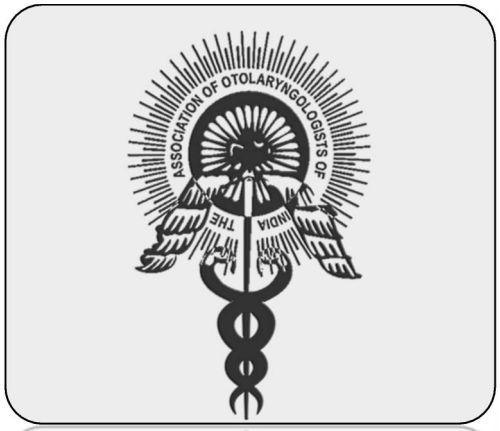

ASSOCIATION OF OTOLARYNGOLOGISTS OF INDIA

KERALA STATE BRANCH

GUIDELINES FOR MANAGEMENT

OF COMMON

OTO RHINO LARYNGOLOGICAL CONDITIONS

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PREFACE

Following the longstanding requirement felt by the otolaryngology fraternity of the state, AOI Kerala under the then President (2015-16), Dr. P. Gopikumar, decided on formulation of treatment guidelines for common ENT disorders. This would serve as a general guideline for the ENT consultant when confronted by equivocal situations in day-to-day practice, and also serve as a reference in dealing with medico-legal tangles. Thus, a technical committee was formulated and the draft formulated by the technical committee was discussed and revised by learned colleagues to prepare the final draft.

TECHNICAL COMMITTEE

Dr. P Gopikumar	-	President, AOI Kerala
Dr. Indudharan Menon	-	Convener
Dr. Shibu George	-	Otology
Dr. Suma R	-	Rhinology
Dr. Suchit Roy BR	-	Laryngology

Table of Contents

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EAR

Acute Otitis externa

(Key reference AAO HNS - 2014)

MANAGEMENT GUIDELINES

a. Analgesics recommended based on the severity of pain.

b. Systemic antibiotics not recommended for primary treatment for uncomplicated external otitis.
   But depends on severity and associated co-morbidities on presentation.

c. Extended Indications for Systemic antibiotics acute otitis externa
   1. Extension outside the ear canal causing peri-aural cellulitis
   2. Presence of specific host factors that can modify disease like diabetes mellitus.

d. Topical preparations should be prescribed for initial therapy of uncomplicated external otitis(these include antibiotic (eg: Ciprofloxacin/Ofloxacin)+ steroid ear drops , 1% Acetic acid irrigations)

e. Topical eardrops may be avoided if tympanic membrane is not visible or if there is known history of allergy to the drug.

f. Aural toilet orear packing (antibiotic steroid cream) or both should be performed when the ear canal is obstructed to facilitate topical drug delivery

g. Specific advises should be given to patients regarding avoidance of scratching, probing or inserting anything into the ear canal including ear buds

Malignant external otitis

(Key reference Medscape 2015)

Criteria for diagnosis

(Three or more criteria to be satisfied)

1) Refractory otitis externa
2) Severe nocturnal otalgia
3) Purulent otorrhea
4) Granulation tissue deep canal
5) Growth of Pseudomonas aeruginosa in culture
6) Presence of diabetes or any other immunocompromised state

Apart from the diagnostic criteria points of importance to be noted in diagnosis of malignant otitis externa:

- Inflammatory changes may spread to peri-aural tissue; deep tenderness may be elicited at the soft tissue between the ramus of mandible and mastoid tip.
- Tympanic membrane usually appears normal (if visualised).
- Persistent temporal headaches, altered mentation, diplopia, hoarseness, dysphagia and facial asymmetry may signify onset of complications.
- Other immunocompromised states apart from diabetes to be kept in mind including renal failure, transplant recipients, disseminated malignancies, anti-malignancy chemotherapy, lymphoproliferative disorders and AIDS.

Management

Investigations

- Do preliminary ESR / CRP to aid to monitor disease progression
- Take an ear swab for culture right at first visit, before initiating antibiotic therapy to direct future change in antibiotic therapy if needed
- HRCT temporal bone & skull should be the primary radiological investigation to assess extent of disease and complications.

Supportive investigations (Not mandatory)

- MRI evaluation is mainly indicated to supplement HRCT **in special situations** like suspected intracranial complications.
- When available Technetium (Tc 99) & Gallium (Ga 67) bone scintigraphy should be undertaken to evaluate status of skull base osteomyelitis (Optional).
- Technetium scan is useful in the initial evaluation since a positive uptake confirms the diagnosis of skull base osteomyelitis. Gallium scan (Negative Ga uptake) may be used monitor disease resolution and is hence may be used as a prognostic marker.
- Granulation tissue if present is obtained for biopsy/LA, to rule out malignancy of middle ear or external canal which has masqueraded as MEO.

Treatment - Medical Care

Antibiotics

1) Initial outpatient therapy may be started with oral ciprofloxacin in patients who do not require hospital admission for diabetes or pain management. The alternate drug is Levofloxacin.
2) Ciprofloxacin (750mg BID) should not be prescribed for patients withfluoroquinolone allergy, history of seizure disorder, cranial neuropathy or intracranial complications.
3) Hospitalized patients should be started on intravenous ceftazidime which as monotherapy is the drug of choice.
4) Antibiotic therapy may also be changed as directed by the sensitivity pattern of the initial culture swab obtained
5) The duration of antibiotic therapy should be prolonged (at least 6-8 weeks)
6) Reduction in pain within 48 hrs of starting therapy may be taken as the sign of sufficient therapeutic response; ESR/ CRP estimation may be used to monitor the disease progression.
7) Supportive…Gallium scintigraphy (if available) may be used to decide duration of antibiotic therapy. Antibiotic may be stopped 1 week after Gallium scan returns back to normal.

Adjuvant therapy:

1) Ototopic antimicrobial therapy may be initiated; preferably ciprofloxacin/ Ofloxacin + Dexamethasone. Irrigation with 1% acetic acid solution should supplement topical antimicrobials

2) Aural toilet – Suction clearance of the discharge, removal of granulations followed by packing of the canal with antibiotic steroid cream may contribute to bringing down local inflammation
3) Meticulous glycemic control should be maintained; change over to insulin (if on OHA), Appropriate consultation with general physician / endocrinologist need be initiated
4) Manage any condition other than diabetes predisposing to MEO appropriately

Acute otitis media

(Key reference - AAP 2013)

Since it is predominantly a disease of children, guidelines formulated considering the target population.

Definition:

AOM is the rapid onset of signs and symptoms of inflammation in the middle ear cleft.

History:

History of AOM varies with age.Constant features in different age groups are as follows

- Neonates: Irritability, excessive crying, ear tugging or feeding difficulties
- Older children: Fever and otalgia; there may be associated vomiting in some.
- Older children and adults: Hearing loss, earache; ear stuffiness is also noted
- Prior upper respiratory catarrh, nocturnal peak of otalgia followed by otorrhea may be common to all. Otorrhea usually mucopurulent and may herald the onset of pain relief.

Diagnosis:

Otoscopy is the gold standard. Look for

a) Congestion and signs of inflammation on the tympanic membrane
b) Bulging of the tympanic membrane
c) Small perforation on TM
d) Presence of an exudate oozing through TM with/without pulsation

Investigations:

Routinely not needed.

Management:

1. AOM management should include pain evaluation and appropriate treatment
2. Indications for antibiotics:

- Bilateral or unilateral AOM in children aged 6 months or above with severe signs or symptoms (moderate or severe otalgia or otalgia for 48 hours or longer or temperature 39°C or higher)
- Non-severe, bilateral AOM in children aged 6-23 months also should be started on antibiotics
- Unilateral, non-severe AOM in children aged 6-23 months or non-severe AOM in older children may be managed either with antibiotics and close follow-up.
- Children whose symptoms have worsened or not responded to the initial antibiotic treatment within 48-72 hours should be reevaluated and treatment changed if indicated (Follow up mandatory

3. Antibiotic policy in AOM
   - Amoxicillin (30 -50 mg/ kg/day) is the antibiotic of choice unless the child received it within 30 days, has concurrent purulent conjunctivitis, or is allergic to penicillin; in these cases, clinicians should prescribe an antibiotic with additional beta-lactamase coverage.
   - Duration recommended is 10 – 14 days, with follow up.
   - 2nd line antibiotics recommended are as follows
   - High-dose oral amoxicillin-clavulanate (80-90 mg/kg/day of amoxicillin component, 6.4 mg/kg/day of clavulanate component)
   - Oral cefuroxime axetil (suspension, 30 mg/mg/day; tablet, 250 mg twice daily)
   - Intramuscular (IM) ceftriaxone (administered as a single IM injection of 50 mg/kg on 3 consecutive days)
   - For children who are allergic to penicillin or beta-lactam Macrolides (5-day course of azithromycin/ 10-day course of clarithromycin) or Levofloxacin may be preferred.
4. Indications for Myringotomy
   - Failed antimicrobial treatment with signs of local or systemic sepsis
   - Complications requiring culture for adequate therapy

5. Recurrent AOM – More than 3 episodes in 6 months or 4 or more episodes in 1 year
   - In children with recurrent AOM ventilation tube insertion is recommended to reduce the frequency of AOM episodes
   - Ventilation tube insertion is not recommended in children with recurrent AOM who *do not* have middle ear effusion in either ear at the time of assessment.
6. Other recommendations
   - Pneumococcal conjugate vaccination is recommended in all children
   - Exclusive breastfeeding is recommended for 6 months or longer
   - Recurrent AOM in children, adenoidectomy to be considered.

