
Psychiatric Disturbances and Psychotropic Drugs in Tinnitus Patients

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Abstract: At the ear, nose, and throat clinic of the Third Medical Faculty at Charles University and at the Psychiatry Department of the Institute for Further Education of Physicians in Prague, we examined 25 patients with tinnitus accompanied by psychiatric disturbances and followed them up for at least 6 months. Psychological changes in tinnitus patients occur in a characteristic chronological succession and manifest in three stages: defense, the search for adaptive mechanism, and relative recovery or a development of psychiatric disturbance (or both). Some psychotropic drugs probably diminish tinnitus by the mechanism of improving general psychiatric comfort and direct central influence. *Subjective heaviness of tinnitus* is defined by the authors as all the difficulties that exist along with tinnitus. It encompasses subjective evaluation of tinnitus loudness, frequency of tinnitus episodes, and psychiatric disturbances arising from the individual discomfort caused by tinnitus. The authors selected the visual analog scale as an easily used instrument appropriate for the complex evaluation of subjective heaviness of tinnitus.

Key Words: psychotropic drugs; subjective evaluation; tinnitus

Under certain circumstances, buzzing in the ear could be experienced by anyone. It becomes a serious problem—both objectively and subjectively—when it is permanent or recurrent. Treatment may include such pharmaceuticals as vasodilators, which cause better penetration of blood into the smallest vessels. In some cases, however, our therapeutic strategy is not satisfactory, leading to the development of psychiatric disturbances. In such cases, we resort to close cooperation with psychiatrists.

According to Hinchclife [1] and Coles et al. [2], tinnitus is reported by 20% of people younger than 20 years and by 60% of people between the ages of 20 and 60. Even among the absolutely otologically normal population, it could be perceived by those living in noisy and well-isolated spaces [3].

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The pathogenesis of tinnitus is seldom well defined. It could be evoked by certain foods (cheese, chocolate, Chinese dishes) or drinks (coffee, tea, tonic, red wine, hard liquor). Tinnitus could be evoked also by the effect of pharmaceuticals (beta-adrenergic blockers, analgesics, antipyretics). Caffeine, antidepressants, anticonvulsants, and some antibiotics [4] can cause reversible tinnitus.

Tinnitus is a symptom, not a disease *sui generis*; therefore, there is no universal treatment for it. Tinnitus is associated primarily with sensorineural hearing loss; less frequently it can be observed without sensorineural hearing impairment [5].

Psychological problems due to tinnitus begin when an affected person becomes aware of noise that exists without external stimulation and tries to discover its origin. Some persons perceive from childhood noises that are initially considered an integral part of the external environment and later report such noises as tinnitus [6].

According to Hallam [6], tinnitus is not primarily a psychogenic disorder; however, psychological factors play a very important role in the processes of perception, interpretation, treatment, and complications of tinnitus. Fowler and Zenkel [7] reported circulatory

changes that are caused by anxiety and may lead to the development of tinnitus in the inner ear. Marlow [8] experienced some success with hypnosis. He took into consideration the hypothesis that perception of tinnitus may evoke the stress reaction that leads to vasoconstriction. Grossan [9] and House [10] reported very good results using biofeedback. Weinschel [11] discussed the psychiatric aspects of tinnitus on the psychodynamic level. He outlined the modalities by which the symptoms are distinguished and how symptoms can change in the course of the time. House [5] remarked that loudness of the tinnitus on the level of 8–12 dB causes some patients very serious problems, whereas it is well tolerated by others. Also, Hallam [6] pointed out that the loudness of tinnitus cannot be considered to have a direct relationship to the psychological discomfort experienced by patients. From affected patients' point of view, the essentially important factor is their personal interpretation of the tinnitus. Hallam [6] remarked that it is very important to assure the patient that there is no malignant disease.

Some individuals are sure that tinnitus originates from external causes, and they point to various entities (e.g., hissing of gas in defective pipelines) and demand improvement. In specific cases, there were confirmed psychotic tendencies among such individuals [12].

