Diagnostic Imaging Pathways - Tinnitus

Population Covered By The Guidance

This pathway provides guidance on the imaging of adult patients with tinnitus.

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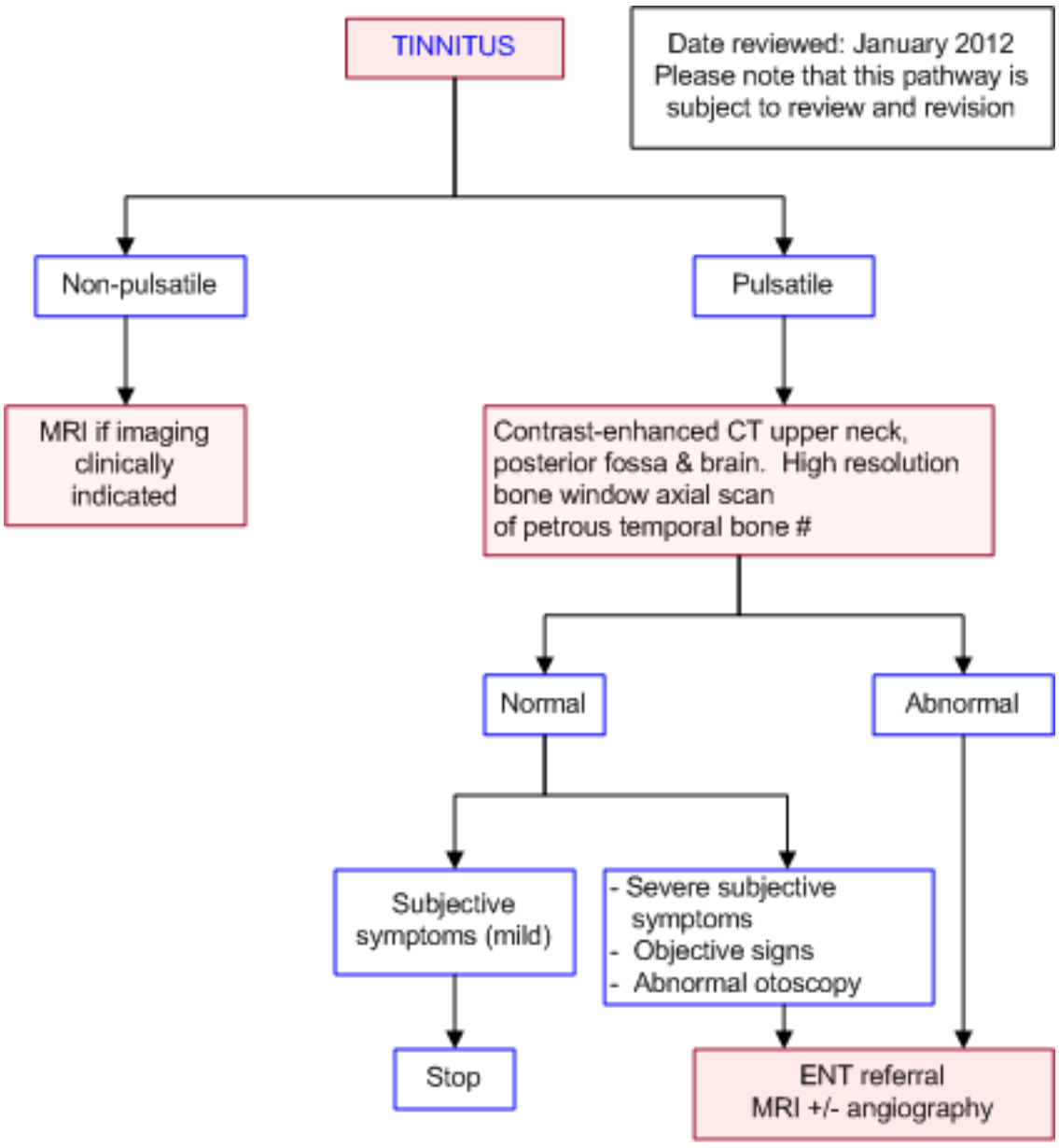
Quick User Guide

Move the mouse cursor over the PINK text boxes inside the flow chart to bring up a pop up box with salient points.
Clicking on the PINK text box will bring up the full text.
The relative radiation level (RRL) of each imaging investigation is displayed in the pop up box.

