

check

Independent learning program for GPs



Unit 525 March 2016

Ear, nose and throat (ENT)

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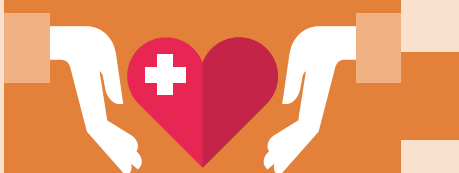
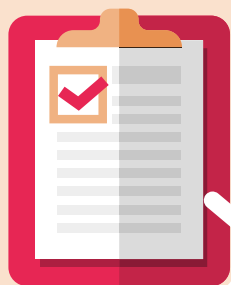
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The five domains of general practice

-  Communication skills and the patient–doctor relationship
-  Applied professional knowledge and skills
-  Population health and the context of general practice
-  Professional and ethical role
-  Organisational and legal dimensions



Patients often present to general practice with various ear, nose and throat (ENT) conditions. These conditions are often referred to specialist care, and general practitioners (GPs) could benefit from further education in the management of these conditions, particularly in rural and remote communities where specialist services are often scarce.

Viral sore throat is common in children and 15–30% of children and 10% of adults will have Group A streptococcal (GAS) pharyngitis/ tonsillitis.¹ Acute tonsillitis was encountered at 2.7 per 100 encounters for children under the age of five years and has one of the highest prevalences of antibiotics prescription.² Acute otitis media is a common childhood problem and 90% of children will have at least one episode by the time they reach school age.³ In particular, acute otitis media is a serious problem in Aboriginal and Torres Strait Islander children.⁴

Viral infections of the upper respiratory tract are the most common causes of acute hoarseness and persistent hoarseness, and could be indicative of a more serious underlying problem.⁵ More than three million Australian are known to have allergic rhinitis and it can severely disrupt a patient's daily activities and cause irritation.⁶ Vertigo is described as a 'false sense of motion' and is one of the sensations of dizziness,⁷ accounting for 32% of all dizziness cases,⁸ up to 56.4% in older Australians.⁹ The management of hearing problems is 3.5 and 2.6 per 1000 encounters for men and women respectively who are 50 years of age and older.¹⁰

This edition of *check* considers the management and treatment of various ear, nose and throat problems that may present in general practice.

LEARNING OUTCOMES

At the end of this activity, participants will be able to:

- outline the differential diagnoses for a patient presenting with a sore throat
- discuss the assessment and management of a child with acute otitis media
- describe strategies for managing hoarseness
- summarise the recommendations for treating children with allergic rhinitis
- discuss the causes and management of vertigo
- describe investigations for hearing loss.

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ACRONYMS

AC	air conduction	ENT	ear, nose and throat	MS	multiple sclerosis
ARF	acute rheumatic fever	FBE	full blood evaluation	NICE	National Institute for Health and Care Excellence
ASCIA	Australasian Society of Clinical Immunology and Allergy	GAS	Group A streptococcal	PTA	pure tone audiometry
BC	bone conduction	GORD	gastro-oesophageal reflux disease	QoL	quality of life
BPPV	benign paroxysmal positional vertigo	GP	general practitioner	RAST	radioallergosorbent test
CSOM	chronic suppurative otitis media	IgE	immunoglobulin E	SNHL	sensorineural hearing loss
CT	computed tomography	IM	intramuscular	TM	tympanic membrane
EBV	Epstein–Barr virus	LFT	liver function test	URTI	upper respiratory tract infection
ECG	electrocardiogram	MBS	Medicare Benefits Schedule	VEMP	vestibular-evoked myogenic potential
ENG	electronystagmogram	MC&S	microbiology, culture and sensitivity		
		MRI	magnetic resonance imaging		

QUESTION 5 

What is the likely diagnosis now? Are there any clinical criteria that could have helped narrow the diagnosis?

QUESTION 6 

How would you treat Paul now?

FURTHER INFORMATION

Paul tells you that this is the third episode of tonsillitis he has had this year, but he also had it twice the year before and three times the year before that. He asks if having his tonsils removed would help.

QUESTION 7 

Would Paul benefit from tonsillectomy? What would you advise?

CASE 1 ANSWERS

ANSWER 1

A targeted history should include the duration of the sore throat and other associated symptoms such as earache, trouble breathing, problems with swallowing, or cough. Problems with swallowing can be divided into dysphagia (difficulty in swallowing) or odynophagia (painful swallowing). Difficulty swallowing may suggest an obstruction, stricture or motility issues, whereas painful swallowing may be due to ulcers, oropharynx pathology or infection. A history of voice change is also important to elicit as it can be a symptom of quinsy, epiglottitis or tracheal pathology.¹

As Paul has complained of a headache, the duration, onset and nature of the headache and other neurological symptoms should be elicited to exclude red flags of serious neurological pathology. Paul should also be asked about photophobia, neck stiffness, and the presence of vomiting or nausea to exclude meningitis or encephalitis. As Paul has mentioned anorexia, a history of his fluid intake is important so he can be assessed for his state of hydration. A history of rashes should be sought, especially about the red maculopapular rash of scarlet fever or a petechial rash of meningitis.

There are certain patient groups who are at higher risk of having a streptococcal pharyngitis/tonsillitis.² Patients should be asked specifically if they identify as Aboriginal or Torres Strait Islander, Maori or Pacific Islander, or if they are immunocompromised.² A history of acute rheumatic fever (ARF) also increases the risk substantially that a patient will have another episode of ARF. The risk of ARF after the first attack of Group A streptococcal (GAS) pharyngitis is approximately 0.3–3%, but with subsequent infection in someone who has already had ARF this risk rises to 25–75%.³

ANSWER 2

Examination should include general appearance, skin (including specifically looking for rashes), difficulty breathing, stridor or a change in voice. Jaw muscles spasm (trismus) and reduced mouth opening should be looked for as if a patient has severe unilateral throat pain, high fever and/or change in voice it is a strong indicator of quinsy or other abscess formation (Therapeutic guidelines). Observations such as temperature and respiratory rate are needed. Paul's ears, throat, chest and heart should be examined. Lymphadenopathy should be checked in the cervical, axilla and groin region. If there are multiple areas of lymphadenopathy, an abdominal examination looking for organomegaly would be appropriate. Paul should also be examined for neck stiffness and photophobia.

ANSWER 3

- The differential diagnoses are:
- viral upper respiratory tract infection
 - bacterial pharyngitis/tonsillitis
 - glandular fever.

Sore throat is a very common complaint in general practice⁴ and, although it is often a viral self-limiting condition, it can be a feature of more serious conditions.

GAS pharyngitis/tonsillitis is found in 15–30% of children and 10% of adults with sore throat.³ The peak incidence is three to 15 years of age.¹ Bacterial causes of sore throat other than GAS are rare.¹ Streptococcal infections can cause suppurative (otitis media, quinsy, sinusitis and cellulitis) and non-suppurative complications (acute rheumatic fever [ARF], acute glomerulonephritis). ARF is a delayed autoimmune response to a throat infection caused by GAS bacteria, which results in an illness that mainly affects the heart, joints, brain and skin.²

Another important condition to consider is Epstein–Barr virus (EBV), which presents as infectious mononucleosis (glandular fever). EBV infects more than 90% of the population.⁵ The syndrome of infectious mononucleosis typically occurs when primary infection occurs in adolescents or adults and consists of the triad of fever, sore throat and generalised lymphadenopathy.

ANSWER 4

A full blood evaluation (FBE), liver function tests (LFTs) and EBV serology should be ordered to assess if the cause is infectious mononucleosis, which could show a raised white cell count, atypical lymphocytes, elevated liver enzyme and positive EBV serology.⁵ A throat swab for microbiology, culture and sensitivity (MC&S) is recommended to identify if the sore throat is due to a streptococcal infection.¹

ANSWER 5

Paul's symptoms are consistent with a diagnosis of streptococcal tonsillitis.

Several studies have looked at criteria or features that may help doctors to identify when patients are more likely to have a bacterial infection.³ In one such study, the Centor criteria suggest that GAS infection is present if a patient has at least three of the following:⁶

- pus
- cervical nodes
- history of fever
- no history of cough.

Other researchers have suggested that short duration and severe inflammation should be included in the Centor criteria.⁴ However, these criteria have low specificity⁴ for bacterial infection.

It can also be difficult to differentiate EBV from streptococcal infection.⁵ Although there are no specific criteria or guidelines for the diagnosis of EBV or streptococcal infections, there are associated clinical features that might help to differentiate EBV infection. In infectious mononucleosis, the cervical nodes in the posterior triangle are more likely to be involved, whereas in streptococcal infection, the submandibular nodes are more likely to be very tender.⁵ EBV is also more common in older children and adolescents.⁷ EBV-related palatal petechia located at the junction of the hard and soft palates occurs in 25–60% of cases.⁵ Splenomegaly occurs in about half of the cases and hepatomegaly is present in 10–15% of cases.⁵

ANSWER 6

There is controversy regarding the need for antibiotic therapy for streptococcal infections in populations where ARF is rare.^{1,2,4,8} In Australia, ARF persists among children in rural and remote settings, but also among those living in disadvantaged urban areas.² Aboriginal and Torres Strait Islander peoples and Pacific Islander children are over-represented among these children.¹ It has been found that antibiotics do confer relative benefits in the treatment of sore throat in low-risk groups.⁸ However, the absolute benefits are modest. Protecting those with a sore throat against suppurative and non-suppurative complications in low-risk populations requires treating many with antibiotics for one to benefit. Antibiotics shorten the duration of symptoms by about 16 hours overall in low-risk groups.⁸ In most cases, antibiotics are not needed, but a delayed prescription strategy is likely to provide similar benefits to an immediate antibiotic prescription.⁸

Streptococcal infection remains highly susceptible to penicillin.⁷ If treatment is indicated, use phenoxymethylpenicillin 500 mg (children: 15 mg/kg up to 500 mg) orally, 12-hourly for 10 days. Dosing with phenoxymethylpenicillin 12-hourly is effective for the treatment of streptococcal pharyngitis and is preferred due to improved adherence.⁷ For non-adherent patients, or if oral therapy is not tolerated, use benzathine penicillin 900 mg (children: 3–6 kg: 225 mg; 6–10 kg: 337.5 mg; 10–15 kg: 450 mg; 15–20 kg: 675 mg; 20 kg or more: 900 mg) intramuscular (IM), as a single dose.⁷

For patients with non-immediate hypersensitivity to penicillins, use cephalexin 1 g (children: 25 mg/kg up to 1 g) orally, 12-hourly for 10 days. If patients have immediate hypersensitivity, then use azithromycin 500 mg (children: 12 mg/kg up to 500 mg) orally, daily for five days.⁷

Amoxicillin/ampicillin is contraindicated in glandular fever and should be avoided when prescribing for sore throats as it can precipitate a maculopapular rash, which can be confused with hypersensitivity to penicillins.