Although tinnitus generally has something to do with many psychological factors, it is impossible to define categories of "psychogenic" and "nonpsychogenic" tinnitus, just as it is virtually impossible to differentiate between "organic" and "nonorganic" tinnitus [6]. Patients who are suffering from tinnitus and who exhibit psychopathological symptoms usually are sent for psychiatric examination.

Nevertheless, what should be kept in mind is that not every patient who suffers from tinnitus should be referred for psychiatric treatment. In some cases, tinnitus patients have been wrongly informed about their disorder or have been treated incorrectly. Stress is connected with tinnitus [13]. Persons with heavy tinnitus live under very serious stress, which negatively influences the self-defense capacity of the organism; therefore, a patient's ability to compensate for or cope with his or her tinnitus could be highly compromised. Affected patients can exhibit numerous symptoms of hysteria and deep depression. Many of them concentrate their attention on their problem and try to objectify it, thereby worsening the disturbance. Stress itself can provoke an episode of tinnitus. Conversely, prevention of and therapy for stress can act on tinnitus positively. The psychiatric methods that seem to be effective are autogenous training, biofeedback, and individual psychotherapy.

Trials of pharmacological therapy for tinnitus have been conducted with varying success over many years.

Anticonvulsants, vasodilators, vitamins, antihistamines, reserpine, sedatives, antidepressants, neuroleptics, and other modalities have all been used [4]. Both central and peripheral effects of psychotropic drugs could be considered as influencing the etiological mechanisms and the individual psychological impact of tinnitus. (For example, antidepressants enhance the supply of neurotransmitters on synaptic membranes and change the density of neuroreceptors; some of them act as anticonvulsants.) Their use is suggested for tinnitus therapy especially because of their combination of antidepressant and anticonvulsant effects. Antidepressants reduce elevated affectivity, which very often accompanies tinnitus. They also cause an increase in tolerance and, together with anticonvulsants, probably diminish the intensity and frequency of tinnitus [4].

Neuroleptics produce an effect through interaction among dopamine, muscarine, histamine, and alpha-adrenergic and serotonin receptors. Certain known areas in the central nervous system are specifically affected by neuroleptics (brain cortex, basal ganglia, reticular formation, hypothalamus, and prolonged cord). For the treatment of tinnitus, an important factor may be that neuroleptics (especially phenothiazines) are selectively absorbed by melanin pigments of the inner ear [14]. Novotny and Nekuda [15] reported very good effects from phenothiazine neuroleptics, such as thioridazine and levomepromazine in daily dosages of 25 mg and 2 mg, respectively. In a large study group, more than one-third of affected patients experienced cessation of their tinnitus after 3 months of treatment, and more than 90% of patients had confirmed remarkable reduction of tinnitus. Such good results have not been confirmed yet by any other authors. Goodey [4] found phenothiazines to be better than benzodiazepines for the treatment of anxiety in persons suffering from tinnitus. He did not discuss the well-known epileptogenic influences of low neuroleptic dosages and the danger of the development of tardive dyskinesia, which, of course, limits the use of first-generation antipsychotics.

Anticonvulsants, especially carbamazepine, used with increasing frequency in psychiatric therapy for aggressive and convulsive states and as a prophylactic in treating depression, are used increasingly in therapy for tinnitus. Goodey [16] reported more than 60% good results in those who reacted positively to intravenous lidocaine or tocainide [17]. These authors also considered the effect of local anesthetics on tinnitus and the effect of those pharmaceutical agents on the pain pathway in the brain. They suggested the combination of local anesthetics with very small dosages of antidepressants or neuroleptics.

Anxiolytics, particularly benzodiazepines, are very often used in the treatment of anxiety connected with

the occurrence of tinnitus. However, the possibility that their depression-inducing effects might worsen tinnitus has been discussed.

Our study deals with three practical factors in considering the treatment of patients suffering from tinnitus: (1) indications for psychiatric treatment, (2) changes in psychiatric status in tinnitus patients, and (3) influence of psychotropic drugs on the subjective experience of tinnitus.

