Otorrhea

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1. General. Otorrhea is defined as the presence of any kind of secretion in the external auditory canal (EAC). It is ussually 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 intermmitent or persistent according to the evolution. Even some times we are not able to identify its presence.

Figure 1. Anatomic view

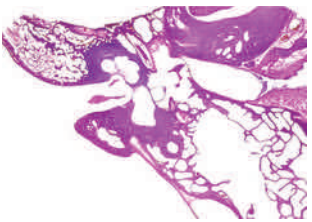


Figure 2. Histological view

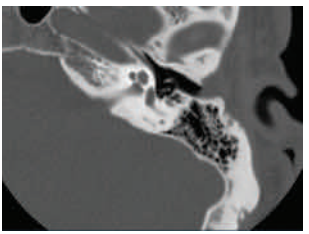


Figure 3. CT view

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 se 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 adyacent 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 otorrea and its caractheristics 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 othorrea, the caractheristics 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 adyacent 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 posible. (**Figure 5)**

Figure 4. Physical exam

Figure 5. Use the wider otoscope speculum

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.

Figure 6. External difuse otitis

6. Clasification

A very personal clasification 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 intermmitent. A typical example of the acute type is the external difuse otitis (**Figure 6)**, andin the other group, the typical examples are mycotic external otitis, which is also ussually intermmitent 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

Figure 7. Purulent otorrhea secondary to suppurative otitis media.

The classical carachteristic of the diffuse external otitis is the pain. After the pain, comes the otorrhea, ussually purulent, sometimes scarce, and occupies the EAC, so it makes it imposible 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).**

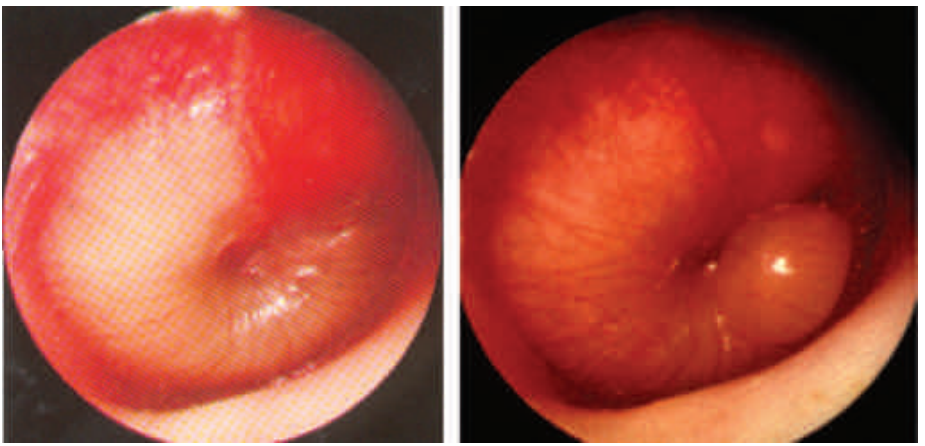


Figure 8. Non-suppurative acute otitis media.

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 difusion technique (HASTE).

Figure 9. Initial stage of EO

Figure 10. Initial stage of EO

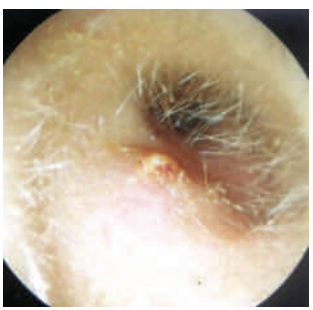


Figure 11. Localized external otitis.

Figure 12. Infected earwax.

In the initial stage of a diffuse external otitis (EO), the EAC is severely inflammated 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 suggests 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 oxcupy 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 ocasions, 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 ocasions, 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**