ANSWER 7

A systematic review has found that adeno-/tonsillectomy leads to a reduction in the number of episodes of sore throat and days with sore throat in children in the first year after surgery, compared with non-surgical treatment.⁹ Children who were more severely affected were more likely to benefit as the procedure had a small reduction in moderate/severe sore throat episodes. The size of the effect is very modest. Insufficient information was available on the effectiveness of adeno-/tonsillectomy versus non-surgical treatment in adults to draw a firm conclusion.⁹

The potential 'benefit' of surgery must be weighed against the risks of the procedure as adeno-/tonsillectomy is associated with a small but significant degree of morbidity in the form of primary and secondary haemorrhage and, even with good analgesia, is particularly uncomfortable for adults.

Several guidelines have suggested that the following features, called the Paradise Criteria, in children aged 1–18 years identify those children who are more likely to benefit from a tonsillectomy. The

criteria state that tonsillectomy may be considered in patients with recurrent throat infections if they have had at least:

- seven documented episodes of sore throat in the previous year
- five documented episodes in each of the previous two years, or three documented episodes in each of the previous three years.

They must also have a temperature of greater than 38.3°C, cervical lymphadenopathy, tonsillar exudate, or a positive culture for group A beta-hemolytic streptococcus.^{10,11} Paul is very close to the three episodes of tonsillitis in each of the past three years and it would be reasonable to refer him for an ear, nose and throat specialist opinion for further discussion about the risks and benefits of tonsillectomy.^{10,11}

RESOURCES FOR PATIENTS

- Better Health Channel factsheet on tonsillitis, www.betterhealth.vic.gov.au/health/conditionsandtreatments/tonsillitis

RESOURCES FOR DOCTORS

- The Royal Children's Hospital, Melbourne, Australia, Clinical practice guideline on sore throat, www.rch.org.au/clinicalguide/index.cfm
- The Royal Australian College of General Practitioners. National guide to preventive health assessment for Aboriginal and Torres Strait Islander people – Rheumatic heart disease, www.racgp.org.au/your-practice/guidelines/national-guide/rheumatic-heart-disease

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CASE 2

CASEY HAS EAR TROUBLE

Casey is nine years of age and is brought to you because of bilateral ear pain that awakens her at night. Her symptoms have been progressing over the last two days and, although it is summer, she has no interest in going to the local pool, despite being a keen swimmer. She also complains of not hearing properly and has a track record of ear infections. Casey lives with her parents and two younger siblings in a smoke-free household.

QUESTION 1 

What other information do you need?

FURTHER INFORMATION

Casey tells you that she has intense pain in both ears and this bothers her during the day and at night. She adds the pain is worse when wearing ear plugs for swimming or diving into the water. Casey's mother says she has not noticed any discharge from Casey's ears. Casey has not complained of any neck pain or discomfort. She has not had any headaches, fever, or gastrointestinal or other symptoms, apart from the ear pain. She has not had any problems with balance and is doing well at school. Her medical record shows that she has a history of bilateral otitis media (about three episodes per year for the past three years).

QUESTION 2 

How would you examine Casey?

FURTHER INFORMATION

Overall, Casey appears lethargic. Her temperature is 37.8°C and her heart rate is 100 beats per minute. Bilateral middle ear effusions are noted. There is no tympanic membrane (TM) perforation but both TMs are 'bulging'. There is inflammation and erythema within the external auditory canal. There is no pain with palpation over the mastoid, but pain on tragus manipulation (change in the position of the tragus, which is the small 'pointed' superior aspect of the external ear).¹ Casey sounds congested when speaking, but denies pressure when lowering her head or tapping on sinus. Examination of the oropharynx is non-contributory. Her central capillary refill was less than two seconds. She has not had any recent head trauma and is developing normally.

QUESTION 3 

What is the probable diagnosis? What are the important differential diagnoses that must not be missed?

QUESTION 4 

What is the pathophysiology of otitis media?

FURTHER INFORMATION

Casey is diagnosed with otitis media with mild effusion on the basis of tympanic membrane appearance and positive response to pneumatic otoscopy. Effusion can be graded according to otoscopic appearance. For example: 'a completely opaque tympanic membrane that is immobile to pneumatic otoscopy would be considered more severe than if the tympanic membrane was translucent and mobile to pneumatic otoscopy.² She also has some pain with manipulation of the tragus, which is suggestive of a concurrent otitis externa.

QUESTION 5 

How would you manage Casey?

FURTHER INFORMATION

Casey's mother was wondering about the use of antibiotics and steroids for her daughter's ear infection (otitis media with effusion). She heard about a treatment called 'autoinflation' and was wondering if that is a better choice for her daughter. She is also interested in using antihistamines and decongestants.

QUESTION 6 

What would you tell Casey's mother about these approaches?

QUESTION 7 

If Casey had tympanostomy tubes, would this change your management? If so, how?

QUESTION 8 

Describe how your management would differ for an Aboriginal and Torres Strait Islander child, aged nine years, with tympanic membrane perforation and discharge that persists for longer than six weeks.

FURTHER INFORMATION

Casey has had several ear infections over the past 12 months.

QUESTION 9 

When would you refer Casey to an ear, nose and throat (ENT) surgeon for surgical management? What advice should you give?

FURTHER INFORMATION

Casey's mother is wondering what else could be done to prevent the recurrence of infections. She read something about zinc supplementations and also heard that some vaccinations can help.

QUESTION 10 

What would you tell Casey's mother?

CASE 2 ANSWERS

ANSWER 1

The National Institute for Health and Care Excellence (NICE) guidelines³ suggest that history taking should also focus on hearing, speech, behaviour or inattention, recurrence of ear infection or upper respiratory tract infections, balance problems and poor education progress.

Second-hand smoke is a particular risk factor that should be enquired about.⁴

ANSWER 2

The NICE guidelines³ suggest that examination should focus on otoscopy, tympanometry, general upper respiratory tract health and developmental status. Hearing tests, if required, should be carried out by trained staff.

Hearing tests are indicated as part of the formal assessment. It is important to use tests appropriate for the child's developmental stage. According to NICE guidelines, a formal assessment involves:⁴

- clinical history – focus on:
 - poor listening skills
 - indistinct speech or delayed language development
 - inattention and behaviour problems
 - hearing fluctuation
 - recurrent ear infections or upper respiratory tract infections
 - balance problems and clumsiness
 - educational progress
- clinical examination – focus on:
 - otoscopy
 - general upper respiratory health
 - general development
 - hearing testing – use tests appropriate for child's developmental stage
 - tympanometry.

Important hearing loss causes need to be considered, such as sensorineural, permanent or non-organic causes.

ANSWER 3

The probable diagnosis is otitis media with some otitis externa.

Key features of acute otitis media include pain, fever, acuteness and a bulging, red tympanic membrane, with or without effusion.^{5,6}

Acute otitis media is a common problem in early childhood, and the majority of children have at least one episode before starting school.⁶ Causes of otitis media include the following:⁶

- viruses (25%)
- *Streptococcus pneumoniae* (35%)

- non-typable strains of *Haemophilus influenzae* (25%)
- *Moraxella catarrhalis* (15%).

Aboriginal and Torres Strait Islander patients require particular attention for acute otitis media. A helpful algorithm has been made available by the Department of Health (Figure 1).⁷

Sudden-onset hearing loss can be a particular concern; the differential diagnosis can be classified into anatomical regions:⁸

- outer ear: conductive hearing loss from foreign body, wax, otitis externa, ear canal pathology or trauma
- middle ear: conductive hearing loss from otitis media with effusion,

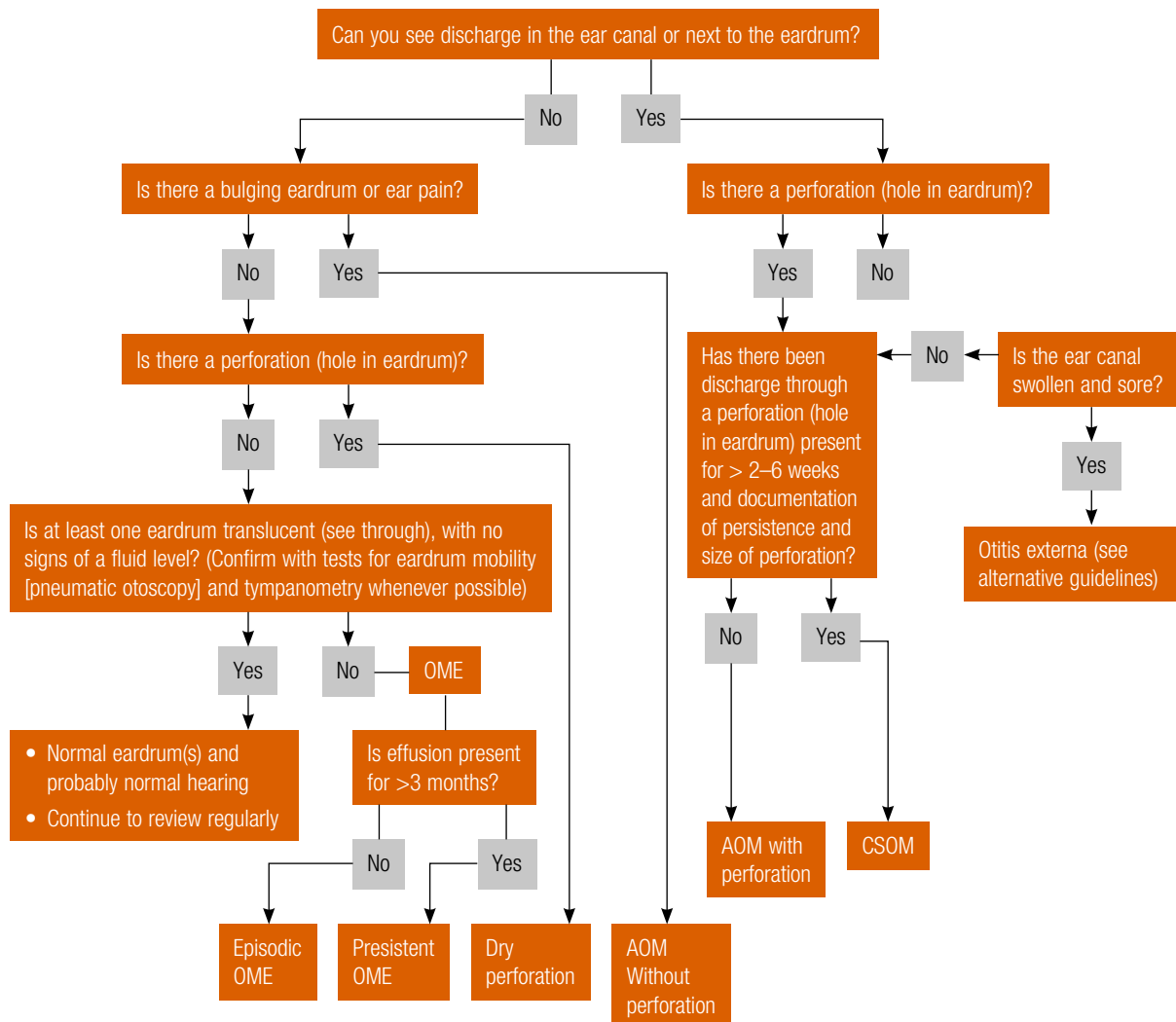
haemotympanum, ossicular chain discontinuity, trauma, iatrogenic, tympanic membrane perforation or choleostoma

- inner ear: sensorineural hearing loss from noise, ototoxic medications, infection, trauma, tumours, vascular causes, autoimmune causes or other causes.