Otitis Media with Effusion (OME)

(Key reference – AAO HNS 2016)

Synonyms: Serous, Secretory, Non suppurative OM, Middle ear effusion, Glue ear

Definitions

OME is defined as the presence of fluid in the middle ear without signs or symptoms of acute ear infection.

Chronic OME is defined as presence of middle ear fluid for more than 3 months from the date of onset (if known) or date of diagnosis (if onset unknown).

Diagnosis

- Otoscopy should be performed to rule out OME in children with earache, deafness or both.
- Otoscopy with visualized & documented presence of middle ear fluid should be the corner stone of diagnosing OME in children.
- If the diagnosis is uncertain after otoscopy, Tympanometry should be obtained in children with suspected OME
- Wax removal must be ensured before tympanometry. Ensure ear canal is free of wax or foreign body.

Treatment guidelines:

- Antibiotics, systemic steroids, decongestants or antihistamines are recommended for treatment of OME. However as an initial conservative management depending on associated clinical situations upto three months in children.
- Clinicians should obtain an age-appropriate hearing test if OME persists for ≥3 months ***OR*** for OME of any duration in an at-risk child, after ensuring ear canal wax clearance
- Children with OME may require grommet insertion/ Adenoidectomy

Guidelines for grommet insertion

Persistant OME lasting for more than three months in spite of conservative management with B type tympanogram and/or PTA with more than 40 dB COHL

Guidelines for associated adenoidectomy

i. Grommet insertion alone (WITHOUT adenoidectomy) is recommended if OME with hearing loss is persist more than 3 months; and no associated nasal / nasopharyngeal problems or OSAS is present.

ii. Clinicians may recommend Grommet insertion + adenoidectomy when surgery is performed for persistent OME.

iii. Adenoidectomy should not be performed unless there is a distinct indication (eg: severe nasal obstruction, OSAS) other than OME.

Chronic otitis media (COM)

Classification

- Healed COM – Healed perforation (Thin replacement membrane, usually circular in outline; use pneumatic otoscopy to confirm) OR Tympanosclerosis (chalk patches on TM).
- Active Mucosal – Central perforation with middle ear inflammation (mucopus, polyps or granulations in middle ear)
- Active squamosal – Cholesteatoma
- Inactive squamosal – Retraction pockets (either in pars tensa or flaccida)
- Inactive mucosal – Central perforation with normal middle ear

Clinical Diagnosis

Diagnosis mainstay is history &pneumatic Otoscopyto sub-classify into different types as mentioned above

Investigations

- Pure tone audiometry – Essential investigation
- Look for degree of hearing loss, magnitude of A-B gap, associated sensorineural loss if any and hearing status of the opposite ear
- Culture& sensitivity – Is only of value in active ears especially if suppurative complications are anticipated.
- Both bacteriological and fungal culture desirable, if unresolved or complicated
- Radiology – Not needed routinely.
- Indicated in suspected complications, inability to assess the TM (eg. Narrowed canal), revision surgery or in associated congenital anomalies.
- CT scan (1.5mm sections; coronal and axial) preferred over Xray or MRI.
- Outpatient microscopy/ Otoendoscopy – Desirable as it helps to plan surgery and has added advantage as a teaching aid. Aid in preliminary management (aural toilet) as well.

Management

Healed otitis media

a. Needs no further treatment if hearing is normal.
b. If there is conductive hearing loss of >35 db the patient may be offered option of Tympanoplasty
c. Informed consent for guarded success in the presence of tympanosclerosis or middle ear adhesions.
d. Hearing aid is an alternative for surgery

Mucosal disease

a. Aural toilet and topical antibiotic with topical steroids should be the preliminary management in active ears which aids in better clinical evaluation as well.
b. Topical fluroquinolones are preferred to aminoglycosides due to theoretical risk of ototoxicity.
c. Appropriate treatment of co morbidities like respiratory allergies, tonsillo-pharyngitis, nasal and sinus disease should be initiated.
d. Definitive management is tympanoplasty with appropriate ossicular reconstruction.
e. Cortical mastoidectomy need to be added in persistent activity despite adequate initial management.

Squamosal disease

Inactive Squamosal

a. Adults - If the retraction pocket is stable with no hearing loss regular follow up with microscopic suction clearance as and when necessary should be advised.
b. If there is associated hearing loss of >35db &/ or persistent discharge a tympanoplasty need be done.
c. Inactive disease may need surgery in swimmers and hearing aid users.
d. Children - There is a greater likelihood of progression of the pocket. If the hearing is normal frequent follow up need be advised with a low threshold for surgery in the event of noticing progression of the retraction. If there is hearing loss with a significant pocket a tympanoplasty with appropriate reconstruction should be offered.

Active Squamosal

a. Patients with confirmed cholesteatoma need surgery to eradicate the disease, improve the hearing and have a self-cleaning epithelialized ear.
b. Mastoid exploration with appropriate tympanoplasty procedure should be contemplated

c. Type of mastoidectomy may be chosen based on the extent of disease, reliability of the patient, hearing status of the opposite ear, surgeon's experience and surgeon preference.

Permanent childhood hearing Loss

(Key references AAO-HNS, ASHA 2014)

Aims of management

1. To Screen all at-risk infants right in the neonatal nursery to rule out hearing loss
2. All children to be screened for hearing loss no later than 1 month of age
3. hearing and medical evaluations to be completed no later than 3 months of age
4. To fit Infants with confirmed hearing loss with amplification
5. Early intervention services to begin no later than 6 months of age
6. To engage the parents in various aspects of the evaluation and treatment

At-risk neonates to be screened at birth

a. H/O Maternal infections (TORCH)
b. Prematurity
c. Low birth weight
d. Birth injuries/ asphyxia
e. Kern icterus
f. Maternal drug & alcohol abuse
g. Maternal diabetes
h. Toxemia of pregnancy
i. Anatomical abnormalities of head&neck
j. Genetic syndromes (Treacher Collins, Goldenhar, Alports, Usher, CHARGE, Waardenburg)

Conditions causing permanent hearing loss after birth

a. Ear infections
b. Ototoxic drugs
c. Meningitis/ Encephalitis
d. Measles
e. Chicken pox
f. Mumps
g. Head injury
h. Noise exposure.

Screening

Neonatal screening

'At risk' Neonates require the full test battery even if they pass the initial screen
To be initiated with otoacoustic emissions at birth in the neonatal nursery.
Re-test advised in those children who fail the first screen at 3 weeks and 6 weeks.
If still negative deafness should be confirmed with ABR testing at 3 months of age.
Infants who pass the neonatal screening but have a risk factor should have a repeat audiology assessment by 24 to 30 months of age.
Early and more frequent repeat assessments may be indicatedfor children with maternal TORCH infections, genetic syndromes associated with progressive hearing loss, neurodegenerative disorders, trauma or postnatal infections like meningitis or with a family history of hearing loss.

Test battery at 0- 6 months

Otoacoustic emissions, automated ABR, Acoustic Imittance measurements (Tympanometry + ASR)

Test battery at 6- 36 months

Behavioural observation audiometry (conditioned play audiometry & visual reinforcement audiometry), Speech audiometry, ABR, Otoacoustic emissions and Immitance measurements

Test battery at 3 – 5 years

Pure tone audiometry, speech audiometry, ABR, Otoacoustic emissions and acoustic immitance measurements

Management

Hearing aids

- Children with any degree of hearing loss that has the potential to impede access to speech should be made to fit hearing aids as soon as possible; at least within 1 month of diagnosis.
- Candidates include children with permanent bilateral hearing loss, unilateral hearing loss, auditory neuropathy and cochlear implant candidates as trial amplification period.
- Behind-the-ear (BTE) is the most commonly recommended type of device for infants and young children.Binaural amplification is to be provided to young children with bilateral hearing loss as far as possible.

Cochlear Implant (CI)

Children not benefited by hearing aid trial should be counselled for cochlear implantation. Candidacy criteria for CI is as follows:

- Bilateral severe-to-profound sensorineural hearing loss;
- Age of 1 year or older (a few exceptions based on aetiology eg. meningitis)
- No benefit from binaural hearing aid & intensive auditory training
- Absence of chronic middle ear pathology, lesions of the VIIIth cranial nerve& central auditory pathway and other medical issues that contraindicate surgery
- a family commitment to post-implant rehabilitation process with a realistic expectation for cochlear implant use and benefit.
- Children diagnosed with Auditory neuropathy/dyssynchrony

Idiopathic Sudden SNHL

(Key reference AAO HNS, AAN)

Definitions

- Sudden SNHL is defined as a rapid-onset sensorineural hearing impairment, occurring over a 72 hour period, in one or both ears, with decrease in hearing thresholds of greater than or equal to 30 decibels, affecting at least three consecutive frequencies.
- Idiopathic sudden sensorineural hearing loss (ISSNHL) is defined as SSNHL with no identifiable cause despite adequate investigations

Evaluation – Aims & Recommendations

a. If audiometry confirms a 30 dB hearing loss at three consecutive frequencies AND an underlying condition cannot be identified by history and physical examination a presumptive diagnosis of idiopathic Sudden SNHL may be entartained.
b. Differentiate conductive from sensorineural hearing loss in all patients presenting with sudden hearing loss.
c. Rule out *bilateral* sudden hearing loss, *recurrent* sudden hearing loss and hearing loss as a part of other neurological deficits (from Idiopathic Sudden SNHL) in all patients since the approach should be different.
d. Retrocochlear pathology like acoustic neuroma need be ruled out by obtaining an MRI, Auditory Brainstem Response (ABR), or audiometric follow-up.
e. CT scan of head/brain is NOT indicated in the initial evaluation of a patient with presumptive SSNHL.
f. Routine laboratory tests NOT immediately necessary in patients with such presumed ISSNHLto avoid false positives, delay in diagnosis and treatment.

