Otalgia

Presenter: R1 蔡典倫
Supervisor: Dr 褚嘉慧
Introduction

- Otalgia is defined as pain localizing to the ear
- Two etiology:
  - **Primary otalgia:** an etiology in the ear
  - **Referred otalgia:** no distinct otologic etiology, also termed secondary, or nonnotogenic otalgia
- Referred otalgia may be as many as 50% of patients in an adult general medicine population

*Postgraduate Medical Journal 1986;80(6):50–63*
Epidemiology

• 50% of pain in the ear is referred otalgia
• Around 50% of referred otalgia results from dental causes
• Among the referred otalgia
  – Dental (45%)
  – Cervical spine disorders (8%)
  – Neuralgias (5%)

Anatomic consideration

• Auriculotemporal branch of CN V3:
  – Anterior aspect of helix and crus, anteriosuperior external auditory canal

• Chorda tympani branch of CN VII:
  – pars flaccida & pars tensa

• Jacobson’s branch of CN IX:
  – middle ear
• Arnold’s branch of CN X:
  – Floor of external auditory canal
  – Lateral tympanic membrane

• Great auricular nerve of cervical nerve plexus:
  – Posterior and medial auricle

• Vestibulocochlear nerve:
  – no pain fibers

  ➔ Meniere’s disease: describes aural fullness as “ear pain”
Primary otalgia
Primary otalgia

• Infectious
  – Otitis media
  – Mastoiditis
  – Malignant otitis externa
  – Herpes zoster oticus (Ramsay-Hunt syndrome)
  – Bell’s palsy
  – Cellulitis/chondritis/perichondritis

• Inflammatory
  – Relapsing polychondritis

• Trauma

• Neoplastic process
Infection – Otitis media

• Infection of middle ear: the most common cause of primary otalgia

• Otalgia from:
  – Inflamed mucosa, mediated by CN IX
  – Bulging of tympanic membrane, mediated by auriculotemporal branch of CN V
Infection – Malignant otitis externa

- Involvement of bone & marrow of skull base
- Most in diabetics or immunocompromised persons
- Causative organism: *Pseudomonas Aeruginosa*
- Granulation tissue in external auditory canal, specifically at the bony-cartilaginous junction
- Deep unrelenting pain that may keep the patient awake at night and is refractory to oral analgesics
Infection – Herpes zoster oticus

• Viral polycranial neuropathy affecting the ear

• Otalgia, facial palsy, vesicular rash of the pinna, external auditory canal & tympanic membrane

• Vesicles or an irritation or inflammation of affected cranial nerves & residual postherpetic neuralgia
Inflammation – Relapsing polychondritis

- Chronic autoimmune disease characterized by recurrent acute inflammation of cartilage & resulting long-term fibrosis

- Systemic symptoms such as fever & weight loss may occur

- 50% of patients can have airway involvement with dysphonia, dyspnea & stridor
Neoplastic process

- Skin of the external ear
  - squamous cell carcinoma, basal cell carcinoma, melanoma

- Glandular tissues of the external or middle ear
  - adenoma, adenocarcinoma

- Neurogenic tumor from middle ear or jugular foramen
  - schwannomas or glomus tumors
Secondary otalgia
Secondary otalgia

- Source from cranial nerve V3
- Source from cranial nerve VII
- Source from cranial nerve IX
- Source from cranial nerve X
- Neuralgia
Cranial nerve V3

Auriculotemporal N. (CN V)
- Sensory afferents
  - Posterior auricle
  - Temporal bone
  - Posterior wall of EAC
  - Jacobson’s N. (CN IX)
    - Sensory afferents
      - Lateral surface of TM
      - Eustachian tube
      - Premotor
      - Etiologies in Referred Dystonia
        - Tonsil/Pharynx
        - Esophageal syndrome
        - Sinusitis
        - Pharyngeal tumor
  - Parotid tumor/infection

Posterior Auricular N. (CN VII)
- Sensory afferents
  - Posterior wall of EAC
  - Posterior auricular skin
  - Etiologies in Referred Dystonia
    - Carcinoma of the external auditory canal
    - Hemifacial spasm
    - Gomulka neuralgia