Red flags associated with sudden-onset hearing loss include:⁸

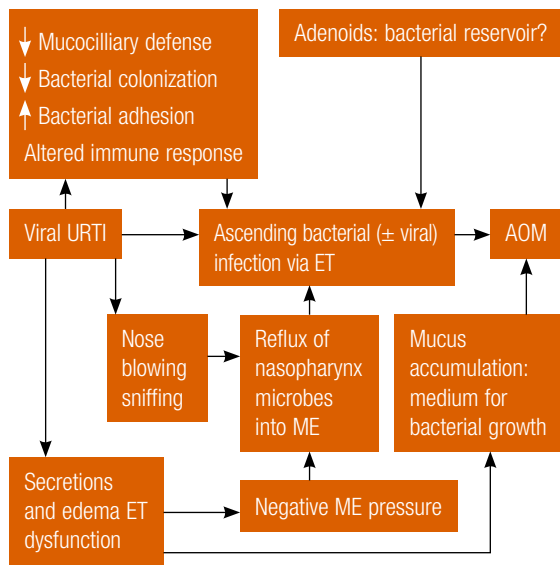
- concurrent head trauma
- neurological signs or symptoms
- unilateral middle ear effusion (post-nasal space must be examined).

Figure 1. Algorithm for diagnosis of otitis media



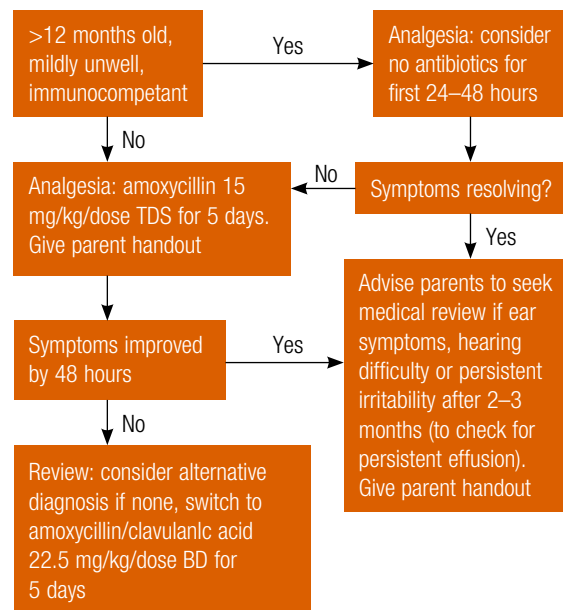
AOM, acute otitis media; CSOM, chronic suppurative otitis media; OME, otitis media with effusion. Reproduced with permission from Department of Health. Recommendations for clinical care guidelines on the management of otitis media in Aboriginal and Torres Strait Islander populations. Canberra: DoH, 2011. Available at www.health.gov.au/internet/publications/publishing.nsf/Content/oatsih-otitis-media-toc- Algorithms [Accessed 27 November 2015].

Figure 2. Pathophysiology of acute otitis media



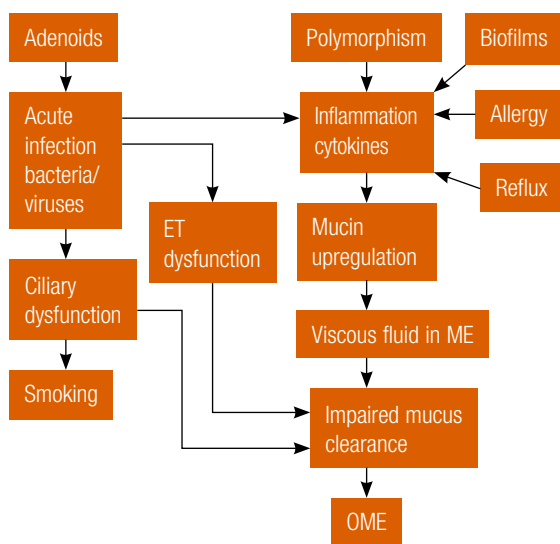
AOM, acute otitis media; ET, eustachian tube; ME, middle ear; URTI, upper respiratory tract infection
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Figure 4. Management of otitis media⁵



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Figure 3. Pathophysiology of otitis media with effusions



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ANSWER 4

The pathophysiology of acute otitis media and otitis media with effusions is shown in Figures 2 and 3.⁹

Sequelae of acute otitis media include mastoiditis, facial nerve paralysis, meningitis, intracranial abscess, lateral sinus thrombosis.⁵

ANSWER 5

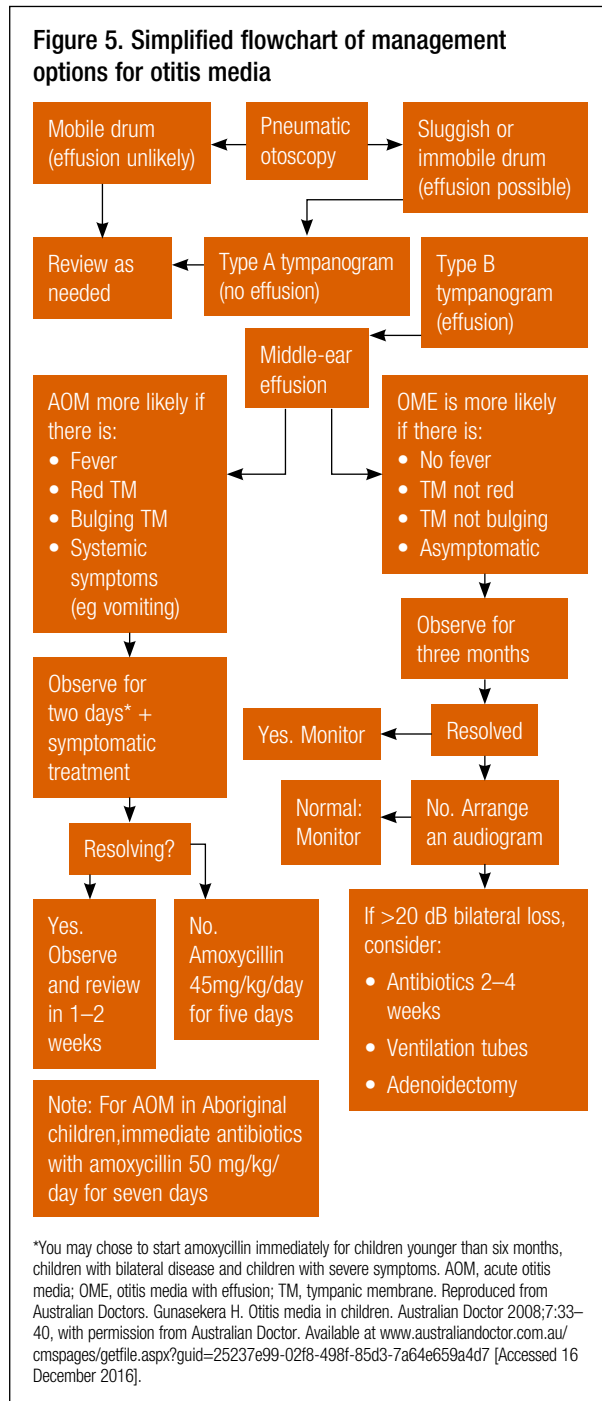
There are several guidelines available (two examples are shown in Figures 4 and 5).^{5,6}

The Therapeutic Guidelines⁹ suggests avoiding antibiotic therapy for non-suppurative acute otitis media in the low-risk patient, because the number to treat is 20 to prevent pain in one child at two to seven days. Antibiotic therapy is considered for children who do not improve with symptomatic treatment or develop systemic features, such as high fever, vomiting or lethargy. Amoxicillin 15 mg/kg (max 500 mg) every eight hours for five days or, for patients suspected to be non-adherent 30 mg/kg (max 1 g) every 12 hours for five days are the recommended treatment regimens. Those not responding adequately can be changed to amoxicillin and clavulanic acid or trimethoprim and sulfamethoxazole.¹⁰

ANSWER 6

Otitis media with effusion has often been treated with a combination of antibiotics and steroids. However, there is no evidence for the long-term benefits of steroids, although resolution of the otitis media with effusion may be faster.¹¹

Equally so, antibiotic therapy should not be commenced automatically. A recent Cochrane review¹² does not support the use of antibiotics for children up to 18 years of age with otitis media with effusion. The



review found that the greatest effects of antibiotics were seen with continuous treatment for four weeks or three months, but suggested that benefits should be weighed against potential side effects and the emergence of bacterial resistance.

Autoinflation is a technique used to re-open the Eustachian tube by raising pressure in the nose to equalise pressure and facilitate fluid drainage. Raised pressure can be achieved by forced exhalation with

Box 1. Key messages for primary care providers¹⁵

Aboriginal and Torres Strait Islander health staff working with Aboriginal and Torres Strait Islander families are likely to have the greatest impact on severe otitis media. Intervention at this level will have the greatest impact by these health professionals as they can reach the target population to deliver screening, education and acute management, as well as preventive tasks to improve patient outcomes (eg preventing hearing loss).