Figure 13. Ear wax

Figure 14. Ear wax

Figure 15. Ear wax

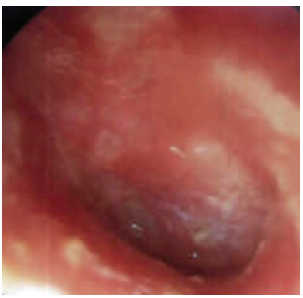


Figure 16. EAC inflammation

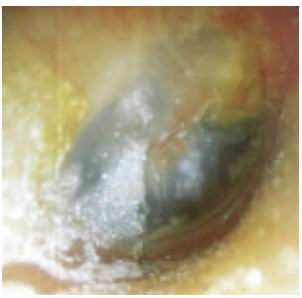


Figure 17. Eczema

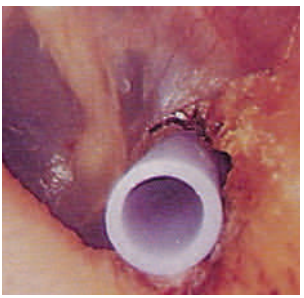


Figure 18. Tympanostomy tube

otorrhea

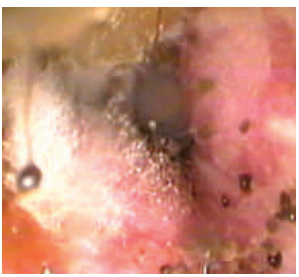


Figure 19. Otomycosis

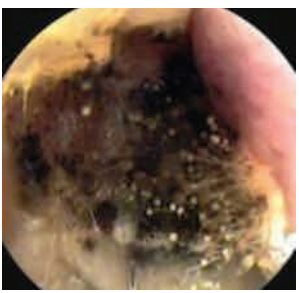


Figure 20. Otomycosis

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

Otorrhea can be of slow onset, ocassionally intermmitent. It is ussually prolongated 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 signifficative and recurrency is frequent if the treatment is short.

The otomycosis produces a thick otorrhea and some times 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 ocasions they show scarce symptoms and in some ocasions 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 presen: patient older than 60 years old,

Figure 21. Inflam. granuloma

Figure 22. Polypoi lesion

Figure 23. Foreign body -insect

Figure 24. Foreign body

diabetes mellitus 2, inmunosupressed patiens, the presence of granulatory tissue in the examn and a bad response to treatment. In this cases we must suspect external necrotizing otitis or neoplasia.

The external necrotizing otitis ussually occurs in diabetic patients, older than 60 years old and have otorrhea associated with otorrhagia and granulatory tissue in the EAC. It is generally produced by *Pseudomona 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 comfirmed 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 inspecial 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 extense cholesteatoma of the middle ear (**Figure 22)**

The foreign bodies kn 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 persisent 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-

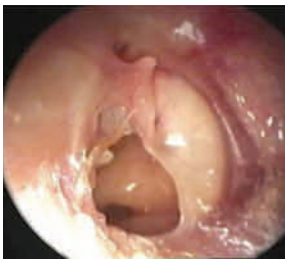


Figure 25. Inactive TM

Figure 26. Otorrhea

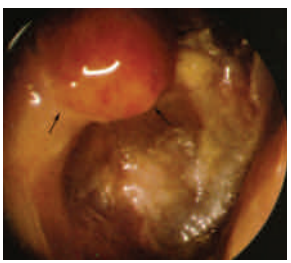


Figure 27. Otorrhea

brane (TM). It is ussually asymptomatic and ocassionally 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 uteeonset otorrhea, that's why it is so important to take a good history and perform a complete physical exam.

The cholesteatomatosus chronic otitis media can also show insidious onset peristent otorrhea (**Figure 27)**

If this type of otorrhea is refractary to the ussual treatment we must suspect a more significatice process, specially if the latientis inmunossupressed 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 refractary 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.

Figure 28 A. Carcinoma

Figure 28 B. Carcinoma

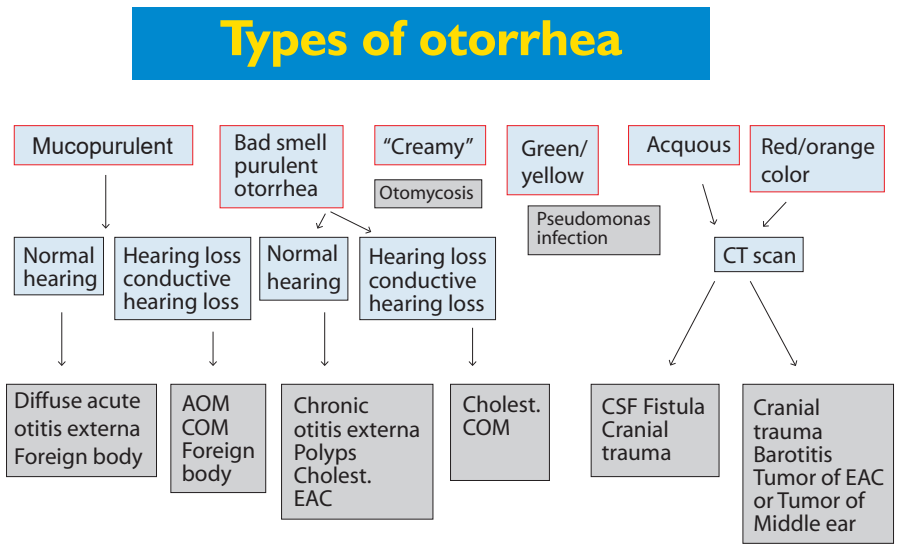
A medical problem we must not forget is ear's tuberculosis, which must be suspected when we have a chronic otitis media (COM - 0, 1% of them are secondary to TB infection). Its number has been raising in the last years and it presents with persistent otorrhea and sometimes with compromise of the facial 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 pulmonar 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, serose or orange-red otorrhea. If we associate this caractheristics with the hearing and/or the imaging, we can find the most probable diagnosis. We can see it in the following squema (**Figure 29**):

Figure 29. Types of otorrhea.