Greater Auricular N., Lesser Occipital N. (C2, C3)
- Sensory afferents
  - Posterior auricle
  - Pre-scapular skin overlying parotid
  - Skin overlying mastoid
  - Etiologies in Referred Dystonia
    - Cervical spine degenerative diseases
    - Whiplash/truma
    - Cervical meningiomas

Arnold’s N. (CN X)
- Sensory afferents
  - Floor of EAC
  - Condyloid of condyle
  - Lateral surface of TM
  - Etiologies in Referred Dystonia
    - G2B
    - Laryngeal tumor
    - Thyroid tumor/infammation
Temporomandibular Joint Disorder

- **Dental etiology** is the most common causes of otalgia, specifically temporomandibular joint syndrome

- Other otologic manifestations:
  - aural fullness, tinnitus, & vertigo
  - *Costen’s syndrome*: posterior displacement of condyle of the mandible, which compresses the auriculotemporal branch of CN V or chorda tympani branch of CN VII
Examine temporomandibular Joint

- Reproduce otalgia by palpation. Crepitus or a “click” may be heard or palpated.

- Intraoral palpation of the pterygoid muscles to evaluate spasm of the muscle.

- A study of 450 patients with TMJ pain demonstrated otalgia to be the presenting complaint in 48%.

Cranial nerve VII

**Posterior Auricular N. (CN VII)**
- Sensory afferents
  - Posterior auricle
  - Posterior auricular skin
- Etiologies in Referred Otalgia
  - Carotid artery aneurysms
  - Herpes zoster
  - Otic neuralgia

**Auriculotemporal N. (CN V)**
- Sensory afferents
  - Posterior auricle
  - Trigus
  - Anterior wall of EAC
- Etiologies in Referred Otalgia
  - TMJ disease
  - Parotid pathology
  - Parotid tumor infection

**Jacobson’s N. (CN IX)**
- Sensory afferents
  - Medial surface of TM
  - Eustachian tube
  - Palatine tonsil
- Etiologies in Referred Otalgia
  - Tonsillitis/Pharyngitis
  - Eagle’s syndrome
  - Sinusitis
  - Pharyngeal tumor

**Arnold’s N. (CN X)**
- Sensory afferents
  - Floor of EAC
  - Conavity of coriopharyngeus
  - Lateral surface of TM
- Etiologies in Referred Otalgia
  - GERD
  - Laryngeal tumor
  - Thyroid tumor/inflammation

Adapted, with permission, from Todd.
Inflammation of sinus

• Mucosal inflammation of the sphenoid & posterior ethmoid sinuses and nasal septum may cause referred otalgia
Cranial nerve IX

Posterior Auricular N. (CN VII)
- Sensory afferents
  - Posterior wall of EAC
  - Posterior auricular skin
- Etiologies in Referred Otitis
  - Carcinomas
  - Dermoids

Auriculo temporal N. (CN V)
- Sensory afferents
  - Anterior auricle
  - Tegmen
  - Posterior wall of EAC
- Etiologies in Referred Otitis
  - TMJ disease
  - Dental pathology
  - Parotid tumor/infection

Jacobson’s N. (CN IX)
- Sensory afferents
  - Medial surface of TM
  - Eustachian tube
  - Premontory
- Etiologies in Referred Otitis
  - Tongue/pharynx
  - Endolymphatic hydrops
  - Sinusitis
  - Pharyngeal tumor

Arnold’s N. (CN X)
- Sensory afferents
  - Endolymphatic sac
  - Concavity of concha
  - Lateral surface of TM
- Etiologies in Referred Otitis
  - GERD
  - Laryngeal tumor
  - Thyroid tumor/inflammation

Greater Auricular N., Lesser Occipital N. (C2, C3)
- Sensory afferents
  - Posterior auricle
  - Preauricular skin overlying parotid
  - Skin overlying mastoid
- Etiologies in Referred Otitis
  - Cervical spine degenerative diseases
  - Whiplash trauma
  - Cervical meningioma

Adapted, with permission, from Todd.
• Neoplastic process:
  – *Oropharyngeal cancer*
  – Palatine tonsillar cancer
  – Tongue base cancer
  – Nasopharyngeal cancer

• Non-neoplastic process
  – Acute tonsillitis
  – Peri-tonsillar abscess
Eagle’s syndrome

- Otalgia, facial pain, sore throat, globus, or dysphagia due to elongation of styloid process or ossification of stylohyoid ligament