- Families should be told that Aboriginal and Torres Strait Islander children are at greatly increased risk of severe otitis media.
- Families should be told that severe otitis media will get better with improved living standards, maternal education, breastfeeding, provision of a smoke-free environment and pneumococcal vaccination.
- Families should be encouraged to attend the local health clinic as soon as possible whenever a child develops ear pain or discharge.
- Frequent ear examinations are recommended even when the child is well. Use pneumatic otoscopy or tympanometry whenever possible.
- Antibiotics (amoxicillin) are recommended for Aboriginal and Torres Strait Islander children with acute otitis media (identified by bulging eardrum or recent perforation). Antibiotics should be continued until the bulging and discharge have resolved.
- CSOM should only be diagnosed in children who have persistent discharge through a perforation despite appropriate treatment for acute otitis media with perforation. Effective treatment of CSOM requires a long-term approach with regular dry mopping or syringing of ear discharge followed by the application of topical antibiotics.
- All children with persistent bilateral otitis media (all types) for greater than three months should have their hearing assessed.
- Families of children with significant hearing loss (>20dB) should be informed of the benefits of improved communication strategies and hearing aids.
- Explain to families/caregivers that a child needs to hear people talking in order to learn to talk themselves. Children with otitis media do not hear well. They will benefit from lots of focused verbal communication.
- Aim to provide patients or families/caregivers with the knowledge to manage their own health needs. Use communication techniques and resources that facilitate true understanding.

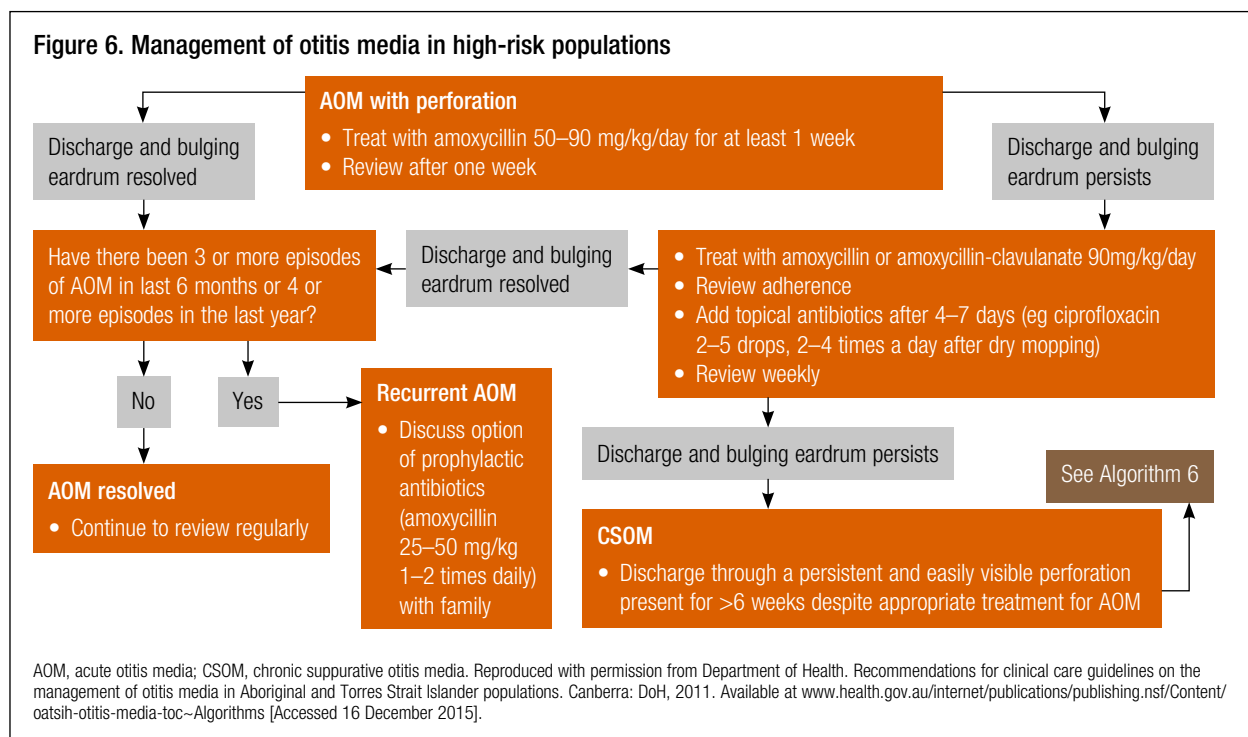
mouth and nose closed, blowing up a balloon through each nostril or using an anaesthetic mask.¹³

Autoinflation may be a reasonable measure (low cost, absence of adverse effects) while awaiting natural resolution of otitis media with effusion.¹³

A recent Cochrane review¹⁴ suggested no benefit and some harm from the use of antihistamines or decongestants, either alone or in combination, in the management of otitis media with effusion, and recommend against using these.

ANSWER 7

Treatment in this particular situation needs to consider ototoxicity, development of bacterial resistance and the overall systemic health



of the patient. Recent evidence suggests that topical fluoroquinolones (+/– corticosteroids) offer the most effective treatment. Aminoglycoside agents should not be used because of the potential ototoxicity.^{15,16}

ANSWER 8

Chronic suppurative otitis media (CSOM) is more common in Aboriginal and Torres Strait Islander peoples. It requires cleaning of the external ear canal by dry mopping the ear with rolled tissue spears or similar, every six hours until the external canal is dry (dry aural toilet).¹⁰ Ciprofloxacin ear drops (0.3%, five drops instilled every 12 hours for at least three days) is the antibiotic of choice. Systemic antibiotics may be indicated if perforation was recent or if it is clear that the patient is not adhering to the management plan. In the latter situation it may be necessary to balance the risk and benefits of oral antibiotic therapy (twice daily dosing).¹⁷ Persistent discharge may require referral to an ear, nose and throat (ENT) specialist to exclude cholesteatoma or chronic osteitis. An algorithm for management of otitis media in high-risk populations is shown in Figure 6. Key messages for primary care providers are shown in Box 1.

ANSWER 9

Referral to an ENT specialist should be considered for recurrent acute otitis media with three or more episodes in six months or four or more episodes in 12 months.

Other indications for immediate referral are complications such as mastoiditis, nerve involvement, or high-risk patients who are not improving despite multiple courses of antibiotics.⁵

Specialist input should also be sought for hearing loss (>30 dB) or if there is any impact on education, speech or behaviour, or if symptoms are chronic in nature (>three months). However, anything 'worse than normal hearing' should be considered for referral and 20–30 db loss or more is very significant.⁵

A recent qualitative study suggested a discrepancy between evidence-based treatment guidelines and parents' expectation and perception of what should be done. This provides an opportunity to identify concerns and misconceptions, and address these in an appropriate manner.¹⁸

Generally speaking, antibiotics have no early effect on pain in acute otitis media, but have a modest effect in some children with tympanic perforations. In countries like Australia, recovery is uneventful without treatment or complications. A Cochrane review reported that antibiotics were most useful in children under the age of two years with bilateral acute otitis media, or with acute otitis media and otorrhoea.¹⁹ Adverse events, including vomiting, diarrhoea and rash, occurred in one out of every 14 children treated with antibiotics.¹⁹ This review recommended that patients should be given advice about adequate analgesia and the limited role of antibiotics in the management of otitis media.¹⁹

Avoidance of cigarette smoking and overcrowding in households can reduce the risk of ear infections. For infants, breastfeeding has been shown to be beneficial as well.²⁰

Swimming, flying and diving should be avoided during an acute otitis media phase.

Cotton buds should not be used in the ears as these can damage the external ear canal and contribute to infections.⁶

General risk factors for acute otitis media are younger age and day care settings.²¹ Prophylactic administration of xylitol has been shown to reduce the occurrence of acute otitis media in healthy children attending day care centres.²¹

ANSWER 10

The pneumococcal vaccine^{9,22} and influenza vaccination²³ may be useful at reducing the risk of recurrent infections, although trials are still ongoing.^{22,23}

Current evidence on whether zinc supplementation can reduce the incidence of otitis media in healthy children under the age of five years living in low- and middle-income countries is mixed. Its role for those above age five is unknown.²⁴

CONCLUSION

- Parents' expectations and understanding of ear infections need to be considered and addressed.
- Current treatment guidelines for acute otitis media (without discharge) suggest conservative management (observation + symptom relief) for two days before commencing amoxicillin, unless the patient is in a high-risk group.
- The latest Cochrane review reiterates the message that low-risk patients in Australia will recover spontaneously, without antibiotic treatment and without any increased rate of complications.
- History-taking should also focus on hearing, speech, behaviour or inattention, recurrence of ear infection or upper respiratory tract infections, balance problems and poor education progress.
- Examination should focus on otoscopy, tympanometry, general upper respiratory tract health and developmental status. Hearing tests may need to be carried out in certain patients. Important hearing loss causes need to be considered, such as sensorineural, permanent or non-organic causes.
- After resolution of an acute episode, it is important to follow up with otoscopy to ensure there is no persistent effusion
- Prevention: Do not forget immunisation.
- Currently, a Cochrane project is underway to assess the effectiveness of paracetamol or non-steroidal anti-inflammatory drugs, alone or combined, compared with placebo or no treatment in relieving pain in children with acute otitis media.

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CASE 3

JANINE'S VOICE IS HOARSE

Janine, aged 52 years, is a primary school teacher and a long-term patient of your practice. She presents today complaining of a hoarse voice for the past three weeks. At first, she assumed it was part of a mild cold she had; however, the cold symptoms resolved two weeks ago, but the hoarseness persisted. Janine is finding it difficult to make herself heard in the classroom, especially towards the end of the day.

QUESTION 1 

What aspects of Janine's history and examination will you be particularly interested in?

FURTHER INFORMATION

Janine has no significant medical history apart from asthma, which has been well controlled for many years on inhaled fluticasone propionate 100 µg twice daily. She tries to keep fit by eating well and exercising regularly, but has not been able to give up smoking – she has smoked about 15 cigarettes a day since her late teens. She drinks three or four cups of coffee a day and has one to two glasses of wine with dinner most nights.

QUESTION 2 

How will you manage Janine at this stage?

FURTHER INFORMATION

You review Janine four weeks after her first visit. She has tried to follow your advice. Janine took two days off work to rest her voice, and is now using a microphone for her bigger classes. She is using nicotine patches and has managed to decrease her smoking to only one or two cigarettes per day. She has stopped fluticasone inhaler and has not had any asthma symptoms. Despite these measures, the hoarseness has persisted.

QUESTION 3 

What will be your next step in Janine's management?

FURTHER INFORMATION

Janine's laryngoscopy demonstrates the presence of bilateral benign vocal cord nodules.

QUESTION 4 

In light of these findings, what management strategies would you advise for Janine?

