Chapter 45
Introduction

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Keypoints

1. Tinnitus is not a single clinical or pathophysiologic entity. There are many forms of tinnitus that differ in their pathophysiology.
2. Exact diagnosis is required in each patient in order to provide the best management of tinnitus.
3. It is especially important to identify those patients who can be treated by specific interventions and those in which tinnitus is a symptom of a severe underlying disease and those patients who require immediate therapeutic action.
4. Exact diagnosis is also of great importance in clinical trials.
5. In the future, new methods such as functional neuroimaging may be found to have additional diagnostic value.

Keywords Tinnitus • Diagnosis • Heterogeneity • Pathophysiology • Diagnostic algorithm

Tinnitus can be experienced as a ringing, roaring, clicking, hissing, or buzzing. Tinnitus can start together with hearing loss but can also occur after neck trauma or during stressful live events. In some individuals, tinnitus is accompanied by insomnia, others have difficulty in concentrating, and some complaint about hyperacusis. Some individuals report that their tinnitus worsens by environmental sound; in others, the same sound may relieve their tinnitus. These clinical observations clearly show that tinnitus is not a single disease entity, but that there are many different forms of tinnitus that are likely to vary in their pathophysiology and in their response to treatment interventions. This, in turn, implies that an exact differential diagnosis is of utmost importance in the management of tinnitus.

This insightful view on tinnitus is not new. Already, more than 200 years ago (coupled with the systematic application of specific therapeutic interventions), diagnostic criteria for tinnitus were developed. The goal at that time was to identify patients who responded to galvanism, which was the then available therapy (Fig. 45.1, [1]).

It is assumed that the exact pathophysiological changes in an individual determine the efficacy of specific causally oriented therapies. In contrast, the mechanisms involved in generating the sensation of a sound when no sound reaches the ear may be less relevant for therapeutic methods that aim at habituation to the sound, such as tinnitus retraining therapy or cognitive behavior therapy. Hence, the increasing popularity of these methods in the last several decades has shifted the diagnostic focus. Clinical characteristics of the sound a person perceives with a potential reflection of its generating mechanism, such as sound characteristics, laterality, or duration, have been considered as less important. Instead, the interest has focused on detailed information about how the tinnitus impairs an individual's life and its psychosocial consequences. Fully acknowledging the relevance of the latter information for the management of an individual with tinnitus, ignoring the pathophysiologic hetereogenity would be a mistake and can even be dangerous. First, those subforms of tinnitus, which can be treated causally [2] or highly efficiently [3] with specific interventions, may not be identified. Second, tinnitus can be

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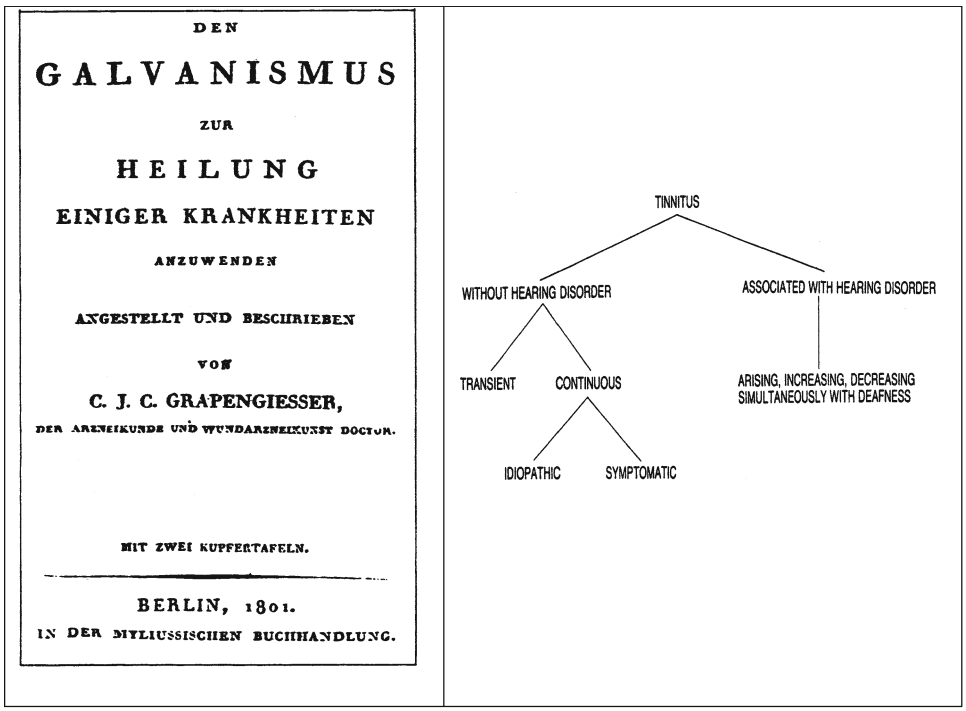

Fig. 45.1 Diagnostic algorithm from 1801 for identifying those tinnitus patients, who responded better to galvanism [1]

the first symptom of potentially dangerous diseases, some of which may even become life threatening if left undiagnosed and untreated (e.g., carotid dissection and vestibular schwannoma). Therefore, each patient with tinnitus requires a careful and systematic diagnostic approach.

In this section (Part. III), a diagnostic algorithm (Chap. 46) will first be presented, which provides guidance for systematic diagnosis of clinically relevant and specific forms of tinnitus. The diagnostic steps, which are recommended in all patients, include a detailed case history (Chap. 47) and otological (Chap. 48) and audiological examinations (Chap. 49). Depending on the findings in these primary diagnostic procedures, further diagnostic steps for exactly diagnosing specific subforms of tinnitus may or may not be required. Indications for further diagnostic steps are, for example, acute tinnitus, pulsatile tinnitus, or severe general impairment of the individual.

Chapter 46, "Diagnostic Algorithm," will give a synoptic overview about the diagnostic process and provide orientation of which diagnostic procedures are indicated in which case. These procedures are then described in detail in Chaps. (49) Neurotologic Assessment, (50) Neurologic Examination, (52) Diagnosis of Somatosensory Tinnitus, (53) TMJ Assessment, and (54) Psychological/Psychiatric Assessment. Parts II (causes of tinnitus) and IV (clinical characteristics of the different forms of tinnitus) concern these specific forms of tinnitus and their management. It should be noted that the proposed diagnostic approach refers mainly to the identification of currently known subforms of tinnitus with a well-understood pathophysiologic mechanism that also holds therapeutic relevance, such as tinnitus together with sudden hearing loss, or pulsatile tinnitus associated with a neurovascular conflict.

However, the frequently observed high variability in treatment outcome in clinical trials [4, 5] suggests the existence of further subforms of tinnitus, the specific clinical characteristics of which we do not yet know and for which our knowledge of the exact pathophysiologic underpinnings is still incomplete. This, in turn, may result in a vicious cycle: it is difficult to identify new promising treatments if we do not know according to which criteria tinnitus patients should be stratified. However, as long as no

effective treatments are available, it is difficult to identify clinically relevant criteria for stratification. Different strategies may help overcome this problem. First, standardized assessment of clinical characteristics in clinical trials will provide the opportunity to identify clinical characteristics that predict responses to specific interventions. For this purpose, an effort has been made at the TRI meeting in Regensburg 2007 to arrive at a consensus about such a standard (http://www.tinnitusresearch.org; [6]). Also, the advent of new techniques such as functional neuroimaging or transcranial magnetic stimulation has shown some promise for better diagnosis of the different forms of tinnitus. Recent findings using these techniques suggest that clinical criteria such as tinnitus duration [7] or sound characteristics (pure tone vs. narrow band noise [8]) may have specific pathophysiologic reverberations and therefore seem to be relevant criteria for stratifying patients with tinnitus.

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