Ancient voices on tinnitus: the pathology and treatment of tinnitus in Celsus and the Hippocratic Corpus compared and contrasted

Maryanne Tate Maltby

Abstract

Objective: The object of the paper is to analyse the treatment of tinnitus in two ancient works, Celsus De Medicina and the Greek Hippocratic Corpus. Whilst reviews of historical references to tinnitus have identified this material, this is the first detailed treatment of the subject in these authors. Design: The paper considers the material relating to tinnitus and suggested treatments in the Roman medical writer Celsus (mid first century AD) in contrast with those found in the Greek Hippocratic Corpus (late fifth, early fourth century BC). Results and Conclusion: The lifestyle change, diet and pharmacological treatments suggested by Celsus are analysed and shown as likely to be effective. Celsus is shown to be remarkably modern in his understanding of the aetiology of the disease and his suggested dietary and pharmacological treatments appear to be soundly based. Celsus' pharmacological approach differs from the more theoretical stance of the Hippocratic Corpus based on humoural theory. The Hippocratic Corpus is more detailed in its descriptions of otological pathology and more concerned with a humoural explanation of the disease, but offers useful advice on diet and regimen and also provides the first detailed description of what appears to be Ménière’s Syndrome.

Keywords: ancient, history, materia medica, tinnitus.
INTRODUCTION

Tinnitus remains a clinical and scientific enigma, and has been considered by medical and scientific authors throughout history. Such material has been summarised and reviewed by several modern authors but in each case the perspective has been an overview rather than an in-depth and contextual analysis of particular authors which would build upon these previous studies.

The author at the centre of this study, Aulus Cornelius Celsus, was not a professional doctor, but rather an expert amateur. His work De medicina, in eight books, was originally part of a much larger encyclopaedia, called the Artes, and was intended for an elite Roman audience and also contained books now lost on agriculture, rhetoric, philosophy and military strategy. His work was known to Pliny the Elder (AD 23-79) and Columella (fl. AD 50), and the period of AD 14 to 39 best suits the sparse evidence we have for the dating of his work. The central section of this work, books 5 and 6, is concerned with materia medica, and the particular portion dealing with hearing complaints is book 6 section 7. No single source has been identified for this work, and it is clear that he had read extensively amongst earlier Greek medical writers and made use of a wide range of earlier specialist texts.

The present study aims to analyse how Celsus considered tinnitus and how it might be treated, for which comparisons can be made with the treatments offered in the Greek Hippocratic Corpus (late fifth century BC). When comparing Celsus with the sparse Hippocratic writing in this area, it is clear that Celsus is much more concerned with the use of pharmacological cures and less with humoural theory, which is the main focus of Hippocratic treatments.

The humoural theory is found for the first time in works of the Hippocratic Corpus and is later refined and standardised by Galen. In its original form as found in the Hippocratic work On the Nature of Man the theory states that the human body contains four humours: blood, phlegm, yellow bile and black bile (chapter 4). Health results from a harmonious mingling of these constituents, whereas pain results from one of them being in excess (chapter 4). Finally the four humours relate to the seasons with phlegm, as cold and wet, being most frequent in winter; blood, being moist and warm, in spring; yellow bile, being warm and dry in summer; black bile, being dry and cold, in autumn (chapter 7).

In his treatments Celsus is more selective than his contemporaries in avoiding the more outlandish (to modern eyes at least) folk remedies recommended by writers such as Pliny, e.g. in Pliny Natural Histories 20.162, veal suet with wild cumin is used as a cure for tinnitus. However Celsus was not averse to traditional rural remedies, which he sometimes gives alongside the treatments of the conventional medical practitioners. As far as his discussion of is concerned, the present paper assesses Celsus' knowledge of audiological pathology and the potential effectiveness of his proposed treatments.

Tinnitus in Celsus

In the first paragraph of his discussion Celsus speaks of three causes of tinnitus:

1. The common cold causes a mild form;  
2. Diseases (unspecified) and prolonged headaches give rise to a more serious form;  
3. The onset of serious disease, especially epilepsy, causes the most serious form:  

Celsus 6.7.8a Another type of problem is when the ears produce a ringing sound within themselves; and because of this it also comes about that they cannot receive sounds from outside. This is least serious (1) when it comes about through a cold; worse (2), when caused by diseases or prolonged head-aches; worst of all (3) when it precedes the onset of serious illnesses, especially epilepsy.

Modern audiologists would concur with Celsus in seeing tinnitus as arising from a number of conditions and, although they would suggest more than three, those given by Celsus would be included among them. Firstly an upper respiratory tract infection can give rise to poor Eustachian tube function and middle ear dysfunction, leading to conductive hearing loss. In such circumstances tinnitus may be perceived as external sounds are reduced in perceived intensity, and the individual may become aware of any internal percept. Secondly, the association of troublesome tinnitus with epilepsy, causes the most serious form:

Celsus 6.7.8b If it is due to a cold, the ear should be cleaned and the breath held until some liquid froths out from it.

Next Celsus goes on to suggest some treatments, starting with tinnitus arising from a cold:

Celsus 6.7.8b If it is due to a cold, the ear should be cleaned and the breath held until some liquid froths out from it.