Management.

- Systemic corticosteroids should be offered as the initial therapy to patients with ISSNHL.
- Antivirals, thrombolytics, vasodilators, vasoactive substances, or antioxidants are NOT 'routinely' indicated in patients with ISSNHL.
- However, there may be patient specific indications for each of these options that may be reasonable to try on an individualized basis.
- Intra tympanic steroid perfusion or Hyperbaric oxygen therapy (if facilities available) may be offered to patients having incomplete recovery from ISSNHL after failure of initial management.

Follow up

Follow up audiometric evaluation is recommended within 3- 6 months to rule out progressive hearing loss.

Bell's palsy

(Key references AAO HNS & AAN)

Definition

Bell's palsy is defined as rapid onset (within 72 hrs) of unilateral LMN facial palsy.
(Bilateral Bell's palsy is rare)

Diagnostic guidelines

- Bell's palsy is diagnosed when no other etiology is identified as a cause of the facial weakness.
- It is a diagnosis of exclusion requiring the careful elimination of other causes of facial paresis or paralysis.
- Other conditions causing facial paralysis, include stroke, brain tumors, parotid tumors, facial nerve malignancies, ear infections and systemic diseases including Herpes zoster, sarcoidosis, and Lyme disease
- Bell's palsy has been observed to be commoner in15-45 age group, those with diabetes, immunocompromise or during pregnancy.
- Preceding upper respiratory catarrh has been reported.
- Bell's palsy is typically self-limiting

Management guidelines

a. Detailed evaluation with history and physical examination to exclude identifiable causes of facial paralysis is recommended in all patients presenting with acute onset unilateral facial paralysis.
b. Laboratory testing or diagnostic imaging is not routinely indicated in patients thus diagnosed with Bell's palsy.
c. Oral steroids are indicated within 72 hours of onset of symptoms in patients with Bell's palsy.
d. Oral antiviral therapy may be added in addition to oral steroids within 72 hours of onset for patients with Bell's palsy.
e. Eye care precautions should be carried out in patients with Bell's palsy presenting with impaired eye closure.
f. Electrodiagnostic testing is not routinely indicated in patients with Bell's palsy.

g. Surgical decompression is not routinely indicated. However, the need for the same has to be individualized based on the level of recovery of facial nerve function after onset of palsy.
h. Physiotherapy is not routinely indicated in patients with Bell's palsy.
i. Neurology reference is recommended in patients with new or worsening neurologic findings or incomplete facial recovery even after three months after initial onset of symptoms.

Meniere's disease

(Key reference AAO-HNS)

Definition

Meniere´s disease is defined as recurrent, spontaneous episodic vertigo, hearing loss, aural fullness and tinnitus caused by endolymphatic hydrops

Diagnostic Criteria for definitive diagnosis

i. Two or more definitive spontaneous episodes of vertigo 20 minutes or longer
ii. Audiometrically documented hearing loss on at least one occasion
iii. Tinnitus or aural fullness in the affected ear
iv. Other cases excluded

Investigations

- Pure tone audiogram – Predominantly low frequency SNHL during early stages; involvement of other frequencies as disease progress. Evidence of recruitment.

The following may be done if diagnosis is in doubt

- Electrocochleography (if available) – Shows SP/AP ratio > 35
- Investigations to rule out other causes of endolymphatic hydrops - Include serum TSH, ESR, VDRL, Lipid profile
- MRI brain - to rule out retrocochlear lesions

Management

Advices

Low salt diet, avoidance of alcohol, smoking, caffeine, chocolates, cola, junk food and water restriction during acute attack

Therapy during acute episode

Rest, anxiolytics (Diazepam), Labyrinthine sedatives (Promethazine, Meclizine, Cinnarazine), Anti-emetics (Scopalamine)

Drug treatment in established cases

- Drugs to lower endolymph pressure - Hydrochlorothiazide, Azetazolamide
- Anti-inflamamtory (if autoimmune aetiology suspected) – Corticosteroids (May also be delivered as intra-tympanic injections)

- Intra-tympanic Gentamycin – Effective in majority of cases; ideal in unilateral disease in older individuals. Warn patients about potential danger of cocohleotoxicity

Surgical Options

- In patients unresponsive to drug treatment or Intra-tympanic therapy
- Vestibular neurectomy, Endolymphatic shunt surgery
- Labyrinthectomy -In unilateral disease

Benign Paroxysmal Positional Vertigo (BPPV)

Definition:

Recurrent episodes of rotational vertigo, often severe in intensity, precipitated by change in position of the head and neck in relation to the gravity vector, associated with severe nausea and vomiting, in the absence of auditory symptoms

Diagnosis

Positional testing – Must for all patients with vertigo precipitated by change in position; to differentiate from central lesions like cerebellar infarction & brainstem tumors.

Treatment Guidelines

BPPV should be treated by canalolith repositioning manoeuvre.

NOSE AND PARANASAL SINUS DISEASES

Antihistaminics in Pregnancy

No definite teratogenic effects have been reported to be associated with intake of antihistamines in pregnancy. However there had not been an FDA approval for antihistamines in pregnancy. Hence decision should be on a risk benefit ratio.

In India, there are no definite guidelines for use of H1 antihistamines. Preferably all antihistamines should be avoided in first trimester. If it has to be prescribed, choice should be first generation drugs like chlorpheniramine, dexchlorpheniramine and hydroxycine. The patient should be advised to take plenty of oral fluids to counter anticholinergic effects. Second generation antihistamines like loratadine and cetrizine should be preferred, if essential in second trimester.

Rhinosinusitis

(Key reference – Clinical practice guidelines update 2015 (AAOHNS update), EPOS 2012)

Most ARS begins when a viral upper respiratory infection (URI) extends into the paranasal sinuses, which may be followed by bacterial infection. The importance of ABRS relates not only to prevalence but also to the potential for uncommon, but serious, complications that include meningitis, brain abscess, orbital cellulitis, and orbital abscess

Rhinosinusitis is defined as symptomatic inflammation of the paranasal sinuses and nasal cavity.

Uncomplicated rhinosinusitis is defined as rhinosinusitis without clinically evident extension of inflammation outside the paranasal sinuses and nasal cavity at the time of diagnosis (eg, no neurologic, ophthalmologic, or soft tissue involvement).

Rhinosinusitis may be classified by duration as **acute** rhinosinusitis (ARS) if less than 4 weeks' duration or as **chronic** rhinosinusitis (CRS) if lasting more than 12 weeks, with or without acute exacerbations. Recurrent ABRS: 4 or more episodes per year of ABRS without signs or symptoms of rhinosinusitis in between. Rhinosinusitis lasting 4 to 12 weeks, sometimes called **subacute** rhinosinusitis. Decisions about whether such patients are more like ARS or CRS must therefore be individualized.

The etiology of CRS is incompletely understood. Current understanding supports inflammation, rather than infection, as the dominant etiologic factor.

Diagnosis

Mainly clinical

Acute rhinosinusitis

upto 4weeks of purulent nasal discharge (anterior / posterior / both) accompanied by facial fullness-pressure or pain or both.

When to diagnose acute bacterial rhinosinusitis which necessitates antibiotic therapy

When (a) symptoms or signs of acute rhinosinusitis (purulent nasal drainage accompanied by nasal obstruction, facial pain-pressure-fullness, or both) persist without evidence of improvement for at least 10 days **beyond the onset of upper respiratory**

symptoms, or (b) symptoms or signs of acute rhinosinusitis worsen within 10 days **after an initial improvement (double worsening)**

Imaging in acute rhinosinusitis is not ordinarily required unless complication or alternative diagnosis is suspected, when imaging becomes useful.

Complications of ABRS include orbital, intracranial, or soft tissue involvement. Alternative diagnoses include malignancy and other noninfectious causes of facial pain. Radiographic imaging may also be obtained when the patient has modifying factors or comorbidities like diabetes, immune-compromised state, or a history of facial trauma or surgery

Treatment:

1) Analgesics, intranasal corticosteroids, saline irrigation (recommended for symptomatic relief of viral rhinosinusitis or ABRS)

2) Topical decongestants should not be used for long periods without a prolonged intervening drug-free period due to their propensity to cause rebound congestion and rhinitis medicamentosa.

3) Antihistamines may have an ancillary role if there is concomitant allergy.

4) Start antibiotic therapy once ABRS is diagnosed

Amoxicillin with or without clavulanate or Macrolides are recommended as first-line therapy for 5 to 10 days for most adults.

5) **If the patient fails to improve with antibiotic therapy by 7 days after diagnosis or worsens during the initial management exclude other causes of illness, and detect complications. Change the antibiotic if there is no response or worsens.**

6) For penicillin-allergic patients, either doxycycline or a respiratory fluoroquinolone (levofloxacin or moxifloxacin) is recommended. Combination therapy with clindamycin plus a third-generation oral cephalosporin (cefixime or cefpodoxime) is recommended in adults with a history of non–type I hypersensitivity to penicillin.

Chronic Rhinosinusitis (CRS)

Diagnosis:

12 weeks or more of symptomatic period with poor or no response to treatment

(Clinical diagnosis of CRS with objective documentation of sinonasal inflammation, which may be accomplished using anterior rhinoscopy, nasal endoscopy, or computed tomography)

Recurrent ABRS: 4 or more episodes per year of ABRS without signs or symtoms of rhinosinusitis in between

In unresponsive CRS, asthma, cystic fibrosis, immunocompromised state, and ciliary dyskinesia may be considered.

Chronic rhinosinusitis without polyp: mild (VAS 0-3) (no serious mucosal disease at endoscopy)

Intranasal corticosteroid with nasal saline irrigation

If there is improvement, follow-up with nasal saline irrigation and intranasal corticosteroid.

If there is no improvement after 3months or if the VAS is > 3-10 moderate/severe with mucosal disease at endoscopy - intranasal corticosteroids with nasal saline irrigation and consider culture and long term antibiotic (if IgE not elevated). CT scan to be taken if not done before and consider surgery. After surgery follow-up with saline irrigations & intranasal corticosteroids.

Chronic Rhinosinusitis with Polyp

Mild: Intranasal corticosteroid spray with nasal saline irrigation. Review after 3months. If there is improvement, continue the same treatment and review every month.

Moderate with mucosal disease at endoscopy: intranasal corticosteroid spray with nasal saline irrigation. Consider increasing the dose of spray, consider long term antibiotic (doxycycline). If no improvement do radiological evaluation and proceed with surgery. If there is improvement follow up with intranasal corticosteroid.

Severe > 7-10 mucosal disease at endoscopy: Apart from intranasal corticosteroid with saline nasal spray, start a short course of oral corticosteroid. If no improvement after 1month , consider radiological evaluation and surgery& follow-up.

Consider urgent investigation & intervention if there is evidence of complications.

Management in special circumstances

Asthma and rhinosinusitis

1) When CRS is treated (medically or surgically), asthma symptoms improve and the need for asthma-related medications decreases
2) GERD and rhinosinusitis:
   Patients with clinically significant GERD should be managed accordingly, but whether treating mild or subclinical GERD can affect rhinosinusitis is unknown.

3) If allergy testing is positive and appears clinically relevant based on individual assessment, management may include environmental control measures, pharmacologic therapy, or immunotherapy as an immunomodulating approach.

The clinician may obtain testing for allergy and immune function in evaluating a patient with chronic rhinosinusitis or recurrent acute rhinosinusitis when aggressive management has failed or when sinusitis is associated with otitis media, bronchiectasis, or pneumonia.

Chronic rhinosinusitis in children:

The four most common clinical symptoms are cough, rhinorrhea, nasal congestion, and post nasal drip with a slightly higher predominance of chronic cough. The adenoids are a prominent contributor to CRS in young children. Management is similar.

In moderate – severe cases or in mild cases with no improvement, consider adenoidectomy / FESS after radiological evaluation.

Fungal Rhinosinusitis

DIAGNOSIS:

Classified into invasive and non-invasive based on presence or absence of tissue invasion by fungal hyphae

Invasive fungal rhinosinusitis:

Clinical signs of suspicion:

1. Unresolved rhinosinusitis even after adequate antibiotic therapy
2. Extensive intranasal sloughing
3. Numbness of cheek
4. Diminution or loss of vision on side of involvement
5. External ophthalmoplegia on side of involvement
6. Black escar in nasal mucosa
7. Palatal blanching especially unilateral
8. Uncontrolled diabetes mellitus, signs of renal impairment

Acute invasive: disease of < 4weeks duration in an immunocompromised patient. High index of suspicion is needed for early diagnosis. This is the most dangerous and life threatening form of fungal sinusitis.

2 criteria for diagnosis: radiologic evidence of sinusitis and demonstration of fungal hyphae in the bone, submucosa or vessels.
Usually caused by Saprophytic fungi of the order Mucorales, including *Rhizopus, Rhizomucor, Absidia, Mucor, Cunninghamella, Mortierella ,Saksenaea,* and *Apophysomyces* species and also by Aspergillus.
Seen in immunocompromised patients. Very rarely in immunocompetent individuals. Apophysomyces elegans causes acute invasive fungal rhinosinusitis in immunocompetent individuals.
Early physical findings on endoscopy include pallor of mucosa, decreased bleeding on abrasion of mucosa. Later black eschar with necrosis develops which can extend to the palate.

TREATMENT: Must be started as soon as provisional diagnosis is made which includes
1) repeated surgical debridement till bleeding points are obtained 2) appropriate antifungal therapy 3) reversal of immunocompromised state wherever possible
Long term follow-up

Chronic invasive

Seen in subtle immunocompromised states like elderly diabetic.
Patients present with symptoms of long-standing sinusitis, over at-least 3months duration. Symptoms are usually not acute, and fever and mental status changes are absent.
Commonly caused by Aspergillus fumigatus, occasionally mucor
Treatments include surgical debridement with antifungal therapy and long term follow-up.

Chronic granulomatous invasive rhinosinusitis

Relatively rare. Usually seen in immunocompetent individuals, usually caused by Aspergillus flavus.
The disease has a relatively slow time course over 3 months, and patients present with an enlarging mass in the cheek, orbit, nose and sinuses
Treatment includes surgical debridement, antifungal therapy and long term follow-up.

Antifungal therapy:

Invasive aspergillus rhinosinusitis:
Primary therapy: Voriconazole (6 mg/kg IV every 12 h for 1 day, followed by 4 mg/kg IV every 12 h; oral dosage is 200 mg every 12 h)

Alternate therapy: L-AMB (3–5 mg/kg/day IV), ABLC (5 mg/ kg/day IV), caspofungin (70 mg day 1 IV and 50 mg/day IV thereafter), micafungin (IV 100–150 mg/day; dose not establishedc), posaconazole (200 mg QID initially, then 400 mg BID PO after stabilization of diseased), itraconazole (dosage depends upon formulation)

Invasive mucor rhinosinusitis: Liposomal amphotericin or conventional amphotericin(if tolerated) with or without Itraconazole, Poceconazole, Voriconazole.

Non-invasive fungal rhinosinusitis

Fungal ball:
Extra mucosal masses of fungal hyphae without any evidence of invasion.
Commonly caused by Aspergillus. Usually single sinus is involved. Most commonly involved sinuses are the maxillary & sphenoid sinuses where the fungus finds favourable conditions such as humidity & warmth for growth.
Treatment includes removal of fungal ball through endoscopic sinus surgery.
Antifungal treatment usually not recommended.

Allergic fungal rhinosinusitis:
Allergic reaction to aerosolized environmental fungi, usually of the dematiaceous species, in an immunocompetent host.
Diagnosis:
Patients with allergic fungal sinusitis (AFS) normally present with signs and symptoms of nasal airway obstruction, allergic rhinitis, or chronic sinusitis. Type I (IgE-mediated) hypersensitivity to fungi, nasal polyposis, characteristic hetero-dense radiographic findings, eosinophilic mucin without fungal invasion into sinus tissue, and positive fungal stain of sinus contents removed at the time of surgery.
Treatment:
Endoscopic sinus surgery to clear polyps and allergic mucin and to restore the ventilation and drainage of sinuses. This has to be combined with aggressive medical therapy with corticosteroids which can be given nasally and/or systemically. Patient may also benefit from immunotherapy and antihistamines.
Antifungal therapy is usually not required as it is the reaction to fungus that needs to be treated. However in severe recalcitrant disease, antifungal therapy may be needed.

Chronic adenoiditis: Indications for adenoidectomy

History:

a. Four or greater episodes of recurrent purulent rhinorrhea in prior 12 months in a child 3 months or associated with additional sets of grommet.
b. Persisting symptoms of adenoiditis after two courses of antibiotic therapy. One course of antibiotics should be with a B-lactamase stable antibiotic for at least two weeks.
c. Sleep disturbance with nasal airway obstruction persisting for at least 3 months
d. Hyponasal speech.
e. Otitis media with effusion >3 months / recurrence of OME after grommet.
f. Dental malocclusion or oro-facial growth disturbance documented by orthodontist or dentist.
g. Cardiopulmonary complications including cor pulmonale, pulmonary hypertension, right ventricular hypertrophy associated with upper airway obstruction
h. Otitis media with effusion (age 4 or greater)

For infectious conditions, it is recommended that documentation of infections be obtained. For hypertrophy and other noninfectious conditions documentation should include information regarding growth, weight gain, daytime performance issues such as behavior and attention, any medical condition necessitating removal of the adenoids. Adenoid size is immaterial when the indication is sinusitis, adenoiditis, or otitis media with effusion.

Allergic symptoms should have been treated with an adequate trial of allergy therapy prior to evaluation for non-infectious conditions which include intra nasal corticosteroids.

2. Physical Examination

a. Description of uvula, palate, tonsils, nasal airway, cervical lymph nodes.
b. Evaluation of adenoids by mirror, palpation, nasal endoscopy or imaging only as necessary
c. Assessment for signs of hypernasal speech or risk factors for postop voice disturbance

3. Tests (If abnormality suspected by history, physical examination)

a. Coagulation and bleeding evaluation based on personal or family history
b. Radiographs (lateral neck or cephalometric)
c. Sleep tape recording (if documentation of snoring or apnea required)
d. Polysomnography in children at high risk for respiratory compromise.