MATERIALS AND METHODS

From patients at the ear, nose, and throat clinic at the Third Medical Faculty of Charles University in Prague, we chose 25 who were suffering from tinnitus and were sent for psychiatric examination to diagnose and treat psychiatric disturbances that accompanied the tinnitus. Among those 25 patients were 14 men and 11 women aged 28–57 years (mean, 35.4 years). All patients underwent a complete psychiatric examination, resulting in diagnoses of a type of premorbidly and of psychiatric disturbances related to the tinnitus. The development of psychiatric disturbances was evaluated as catamnestic (i.e. according to documentation and history of the patients or their relatives and consequent follow-up during the study).

Psychotropic drugs were indicated on the basis of psychopathological symptomatology and the course of psychiatric disturbances. Provided there were no changes within 2 weeks after the start of therapy, estimated by means of a so-called subjective heaviness of tinnitus (SHT) assessment as evaluated by the patients themselves, we swapped a given drug for another drug within a certain class or we combined various classes of drugs. For patients with predominantly an anxiety syndrome, we used mostly tricyclic antidepressants: imipramine (Melipramine), amitriptyline, or dosulepine (Prothiaden). For the anxiety syndrome, we chose prochlorperazine. The choice of prochlorperazine was based on our previous experience with the use of various types of psychotropic drugs in patients suffering from tinnitus [18]. In the patients in whom an intermittent tinnitus appeared, carbamazepine (Biston) was used.

In the course of 6 months, we used the aforementioned agents in the following way:

- Carbamazepine in 7 patients (dose, 200–1,200 mg/day)
- Imipramine in 10 patients (dose, 25–150 mg/day)
- Amitriptyline in 10 patients (dose, 25–150 mg/day)
- Dosulepine in 7 patients (dose, 25–150 mg/day)
- Prochlorperazine in 6 patients (dose, 25–50 mg/day)

Five patients have used a combination of carbamazepine and imipramine, and amitriptyline with dosulepine was used in three patients.

On the basis of the patients' evaluation of SHT, we established the fact that acceptance of tinnitus depends not only on the intensity or frequency of tinnitus but on the various psychiatric circumstances. The individual intolerance to troubles caused by tinnitus has been proved to play a crucial role in the development of psychological disturbances. We interpret subjective troubles caused by tinnitus as the grade of general difficulties that affected patients derive from the presence of tinnitus.

On the basis of Luria's experience [19], we employed the practical method of mood estimation according to a visual analog scale for evaluating subjective troubles caused by tinnitus. With the help of a visual analog scale (having a 10-cm abscissa, divided into 1-cm increments, and values of 0–100%, in which 100% signified the highest achievement evaluated subjectively by the patient), we estimated the effectiveness of therapy in patients weekly for 10 weeks after therapy was initiated. During the period of evaluation of the influence of pharmaceuticals on SHT, we did not administer any other pharmacological treatment. The patients were followed up for at least 6 months.

RESULTS

From among 25 patients, we diagnosed a normal premorbid personality in 11 (7 male, 4 female); a hypersensitive premorbid personality in 5 (2 male, 3 female); dysthymic personalities in 4 (2 male, 2 female); hysteria in 3 (1 male, 2 female); and a schizoid personality profile in 1 (male). In 17 patients, we confirmed serious psychiatric problems. Seven persons with a premorbid pathology suffered temporarily from minor psychiatric problems, such as light depression or psychiatric irritation.

In three patients with hypersensitivity, we observed anxiety syndrome and, in two, we observed anxiety-depressive syndrome. All dysthymic personalities reacted with the development of depression. In schizoid individuals, we observed family and work problems as well as kverulation tendencies. All patients exhibited three common stages of psychiatric disorder development as a reaction to their disturbance.

Stage of Defense

Development of tinnitus led in every patient to the defense reaction, according to their type of premorbid personality. In this stage, all the patients engaged in intense activity in searching for help, but also they accused the physicians who were not able to help them

and, therefore, were thought to have caused their troubles. The information given by the physician was of value for all patients. A patient's perception that his or her disease was being underestimated by the physician led to that patient's mistrust and a consequent worsened psychiatric state. For the patient with hypochondriac tendencies, the basic assurance that there was no malignant disease was of great importance.

Search for Adaptive Mechanism

In the second stage, the search for adaptive mechanisms, patients became accustomed to the presence of tinnitus and to the fact that there was no chance of improvement in their condition. They often found a masking environment (i.e., noise, music, and the like). