

Tinnitus

Dr. R. Palaniappan MS FRCS DLO MSc
 Consultant in Audio-vestibular Medicine
 RNTNE

1

Tinnitus

- Ear disorders account for 24% of disabilities in adults [1]
- Functional disorder of the auditory system, might indicate underlying sinister pathologies
- Tinnitus affects up to 20% of the population, with 5% describing it as troublesome
- Only a third of people with persistent tinnitus had audiological assessment

2

Tinnitus

- A 3rd reported it to their GP and not referred on to any relevant services [4]
- 4% have pulsatile tinnitus
- Triage and early differential diagnosis by the primary care physician is critical
- A high quality local audiology service trained and equipped enough for triaging patients

3

Tinnitus - Meniere's

- First described by Prosper Meniere in 1861
- Meniere's disease (MD) is an inner ear disorder, characterised by endolymphatic hydrops of unknown aetiology
- Clinically presents by spontaneous vertigo, fluctuating sensorineural hearing loss, tinnitus, and aural fullness.

4

Tinnitus - Meniere's

- Unilateral in the vast majority
- Incidence varies - earlier studies indicate 100 to 157 per 100,000 persons in the UK [2,8]
- One of the initial symptom in 5-70% of the cases [3, 7]
- One of the most troublesome symptoms in about 50% [3]

5

Tinnitus - Meniere's

- Anxiety is common and is an important factor in increased tinnitus awareness.
- Loud environmental sounds have a variable effect.
- Increase in tinnitus with weather variations, especially rainy days [3].
- Low or medium frequency tinnitus [3, 5]

6

Tinnitus - Meniere's

- Average annoyance - >6 of the VAS in more than 70% of the patients [3]
- Hyperacusis is a significant issue in many of them as much as 70% in some series [3]
- Severe tinnitus is associated with bilateral involvement, drop attacks and longer duration of the disease [7].

7

Tinnitus - Meniere's

- Residual inhibition is much less common with MD compared to other aetiologies
- Labyrinthine destruction/ cochlear nerve section do not change tinnitus, even increase its intensity in many patients [12, 13]
- Hyperacusis and rebound phenomenon impact sound therapy and hearing aid use

8

Tinnitus - Meniere's

- Pre-attack increase in tinnitus in about 30% [3]
- Progressive hearing loss increase tinnitus severity
- Variable character of tinnitus – roaring, buzzing, ringing or popping [6]

9

Tinnitus - Meniere's

- The frequency and duration of vertigo spells does not effect on tinnitus.
- Patients with intense tinnitus had more often vertigo provoked by head movement, physical activity or pressure changes [7]
- Tinnitus in Meniere's disease is often severe and the intensity increases over time.

10

Tinnitus - Meniere's

- Intratympanic Steroids/ Gentamicin have shown positive results in alleviating tinnitus in MD
- Patients with Meniere's disease find their tinnitus most disturbing compared to other aetiologies such as otosclerosis or presbycusis [6,11]

11

Tinnitus-Vestibular Schwannoma

- 75-80% of patients with acoustic neuroma have tinnitus preoperatively [9,11,14]
- Described usually as a high pitched ringing or buzzing/ tends to be constant
- Variable post-op results-better in about 40-50%
- A quarter of patients developed tinnitus post operatively for the first time

12

Tinnitus-Vestibular Schwannoma

- Gaze evoked tinnitus
 - Association with cochlear nerve destruction
 - Post-op manifestation in days or weeks
 - Present whether eyes are open or closed
 - Absent with head movement and *fixed gaze*
 - Reduced prevalence overtime
- 30% reported in the 1st post-op year as opposed to 19 % in 5 years [9]

13

Tinnitus-Vestibular Schwannoma

- Mechanism poorly understood - neural reorganisation following de-afferentation
- Post-op tinnitus can have profound effect on quality of life – careful counselling
- Hearing preservation surgery is thought to reduce post-op tinnitus

14

Charcot-Marie-Tooth Disease

- Most common hereditary neuromuscular disorder - hereditary motor sensory neuropathy (HMSN)
 - prevalence estimated at up to 40 individuals in every 100 000 (200 000 cases in the EU)
- Hearing impairment is not uncommon in CMT [15]
 - hypothesized that the demyelination causes sensorineural hearing loss

Charcot-Marie-Tooth Disease

- Degree of hearing loss is variable, APD reported in some
- Character of tinnitus is variable
 - High , medium or low pitched
 - Intermittent / continuous
- The neurological symptoms probably overtake the tinnitus

Good practise guide-Tinnitus

- Aim - Standardise and improve care for tinnitus sufferers
 - Guidance for commissioners and service managers
 - commissioning pathway with practical details
 - Make processes and systems efficient and leaner
 - reduce waiting time
 - Deliver 18 weeks target before Dec 2009
- A stepped approach to tinnitus care across the different levels of the network [10]

17

Good practise guide-Tinnitus

- Two part document
 - **First** sets out vision, contexts and principles
 - **Second** recommends practical details for a new good practice commissioning pathway
- One of the three guides on good practice for provision of adult audiology services
 - not evidence based guideline