THROAT

Oral mucosal lesions

Herpes simplex infections

- Caused by Herpes simplex Type I virus
- Can affect lips, gums, palate or oropharynx. Two types: Primary and Secondary

Treatment

- Symptomatic treatment is all that is needed normally
- Acyclovir cream may be tried in Herpes labialis
- In immunocompromised, Acyclovir 200mg Q5H x 5 days

Coxsackie virus infections

- Children, particularly less than one year are more susceptible

Herpangina

- Coxsackie A virus mainly but may be caused by Coxsackie B or Echoviruses also
- Lesions are seen in oropharynx, mainly tonsils, pillars, soft palate and uvula
- Present as 2-5 vesicles which rupture producing ulcers 2-4mm size
- They heal in a week's time
- Only symptomatic treatment required

Hand foot and mouth disease

- Coxsackie A virus mainly but may be caused by Enterovirus too
- Usually affects children, but adults may be affected
- Fever 101 – 103^0F
- Painful blisters on the tongue, gums and cheeks (anterior oral cavity mainly)
- Flat discoloration that may blister, involving the skin of the hands and feet follows
- Occasionally buttocks and genitalia are affected
- Self limiting disease (7-10 days) which is treated symptomatically

Vincent' Angina

Clinical features

- Infection starts over gums and spreads to tonsils, usually unilateral
- The tonsil shows gray slough which on removal, bleeds
- Diagnosis is by smear examination

Treatment

- Attention to dental hygiene is paramount
- Oral rinse/gargle with warm saline, dilute H_2O_2
- Penicillins and Metronidazole are the drugs of choice
- In the penicillin hypersensitive, Erythromycin may be used

General Glossitis

Treatment

- Removing triggers if any
- Treating cause and supportive including oral hydration
- Analgesics, steroids (oral/topical rinse)

Other tongue lesions

Fissured tongue

Congenital is seen in Melkersson Rosenthal syndrome
Associated with alternating facial palsy
Acquired is seen in syphilis & anemia

- Geographic tongue may rarely precede fissuring
- It may sometimes be associated with Herpes simplex infection
- Reassurance. If painful, analgesics are prescribed
- Herpetic lesions require oral Acyclovir 200mg Q5H X 5d

Tongue tie (Ankylogolssia)

- Usually no speech symptoms if tongue can be protruded beyond lower incisors

- Thick significant tongue tie requires surgical division
- Cut horizontally and suture vertically

Aphthous ulcers

Treatment

- Address correctable causes
- Analgesics (topical and systemic)
- Steroids, topical and systemic (short term in recurrent severe)
- Frequent oral rinse

Pemphigus vulgaris

Treatment

- Mortality 5-15%. Confirmation by biopsy of lesions.
- Skin and mucous membrane lesions resembling burns. Nikolsky's sign +
- Treatment is Prednisolone 1mg/kg with azathioprine
- In severe cases, cyclophosphamide may be used

Oral Leukoplakia

It is most commonly seen on buccal mucosa. Other areas are affected as well
It is **PRE-MALIGNANT**. Chance of malignant transformation is 5-7%
Lesions on ventral tongue and floor of mouth have more malignant potential
Four types are described

- *Homogenous*
- *Non-homogenous*
- *Proliferative verrucous*
- *Erosive (Erythroleukoplakia)*

Treatment

- Leukoplakias need close observation

- Total elimination of potential pre-disposing factors are elimination
- Homogenous leukoplakia may be observed
- Persistent homogenous and other types are excised and sent for HPE

Other pre-malignant lesions of oral cavity

Oral Sub-mucous Fibrosis

Treatment

Medical

- Avoiding all irritants
- Local steroids
- Hylase injections
- Vitamin supplementation
- Jaw opening exercises

Surgical

- Division of fibrous bands with or without flap interposition
- Division may be with cold steel or laser
- Coronoidectomy
- Temporal muscle division

Chronic Hyperplastic candidiasis

Treatment: Rule-out immunodeficiencies

Mild cases	Topical Clotrimazole Q5H
In moderate/severe cases	Oral Fluconazole 100mg Q24H x 7-14 days*
In pregnancy	Topical Clotrimazole Q5H
In immunosuppressed	Oral Fluconazole 100mg Q24H x 7-14 days*

In immunosuppressed (recurrences)	Posaconazole 400mg Q12H x 28 days
In immunosuppressed (for prophylaxis) if CD4 <150cells/mm3	Fluconazole 100mg thrice weekly (till CD4 >200cells/mm^3)

*Alternative therapy: Itraconazole oral solution 200 mg PO daily OR

Posaconazole oral suspension 400 mg PO BID x 1 day, then 400 mg daily

Patchy lesions of oral cavity if not subsiding with conservative management must be biopsied and treated accordingly

Plummer Vinson syndrome

Dysphagia of more than six weeks if not responding to conservative management should be subjected radiologic imaging and endoscopy

Pharyngeal mucosal lesions

Pharyngitis

Cause

- Nasal allergy
- Post-nasal drip
- Laryngo-pharyngeal reflux disease
- Environmental/industrial pollution
- Infective

Viral pharyngitis

Treatment

- Analgesics and supportive measures

- Oseltamivir in Influenza
- In children less than two years
- Adults more than 65 years
- Diabetes, pregnancy, liver and kidney disease, immunosuppressed
- **Antibiotics are indicated only in secondary bacterial infection**

Infectious mononucleosis

Cause

Epstein-Barr virus

Diagnosis

Paul Bunnel test / Monospot test for heterophile antibodies

Treatment

- Supportive
- **Antibiotics only in secondary bacterial infection**
- Up to two weeks for complete resolution

Bacterial pharyngitis

More common in children (30-40% of cases)
It is mostly caused by GABHS (Streptococcus pyogenes)
Treatment is as for tonsillitis

Tonsillar Lesions

Acute Tonsillitis

Causes

- Causative agent is GABHS mostly

- May be caused by Non-Group A β Hemolytic streptococci, Staphylococci, Pneumococci or Hemophilus influenza
- It is mostly a disease of childhood

Diagnosis

- Rapid Antigen Detection tests (RADT) – Latex agglutination or ELISA – from swabs or throat culture. **(NOT AVAILABLE IN INDIA)**
- RADTs are highly specific but less sensitive. Culture only if RADT is negative
- **ASO titers are not useful in acute tonsillitis**

Treatment (Infectious Disease Society of America [IDSA] 2012)

Children

- Penicillin V 250 mg twice daily or 3 times daily x 10 days **(narrow spectrum only)**

Adolescents and adults

- Penicillin V 250 mg 4 times daily or 500 mg twice daily **OR**
- Amoxicillin 50mg/kg (maximum of 1000 mg) OD x 10 days

Penicillin-allergic individuals

- First generation cephalosporin for 10 days **OR**
- Clindamycin for 10 days **OR**
- Clarithromycin for 10 days **OR**
- Azithromycin for 5 days

Supportive: Rest, Salt water gargle, Lozenges, Analgesics/NSAIDS

Treatment Regimens for Chronic Streptococcal carriers (Asymptomatic throat culture positivity or ASO Titre>200)

- During a community outbreak of acute rheumatic fever, acute post-streptococcal glomerulonephritis, or invasive GABHS infection
- During an outbreak of GABHS pharyngitis in a closed or partially closed community
- In the presence of a family or personal history of acute rheumatic fever
- When tonsillectomy is being considered only because of carriage
- Drugs
  - Amoxicillin–Clavulanic acid 40 mg amoxicillin/kg/d in 3 doses (max 2000 mg amoxicillin/d) x10 d **OR**

- Clindamycin 20–30 mg/kg/d in 3 doses (max 300 mg/dose) x 10 d **OR**
- Penicillin & Rifampicin: Penicillin V: 50 mg/kg/d in 4 doses × 10 d (max 2000 mg/d) & Rifampicin: 20 mg/kg/d in 1 dose × last 4 d of treatment (max 600 mg/d)

Tonsillitis by other bacteria in adults

- Usually self-limiting. Only analgesics and supportive measures are needed.
- Antibiotics are started if patient is very sick, does not show expected improvement in 3-4 days or in immunocompromised.

Diphtheria

Caused by Corynebacterium diphtheria
It is a disease of children

Clinical features

Fever seldom rises above 38^0C but child is ill and toxemic
Gray slough spreading to the pillars and soft palate is seen
Cervical lymphadenopathy is seen, which may lead to bull neck
These children can develop cardiac and neurological complications
Smear and culture are diagnostic

Treatment

- Be on the lookout for airway compromise
- Penicillin **OR** Erythromycin is the antibiotic of choice
- Anti-diphtheric serum 20,000-40,000U if membrane limited to tonsils or if less than 48 hours of onset **(Can cause anaphylaxis, adrenaline should be kept ready)**
- 80,000-120,000U if membrane beyond tonsils or if more than 48 hours of onset
- Consult departments of Infectious Disease, Cardiology or Neurology as needed
- Supportive measures

Management protocol for acute white throat patches or exudative tonsillitis or pharyngitis with throat pain with/without fever.