- Mechanism
  - 1. Direct compression of CN V, VII, IX or X
  - 2. Direct compression of carotid vessels (carotidynia)
  - 3. Inflammation of tendinious part of stylohyoid ligament
  - 4. Infection of styloid process (styloiditis)
• Styloid process: normally 20 to 30 mm in length.
• 4% of population: styloid process > 30 mm, in which 4% are symptomatic
• Diagnosed by palpation of tonsillar fossa or image

Cranial nerve X

Adapted with permission from Todd

Posterior Auricular N. (CN VII)
Sensory afferents
- Posterior wall of EAC
- Posterior auricular skin

Etiologies in Referred Doulagia
- Carotid body tumor
- Herpes zoster
- Geniculate neuralgia

Auriculotemporal N. (CN V)
Sensory afferents
- Anterior auricle
- Tragus
- Posterior wall of EAC

Etiologies in Referred Doulagia
- TMJ disease
- Dental pathology
- Parotid tumor/infection

Jacobson's N. (CN IX)
Sensory afferents
- Medial surface of TM
- Eustachian tube
- Pharynx

Etiologies in Referred Doulagia
- Tonsillitis/pharyngitis
- Exudate syndrome
- Sinusitis
- Pharyngeal tumor

Arnold's N. (CN X)
Sensory afferents
- Lateral surface of EAC
- Condyloc of corchoa
- Lateral surface of TM

Etiologies in Referred Doulagia
- GERD
- Lingual tumor
- Thyroid tumor/inflammation

Greater Auricular N., Lesser Occipital N. (C2, C3)
Sensory afferents
- Posterior auricle
- Pre-auricular skin overlying parotid
- Skin overlying mastoid

Etiologies in Referred Doulagia
- Cervical spine degenerative diseases
- Whiplash/truma
- Cervical meningoma

Cortex (contralateral)
Ganglion
• Neoplastic process:
  – Laryngeal cancer
  – Thyroid neoplasms
  – Lung carcinoma

• Non- neoplastic process
  – Gastroesophageal reflux
  – Thyroiditis
Gastroesophageal reflux disease

- Irritation of upper aerodigestive tract in sensory distribution of CN IX & X, so it may be perceived as originating within ear.

- Reflux of gastric secretions can extend superiorly to orifice of eustachian tubes which cause irritation directly to ear.

Neuralgia

• Brief, severe, electric-shock-like, episodic pain

• Geniculate (VII)
  – middle-aged women with pain deep in the ear

• Glossopharyngeal (IX)
  – Pain while swallowing, chewing, or yawning

• Vagal (X)
  – pain in the distribution of the larynx & hypopharynx
• Sphenopalatine:
  – Sluder neuralgia with lancinating pain in eye & nose

• Occipital:
  – throbbing occipital/suboccipital headache
Worst case scenario
<table>
<thead>
<tr>
<th>Risk</th>
<th>Possible diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age &gt; 50 y/o, ESR &gt; 50 mm per hour</td>
<td>Temporal arteritis</td>
</tr>
<tr>
<td>Coronary artery disease risk factors</td>
<td>Myocardial infarction</td>
</tr>
<tr>
<td>Diabetes or immunocompromise</td>
<td>Necrotizing otitis externa</td>
</tr>
<tr>
<td>Tobacco &amp; alcohol use, dysphagia, weight loss, age &gt; 50 y/o</td>
<td>Head or neck tumor</td>
</tr>
</tbody>
</table>
Conclusion
• A comprehensive head & neck examination is fundamental in evaluating persistent otalgia

• In setting of normal otologic examination, a fiberoptic nasopharyngolaryngoscopy is mandated to look for lesion
Otalgia

Ear Exam
Normal  Ear Exam
Abnormal

H&N Exam
Normal  H&N Exam
Abnormal

CN/Neuro Exam
Normal  CN/Neuro Exam
Abnormal

Neurogia  TMJ syndrome  H&N Neoplasm
Occult neoplasm  GERD  Herpes zoster oticus
Eagle’s syndrome

Skin lesions  Otitis externa  Malignant OE
Chondritis  Myringitis  OM complication
Otitis media  Temporal bone neoplasm
Bell’s palsy

References

Thanks for your listening