Conditions affecting the middle ear: what to do at primary level

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Common problems affecting the middle ear

The middle ear (see diagram on page 3) is susceptible to inflammation and infection. Both are often associated with upper respiratory tract infections. Untreated middle ear conditions often become chronic, particularly in low-income countries.

The middle ear conditions you will encounter can be divided into four categories:

1. **Serous otitis media (SOM)** is a collection of fluid in the middle ear, as a result of allergy, viral infection or dysfunction of the Eustachian tube. It is also known as 'glue ear'.
2. **Acute otitis media (AOM)** is an acute (i.e. less than two weeks old) infection of the middle ear. We will distinguish, for practical reasons, between 'AOM without a perforation' (of the eardrum) and 'AOM with perforation'.
3. **Chronic otitis media (COM)** is an infection that has been present for more than two weeks. It is characterised by an eardrum perforation with or without discharge. An untreated chronic infection could result in a permanently discharging ear (known as chronic suppurative otitis or CSOM), other complications and even death.
4. **A dry perforation of the eardrum** is usually the sequela of a middle ear infection (more rarely of a trauma) and is sometimes referred to as 'inactive COM'. In this case there is a perforated eardrum without ear discharge. Sometimes the ear only discharges after being in contact with water or when the patient has an upper respiratory tract infection.

PIET VAN HASSELT

Ear discharge

These middle ear conditions are linked to each other (see Diagram on opposite page) in the following way:

AOM can lead to a bulging eardrum due to a build-up of fluid. If the condition is untreated, the eardrum may eventually burst to produce a **perforation**; this perforation relieves the pain and produces a purulent discharge.

When **AOM** resolves, it can result in a **SOM** before returning to a normal ear or it may remain as SOM unless treated.

Conversely, a **SOM** developing in the absence of an infection can evolve into an **AOM** (when fluid is not drained properly by the Eustachian tube, this can lead to a middle ear infection).

Some cases of **AOM** do not heal and develop into **COM**, especially when repeated infections and ear discharge have occurred or there are underlying conditions affecting the Eustachian tube, such as upper respiratory tract infections, allergies, etc.

Dry perforations can result from a **COM** that has resolved by itself. If an infection occurs again, a dry perforation can become a **COM**.

TABLE 1 DIAGNOSIS OF MIDDLE EAR CONDITIONS AT PRIMARY LEVEL

	No discharge			Discharging ear	
	SOM*	Dry perforation	AOM* without perforation	AOM* with perforation	COM*
Discharge	No	No	No	Yes, for less than 2 weeks	Yes, for more than 2 weeks
Pain	Moderate or none	No	Yes, acute and with episode of fever	No (unless intracranial complication)	No (unless intracranial complication)
Perforation of the eardrum	No	Yes	No	Yes	Yes
Eardrum	Dull, sucked in. No blood vessels visible in the light of the otoscope	Perforation (size may vary). Middle ear structures may be distorted	Bulging, red eardrum. Blood vessels visible in the light of the otoscope	Perforation (usually the size of a pinhole). Sometimes hard to see due to the presence of a purulent discharge	Perforation, with or without granuloma or cholesteatoma visible, usually in the upper posterior quadrant (Fig. 6)
Hearing loss	Yes	Yes (sometimes unnoticed)	Yes	Yes	Yes
Vertigo (ask 'Do you feel dizzy?')	No (but children may appear clumsy)	May be present	Yes or No	Yes or No	Yes or No

*SOM = serous otitis media AOM= acute otitis media COM= chronic otitis media

Important facts for primary health care personnel

SOM and 'AOM without perforation' are reversible conditions: if they are treated early, the inflammation resolves and hearing is restored.

Once a perforation of the eardrum has occurred (in COM and 'AOM with perforation'), the middle ear becomes more susceptible to further infections. The hearing loss could become permanent. Ideally, a perforation of the eardrum, with or without discharge, should always be referred to an ear, nose and throat (ENT) specialist or – where such specialists are not available – to the doctor or health worker most experienced in ear matters (e.g. an experienced paediatrician).

All middle ear infections (acute or chronic) can lead to **very serious complications and death**, as the infection can spread from the middle ear to the mastoid bone, the brain or the facial nerve. It is important to urgently refer any suspected complication (see Box on page 8).