Fever less than 38 degree centigrade, with coryza. Primary case. Presumed viral disease. Symptomatic management. No antibiotics

Meanwhile throat swab for Rapid detection Antigen test (if available) or for culture and sensitivity. Bacterial growth confirmation in 24 hours, if positive call back and start antibiotics. Also send swab for Grams staining. If suspicious of membranous tonsillopharyngitis (diphtheria) retain patient till Grams staining results are available in one hour time.

If associated with excessive symptoms associated with large neck nodes, send blood for CBC (atypical lymphocytes), Monospot test and liver enzymes to diagnose Infectious mononucleosis. If no resolution after 3-5 days of conservative treatment, send blood for peripheral smear, do USG abdomen.

After 48hrs if there is empirical antibiotic resistance, call back and change antibiotic.

If associated with large tonsils, with membrane

Chronic tonsillitis

- Physiological enlargement happens in children less than four years of age
- Mostly affects children and young adults
- There are follicular, parenchymatous or fibroid types
- Pus beads may be seen on surface (follicular)
- Enlargement even up to midline (parenchymatous)
- Pus from crypts on pressure on anterior pillars (fibroid)
- Jugulo-digastric nodes are enlarged and non-tender
- Surgical indications
- Interference with speech, deglutition or respiration
- Failure to thrive
- Nocturnal enuresis
- Obstructive sleep apnea
- Cor pulmonale secondary to sleep apnea
- Recurrent culture positive GABHS tonsillitis, Repeated Rapid Antigen Detection Test positivity and/or ASO Titre more than 200 units
- **Simple enlargement is not an indication for surgery**

Recurrent tonsillitis

Seven or more attacks in a year OR
Five of more attacks per year for two years OR
Three or more attacks per year for three years OR
Loss of two or more weeks of school or work constitutes recurrent tonsillitis
This is an indication for tonsillectomy
(Always make sure that attacks are that of tonsillitis and not generalized sore throat seen with viral infections or other upper airway infections like sinusitis)

Causes for unilateral tonsillar enlargement

- Lymphoma in children
- Carcinoma in adults
- Adenoma tonsil
- Papilloma tonsil
- Tonsillolith
- Tonsillar cyst
- Intra tonsillar foreign body
- Intra tonsillar abscess
- Actinomycosis
- Invasive candidiasis
- Rare causes
- Leukemia, extra medullary plasmacytoma
- Metastatic deposits (lung, breast, kidney, stomach, rectum, seminoma, melanoma)

Tonsillectomy

Absolute indications

- Recurrent tonsillitis
- Chronic tonsillitis with complications as mentioned above
- Second attack of quinsy
- Repeated febrile convulsions as a result of tonsillitis
- Unilateral tonsillar enlargement where only one tonsil may be removed

Relative indications

- Recurrent tonsillitis in patients with valvular heart disease
- Halitosis
- Diphtheria carriers

Approach

- Excision of styloid process
- Section of glossopharyngeal nerve

Lingual tonsillitis

- It presents as unilateral pain, feeling of lump in the throat and dysphagia
- Examination shows enlarged lingual tonsil, sometimes with follicles as in follicular tonsillitis
- Jugulo-digastric nodes may be enlarged and tender
- Treatment is by antibiotics and analgesics

Lingual tonsillar abscess

- It presents as severe unilateral pain in tongue, dysphagia excessive salivation & trismus
- Examination shows enlarged lingual tonsil & pain on protrusion of tongue
- Jugulo-digastric nodes may be enlarged and tender
- It is potentially dangerous because it can lead to laryngeal edema
- Treatment is by antibiotics and analgesics and drainage of abscess

Lingual tonsillar hypertrophy

- Associated with chronic tonsillitis or after adenotonsillectomy
- Presents as feeling of lump in the throat and dysphagia
- Examination shows bilateral swellings in base of tongue with dilated veins over them
- Usually conservative management would suffice
- In severely symptomatic excision is done

Abscesses in relation to the pharynx

Peritonsillar abscess (Quinsy)

Collection of pus in the peritonsillar space
Mixed infection of Streptococcus pyogenes, Staphylococcus aureus and anaerobes
Usually a disease of adults and is unilateral
Bilateral quinsy can be seen in Infectious mononucleosis

Treatment

- Hospitalize & start IV fluids, if airway is compromised
- Penicillin, Third generation cephalosporins and Macrolides are the drugs of choice
- Analgesics and anti-inflammatory drugs
- Steroids reduce pain, trismus and hospital stay
- Indications for drainage of pus
- Pointing abscess
- Clinical deterioration
- Failure to respond to IV antibiotics
- Evidence of pus in imaging
- **Needle aspiration followed by conventional drainage if necessary** (success rates of about 95%)
- Classical drainage if needle aspiration fails (at the site of maximum bulge or junction of lines joining base of uvula and anterior pillar)
- **If more than 10cc of pus is aspirated, think of parapharyngeal space involvement**
- Interval tonsillectomy is not done usually after single attack as recurrence rates are low

Ludwig's angina

Rapidly spreading gangrenous cellulitis of the sub-mandibular and sub-lingual space.
Involves both spaces bilaterally, involves floor of mouth
The infection starts in one of the above spaces and spreads to the other, around the posterior border of myelohoid
Spreads rapidly without involving lymph nodes or forming an abscess

Causes

Usually secondary to dental caries, mostly, the second and third lower molars
Other causes

- Mandibular fractures
- Injuries to oral mucosa including tongue piercing
- Sub-lingual/sub-mandibular sialadenitis
- Neck trauma
- Tumors

The infection is generally of mixed of both aerobic and anaerobic flora
The most commonly cultured organisms include Staphylococcus, α-hemolytic Streptococcus, and Bacteroides species
Immunosuppressed patients may harbor atypical organism including Pseudomonas, Escherichia coli, Klebsiella, Enterococcus faecalis, Clostridium, and Candida

Clinical features

It presents with marked dysphagia, odynophagia and some amount of trismus
The floor of mouth may be edematous and tongue pushed upwards and backwards when sub-lingual space is affected
When sub-mandibular space is involved, there is brawny induration of sub-mandibular region
The major complication of Ludwig's angina is airway compromise by
Spread of edema to larynx
Spread of infection to parapharyngeal space / retropharyngeal space
Infection can spread to mediastinum, or cause aspiration pneumonia and septicemia

Treatment

The primary aims of treatment are to keep the airway patent and to control the infection
Hospitalize, assess airway, hydration
If airway is threatened, **Never try blind intubation**
Intubate by oro-tracheal route / Fibreoptic naso-tracheal route
Tracheostomy is to be done, if intubation is not feasible or fails

If patient is kept in ward without airway intubation, tracheostomy set should be

ready by bedside

Antibiotics [Gloucestershire Hospitals NHS Foundation Trust (GHNHSFT)]

Severity	**First line oral/IV antibiotics**	**Penicillin allergy**
A - Mild B - Moderate C – Severe	Benzyl Penicillin 1.2g* IV Q6H + Metronidazole 400mg PO Q8H x 7-10 days (Increase Penicillin to 2.4g iv Q6H if severe systemic toxicity)	Clindamycin 1.2g IV Q6H x 7-10 days
	***250mg = 4L Units (i.e., 1.2gm = 20L units approximately)**	
Oral switch	If clinical improvement Patient can take drugs orally Apyrexial for the last 24hrs Temp >36°C and <38°C AND no more than one of the following: CRP >100mg/L Heart rate >90/min Respiratory rate >20/min BP unstable WCC <4 or >12x10^9/L. Other complications are absent Amoxicillin 500mg PO Q6H +	Clindamycin 450mg PO Q6H

	Metronidazole 400mg PO Q8H	

Steroids may be tried
Imaging is to be done after patient is started on antibiotics and airway is stable

Surgical drainage

Incision and drainage is done if collection is present
Transverse incision is put between angles of mandible
Split tongue muscles vertically in the midline to let out serous fluid

Acute Retropharyngeal abscess

Clinical features

Dysphagia
Croupy cough
Torticollis
Respiratory distress
Examination shows bulge on one side of posterior pharyngeal wall mainly
X-Rays or CT scans are confirmatory

Treatment

Hospitalize, assess airway / hydration. **Do not examine throat forcibly in children**
Bed rest in supine position to reduce chances of airway compromise

Medical

If no airway compromise, start antibiotics
40-75% of children respond to antibiotics and may be managed conservatively, if there is no airway compromise
β-Lactamase resistant antibiotics are the first line of drugs (Amoxyclav and cephalosporins)
Alternatively, Clindamycin can be tried

Surgical

If airway is compromised arrange for airway management. (Intubation or tracheostomy - Care should be taken, not to rupture the abscess and cause aspiration during intubation)
Small abscesses may be aspirated (18G) or drained intra-orally
Larger ones with multiple space involvement require drainage by intra-oral, trans-cervical or a combination of both routes
Adult abscesses require removal of foreign body and drainage

Parapharyngeal abscess

Collection of pus in parapharyngeal space

Clinical features

Internal swelling is more inferiorly and posteriorly than peritonsillar abscess
Less edema of palate is seen
External swelling is seen behind the angle of jaw
Differential diagnosis: **Pseudo-aneurysm of common or internal carotid or lingual arteries**
Complications
Airway obstruction
Mediastinitis
Acute pharyngeal perforation
Septicemia
Cranial nerve deficits (cranial nerves IX-XII and cervical sympathetic)
Septic thrombosis of jugular vein
Hemorrhage secondary to erosion into carotid artery