CASE 3 ANSWERS

ANSWER 1

Hoarseness (dysphonia) is a disorder characterised by altered vocal quality, pitch, loudness or vocal effort that impairs communication or reduces voice-related quality of life (QoL).¹

The duration of hoarseness is important to ascertain. For example, acute laryngitis, caused by an upper respiratory tract infection or short-term vocal abuse, is a common and self-limiting cause of hoarseness and usually resolves within two weeks.²

It is important to enquire about any associated symptoms. Upper respiratory allergies often involve the larynx and cause hoarseness in addition to rhinitis and conjunctivitis.² The presence of heartburn may suggest reflux of stomach contents into the larynx, a recognised cause of hoarseness.³ Hoarseness can be a symptom of various neurological conditions, such as Parkinson's disease, multiple sclerosis (MS) and cerebrovascular accidents;⁴ and of systemic diseases such as hypothyroidism, sarcoidosis and acromegaly.² Weight loss, dysphagia, odynophagia, haemoptysis, or symptoms of airway obstruction such as stridor, raise the possibility of malignancy.⁴

Medications can have an adverse effect on voice quality. In a 2007 study of the hazardous effects of inhaled corticosteroids on voice quality, higher doses and frequency of use were associated with more voice problems.⁵ Other medications that can potentially affect voice quality include antipsychotics (laryngeal dystonia), angiotensin converting enzyme inhibitors (when causing chronic cough) and bisphosphonates (which can cause a chemical laryngitis).⁴

You should ask about smoking and excessive alcohol consumption, as they are both risk factors for laryngeal problems.⁶ While smoking did not independently increase the risk of voice disorders in a population study,³ hoarseness in tobacco smokers is associated with an increased frequency of polypoid vocal fold lesions, and head and neck cancers.⁷

Ascertain Janine's pattern of voice use and the vocal demands of her occupation. Dysphonia has been shown to be more common in singers, teachers, clergy, lawyers and operators at call centres.⁶ For professional voice users, chronic or recurring dysphonia may have severe career and economic consequences.

ANSWER 2

Provided Janine has no alarm symptoms or signs, such as haemoptysis, dysphagia, stridor, abnormal cervical lymph nodes or a neck mass, addressing her risk factors would be appropriate initial management.² She should be counselled on the benefits of quitting smoking, and provided advice on effective ways to do this. Janine's asthma is well controlled, and it is reasonable to trial stopping the inhaled corticosteroid, as this was found to be the most effective treatment for voice disorders associated with inhaled steroid use.⁵ Janine's asthma will require close monitoring, as patients with well-controlled asthma who stop taking regular inhaled steroids have an increased risk of flare-ups.⁸ Both caffeine and alcohol use are associated with gastric reflux, which may be silent and a contributor

to hoarseness,⁶ so advice to modify these is sensible. Voice protection can also help with voice recovery.⁶ This may involve taking some time off work and/or modifying her voice use at work.

Janine should not be prescribed antibiotics. Bacterial infection is a very rare cause of either acute or chronic hoarseness, and clinical guidelines state that the clinician should not routinely prescribe antibiotics to manage hoarseness.¹

Janine should not be prescribed anti-reflux medication if she has no symptoms or signs of reflux. Studies have shown that up to 55% of patients presenting with hoarseness have laryngopharyngeal reflux.⁹ However, a 2006 Cochrane review found that the benefit of anti-reflux treatment for hoarseness in patients without symptoms of oesophageal reflux (heartburn and regurgitation) or evidence for oesophagitis was unclear, mainly because of a lack of good-quality studies.⁹ Current guidelines recommend that the clinician should not prescribe anti-reflux medications for patients with hoarseness without signs or symptoms of gastro-oesophageal reflux disease (GORD).¹

Janine should also not be prescribed steroids, as there is no evidence to support the empirical use of oral corticosteroids in the treatment of hoarseness.¹

Timely review of the patient is important to check whether these measures have helped with the hoarseness.

ANSWER 3

Current guidelines recommend that laryngoscopy be performed by someone skilled in the technique, when hoarseness fails to resolve after a maximum of three months of onset, or irrespective of duration if a serious underlying cause is suspected.¹ Serious causes include laryngeal malignancy, fungal infection, and neurological diseases such as myasthenia gravis and motor neurone disease.² Janine's smoking history puts her at higher risk of laryngeal cancer than the general population,⁶ and early laryngoscopy allows for prompt institution of appropriate management if a cancer is found. Laryngoscopy is also the most effective way to diagnose many other types of chronic hoarseness:

Unilateral vocal fold paralysis – this causes breathy hoarseness. It is often caused either by surgical damage to nerves, or by thoracic, cervical or brain tumours that compress or invade the vagus nerve or its branches.¹ Stroke may also present with hoarseness due to vocal fold paralysis.¹ Vocal fold paralysis is routinely identified, characterised and followed by laryngoscopy.¹

Benign vocal fold lesions – these include vocal fold cysts, vocal cord nodules and vocal cord polyps, and they are readily detected on laryngoscopy.⁷ In addition, there is significant evidence for the usefulness of laryngoscopy in planning voice therapy and in documenting the effectiveness of voice therapy when treating vocal lesions.¹

Laryngopharyngeal reflux – this term is used when GORD affects the pharynx and larynx.⁹ Visualisation of the larynx may demonstrate changes suggesting the diagnosis of laryngopharyngeal reflux, such as arytenoid erythema, mucosal oedema, contact ulcers and granulomas.⁹

Neurologic disease – Parkinson's disease, amyotrophic lateral sclerosis and MS may affect the muscles of the larynx.¹ Spasmodic

dysphonia is a distinct neuromuscular disorder of unknown aetiology that results in uncontrolled contraction of the laryngeal muscles and focal laryngeal spasm.²

ANSWER 4

Vocal hygiene

There is evidence that vocal hygiene education can be effective in the management of hoarseness.¹⁰ Vocal hygiene programs evaluated included education in environmental changes (eg humidification of the air, and avoidance of smoke, dust, and other inhaled irritants); behavioural changes (eg avoidance of frequent coughing or throat clearing); vocal habit changes (eg avoidance of shouting or speaking loudly for prolonged periods); and dietary changes (eg increased fluid intake, and avoidance of large meals, excessive caffeine and alcohol use, and spicy foods).²

Voice therapy

Voice therapy refers to a variety of non-surgical techniques used to improve or modify voice quality.² For example, the accent method uses rhythmic exercises to facilitate the coordination of vocal fold vibration with appropriate air pressure and air flow. Digital laryngeal manipulation, also called laryngeal massage, aims to decrease excessive contraction of the muscles of the larynx. Vocal function exercises involve three components:¹¹

- warm up
- pitch glides (high to low and low to high)
- sustained vowel phonation at selected pitches.

Evidence from clinical trials documents the efficacy of voice therapy for a spectrum of voice disorders in adults and children, including benign vocal cord lesions and spasmodic dysphonia.¹² Referral to an appropriately qualified and experienced speech pathologist is an important component of management.

Surgery

Many benign, soft tissue lesions of the vocal folds are self-limited or reversible after instituting appropriate vocal hygiene and voice therapy measures.¹ Surgery is reserved for benign vocal fold lesions when a satisfactory voice result cannot be achieved with conservative management.¹ In cases in which surgery is necessary, pre- and post-operative voice therapy may shorten the postoperative recovery time, allowing faster return to work and limiting scar tissue and permanent dysphonia.¹²

Other treatment considerations

Hoarseness can have significant implications for patients' QoL, and patients may suffer social isolation and depression.¹ Hoarseness may also impair work-related function. In the general population, 7.2% of individuals surveyed in America missed work for one or more days within the preceding year because of a problem with their voice.³ Among teachers, this rate increases to 20%, resulting in a \$2.5 billion loss among US adults because of missed work annually.¹

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CASE 4

DILAN HAS A RUNNY NOSE

Ron brings his son Dilan, seven years of age, to see you because Dilan has been unwell and has missed school for most of the past two weeks. Dilan is doing well at school and his attendance is usually good. His sister Amanda, 12 years of age, goes to the same school.

Ron tells you that Dilan has had a runny nose, itchy nose and eyes, cough, sneezing, and headache on and off for the past two to four weeks. His mother, Daisy, has been checking his temperature, which has been normal throughout.

Dilan is otherwise healthy and Ron says he has no other medical illness apart from mild eczema on his left leg.

QUESTION 1 

What is your initial diagnostic impression?

QUESTION 2 

What further history you will require in order to diagnose Dilan's condition?

FURTHER INFORMATION

Further history-taking reveals that Dilan has been having similar symptoms at the same time every year, during the spring, although this year his symptoms are more severe than previously.

Ron had childhood asthma, Daisy has hay fever and eczema, and Amanda has asthma and eczema.

Amanda had her 12th birthday four weeks ago and her parents gave her a puppy as a present.

Dilan and Amanda love the new puppy – they look after him and play with him often.

QUESTION 3 

What is your diagnosis?

QUESTION 4 

What tests would you perform?

FURTHER INFORMATION

You arrange for Dilan to have a radioallergosorbent test (RAST) and refer him to a specialised allergy clinic for a skin prick test. The test results are positive for the grass panel.

QUESTION 5 

How would you manage Dilan’s condition? What treatment options would you consider?

CASE 4 ANSWERS

ANSWER 1

Dilan’s symptoms are suggestive of allergic rhinitis (hay fever). Other possible causes are rhinitis due to other causes (vasomotor, gustatory, hormonal, anatomical), nasal polyps, acute sinusitis and chronic sinusitis.

ANSWER 2

Additional history-taking should include Dilan’s family history, exposure to allergens and other comorbid conditions.^{1,2} Allergic rhinitis has a significant genetic component,³ so a positive family history for atopy makes the diagnosis more likely. A thorough history of environmental exposures helps to identify specific allergic triggers. This should include investigation of risk factors for exposure to perennial allergens (eg dust mites, mould, pets).^{4,5} Patients with allergic rhinitis may have other atopic conditions such as asthma^{6,7} or atopic dermatitis.⁸ Of patients with allergic rhinitis, 20% also have symptoms of asthma. Uncontrolled allergic rhinitis may cause worsening of asthma⁹ or even atopic dermatitis.⁸

ANSWER 3

Given the strong family history, comorbid conditions and seasonal nature, a clinical diagnosis of allergic rhinitis is most likely. Sinusitis and anatomical causes such as deviated nasal septum and nasal polyps can be further excluded from clinical examination and imaging.

ANSWER 4

Testing for reaction to specific allergens can be helpful to confirm the diagnosis of allergic rhinitis and determine specific allergic triggers.¹

Knowledge of specific allergens will be very useful in management, such as avoidance and immunotherapy.

