INAHTA Briefs

Issue 2009/137

Title **The Role of Magnetic Resonance Imaging in the Identification of Suspected Acoustic Neuroma: A Systematic Review of Clinical and Cost Effectiveness and Natural History**

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Reference Volume 13.18. ISSN 1366-5278. www.ncchta.org/project/1514.asp

Aim

To determine: 1) the place of magnetic resonance imaging (MRI) in investigating patients with unilateral hearing loss and or tinnitus for suspected acoustic neuroma (AN); 2) the cost effectiveness of MRI versus other diagnostic strategies in these patients; 3) what is known about the natural history of acoustic neuroma; and 4) to identify published and unpublished literature and extract the relevant evidence to help answer the questions of which tests (including combinations and sequencing) are best to use and also how do acoustic neuromas grow and affect individuals.

Conclusions and results

In current clinical practice, MRI is the first-line investigation for identification of suspected AN in appropriately selected patients. The GdT1W sequence remains the *gold standard* sequence for evaluating cases where the screening sequence is indeterminate and for characterizing any suspected pathology. Non-contrast, high-resolution, 3D T2W or T2*W sequences, enable accurate evaluation of the VIII and VII cranial nerves within the CPA and IAC and evaluation of the cochlear and labyrinth. Given the recent improvement in resolution and reduction in cost of MRI, ABR can no longer be considered appropriate for the primary test used to screen for an acoustic neuroma. While it is relatively inexpensive and offers acceptable sensitivity for medium to larger tumors, its ability to reliably indicate tumors under 1cm is poor. ABR also fails to provide clinically useful results in patients with severe to profound hearing loss (typically a hearing threshold greater than 70 dBHL at 4 kHz).

Recommendations

MRI is the first-line investigation for identification of suspected AN in appropriately selected patients. Non-contrast, high-resolution, 3D T2W or T2*W sequences should be the first-line evaluation followed by GdT1W MRI if necessary. This strategy is a good cost-effective option. The incidence of acoustic neuroma may be increasing. Symptomatology does not predict incidence or growth. Growth rates are variable, and regression can occur. No factors have been identified that predict growth.

Methods

See Executive Summary link at www.ncchta.org/project/1514.asp.

Further research/reviews required

1) Research to provide evidence to further understand the pathophysiological mechanisms by which patients become symptomatic. 2) A consensus method of measuring tumors and evaluating growth, taking into account their three dimensions. 3) Long-term prospective longitudinal studies with agreed criteria to evaluate tumor growth. 4) Establishment of a national tumor registry for acoustic neuroma in the UK.

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ISSN 1654-501X