Treatment

Hospitalize, Assess airway / Hydration
Medical
Penicillin is usually the drug of choice
Cefalosporins may be tried in children
Surgical
Drainage has to be done if large abscess or conservative treatment fails
Small abscesses may be needle aspirated intra-orally
Tracheostomy is to be done if airway is compromised
Drainage is classically done trans-cervically by a horizontal incision at the level of hyoid. The deep fascia is incised and abscess is traced upwards along the carotid sheath or along the medial surface of medial pterygoid muscle

Laryngeal infections

Acute laryngotracheobronchitis (Croup)

Clinical features

History of URI with fever, malaise of self or family
Hoarseness (Laryngitis)
Inspiratory / biphasic stridor (Sub-glottic edema)
Barking cough (Tracheitis)
Nasal flaring, supra-sternal, infra-sternal and intercostal recession
Unattended, it can lead to severe respiratory obstruction, hypoxia, hypercapnea, tachypnea, hypoventilation, tachycardia and death
X-Ray neck AP shows 'steeple sign' or 'pencil tip sign'

Treatment

- Self-limiting and improve in 24 hours in 50-60% children
- Prophylactic antibiotics, preferably penicillins to be started
- Severe when associated with measles or bronchopneumonia
- Hospitalize if signs of severe obstruction, monitor airway
- Humidify air / Correct hydration
- Steroids – Hydrocortisone 100mg OR Dexamethasone 0.6mg/kg (oral or IV) OR Budesonide 2mg nebulization (in a vomiting child)
- Racemic adrenaline nebulization (1ml 1/1000 adrenaline diluted in 3ml 0.9% saline)
- Not sedated usually. If needed, Chloral hydrate 30mg/kg
- Intubation / tracheostomy if airway worsens as shown by
- Increased PCO2
- Worsening neurological status
- Decreasing respiratory rate
- Use tube one size smaller than considered age appropriate
- Naso-tracheal intubation is preferred

Extubation is done when

- Child is systemically well
- Tracheal secretions are minimal
- There is air leak around tube
- This may take about a week

Bacterial laryngotracheobronchitis (Pseudomembranous Croup)

Rule out diphtheria

Severe form of laryngotracheobronchitis associated with sloughing of respiratory epithelium
Initially, same symptoms a croup, but does not respond to steroids
Affects older boys than that of croup
Airway endoscopy shows pseudomembrane, and thick mucopus in the airway
Caused by Staphylococcus aureus mainly
Other organisms include Hemophilus influenza, Moraxella catarrhalis, Streptococcus pneumoniae, Pseudomonas aeruginosa
Increased in Down's syndrome and immunodeficiency

Clinical features

Symptoms are same as that of croup but severe
Unattended, can lead to airway stenosis, respiratory failure, toxic shock syndrome, anoxia and death

Treatment

- Broad spectrum antibiotics
- Endotracheal intubation / tracheostomy
- Intubation may have to be maintained for a week to 10 days Direct laryngotracheobronchoscopy to remove slough and secretions
- Pulmonary toilet

Acute epiglottitis

Treatment

- Hospitalize, assess airway, hydration
- Mild disease with no stridor, drooling – close monitoring in ICU
- Intubation / Tracheostomy if airway is compromised
- Third generation Cephalosporins (Ceftriaxone 100 mg/kg/day IV on first day followed by 50 mg/kg for up to 10days)
- If allergic, Chloramphenicol is used
- Steroids may be tried. Evidence is poor
- Other supportive measures

Extubation possible in 2 – 3 days
If extubation is not possible or re-intubation needed, think of pre-disposing causes
In adults, do direct laryngoscopy to rule out underlying pathology

Prophylaxis

Hib vaccine – three primary doses plus a late booster (Not 100% effective)
Rifampicin prophylaxis in unimmunized household contacts, four years or less of age and unimmunized day-care contacts, two years or less of age (20 mg/kg/day; not to exceed 600 mg/day x 4 days)

Other laryngeal lesions

Vocal nodule

Bilateral small swellings (less than 3mm) at the mid-membranous part
Smaller and pointed and white in color in singers
There is thickening of epithelium and underlying inflammation

Causes

Cause of 25% of hoarseness in children and 5% in adults
More common in boys and women under 30 years of age
Voice abuse is a major cause (Overuse is not)
Forced voice production due to strain in neck and shoulder
Talking for prolonged periods in loud voice above background noise
Repeated shouting / Singing above one's normal range
Repeated coughing, hawking
ENT infections, allergies
Psychological factors
Laryngopharyngeal reflux

Clinical features

Breathy voice
Neck discomfort

Indirect laryngoscopy shows hourglass glottis

Treatment

May disappear spontaneously in boys at puberty
Address any treatable causes
Voice therapy is the main stay of treatment (nodules may persist even after voice becoming normal). This includes advice on the following
Complete voice rest is not needed
Lifestyle modification
Modification of voice usage and care of voice
Effective voice production with less strain on vocal cords
Surgery is done in selected cases only
Voice therapy failure
Persistent symptoms
Voice therapy is needed after surgery to prevent recurrence

Vocal polyps

Usually unilateral and more than 3mm in size
Men more affected than women in ages 30-50 years
Intermittent severe voice abuse or sudden shouting results in hemorrhage and polyp formation
More chance in cords inflamed by LPR or laryngitis
Aspirin intake may predispose

Clinical features

Sudden onset after voice abuse
Diplophonia
Unilateral mass in laryngoscopy
Sessile to start with; becomes polypoidal later with increase in size
Very large polyps may cause stridor

Treatment

Small sessile polypi may respond to anti-reflux treatment and voice therapy

Large polypi require microlaryngeal surgery avoiding vocal ligament injury

Reinke's edema

Chronic irreversible bilateral edema of vocal cords
Almost exclusively in heavy smokers
LPR and hypothyroidism may be seen associated
More in 40-60 years and equal in sexes

Clinical features

Persistent hoarseness. Female complain of androphonia
Diffuse bag like edema of both vocal cords
Grey or yellow in color with superficial vessels
If diffusely red, suspect LPR

Treatment

- Cessation of smoking
- Correct LPR / Hypothyroidism
- Voice therapy is controversial
- Surgery only in select cases
- Suspicion of malignancy
- Airway compromise
- Patient demands pitch elevation

Puberphonia

At puberty frequency drops by one octave in boys and by three to four semitones in girls (Octave is the interval between one musical pitch and another with half or double its frequency and 12 semitones make an octave)
Takes about one and a half to three years in boys and complete by 14 years
Emotionally immature boys with feeing of insecurity who show excessive fixation to mother or sister is at risk

Clinical features

Voice remains high pitched for the individual's age and sex
Momentary low pitch voice is seen during coughing and laughing
Voice tires easily if strained
Pain in the neck may be seen

Treatment

Rule out endocrine abnormalities and structural anomalies of cords
Voice therapy is the main stay
Gutzmann's procedure: Thyroid cartilage is pressed backwards and downwards. This relaxes the vocal cords and lowers the pitch. Phonation during this manoeuvre increases the confidence and helps the patient overcome the defect step by step
Botulinum toxin has been found useful
Laryngeal framework surgery rarely

Vocal cord palsy

Causes

Congenital

Birth trauma
Anomalies of great vessels / heart
Arnold-Chiari malformation
Hydrocephalus

Acquired

Supra-nuclear

Stroke / tumor / trauma

Nuclear

Stroke / tumor / motor neuron disease

Vagus nerve

Intra-cranial compartment: Posterior fossa tumors / meningitis

Skull base: Fractures / Nasopharyngeal ca. / Glomus tumor/ Malignant otitis externa / basal meningitis / metastasis
Neck: Trauma / tumors / metastatic nodes
Recurrent laryngeal nerve: Neck trauma / Thyroid disease or surgery / Cervical esophageal cancer / metastatic nodes / Apical tuberculosis / Apical carcinoma lung /
Mediastinal: Carcinoma lung / Ortner's syndrome/ aortic aneurysm / metastasis
Miscellaneous: Viral illness / Typhoid / Diphtheria / Diabetes / Lead poisoning / Syphilis /
Idiopathic: About 13 %

Types

Unilateral recurrent laryngeal: Right and left
Bilateral recurrent laryngeal
Unilateral superior laryngeal
Bilateral superior laryngeal
Combined unilateral superior and recurrent laryngeal
Combined bilateral superior and recurrent laryngeal

Clinical features

Breathy voice is the main complaint in unilateral recurrent laryngeal palsy. May be asymptomatic in some. No airway problems or aspiration. Affected cord in para-median position. Other cord compensates over time
Dyspnoea, stridor, snoring are main complaints in bilateral recurrent laryngeal paralysis. This is aggravated on exertion or during infection. Voice is normal. Vocal cords lie in median or para-median position
Weak voice and low pitch are seen in unilateral superior laryngeal palsy. Aspiration may be present. Indirect laryngoscopic examination shows tilted larynx with larynx tilting to the side of paralysis. Vocal cord may lie at a level lower than the normal cord and may appear shorter
Bilateral superior laryngeal nerve palsy is very rare. Aspiration and choking are the main complaints. Voice is very weak
Combined unilateral palsy presents with weak voice, aspiration and ineffective cough. Vocal cords will be seen in cadaveric position
Combined bilateral palsy presents with aphonia, aspiration, inability to cough and

symptoms of bronchopneumonia

Investigation

Investigate according to the suspected cause and site of lesion (from causes above)
Investigate for neck, intra-thoracic, skull base and intra-cranial causes as needed

