for 1 or 2 months. Surgery is indicated in special cases.

In the following picture we can observe an inflammatory lesion in a ten-year-old boy with previous diagnosis of chronic otitis media without controls and now refers otorrhea and otalgia. We can see in the bottom of the EAC a polyoid lesion, and when we remove it, shows an extensive cholesteatomatoma of the middle ear (*Figure 22*).

The foreign bodies in the ear are even more infrequent, specially the animated objects, and they can be a finding in the physical exam. They can produce inespecific discomfort and associated otorrhea (*Figure 23*). Other kind of foreign bodies can be found in children or in cases of manipulation of the EAC (*Figure 24*).

**III.- Causes of insidious onset and persistent otorrhea**
- Active chronic otitis media
- Tumors of the EAC or the middle ear
- Tuberculosis
- Granulomatous disease of the middle ear

This type of otorrhea is generally insidious and progressive, that’s why it is also called chronic otorrhea. It can be present in reactivations of chronic otitis media and can be persistent without treatment. As it is with tympanostomy tubes, the otorrhea occurs when water comes into the middle ear through a perforation of the tympanic mem-
brane (TM). It is usually asymptomatic and occasionally it can have a bad smell.

An inactive tympanic perforation shows a healthy middle ear mucosa, without signs of infection (Figure 25). When there is a reactivation, the mucosa changes and we can find purulent, smelly otorrhea (Figure 26).

A slow onset otorrhea can show a very similar otoscopic/microscopic vision with a a uter onset otorrhea, that’s why it is so important to take a good history and perform a complete physical exam.

The cholesteatomatous chronic otitis media can also show insidious onset persistent otorrhea (Figure 27).

If this type of otorrhea is refractory to the usual treatment we must suspect a more significatice process, specially if the latentis immunosuppressed or uncontrolled diabetic. In this setting we must also remember to look for malignancies, such as carcinoma (Figure 28 A and B).

The EA cancer is a very infrequent lesion, 1-2 cases per 5 million of patients of 50-60 years old. It presents as a refractory to treatment external otitis, in a patient with persistent otorrhea and otalgia and with an otoscopy that shows granulatory tissue or has concomitant cranial nerves compromise.

It can be derived from the skin, as carcinomas, from glands, as adenocarcinomas or cystoadenoid carcinomas.

A medical problem we must not forget is ear’s tuberculosis, which must be suspected when we have a chronic otitis media (COM - 0, 1% of them are secondary to TB infection). Its number has been raising in the last years and it presents with persistent otorrhea and sometimes with compromise of the facial nerve in children (15 to 30 %). In the physical exam we can see multiple lesions in the tympanic membrane with many perforations or absence of the tympanic membrane. The midle ear’s mucosa shows a thickened mucosa with granulatotissue, and besides a conductive hearing loss, we can see a sensory neural hearing loss, which can be complete.
The diagnosis is made histologically and microbiologically. The treatment is similar to the pulmonary TB, and with treatment, otorrhea can improve in about 2 months. Generally surgical treatment has a bad response.

According to a publication in the European Manual of Medicine by M. Anniko, M. Bernal-Sprekelsen, V. Bonkowsky, P. Bradley and S. Lurato, otorrhea can be evaluated according to the type of secretion and relate it with hearing or CT, to reach the right diagnosis.

In that case we have mucopurulent otorrhea, foul smelling otorrhea, creamy otorrhea, yellowish-green, serous or orange-red otorrhea. If we associate this characteristic with the hearing and/or the imaging, we can find the most probable diagnosis. We can see it in the following schema (Figure 29):

Figure 29. Types of otorrhea.

We have analysed the most frequent types of otorrhea, however, there are other causes which deserve our special attention. If these are from the external ear, we must suspect a necrotizing external otitis or a neoplasm. If the otorrhea comes from the middle ear, we must suspect non-diagnosed cholesteatomas, tuberculosis or a granulomatous disease as GPA (ex-Wegener disease).

Other very infrequent causes of otorrhea are keratosis obturans, contact dermatitis, miringitis bulosa, granulomatous diseases, first branquial arch fistulae connected to the EAC.

Conclusions
1.- The clinical history is fundamental for the differential diagnosis.
2.- The presence of otorrhea is always abnormal.
3.- The otoscopy is fundamental for the diagnosis.
4.- Otorrhea associated with otalgia suggest an infectious process.
5.- Pay attention to the persistent infectious process and the response to conventional treatment.
6.- Otorrhea without otalgia suggests a mycotic infection or a COM.
7.- The clinical records are fundamental for the diagnosis of COM.
8.- EO, suppurative AOM and COM are the most common causes of otorrhea.
9.- We must be suspicious about the presence of persistent otorrhea in immunosuppressed patients, in the elderly and in the newborn, those who have associated neural lesions, otorrhea with hematic secretion, severe otalgia, systemic symptoms or granulatory tissue in the EAC.

Recommended readings