18

Good practise guide-Tinnitus

- Vision
 - Accessible and high quality services closure to patient's home
 - System and processes (lean and efficient)
 - Technology
 - Plan and train a competent and productive work force (mix of skills and new roles)
 - Triage and differential diagnosis at an early stage

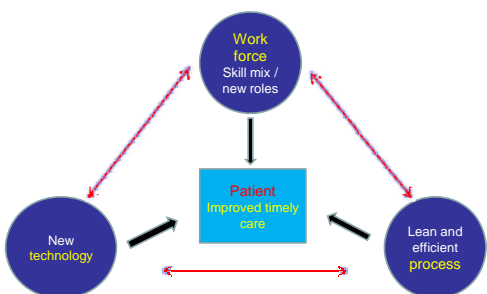
19

Networked Patient Journey

- | | |
|---------------------------|--|
| • Primary Care | • Identification |
| ↓ | |
| • Local Audiology Service | • Initial Assessment |
| ↓ | |
| • Specialist Centre | • Further assessment for specialist medical/surgical interventions |
| ↓ | |
| • Supra-specialist Centre | • Further management of co-morbidities |

20

Integrated Tinnitus Service



21

Good practise guide-Tinnitus

- Planning capacity
- Clear referral criteria
 - Primary care physician with special interest in ENT/audiology
 - Non troublesome tinnitus without HL
 - Local community audiology service
 - Mild to moderate tinnitus with suspected/reported HL

22

Good Practice Guide

- Secondary level specialist centre
 - Distressing tinnitus with associated symptoms
 - Anxiety/depression, sleep disturbance
 - Unilateral hearing impairment
 - Sudden/fluctuating hearing loss
 - Sudden deterioration of existing HL/progressive
 - Dizziness, vertigo, imbalance
 - Asymmetric HL
 - Unilateral and/or pulsatile tinnitus

23

Good Practice Guide

- Tinnitus with non-otological conditions
 - systemic/neurological
- Tinnitus associated with abnormal auditory perception
 - dysacusis, hyperacusis
 - difficulty hearing in noise or localisation
 - difficulty following complex auditory direction
- *Clear guidelines and criteria* for referral from primary care to local audiology services and specialist centres

24

Good Practice Guide

- Quality of referral information from GP influence first level assessment
- Service transformation
 - Administrative and clerical staff
 - Patient contacted by text or mobile phone
 - One stop shop
 - Information technology
 - Networked service - linking referral and assessment centres

25

Good Practice Guide

- Technology
 - Modern hearing-aids
 - Specialist/supra specialist centres
 - Access to full range of audio-vestibular testing, radiology, medical, biochemical and haematological investigations
- Work force
 - Roles redesigned and new roles may emerge
 - MDT – regular meetings/team coordinator

26

References

1. Department of Health, Health Survey for England 1997. London: HMSO (1997)
2. Cawthorne T, Hewlett AB (1954) Meniere's disease. *Proc R Soc Med* 47:633–670
3. C. Herraiz AE M. C. Tapia AE G. Plaza (2006) Tinnitus and Meniere's disease: characteristics and prognosis. *Eur Arch Otorhinolaryngol* 263: 504–509
4. Department of Health. Transforming adult hearing services for patients with hearing difficulty. A good practice Guide. 2007b.

27

References

5. Vernon J, Johnson R, Schleuning A (1980). The characteristics and natural history of tinnitus in Meniere's disease. *Otolaryngologic Clin North Am*;13(4):611–4.
6. Stouffer J, Tyler R. Characterization of tinnitus by tinnitus patients. *J Speech Hear Dis* 1990;55:439–53.
7. Havia M, Kentala E, Pyykko I (2002) Hearing loss and tinnitus in Meniere's disease. *Auris Nasus Larynx* 29:115–119
8. Harrison MS, Naftalin L (1968) Meniere's disease. In: Charles C Thomas (ed) *Mechanism and management*. Springfield, IL

28

References

9. Biggs NDW, Ramsden RT(2002) Gaze evoked tinnitus following acoustic neuroma resection: a de-afferentation plasticity phenomenon. *Clin. Otolaryngol.* 27: 338-343
10. Department of Health, Provision of Services for adults with Tinnitus. A Good Practice Guide. London: COI (2009)
11. Kentala E. (1996) Characteristics of six otologic diseases involving vertigo. *Am J Otol*;17:883–92.
12. Møller A (2003) Pathophysiology of tinnitus. *Otolaryngol Clin North Am* 36:249–266

29

References

- 13. Jastreboff PJ (1990) Phantom auditory perception (tinnitus): mechanisms of generation and perception. *Neurosci Res* 8:221–254
- 14. Kanzaki J, Satoh A, Kunihiro T (1999). Does hearing preservation surgery for acoustic neuroma affect tinnitus? *Skull Base Surgery* 9 (3): 169-176
- 15. Neijenhuis K, Beynon A, Snik A et.al (2003). Auditory processing in patients with Charcot-Marie-Tooth Disease Type 1A. *Otology & Neurotology* 24:872–877

30