Treatment

Unilateral recurrent laryngeal

Voice therapy
Vocal cord injections
Type I thyroplasty
Arytenoid adduction in case of posterior gap

Bilateral recurrent laryngeal

Tracheostomy with speaking valve
Endoscopic cord lateralization and arytenoidectomy
Kashima's operation where tracheostomy not preferred

Unilateral superior laryngeal

Voice therapy

Bilateral superior laryngeal

Aspiration has to be addressed by epiglottopexy or cuffed tracheostomy
Voice therapy

Combined unilateral superior and recurrent laryngeal

Voice therapy
Type I thyroplasty

Combined bilateral superior and recurrent laryngeal

Aspiration is to be managed aggressively
Tracheostomy
Epiglottopexy

Vocal cord plication
Laryngo-tracheal separation

Referral Guidelines - Oral cavity, pharynx, larynx head and neck

General guidelines for referral from peripheral centers

- General co-morbidities including uncontrolled diabetes, uncontrolled hypertension, cardiac, neurological, hepatic, hematologic or renal diseases complicating ENT disease
- Anesthetic risk for surgery
- Suspicion of impending airway compromise or any life threatening complication during treatment or surgery
- Poly-trauma involving ENT and other areas should be first seen by general surgeon
- Diagnostic dilemma or cases non-responsive to usual lines of management for reasonable time
- Elective cases from PHC and CHC may be referred to Taluk / District hospitals. Cases may be referred by the concerned ENT surgeon to medical college, only if indicated. Patients attending primary care centers after routine OP hours may be advised to attend the OP of secondary care hospital next day after symptomatic treatment, instead of referring to Tertiary care centers.
- In all medico legal cases, wound certificates should be written by the attending doctor from the referring institution.
- Strengthen facilities at the periphery (primary and secondary levels) before implementing referral guidelines. Facilities for the following surgeries may be provided at the secondary care centre.

Tonsillectomy & Adenoidectomy
Direct laryngoscopy and Hypopharyngoscopy

- Any post-operative complication not controlled by usual means
- Adequate support from higher authorities when patient lands in complications after refusing referral.
- HIV, HCV and HBsAg positive patients should be managed at secondary care centers and not shunted for this reason alone
- Referral should not be used as a means of shunting patients. Specific guidelines are given below. The list is not exhaustive or all encompassing. Discretion of the referring surgeon at primary and secondary care centers is solicited.

Cases which can be managed at Primary Care Centers

1. Benign oral ulcers including aphthous ulcers
2. Acute tonsillitis and pharyngitis
3. Chronic tonsillitis and pharyngitis – medically managed
4. Acute laryngitis.
5. Uncomplicated viral and suppurative parotitis

(All cases with persistent hoarseness of more than two weeks to be referred to higher centre for indirect laryngoscopy and or direct laryngoscopy)

Cases which can be managed at the Secondary Care centers

1. Oral ulcers with suspected malignancy which may be biopsied if needed.
2. Benign tumors of the oral cavity
3. Premalignant conditions of the oral cavity if biopsy is negative for malignancy and there is no progress of the disease
4. Peritonsillar abscess uncomplicated
5. Chronic tonsillitis and adenoids for surgery
6. Benign tumors and cysts of oropharynx if not compromising airway
7. Pharyngeal ulcers and growths – may be biopsied if needed

8. Vocal nodules and polypi
9. Chronic laryngitis
10. Gastro-esophageal reflux disease and laryngo-pharyngeal reflex
11. Uncomplicated foreign bodies of oropharynx or hypopharynx
12. Benign thyroid diseases
13. Benign neck swellings
14. Benign laryngeal tumors
15. Uncomplicated blunt trauma of neck
16. Superficial wounds of neck not involving larynx, pharynx or neurovascular bundles
17. Benign tumors of larynx
18. Malignant laryngeal tumors with no airway compromise – may be biopsied
19. Terminal malignancies requiring only palliative care

(Tumors with airway compromise or impending airway compromise may be managed if facility and competency for tracheostomy are both available)

Malignancy of any area if confirmed and requiring radiotherapy may be referred to department of radiation oncology after proper staging, with slides for pathological review if needed

Cases which are to be referred to Tertiary Care centers

1. All neonates, infants and toddlers with airway compromise
2. Membranous tonsillitis
3. Lingual tonsillitis/abscess
4. Lingual thyroid
5. Peritonsillar abscess with: severe trismus, parapharyngeal or retropharyngeal space involvement, impending airway compromise
6. Ludwig's angina
7. Retropharyngeal and parapharyngeal abscesses

8. Acute epiglottitis especially in children
9. All cases of acute laryngeal edema
10. Corrosive poisoning
11. Foreign bodies of oral cavity, oropharynx or hypopharynx with abscess formation or impending airway compromise
12. Foreign bodies of esophagus
13. Foreign bodies of bronchus
14. Penetrating neck injuries
15. Cases requiring micro-laryngeal surgery
16. Cases with trismus or spondylotic changes which necessitate fibreoptic scopies
17. Laryngeal injuries with fracture of cartilages or airway compromise
18. Nasopharyngeal angiofibroma
19. Pharyngeal pouch
20. Cases requiring esophagoscopy
21. All malignancies of oral cavity larynx and pharynx requiring surgery
22. Benign or malignant tumors of the parotid
23. Unilateral or bilateral vocal cord paralysis – traumatic or otherwise
24. Thyroid malignancies
25. Benign and malignant parotid diseases
26. All malignant neck swellings including lymph nodes which require surgery
27. Unknown primary for detailed investigation

(All diseases of the throat are potential threat to airway; either the disease itself or the interventional surgery. This has to be anticipated and referral made at the earliest if facilities for airway management are not available)

Management protocols for Head and Neck cancers

UK National multidisciplinary guidelines

Laryngeal cancer

1. Radiotherapy and trans oral laser microsurgery are accepted treatment options for T1a – T2a glottis carcinoma
2. Open partial surgery may have a role in the management of selected tumors.
3. Radiotherapy, Trans oral laser microsurgery are vand trans oral robotic surgery are reasonable treatment options for T1-T2 supraglottic carcinoma.
4. Supraglottic laryngectomy may have a role in the management of selected tumors.
5. Most patients with T2b-T3 glottic cancers are suitable for non-surgical larynx preservation therapies.
6. Concurrent chemotherapy should be regarded as the standard of care for non-surgical management.
7. Subject to the availability of appropriate surgical expertise and multidisciplinary rehabilitation services, transoral laryngeal laser microsurgery or open partial surgical procedures +/- post-operative RT may also be appropriate in selected cases.
8. In the absence of clinical or radiological evidence of nodal disease, elective treatment (RT or surgery +/- post operative RT) is recommended to at least lymph nodes levels II,III and IV bilaterally. In node positive disease, it is recommended that lymph node levels II-V should be treated on the involved side. If level II nodes are involved, then elective irradiation of ipsilateral level 1b nodes may be considered.
9. Most patients with T3 supraglottic cancers are suitable for non-surgical larynx preservation therapies.
10. Concurrent chemo-radiotherapy should be regarded as the standard of care for non-surgical management.

11. Subject to availability of appropriate surgical expertise and multidisciplinary rehabilitation services, trans-oral laser microsurgery or open partial surgical procedures +/- post operative RT, may also be appropriate in selected cases.
12. In the absence of clinical or radiological evidence of nodal disease, elective treatment (RT or surgery +/- post operative RT) is recommended to at least lymph nodes level II,III and IV bilaterally. In node positive disease, lymph nodes levels II-V should be treated on the involved side.
13. As per PET neck clinical trial, patients with N2 or N3 neck disease who undergo treatment with chemo-radiotherapy to their laryngeal primary and experience a complete response with a subsequent negative post treatment PET combined with CT do not require an elective dissection. In contrast, patients who have a partial response to treatment or have increased uptake on post treatment PET-CT should have a neck dissection.
14. Larynx preservation with concurrent chemo-radiotherapy should be considered for T4 tumors, unless there is tumor invasion through cartilage into the soft tissues of the neck, in which case total laryngectomy yields better outcomes.
15. In the absence of clinical or radiological evidence of nodal disease, elective treatment (RT or surgery +/- post-operative RT) is recommended to bilateral lymph node levels II, III, IV, V and VI.

Nose and Paranasal Sinus tumors

1. Sinonasal tumors are best treated de novo and unusual polyps should be imaged and biopsied prior to definitive surgery.
2. Treatment of sinonasal malignancy should be carefully planned and discusse at a specialist skull base multidisciplinary team meeting with all relevant expertise.
3. Complete surgical resection is the mainstay of treatment for inverted papilloma and juvenile angiofibroma

4. Essential equipment is necessary and must be available prior to commencing endonasal resection of skull base malignancy.
5. Endoscopic skull-base surgery may be facilitated by two surgeons working simultaneously, utilizing both sides of the nose.
6. To ensure optimum oncological results, the primary tumor must be completely removed and margins checked by frozen section if necessary.
7. The most common management is surgery followed by post-operative radiotherapy, ideally within six weeks,
8. Radiation is given first if a response to radiation may lead to organ preservation.
9. Radiotherapy should be delivered within an accredited department using megavoltage photons from a linear accelerator (typical energies 4-6MV) as an unbroken course.