Many chronic middle ear conditions or complications cannot be successfully treated without the help of an ENT specialist. ENT specialists are not readily available in low- and middle-income countries, therefore intervention at primary level is crucial for prevention and early detection.

The role of a primary healthcare worker consists in:

- Detecting patients presenting with a middle ear condition.
- Managing AOM and SOM in a timely manner and following up after treatment. This will prevent the occurrence of COM, which causes irreversible damage and is very difficult to manage at primary level.
- Referring all cases of COM to an ENT doctor, where possible, in order to restore a clean, dry, safe ear.
- Recognising and referring very urgently all complications of middle ear conditions (see Box on page 8).
- Increasing awareness at community level of the importance of early presentation and management.

Identifying middle ear problems at primary level

Before you examine the eardrum, certain warning signs should alert you to the fact that the middle ear could be affected:

- continuous discharge or history of continuous discharge (this indicates a chronic infection)
- any neurological sign, e.g. dizziness or lack of coordination (this may indicate potential complications)
- associated hearing loss or tinnitus.

Understanding common ear conditions and taking a good medical history will provide you with a valid working diagnosis in many cases. It is, however, the examination of the eardrum (preferably with an otoscope) that will allow you to draw diagnostic conclusions.

A normal eardrum is shiny and smooth (Figure 1). It appears translucent (semi-transparent) when you shine a light into the ear canal. **An abnormal eardrum signifies the presence of a middle ear condition**.

COMMON CONDITIONS AFFECTING THE MIDDLE EAR

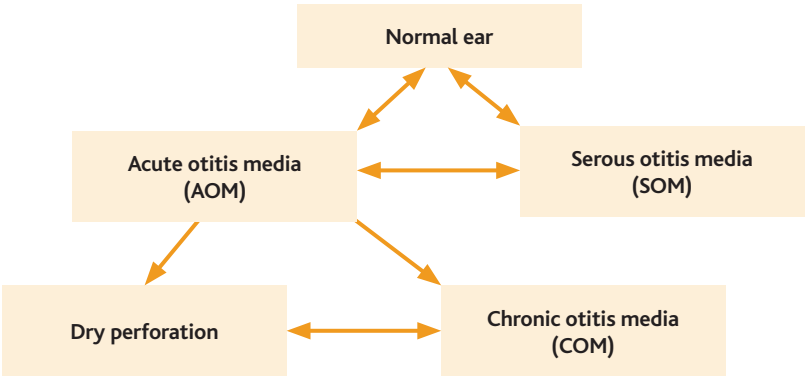

Table 1 will help you distinguish between different middle ear conditions at primary level. From a practical point of view, it helps to start by checking if an ear discharge is present or not:

If there is no ear discharge

If the eardrum is abnormal and there is no discharge, you are generally faced with three possible diagnoses: SOM, AOM without perforation, or dry perforation (see Table 1).

- If there is no perforation, the eardrum appears 'sucked in' (Figure 2) and does not appear translucent when you shine a light into the ear canal, the patient is likely to have **SOM**. He/she should not report any pain, only mild to moderate hearing loss and a sensation of 'full ear'.
- If there is no perforation, the eardrum appears to be red and bulging (Figure 3) and the patient is experiencing acute pain, this is likely to be **AOM without perforation**.
- If there is a perforation and there is no discharge in the ear canal or middle ear cavity, this is a **dry perforation** (Figure 4). The patient should not feel any pain at present and may remember one or several episodes of discharging ear, with or without pain.

The management of these situations is shown in Table 2 on page 8.

If there is an ear discharge

You must first dry mop the ear with wicks made of clean cotton material or with dry mops if you have been taught to use them (see page 4). Unless there is no other option and you are an experienced primary ear and hearing care worker, do not syringe the ear, as a discharge is likely to indicate a perforation.

If there is no perforation of the eardrum, the discharge is not due to a middle ear problem and you should treat it as otitis externa (see page 5).

If there is a perforation (Figure 5), this indicates a middle ear infection. The patient should not be reporting any pain (if he/she does, you should treat it as a complication).

- Check for the presence of cholesteatoma (white, cauliflower-like material in the middle ear cavity – see Figure 6) and for other complications (see Box on page 8).
- If the discharge has been present for less than two weeks, treat as **AOM with perforation** (see Table 2).
- If the discharge has been present for more than two weeks, **treat as COM** (see Table 2).