One reading of this would be that the treatment consists of cleaning the ear. No detailed information is given as to the cleansing agent that might be used, but
the mention of breath holding and of liquid frothing out of the ears suggests perhaps the use of some substance such as soda dissolved in wine, as recommended by Pliny:

Natural History 31.117 Soda dissolved in wine is poured into purulent ears; wax in the same organ it eats away in vinegar; noises and tinnitus it stops if added dry.

In the case of tinnitus caused by a common cold, cleaning it would not resolve middle ear dysfunction. In the case of tinnitus caused by wax, on the other hand, cleaning the meatus in this way might be of benefit. Baking soda mixed with warm water is still used to remove wax, but this is usually seen now as a rather harsh treatment. Wax dissolved by the soda can be washed or syringed out of the ear and the use of wine or vinegar as solvents, as suggested by Pliny (quoted above), would act as effective antimicrobial agents. Alternatively, the combination of breath holding and an emission from the ear may indicate a tympanic membrane perforation. It is difficult to see how tinnitus might be improved by such a procedure.

Celsius now moves on to the second cause of tinnitus, this being unspecified disease and headache. Here the treatment starts not with pharmacology but with regimen. The patient should start with exercise, massage, washing in hot water and gargling. Only slimming foods are to be eaten:

Celsius 6.7.8b (cont’d) If it arises from disease and pain in the head, the prescriptions as to exercise, massage, washing and gargling should be carried out. Only foods that make thin are to be used.

These treatments involve good hygiene and lifestyle change. As such they resonate with modern approaches which involve stress reduction and physical therapy.

Next Celsius discusses the pharmacological components of the treatment for tinnitus arising from disease and headache:

Celsius 6.7.8b (cont’d) Into the ear radish juice should be dropped with oil of roses or with the juice of wild cucumber root; or castoreum with vinegar and laurel oil. Also veratrum (hellebore) is pounded up for this purpose in vinegar, then mixed with boiled honey, and a salve made of it introduced into the ear.

Two alternative mixtures are suggested for drops to be inserted into the ear. In both cases there is an oily vehicle, to make sure that the substance adheres, either oil of roses or laurel oil. The first mixture then consists of radish juice, oil of roses and the juice of the wild cucumber root. Radish *raphanus sativus* was a larger and coarser version of the modern radish, with a large swollen root more like a turnip is used earlier in 6.7.7c with vinegar and laurel oil for deafness.

Oil of roses was prepared from the fresh and dried petals of the damask rose. In ancient pharmacology it is used to clear up inflammation, mainly in ear complaints, and for example used as such in Celsius at 6.7.1c and 6.7.1d. It also appears in mixtures in Pliny 20.137 and 23.85 as a constituent of a tinnitus treatment. In modern times the rose plant has been suggested as a source of anti-depressant, antiseptic, antiviral, laxative and tonic substances. The cucumber root contains bitter compounds known as cucurbitins, one of which has an anti-tumour effect. It is rich in antioxidants and contains a number of fatty acids which have been considered to have cooling and diuretic effects. In Dioscorides 2.162, it is used, as here, with rose oil to cure earache. Earlier in Celsius at 6.7.7c it is applied to the ear with castoreum and crushed rose leaves to cure deafness. In Western folk medicine in general it is used to reduce heat and inflammation, particularly when applied to wound swellings.

Moving on to the second mixture, castoreum is the name given to the strongly odiferous, oily yellowish secretion of a sac near the anal area of both the male and female beaver, used in scent marking. The chemical contents depend to some extent on the food of the animals, but one important element contained is salicylic acid, an acid derived from eating twigs of willow. This acid is the basis of modern aspirin. It is commonly used by the ancients in compounds for the relief of earache and ear infections and appears no less than ten times in Celsius’ ear section. Vinegar, acetic acid, made from the fermentation of ethanol is the most widely used preparation in Celsius’ section on ear complaints and it makes an appearance in Pliny in the context of tinnitus at 31.117. In ancient ear treatments generally it is frequently used to dissolve other compounds. The acid content, which is made up of tartaric as well as acetic acid, would potentially have had useful antiseptic and anti-fungal properties. In modern pharmacology vinegar-based products are used for their anti-fungal and anti-bacterial properties and have been applied to the treatment of ear infections.

Finally laurel oil is again a frequent component of Celsius’ ear treatments, occurring again twice in the earlier section 6.7.7 on deafness and three times in the current section on tinnitus. In modern pharmacology the bark, leaves and fruit extracts of the laurel, *laurus nobilis*, have been shown to have anti-microbial properties.

As an alternative to these two mixtures Celsius suggests pounded veratrum, a type of hellebore with vinegar and boiled honey. The roots of veratrum are highly toxic and it has been applied in the treatment of mental disorders, sometimes with fatal effects.
Celsius reveals his debt to Hippocratic medicine.