The most commonly used methods for identifying an allergy to a particular substance are skin testing (testing for immediate hypersensitivity reactions) and RAST, which indirectly measures the quantity of specific immunoglobulin E (IgE) to a particular antigen.¹ General practitioners (GPs) can order a RAST test but, in Australia, referral to a specialist or allergy clinic is required for skin prick tests. The RAST test is subsidised by the Medicare Benefits Schedule (MBS) with restrictions (MBS item 71079); up to four tests in a 12-month period can be claimed through the MBS.¹⁰

Total IgE may be raised in people with allergies. High total IgE antibody levels are also found in people with parasite infections, eczema and some rare medical conditions such as allergic bronchopulmonary, aspergillosis, Hodgkin’s lymphoma, systemic vasculitis (especially Churg–Strauss syndrome), primary immunodeficiencies (especially hyper-IgE syndrome, Wiskott–Aldrich syndrome) and IgE myeloma.¹¹ High IgE levels do not prove that symptoms are due to allergy, and a normal IgE level does not exclude allergy. Therefore, measuring total IgE levels is not routinely recommended in allergy testing.¹²

Eosinophils are specialised white blood cells that are designed to kill worms and parasites. They can also cause tissue inflammation in allergies. High levels of eosinophils are sometimes seen in blood samples from people with allergic rhinitis, asthma and eczema, as well as in a number of less common conditions. However, a high eosinophil count does not prove that symptoms are due to an allergy, and a normal eosinophil count does not exclude allergy. Therefore, measuring eosinophil counts has a limited role to play in allergy testing.¹²

ANSWER 5

The management of allergic rhinitis consists of three major categories of treatment:¹

- allergen avoidance
- pharmacological management
- immunotherapy.

Allergen avoidance and environmental controls requires identification of the specific allergen(s).

Pharmacological management consists of the following:

- oral or intranasal antihistamines
- intranasal nasal corticosteroids
- leukotriene receptor antagonists
- intranasal decongestants.

Intranasal corticosteroids medication is the mainstay of treatment and probably the most effective option.²

The *Australian asthma handbook*¹³ recommends intranasal corticosteroids for adults and children with persistent allergic rhinitis or moderate-to-severe intermittent allergic rhinitis, even if the person is already taking regular inhaled corticosteroids for asthma. Further, if symptoms are troublesome to the patient, consider initially adding an agent with a more rapid onset of action (eg oral or intranasal

H1-antihistamine or short-term intranasal decongestant). Warn patients not to take intranasal decongestants for more than five days, and only occasionally.

For young children with mild allergic rhinitis or intermittent allergic rhinitis, or those who will not tolerate intranasal medicines, consider an oral H1-antihistamine. Avoid older, sedating antihistamines. If allergic rhinitis symptoms do not resolve within three to four weeks, consider allergy testing and review the diagnosis.¹³

Immunotherapy reduces the patient's immunoreactivity to harmless environmental antigens (allergens).¹⁴ It is indicated for severe allergic rhinitis that is not responsive to pharmacotherapy.^{11,15} It is available in subcutaneous and sublingual administration forms and requires care by an allergy specialist or immunologist.¹³

There is evidence from meta-analyses for the efficacy of subcutaneous and sublingual immunotherapy in the management of allergic rhinitis and asthma.^{14,16–18}

Subcutaneous immunotherapy is widely available for various types of allergens, whereas sublingual immunotherapy is limited to a few allergens. Subcutaneous immunotherapy is associated with local adverse effects, which may occur in up to 10% of patients (eg injection-site swelling) and, less frequently, with serious systemic adverse effects (eg anaphylaxis). Subcutaneous immunotherapy is generally not suitable for younger children (eg less than seven years of age) because they may not be able to tolerate frequent injections.¹³

Sublingual immunotherapy is available for a limited number of allergens in Australia. Higher doses of allergen are required, compared with subcutaneous immunotherapy.¹⁴ The cost of sublingual immunotherapy has been reported to be \$250 for six months.¹⁹

Local adverse effects include an unpleasant taste, localised swelling in the mouth, abdominal pain and nausea. Local adverse effects are common in children receiving sublingual immunotherapy.

Systemic adverse reactions, such as anaphylaxis, are very rare (estimated as 1.4 serious adverse events per 100,000 doses). The majority of adverse events occur soon after beginning treatment.¹⁹

An allergic rhinitis action plan may be helpful for management of Dilan's condition at home and at school. The Australasian Society of Clinical Immunology and Allergy (ASCI) provides templates for allergic rhinitis plans.¹⁵

CONCLUSION

You discuss avoidance of exposure to grasses and the possibility of allergy to pets with Dilan and his parents, and prescribe intranasal corticosteroids and oral antihistamines. You also prepare an action plan and discuss desensitisation and specialist care briefly as per longer term options if pharmacotherapy is not working.

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CASE 5

LYNNE FEELS DIZZY

Lynne, 71 years of age, presents to your surgery feeling ataxic and dizzy. This is the third episode in the past 10 days, and she describes the dizziness as a sensation of spinning. She has never experienced this before. Lynne feels that her symptoms are worse when associated with certain positions and has not noticed a change in her hearing. She has no significant past medical history.

QUESTION 1 

What are the red flag symptoms associated with dizziness and ataxia?

QUESTION 2 

What key points in Lynne's history will help to clarify the diagnosis?

QUESTION 3 

What initial examination should be performed in the primary care setting?

FURTHER INFORMATION

On history taking, you find that Lynne has had three distinct episodes of vertigo lasting one to four hours, usually preceded by tinnitus and aural fullness over the last 10 days. Lynne has a history of palpitations for which she underwent Holter monitor investigations, but the doctors found no cardiac rhythm abnormality. Her cardiovascular examination was unequivocal and her electrocardiogram (ECG) is normal. Lynne's chest is clear. Neurological examination revealed grossly intact cranial nerves, no lateralising cerebellar signs and a negative Romberg's test. Despite no perception of hearing loss, tuning fork tests suggested a right-sided sensorineural hearing loss.

QUESTION 4 

What is vertigo? How is it related to balance?

QUESTION 5 

Is it possible to differentiate between dizziness and true vertigo?

QUESTION 6 

What initial management could be provided for Lynne?

QUESTION 7 

What is your working diagnosis and why? What baseline investigations should be ordered?

QUESTION 8 

When is a specialist referral indicated?

FURTHER INFORMATION

Lynne was referred to an otolaryngologist for further opinion on the aetiology of her vertigo and for management advice. At this time, it was found that prochlorperazine was improving her symptoms. The otolaryngologist sent Lynne for further formal audiometry testing, including electronystagmogram (ENG) and vestibular-evoked myogenic potential (VEMP). Lynne's balance testing and audiological tests were in keeping with a diagnosis of Ménière's disease, although this was not definitive. She was trialled on a thiazide diuretic and showed a dramatic response, which is again consistent with the diagnosis of Ménière's disease.

QUESTION 9 

What audiology tests should be ordered to assess for Ménière's disease, dizziness or vertigo?

QUESTION 10 

How can Ménière's disease be managed? What options are available for specialist management of Ménière's disease?

CASE 5 ANSWERS

ANSWER 1

Dizziness is a complex symptom with a broad differential that commonly presents in primary care.¹ Although most of the conditions presenting with dizziness are benign, there are more sinister conditions that need to be directly explored (Table 1). Ataxia is also a generalised symptom that needs thorough evaluation. Alone it may direct to a neurological cause, but when associated with other symptoms, may suggest more complex disease.

Table 1. Red flags that should raise concern for more sinister pathology in patients who present with dizziness and ataxia	
Red flag	Consider
Acute onset	Any acute onset should raise concern for a more sinister diagnosis
Acute hearing loss	Sudden hearing loss may suggest a cerebrovascular cause. Inner ear vascular supply is from the posterior cerebral circulation and patients may present with combined vestibular dysfunction and hearing loss from an ischaemic insult ²⁻⁴
Any neurological symptoms or signs (including facial weakness, diplopia, dysphagia)	Cranial nerve involvement may indicate a central cause from mass effect or vascular pathology
Recent head and neck trauma	Consider traumatic brain injury and vertebral dissection. Trauma may also be the cause of benign paroxysmal positional vertigo

ANSWER 2

A medical history is one of the most important tools to help clarify the diagnosis. A thorough history of the 'dizziness' itself should be taken, including light-headedness, the duration of episodes, aggravating factors and associated symptoms (hearing loss, tinnitus, aural fullness, visual disturbance, aura).

Given that the range of diagnoses is broad and covers many sub-specialties, it is important to take a thorough history, look for common patterns and directly rule out conditions associated with different organ systems (Table 2). Consider neurological, cardiovascular and endocrine disorders, as well as disorders of otology that may present with dizziness, disequilibrium, presyncope or syncope.⁵ An accurate history can determine if the dizziness is related to a vestibular disorder. If the patient's symptoms do not fit common patterns, then you should explore rarer causes (eg vestibular migraine or hypotension resulting in dizziness and ataxia). For elderly patients, although age-related vestibular impairment (presbystasis) is possible, the common causes of dizziness should always be explored, as well as red flags, before presuming that dizzy spells are simply due to ageing.⁶

Table 2. History to help clarify dizziness	
History pattern	Relevance
Episodic symptoms versus continuous symptoms	Episodic symptoms may suggest a peripheral vertigo. Consider: ⁷ <ul style="list-style-type: none"> benign paroxysmal positional vertigo (BPPV) with vertigo lasting seconds Ménière's disease with vertigo, lasting minutes to hours vestibular neuronitis, lasting days Continuous symptoms without other findings may suggest a psychogenic cause
Other otological symptoms	May suggest peripheral vertigo. Aural fullness and tinnitus can precede an attack of vertigo in patients with Ménière's disease ^{7,8}
Movement of head and relation to dizziness	Consider BPPV with specific head movements, rolling over in bed, particularly to one side
Sympathetic symptoms (sweating, dyspnoea, palpitations)	May indicate a cardiac cause or accompany panic attacks
Associated headache with dizziness	Consider vestibular migraine
Intercurrent or previous illnesses	Consider vestibular neuronitis and labyrinthitis
Symptoms with changes in pressure	Patients with semicircular canal dehiscence, perilymphatic fistula, or enlarged vestibular aqueduct may have symptoms with acute pressure changes when performing a Valsalva manoeuvre, coughing or straining ⁷

ANSWER 3

Physical examination provides an adjunct to your findings in history and should be focused on the key symptoms. All patients should have their ears, nose and throat examined. Dix–Hallpike manoeuvre should be performed in patients with episodic dizziness to diagnose BPPV. This manoeuvre is performed by taking a patient from a sitting to supine position while the head is laterally rotated at 45 degrees, then guiding the head a further 15–20 degrees from horizontal while maintaining the rotation for at least 60 seconds. It is essential to ensure there is enough room at the end of the bed to allow for effective tilting of the head and it is useful for the examiner to place a seat for themselves at this position to safely maintain the orientation of the patient's head. Patients should be advised that their symptoms may be reproduced but that they will pass and, despite any nausea, they are extremely unlikely to vomit. Patients must also keep their eyes open to allow examination of the movements of the eyes as part of the interpretation of the test. Nystagmus that is rotational, has a latent period and is fatigable is characteristic of BPPV.⁹

Basic cardiovascular and neurological testing, including postural blood pressures, cranial nerve examination, examination of sensation and motor function, as well as reflexes, should also be assessed in all patients. Further neurological examination including observing for nystagmus and Romberg's test should also be performed. This test is performed by having the patient stand with feet together and hands by their sides. On closing eyes a positive test is seen with swaying – indicating a loss of balance.