CT: Computed tomography; CSF:Cerebrospinal fluid; EAC:External auditory canal; EO:External otitis; AOM:Acute otitis media;COM:Chronic otitis media; Cholest:cholesteotoma

We have analysed the most frequent types of otorrhea, however, there are other causes which deserve our special atention. 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, tuberculose 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 infectous 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 immunosupressed 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

1. Abenavoli FM. Split earlobe: repair using a half Z-plasty rechnique [Ietter]. Plast Reconstr Surg. 1996;98: 372-3.
2. Anniko M., Bernal –Sprekelsen M., Bonkowsky V., Bradley P., Lurato S. Otorhinolaryngology, Head and Neck Surgery. European Manual of Medicine. ISBN: 978-3-540-42940-1. Springer Verlag Berlin Heidelberg 2010
3. Braithwate RL, Stephens T, Sterk C, Braithwate K. Risks associated with tattoing and body piercing. J Public Health Policy. 1999;20:459-70.
4. Brent B. Reconstrucción de la oreja. En: McCarthy, editor. Cirugía plástica de la cara 11. Montevideo: Ed. Médica Panamericana; 1992.
5. Crumley RL, Abemayor E. Burn of the auricle. Head Neck. 1992; 14:243-6.
6. Cumberworth VL, Hogarth TB. Hazards of ear-piercing procedures which traverse cartilage: a report of Pseudomonas perichondritis and review of other complications. Br J Clin Pract. 1990;44:512-3.
7. Cunningham M, Yu VL, Turner j, Curtin H. Aspergillus in a inmunocompetent patient. Arch Otolaryngol Head and Neck Surg. 1988; 114:554-6.
8. Chandler R, Grobman L, Quencer R, Serafini A. Osteomyelitis of the base of the skull. Laryngoscope. 1986; 96:245-51.
9. Díaz G, Holguín JA, Roa A, Camacho A. Trauma cervicofacial en niüos. Acta otorrinolaringol Cir cabeza cuello.1999;27:73-9.
10. Firmin F. La reconstruction secondaire du pavillon auriculaire detruit par brulure. Indications et techniques. A propos de trente cas cliniques. Ann Chir Plast Esthet. 1995;40:252-63.
11. Giffin CS. Wrestlers ear: pathophysiology and tratment.Ann Plast Surg. 1992;28:131-9.
12. Gil-Carcedo LM, Vallejo LA. Otohematoma. En: Gil·Carcedo LM, Vallejo LA, editores. EI oído externo. Madrid: Ed. Ergon; 2001. p. 166-9.
13. Gilmer PA, Trauma of the auricle. En: Bailey Bryron J, editores. Head and Neck Surgery. Philadelphia J.B. Lippincot Company; 1993. p. 1557.
14. Grandis IR, Curtin HD, Yu VL. Nectrotizing (malignant) externaI otitis:prospective comparison of CT and MR imaging in diagnosis and follow-up, Radiology. 1995;196:499-504.
15. Hersh SP. Repair of the incomplete earlobe cleft. Plast Reconstr Surg. 1996;97:869-70.
16. Laborda- Margolles IM. Oreja roja. En: Rodríguez- Domínguez F, Rodríguez- Herrero D, edit. Manual de otorrinolaringología práctica para médicos de atención primaria. Iaen: Formación Alcalá; 2009.
17. Larrabee Ir WF, Sherris DA. Ear. En: Principies of facial reconstruction. Philadelphia: Lippincott-Raven; 1995. p.556-71.
18. Lee D, Sperling N. Initial management of auricular trauma. Arn Farn Physician. 1996;15:2339-44.

19. Meltzer PE, Kelemen C. Pyocyaneus osteomyelitits of the temporal bone, mandible and zygoma. Laryngosco¬pe. 1959;69: 1300-16.
20. Merino-Gálvez E. Cuerpos extra fios en el área ORL. En: Rodríguez-Domínguez FJ, Rodríguez-Herrero D, editores. Manual de otorrinolaringología práctica para médicos de atención primaria. Jaén: Formación Alcalá; 2009.
21. Navarro Paule MP, Pérez Aguilera R, Sprekelsen Gassó C. Manual de Otorrinología Infantil. Elsevier 2012. Barcelona, ISBN: 978-84-8086-905-8. 49-75
22. Russell ID, Donnelly M, McShane DP, Alun-Iones T, Walsh M. What causes acute otitis externa? J Laryngol Otol. 1993; 1 07:898-90 I.
23. Schulz M, Salem, C. Reconstrucción auricular. Cuad CidValdivia). 2003;17:75-85.
24. Signorini M, Rafanclli G, Pajardi G, Stefani A, Venini G. Les epitheses doreille dans les brulures du pavillon auriculaire. Notes techniqucs. Ann Chir Plast Esthet.1995;40:265-70.
25. Tcmpler J, Rcnncr GI. Injuries of the externai ear. Otolaryngol Clin North Am. 1990;23: 1003-18.