Previous Treatments of Tinnitus in the Hippocratic Corpus

At this point it would seem appropriate to compare and contrast Celsius’ ideas on tinnitus with the Hippocratic discussion of the same complaint in Diseases 2 and 33. To take first the discussion in Diseases 2.4:

If around the brain, small vessels overfill with blood... the vessels are raised up and Thomb, pain occupies the entire head, the ears ring and the patient hears nothing. The ears ring because the vessels are throbbing and quivering, for then there is a ringing in the head. The patient is hard of hearing, partly on account of the sound and ringing and partly because the brain and vessels around it swell; for owing to the overheating that occurs, the brain by itself
fills up the empty space in the direction of the ear; therefore as the same amount of air as in the time before is no longer present, and thus does not provide the same sound, what is said does not register with the patient, and for this reason he is hard of hearing.

The Hippocratic work, in contrast with Celsus, is much more concerned with the mechanism behind what is causing the phenomenon of tinnitus. The influence of humoural theory can be seen clearly in the emphasis on excess of blood and heat in the head. There is also more emphasis on the physiology of hearing. As a result of the excess of blood and heat in the head the brain was thought to swell to fill some of the auditory cavity that normally would be filled by air, thus affecting the patient's perception of sound. Whilst the tinnitus percept is here described as 'ringing’ rather than beating or banging, it may be that the phenomenon of pulsatile tinnitus, wherein the individual hears a rhythmic sound, often pulse synchronous, underpins these observations.

The next mention of tinnitus in Diseases 2 comes at 2.15:

The patient cannot tolerate wind or sun; his ears ring, he is vexed by any noise, and he vomits saliva and scum, sometimes food as well... When the case is such, first give the patient a medication to drink that will draw phlegm upwards, and after that clean out the head.

This passage seems to be treating tinnitus which is connected with sensory over-sensitivity, specifically to wind, sun and noise. Tinnitus is often linked with hyperacusis or over-sensitivity to normal levels of sound and is an important symptom in Ménière’s syndrome. The humoural explanation also differs from that found at 2.4. In this case it consists of an excess of phlegm that should be cleared from the head. It may be that this is an early reference to Ménière’s syndrome, characterised by episodic rotary vertigo, hearing loss and tinnitus. The Hippocratic passage does not mention vertigo, but only the accompanying sickness, though vertigo is mentioned in another possible unnoticed ancient reference to this syndrome in Pliny’s Natural History 20.69:

The juice (of beet) relieves headache and giddiness, noises in the ears if poured into them.

An alternative explanation of the phrase “vexed by noise” might be the individual is experiencing hyperacusis, or a reduction in sound tolerance, which is commonly accompanied by irritation and emotional distress.

The final Hippocratic mention of tinnitus occurs at Diseases 3.1:

The patient’s ears are filled with ringing, he hears unclearly, and the vessels in his head are stretched, and throb; sometimes fevers and chills occur as well... When the patient is suffering intense pain, you must cool his head - best after shaming it - by pouring cooling agents such as nightshade juice and potter’s earth into a bladder or length of gut; alternately apply and remove this before it becomes warm. Also, draw off blood, and clean out the head with fragrant substances mixed with celery juice. Let the patient abstain totally from wine, give him cold barley water as gruel, and empty his lower cavity.

Here the reference to the vessels in the head being stretched, seems to revert to the type caused by excessive blood described in 2.4 Consequently the treatment involves removal of blood in addition to cooling the head to relieve excess heat. The abstention from wine was also recommended by Celsus in 6.7.8c.

Although Diseases 2 and 3 along with internal affections (all perhaps from the end of the fifth century BC) are the three nosological treatises of the corpus to include pharmacological recipes, there is no internal use whatsoever of pharmaka, in the ears. Nightshade juice is applied in 3.1 externally as a cooling agent, and the head is cleaned with fragrant substances mixed with celery juice. The only medication recommended in 2.15 is an emetic to draw excess phlegm from the body.

CONCLUSION

In conclusion Celsus, in comparison with the Hippocratic Corpus, is free from explanations related to humoural theory and concentrates mainly on practical treatments not found in Hippocrates and on sensible advice regarding lifestyle and diet. As such the work of Celsus regarding tinnitus represents the well-educated Roman approach which is willing to give equal weight to effective herbal treatments and to Hippocratic theory on diet and lifestyle.

ACKNOWLEDGEMENTS

I gratefully acknowledge the help and support of Prof. David Baguley, Senior Academic Clinical Fellow and Consultant Audiological Scientist, Addenbrooke’s Hospital, Cambridge and Visiting Professor, Dept of Vision and Hearing, Anglia Ruskin University, and Prof. Robert Maltby, Professor Emeritus, School of Classics, University of Leeds.

REFERENCES


Objective: The objective of this study was to examine the treatment of tinnitus in two ancient works, Celsus De Medicina and the Greek Hippocratic Corpus. While reviews of historical references to tinnitus have identified this condition, the perception of sound when no corresponding external sound is present, as ringing, clicking, buzzing, hiss, or roaring. The sound may be soft or loud, low or high pitched, and often appears to be coming from one or both ears. In some people, the sound may interfere with concentration and in some cases it is associated with anxiety and depression. Tinnitus is usually associated with some degree of hearing loss and with decreased