ANSWER 4

Vertigo is classically described as an illusion of motion, which may be felt internally by the patient or perceived in their surroundings. It reflects an abnormality within the vestibular system. Successful balance requires that at least two of the following are intact:^{7,10}

- vision
- proprioception
- peripheral vestibular system supplied by the eighth cranial nerve (semicircular canals, saccule and utricle).

Failure of two of these will lead to the perception of vertigo. Vertigo can be associated with other otological symptoms or generalised symptoms such as nausea, vomiting and sweating. Causes of vertigo are classified into central and peripheral (Table 3). Central causes of vertigo may be life threatening and require urgent intervention.¹¹ Clinical findings assist in differentiating between central and peripheral cause of vertigo. Generally, where there is a central cause for vertigo, ataxia will be severe,¹² neurological symptoms frequent¹⁰ and hearing loss rare.¹³

ANSWER 5

The traditional characterisation of vertigo as a spinning sensation, versus dizziness as a different perceived sensation, can be somewhat unreliable. More importantly, a lack of spinning should not exclude diseases that cause vertigo. The complex neurological pathways involved in the coordination of balance are below the patient's level of awareness, which makes symptoms particularly difficult to describe.

It should be emphasised that timing and triggers are more reliable historic factors that should be investigated.⁵ Additionally, other significant causes of dizzy episodes have been reported as vertiginous episodes by patients. Therefore, over-reliance on the characterisation of a spinning sensation may miss red flag conditions.¹⁴

Table 3. Important peripheral and central causes of vertigo

Peripheral causes	Central causes
BPPV	Vestibular migraine
Ménière's disease	Vertebrobasillar insufficiency
Labrynthitis	Vertebrobasillar cerebrovascular accident
Vestibular neuronitis	Intracranial abscesses as a complication of ear infections
Vestibular schwannoma	
Perilymph fistula	
Trauma – barotrauma/blast trauma	
Superior semicircular canal dehiscence syndrome	

ANSWER 6

The best treatment is aimed at the underlying cause. However, a patient can be supported through an acute episode of vertigo with short-term use of vestibular sedatives such as prochlorperazine, antihistamines or benzodiazepines (Box 1). These can give the patient comfort, while allowing time to undergo investigations to clarify the cause. These medications should be used as temporary management as there is a possibility of adverse neurological effects and possible dependence.^{12,15}

Box 1. Medications for acute vertigo attacks¹⁶

- Prochlorperazine – 12.5 mg intramuscular (IM), followed in six hours by 5–10 mg orally as a single dose if required
- Prochlorperazine – 5–10 mg orally, 3–4 times daily
- Promethazine – 25–50 mg orally, 8–12 hourly for 48 hours
- Diazepam – 5–10 mg orally, three times daily when required

ANSWER 7

Ménière's disease should be considered in a patient with episodic attacks of vertigo, sensorineural hearing loss (SNHL), which usually fluctuates, and tinnitus, with or without a sensation of aural fullness. It is a diagnosis of exclusion after consideration of other causes of dizziness and vertigo. Patients with Ménière's disease have hearing loss that is often, initially, in the low frequencies and fluctuating, but can be progressive in the involved ear. The hallmark of Ménière's disease is thought to be primary endolymphatic hydrops – an abnormality in the fluid within the inner ear resulting in fluctuation in pressure. The aetiology is unclear, although a number of theories, including abnormal endolymph drainage and immune dysfunction,

have been postulated.⁷ Other pathologies can also result in endolymphatic hydrops, such as otosclerosis and trauma – these are considered secondary causes.

Baseline tests should be performed to rule in Ménière's disease and exclude other diagnoses. Office-based audiogram, ECG and blood tests, including fasting glucose, should be considered when a patient first presents with dizziness. Meniere's disease will usually show normal results to these initial investigations and is therefore usually, initially, diagnosed on clinical grounds alone. Formal balance testing supports the diagnosis, but can have false negatives (these tests are discussed in another question).⁸ Neuroimaging should be considered to investigate for cerebrovascular disease and a lesion causing mass effect such as a vestibular schwannoma, particularly in patients who have progressive symptoms, unilateral hearing loss, and should not otherwise be a routine initial investigation.^{17,18}

ANSWER 8

Consider referrals to a neurologist and otolaryngologist to assist in clarifying the diagnosis for prolonged or concerning dizziness. Referral to an otolaryngologist is indicated for persistent vertigo or dizziness that is resistant to conservative measures (diet and lifestyle) and does not resolve within two to three months, or is associated with other otolaryngology symptoms such as hearing loss. All patients should have formal audiometry done before the referral is made.^{19–21}

ANSWER 9

Formal pure-tone audiometry is required; a patient should be referred in the primary care setting if there are any other otological symptoms associated with vertigo. Formal vestibular assessment by an audiologist can often be performed by professional audiology centres, and an ENG and VEMP tests (usually ordered by otolaryngologist) may assist in the initial evaluation of balance function.

ANSWER 10

It is important to advise patients that there is no cure for Ménière's disease, but symptoms can often be well controlled.²² Symptom control from Ménière's disease should involve lifestyle management (Box 1), and medications that can reduce the frequency and duration of vertigo in most people. Tinnitus and hearing loss are less responsive to these conservative treatments. Spontaneous resolution of symptoms occurs in 60% of patients at two years.²³

Box 2. Lifestyle management of vertigo

Salt restriction to 3 g per day

Avoid caffeine

Avoid stress

Regular sleep

Remain physically active, avoid excessive fatigue

Medications are used to reduce endolymphatic pressure by reducing

sodium and water content of the endolymph. First-line prophylactic treatment is a thiazide diuretic. Most often, hydrochlorothiazide 25 mg orally, once daily, is prescribed.¹⁶ Alternatively, combination therapy with a thiazide diuretic and a potassium-sparing diuretic (eg amiloride, triamterene) may be used. When using thiazide diuretics, electrolytes should be monitored and replaced if required.

Betahistine is a vasodilator that has been used on the basis that it may increase blood supply to the inner ear, although this may not be its only mechanism of action in Ménière's disease. The starting dose of betahistine is 8 mg orally, increasing to 16 mg, two or three times per day.¹⁶

Specialist otolaryngologist management includes office procedures and surgery, which are reserved for patients in whom episodes of vertigo become intractable or disease progresses despite conservative management. Consideration may be given for the insertion of tympanostomy tubes, and middle ear infusion with either gentamicin or dexamethasone, or surgery to destroy the inner ear. Gentamicin infusions and surgeries that destroy the inner ear are considered for patients who already have poor hearing on that ear.

Referral to allied health professionals such as physiotherapists or audiologists who have an interest in vestibular disorders should only be done after consideration of potential diagnoses, to avoid inadvertently referring a patient with a sinister cause of their disorder. Ménière's support groups are a helpful resource for patients (refer to 'Resources for patients and doctors').

CONCLUSION

Lynne has had two further episodes of vertigo and was treated successfully with intratympanic dexamethasone. She has responded well post-injection and has so far had no further episodes of vertigo.

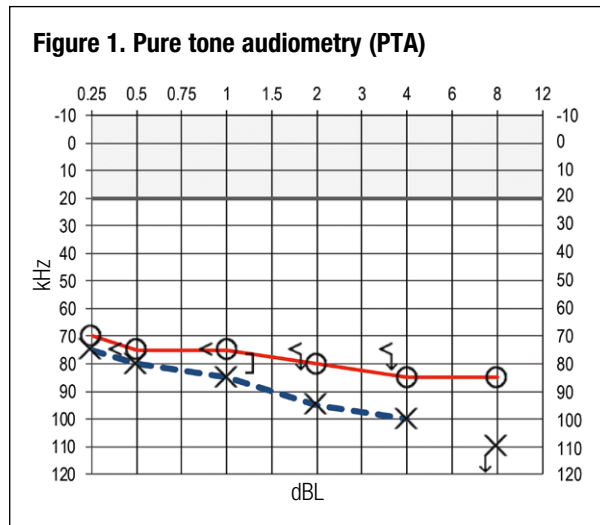
RESOURCES FOR PATIENTS AND DOCTORS

- Ménière's Australia is a national non-profit, non-government organisation that aims to promote and facilitate the development of Australia-wide services and support for those living with Ménière's disease and other vestibular conditions, www.Menières.org.au
- Neurosensory is a complete hearing healthcare company, owned by more than 50 ear, nose and throat (ENT) surgeons across Queensland, New South Wales and Victoria. Neurosensory provides comprehensive hearing and balance tests that are all personally reviewed by ENT surgeons, www.nsu.com.au

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QUESTION 3 📖

What are the differential diagnoses for SNHL?

QUESTION 4 📖

What investigations should you do? How would you exclude the differentials?

FURTHER INFORMATION

An MRI shows no retrocochlear pathology or demyelinating process.

QUESTION 5 📖

What is the diagnosis? What is the prognosis?

FURTHER INFORMATION

Further audiometry, including speech perception scores, confirms insufficient hearing amplification. He scores 10% in his better hearing ear and 0% in his worse hearing ear. With aiding he scores 50% in his better hearing ear and 35% in his worse hearing ear (Table 2).

Table 2. Ralph's speech audiometry				
	R – Unaided	R – Aided	L – Unaided	L – Aided
% correct	10	50	0	35

You refer Ralph to a cochlear implant program for further management and assessment.

QUESTION 6 📖

What does the cochlear implant program consist of? How is eligibility for a cochlear implant determined?

CASE 6 ANSWERS

ANSWER 1

Questions to ask Ralph include:¹

- Which ear is better at hearing?
- What was the onset and progression of your hearing loss?
- Have you had any ear discharge (otorrhoea)?
- Have you had any ear pain (otalgia)?
- Do you get vertigo?
- Do you get tinnitus?
- Have you had any ear operations or head trauma in the past?
- Do you have any exposure to loud noises?
- Do you have a family history of hearing loss?
- Do you have any past or current medical conditions?
- Are you on any medications (ototoxic potential)?

