



The pharmacotherapy of tinnitus: less is best?

Paolo Enrico (enrico@uniss.it)^{1,2}, L. Del Bo²

1 - Dept. of Biomedical Sciences, University of Sassari, Italy; 2 – *Fondazione Ascolta e Vivi, Milano, Italy.*



Background

Unprotected exposure to intense noise (AT) such as explosions, gunshots, etc., may permanently damage the inner ear causing permanent hearing loss and often subjective tinnitus. Probably due to excitotoxic damage of hair cells with mitochondrial lesions, elevation of intracellular Ca²⁺ concentrations and generation of reactive oxygen species, AT-induced ototoxicity is basically unpreventable in the real world.

Although many drugs can cause some relief of tinnitus (in excess of placebo effect), a number studies have consistently failed to identify a single cure.

Tinnitus treatment remains elusive and includes different drugs (among which sedatives, antidepressants, anticonvulsants, local anesthetics, etc.), as well as several complementary/alternative products (CAM). Drugs are largely used off-label and drug choice is often made serendipitously, without a sound scientific support.

This situation increases costs, exposes patients to unnecessary drugs toxicity, and decreases the overall efficacy of the management of tinnitus.

Methods

The pharmacological therapy of subjective tinnitus is evaluated in an analytical way, with two main targets: 1) to draw an accurate map of this complex panorama; 2) to understand the rationale behind the use of the major drug families (including CAM approaches) and test its scientific support, in order to help exclude ineffective drugs from therapeutical protocols.

Data have been collected mainly through the leading scientific database and, when possible, the study was limited to peer-reviewed, indexed documents.

Antidepressants	GABAergic agents	Anticonvulsants	Local anesthetics	Glutamatergic agents	Dopaminergic agents	Other agents		CAM
Nortriptyline	Alprazolam	Carbamazepine	Lidocaine	Acamprosate	Sulpiride	Cyclandelate		Vitamins
Amitriptyline	Clonazepam	Gabapentin	Tocainide	Caroverine	Piribedil	Nimodipine		Minerals
Trimipramine	Diazepam	Lamotrigine	Flecainide	Flupirtine		Flunarizine		Antioxidants
		Valproic acid	Mexiletine	Gacyclidine				<i>Gingko biloba</i>
Duloxetine	Baclofen (?)	Vigabatrin		Memantine		Misoprostol		<i>Cimicifuga racemosa</i>
Venlafaxine		Flunarizine		Riluzole (?)				<i>Cornus officinalis</i>
Mirtazapine						Botox		<i>Verbascum densiflorum</i>
								Yoku-ka-san
Paroxetine						Atorvastatin		Melatonin
Sertraline								

Compounds for which clinical studies have been performed

Conclusions

Development of new effective therapies is hampered by poor understanding of tinnitus pathophysiology, and the efficacy of most pharmacological interventions for tinnitus remains to be demonstrated conclusively. Nevertheless, several well-designed study allows to exclude from therapy many useless compounds such as CAM products, anticonvulsants, etc.

At this very moment, despite a renewed interest, overall evidence suggests that drugs should not be considered as a major therapeutic option in tinnitus patients.

Selected references

Hoekstra et al. *Cochrane Rev* 2011, 7: CD007960.

Fornaro & Martino. *Neuropsych Dis Treat*. 2010, 6: 209–18

Langguth et al. *Expert Opin Emerg Drugs*. 2009 (4): 687-702

Seidman et al. *Curr Opin Otol Head Neck Surg*. 2010 18(5):363-8.

Martinez-Devesa et al. *Cochrane Rev*. 2010, (9): CD005233.

Baldo et al. *Cochrane Rev*. 2006, (4): CD003853