SYMBOL	RRL	EFFECTIVE DOSE RANGE
	None	0
	Minimal	< 1 millisieverts
	Low	1-5 mSv
	Medium	5-10 mSv
	High	>10 mSv

Pathway Diagram



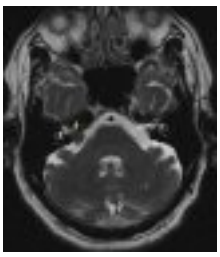
Notes:
Will exclude nearly all causes such as vascular variants & vascular skull base tumours

Image Gallery

Note: These images open in a new page

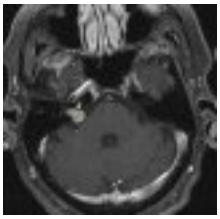
1a **Acoustic Neuroma**

Image 1a and 1b (Magnetic Resonance Imaging): Pre- and post-contrast images demonstrating an enhancing lesion within the right cerebello-pontine angle and internal auditory canal (arrows). Appearances are typical of an acoustic neuroma. The lesion measures up to 17mm. Its medial aspect



almost contacts the pons. A small vessel in interposed between the mass and the pons. The inferior aspect of the lesion approaches the fundus of the right internal auditory canal.

1b



Teaching Points

- Tinnitus, a buzzing or ringing in the ear, may be pulsatile or continuous (non-pulsatile)
- The distinction determines the most appropriate imaging study
- Gadolinium enhanced MRI is the study of choice for evaluation of non-pulsatile tinnitus
- Contrast enhanced CT (+/- CTA) is the initial imaging modality of choice for the investigation of pulsatile tinnitus

Angiography

- Indicated when there is high clinical suspicion of dural arterio-venous malformation or fistula and the cross-sectional imaging studies (CT and MRI) are normal 4,9

Computed Tomography (CT)

- Contrast-enhanced CT scan of the temporal bones and brain is the imaging modality of choice for investigation of pulsatile tinnitus 1,2,3,4
- Allows delineation of the bony abnormalities that are associated with some of the vascular diseases 4
- Useful in delineation of the location and size of the jugular bulb and the course of the carotid artery in order to exclude an aberrant carotid artery or a vascular mass of the middle ear 3
- CT angiography of the head and neck may be required to exclude a vascular cause of pulsatile tinnitus
- Advantages: relatively inexpensive and widely available
- Limitations: ionising radiation and use of contrast agent

Magnetic Resonance Imaging (MRI) in the Evaluation of Non-pulsatile Tinnitus

- Gadolinium enhanced MRI (with thin transverse and coronal T1- and T2- weighted images through the temporal bones, and transverse images through the entire brain) is the study of choice for

evaluation of non-pulsatile tinnitus 1,2
- Helps exclude a vestibular schwannoma or other neoplasm of the cerebellopontine angle cistern in patients with non-pulsatile tinnitus. Brainstem pathology such as stroke or multiple sclerosis is also a consideration, and will be adequately imaged with MRI 1,2
- Limitations - limited availability and high expense

Magnetic Resonance Imaging (MRI / MRA / MRV) in the Evaluation of Pulsatile Tinnitus

- Indications
  - To evaluate patients with objective tinnitus or severe subjective tinnitus with or without otoscopic abnormality and normal CT scan findings 5
  - To delineate an abnormality detected on CT
  - To detect rare causes of pulsatile tinnitus such as multiple sclerosis and a Chiari I malformation not seen on CT 1
- Addition of MRA and MRV to conventional MRI greatly enhances the ability to show vascular lesions 5
- Superior to CT for enhancement of vascular tumours, typically paragangliomas 6, 7
- Limitations
  - Low yield in patients with subjective pulsatile tinnitus and a normal otoscopic examination 5
  - May not detect dural fistulas 8

Tinnitus

- Tinnitus, a buzzing or ringing in the ear, may be pulsatile or continuous (non-pulsatile) 1
- Pulsatile tinnitus (a discrete, repetitive sound that accompanies the patients pulse) suggests the presence of vascular abnormality (a tumour, a congenital anomaly, a malformation, or an acquired vasculopathy) 1
- Patients with non-pulsatile tinnitus (constant, unremitting noise) may require exclusion of cerebellopontine angle tumour, most often a vestibular schwannoma 1
- The distinction, with a detailed clinical evaluation, determines the most appropriate imaging study 1,2,3
- In vast majority, no pathology is identified 1,2,3

References

References are graded from Level I to V according to the Oxford Centre for Evidence-Based Medicine, Levels of Evidence. Download the document

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Further Reading

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