ANSWER 2

Non-pulsatile, high-pitched tinnitus is generally benign. For pulsatile tinnitus, an MRI to exclude causes such as arteriovenous malformations or high-riding jugular bulb is considered.

Physical examinations should include:

- otoscopy
- tuning fork tests (Rinnes and Weber)
 - Rinne test – using a tuning fork, strike the tuning fork lightly and place it first on the base of the mastoid bone, then in the air beside the ear. Normal hearing AC should be louder than BC. If $BC > AC$, then this indicates a conductive hearing loss. In SNHL $AC > BC$
 - Weber test – using a tuning fork, strike the tuning fork lightly and place it high on the forehead in the midline. Ask the patient if the sound is louder in one ear or another. If the sound lateralises there is either a conductive loss in the ear, which it lateralises, or an SNHL in the opposite ear
- cranial nerve examination
- pure tone audiometry
- tympanometry.

ANSWER 3

Sensorineural hearing loss may have the following underlying causes:

- presbycusis (age-related SNHL)
- noise-induced hearing loss
- acoustic neuroma
- autoimmune disease of the inner ear
- genetic SNHL

- Ménière's disease
- congenital SNHL
- enlarged vestibular aqueduct
- temporal bone fracture.

ANSWER 4

Noise-induced hearing loss could be detected in the history. Acoustic neuroma could be associated with central signs such as vertigo, tinnitus, and nystagmus and would be excluded with an MRI of the brain. Autoimmune disease is usually relapsing-remitting, associated with other neurological abnormalities (visual changes, gait disturbances). Genetic SNHL is suggested by a strong family history of hearing loss. Ménière's is associated with vertigo, tinnitus, aural fullness and a fluctuating usually low frequency SNHL. Congenital SNHL presents in the history; a younger person who has failed the newborn hearing screening program or someone who has not developed speech well indicates congenital loss. Testing of children for congenital deafness is done soon after birth and an abnormal test result warrants prompt referral to a specialist for further investigation.

Investigations should include:

- computed tomography (CT) scan of the temporal bone
- magnetic resonance imaging (MRI) of the brain and temporal bone.

Specialist referral (when the patient presents with hearing loss impacting on his daily living):

- otolaryngologist
- audiologist.

ANSWER 5

The likely diagnosis is presbycusis or age-related SNHL. It is generally a diagnosis of exclusion of other causes of SNHL. Age-related hearing loss is typically worse for high frequencies and is more severe in men.² The hearing loss is usually progressive and the rate at which hearing deteriorates accelerates with time.²

ANSWER 6

The cochlear implant program consists of a multidisciplinary team including:

- ear, nose and throat surgeons
- audiologists
- social workers
- speech pathologists
- administrative staff.

The program also provides access to additional hospital clinics, such as anaesthetics departments and occupational therapy.

In patients who do not receive adequate amplification from hearing aids, cochlear implantation is a management option. Current literature supports the use of cochlear implants in the elderly and has been

shown to improve quality of life, cognition and social functions in the elderly.³ With improvements in technology, surgical procedures are shorter and associated with fewer complications and lower device failure rates. There are no reported differences between older and younger patients.⁴ Advanced age is not a contraindication for a cochlear implant and all patients should be referred to an otolaryngologist for assessment.

The eligibility criteria for a cochlear implant vary between different centres but are based primarily on speech perception scores and must meet audiometric criteria. The Mater Hospital (Queensland) criteria are listed as an example in Table 3.

Speech perception guidelines	Audiometric guidelines	Additional guidelines
<ul style="list-style-type: none"> • Phoneme score ≤55% in the worse hearing ear • Phoneme score ≤75% in the better hearing ear 	<ul style="list-style-type: none"> • Flat/gradually sloping hearing loss: unaided PTA ≥ 75dB hearing loss in the worse hearing ear; unaided PTA ≥65dB hearing loss in the better hearing ear • Steeply sloping hearing loss: Some degree of hearing loss at 1 kHz, severe-profound hearing loss at 2 and 4 kHz 	<ul style="list-style-type: none"> • Evidence that auditory cues assist/ are expected to assist communication

CONCLUSION

Following extensive assessment and counselling, Ralph is found to be a cochlear implant candidate and undergoes left cochlear implantation surgery (his worse hearing ear). He continues to wear a hearing aid in his right ear.

Ralph undergoes speech perception testing 12 months after the cochlear implantation surgery. He achieves a score of 98% using his cochlear implant alone and 100% with the cochlear implant and hearing aid (binaural).

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ACTIVITY ID: 39561

EAR, NOSE AND THROAT

This unit of *check* is approved for six Category 2 points in the RACGP QI&CPD program. The expected time to complete this activity is three hours and consists of:

- reading and completing the questions for each case study
 - you can do this on hard copy or by logging on to the *gplearning* website, <http://gplearning.racgp.org.au>
- answering the following multiple choice questions (MCQs) by logging on to the *gplearning* website, <http://gplearning.racgp.org.au>
 - you must score $\geq 80\%$ before you can mark the activity as 'Complete'
- completing the online evaluation form.

You can only qualify for QI&CPD points by completing the MCQs online; we cannot process hard copy answers.

If you have any technical issues accessing this activity online, please contact the *gplearning* helpdesk on 1800 284 789.

If you are not an RACGP member and would like to access the *check* program, please contact the *gplearning* helpdesk on 1800 284 789 to purchase access to the program.

CASE 1 – JUSTINE

Justine is 17 years of age and presents with a sore throat, headache and sore neck. She has had these symptoms for five days.

QUESTION 1

According to the Centor criteria, Justine may have a Group A streptococcal (GAS) infection if she has:

- A. cervical lymphadenopathy and pus over her tonsils
- B. a history of cough and severe inflammation
- C. fever, no history of cough and pus over her tonsils
- D. cervical lymphadenopathy, history of cough and no abdominal pain.

FURTHER INFORMATION

Clinical findings and investigations confirm that Justine has streptococcal tonsillitis. She tells you that she has had several episodes of tonsillitis since the age of 15 years.

QUESTION 2

A tonsillectomy might be considered for Justine if she has had:

- A. five documented episodes of sore throat in the previous two years
- B. seven documented episodes of sore throat in the previous three years
- C. three documented episodes of sore throat in the previous year
- D. three documented episodes of sore throat in the previous two years.

CASE 2 – DOMINIC

Dominic is six years of age and comes to see you with his father, Alan. Dominic woke up during the previous night complaining of ear pain. You examine Dominic's ears and find that the tympanic membrane is dull, opaque, red and bulging, but not perforated, and mobility is reduced. Dominic does not have any other symptoms. Your diagnosis is acute otitis media. Alan tells you that Dominic has not had any problems with his ears before.

QUESTION 3

What would you recommend initially for Dominic, if he is not from a high-risk population?

- A. Amoxicillin 15 mg/kg
- B. Paracetamol 20–30 mg/kg
- C. Topical corticosteroids
- D. Observation for 48 hours

FURTHER INFORMATION

Dominic's condition resolves without antibiotics, but one month later he complains of ear pain again and Alan brings him to see you. At this presentation, you note that Dominic has a discharge in the ear canal and a bulging tympanic membrane. You prescribe antibiotics and review Dominic at weekly intervals but the discharge persists for more than six weeks.

QUESTION 4

How should you manage Dominic if he were an Aboriginal and Torres Strait Islander?

- A. Dry mopping of the ear every six hours followed by ciprofloxacin ear drops.
- B. Dry mopping of the ear every six hours and ciprofloxacin ear drops instilled every 12 hours for three days.
- C. Dry mopping of the ear every six hours and ciprofloxacin ear drops instilled every 12 hours until the ear is free of discharge for at least three days.
- D. Dry mopping of the ear every six hours and oral antibiotics for five days.

CASE 3 – AINSLEY

Ainsley, 46 years of age, presents with a hoarse voice, which he has had for the past three weeks. Ainsley is a member of an amateur theatre group and has a singing role in an upcoming musical production. He has been unable to sing with his hoarse voice and asks if there is any treatment you can prescribe. Ainsley does not have any other symptoms or significant medical history, and does not smoke or drink alcohol.

QUESTION 5

What initial step would you take in managing Ainsley?

- A. Assess Ainsley for underlying neurological or systemic conditions.
- B. Refer Ainsley for laryngoscopy.
- C. Treat Ainsley's hoarseness with antibiotics.
- D. Treat Ainsley's hoarseness with anti-reflux medication.

CASE 4 – BELLA

Bella is 10 years of age and presents with symptoms of allergic rhinitis. Bella also has asthma and takes an inhaled corticosteroid.

QUESTION 6

Which of the following is the best treatment option for Bella at this stage?

- A. Intranasal corticosteroid
- B. Montelukast
- C. Immunotherapy
- D. Oral antihistamine

QUESTION 7

Which of the following statements about immunotherapy is true?

- A. Subcutaneous immunotherapy is limited to a few allergens.
- B. Sublingual immunotherapy is widely available for various types of allergens.
- C. Subcutaneous immunotherapy is generally not suitable for children under the age of seven years.
- D. The doses of allergen required for subcutaneous immunotherapy are much higher than for sublingual immunotherapy.

CASE 5 – STACEY

Stacey, 45 years of age, comes to see you because she felt dizzy, lost her balance and stumbled on the pedestrian crossing on her way to the bus stop a week ago. A motorist stopped and assisted her, and she felt better after a few minutes but she has had two more episodes of dizziness since then. The last two episodes were much longer in duration and she felt a rocking sensation accompanied by a loss of balance, weakness, nausea and sweating. Stacey also tells you that she sometimes has difficulty hearing. You suggest that symptoms are consistent with a diagnosis of vertigo.

QUESTION 8

Which of Stacey's clinical findings is suggestive of a peripheral cause of Stacey's vertigo?

- A. Loss of balance
- B. Weakness
- C. Nausea and sweating
- D. Hearing loss

QUESTION 9

If Stacey had Meniere's disease, which of the following medications would you recommend as a first-line option to reduce the frequency and duration of vertigo?

- A. Promethazine
- B. Diazepam
- C. Hydrochlorothiazide
- D. Prochlorperazine

CASE 6 – SPENCE

Spence is 50 years of age and has been having hearing difficulties in the past three months. A Rinne test indicates sensorineural hearing loss (SNHL).

QUESTION 10

What is Spence's Rinne result likely to be?

- A. Air conduction (AC) is greater than bone conduction (BC)
- B. AC twice as long as BC
- C. BC>AC
- D. AC and BC are equal



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