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Figure 1. Normal eardrum


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Figure 2. 'Sucked-in' eardrum (serous otitis media)


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Figure 3. Inflamed, bulging eardrum (AOM without perforation)


RICHARD WAGNER/GEO

Figure 4. Dry perforation of the eardrum


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Figure 5. Perforated eardrum with discharge

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Figure 6. Cholesteatoma (visible through a perforation in the top left quadrant)

CHECKING FOR COMPLICATIONS ASSOCIATED WITH MIDDLE EAR CONDITIONS

Middle ear problems can lead to the following complications: cholesteatoma, facial paralysis, mastoiditis, brain abscess, meningitis. If the eardrum is abnormal and if you notice any of the following signs, refer very urgently:

- **Tenderness or swelling behind the ear.** This is indicative of an infection of the mastoid.
- **Perforation and white build-up inside the middle ear cavity** (with a 'cauliflower' aspect). This is cholesteatoma (Figure 6). The patient might get mastoiditis and brain abscess.
- **Perforation and associated pain.** This is a sign of complication inside the skull.
- **Facial paralysis.**
- **Fever and headache associated with a perforated, suppurating ear.** This is a sign of impending complication inside the skull.
- **Any neurological sign:** this means the infection has spread to the brain. These signs can be: poor coordination, dizziness, headache, vomiting, neck stiffness, drowsiness, or loss of consciousness.

TABLE 2 PRIMARY LEVEL MANAGEMENT OF COMMON MIDDLE EAR CONDITIONS

Note: whenever you have the opportunity or facility to do so, you should also assess the patient's hearing.

Diagnosis	Objective	Management
SOM*	Replace the fluid in the ear with air	• Tell the patient to breathe in, close their mouth and pinch their nostrils, then blow their cheeks up. The patient can also try blowing up a balloon (or a party blower) with their nose, one nostril at a time, whilst keeping their mouth shut. • Advise steam inhalations, preferably with hot water and tea leaves (tea contains a mucolytic and a decongestant). • Review after 1 to 2 weeks: the hearing and eardrum should be back to normal. • If there is no improvement after 2 weeks refer the patient to an ENT doctor.
Dry perforation*	Monitor the ear, as there is a risk of infection to the middle ear and adjoining areas	• Tell the patient to keep their ear dry and to avoid introducing anything into their ears. • Advise the patient to consult an ENT doctor to evaluate the options for repair. • If the patient does not consult an ENT doctor and the ear starts discharging, advise them to report back.
AOM* without perforation	Prevent the eardrum from rupturing and the infection from becoming chronic. This is still a reversible condition	• Check for complications (see Box on this page). • Advise steam inhalations, preferably with hot water and tea leaves (tea contains a mucolytic and a decongestant). • Treat the pain with paracetamol in adults or children. • Prescribe an oral antibiotic (ideally for 7 to 10 days) and, if affordable, also an antihistamine. • Review after 2 weeks to evaluate the ear and hearing. • If the eardrum ruptures, wait for 48 hours to see if it heals spontaneously. If it does not, refer to 'AOM with perforation' (below).
AOM* with perforation	Prevent this infection from becoming chronic	• Check for complications (see Box on this page). • Clean up the discharge by using dry mops or wicks (see page 4). • Advise the patient to keep the ear dry and teach them to make a wick to clean any discharge. • Prescribe a systemic antibiotic (only if this has not been done before). The preferred systemic administration route in children continues to be by mouth. • You can also prescribe antibiotic eardrops to prevent further exacerbation of the infection, but these should only be administered after cleaning the discharge from the ear. • Review after 1 week: if there is no improvement, refer the patient to an ENT doctor and advise them to clean the ear discharge and instil the eardrops until then.
COM*	Commence treatment and try to dry up the ear (and maintain it dry) until the patient sees a specialist	• Check for complications (see Box on this page). • Clean up the discharge by using dry mops or wicks (see page 4). • You can also prescribe antibiotic eardrops to prevent further exacerbation of the infection, but these should only be administered after cleaning the discharge from the ear. • Advise the patient to keep the ear dry. Teach the patient (or their carer) how to clean the ear discharge with a wick before instilling any eardrops. Tell the patient to continue instilling the drops until they are seen by an ear care specialist. • Refer to an ENT doctor who will advise on treatment, or a health worker experienced in chronic ear management if no ENT doctor is available.

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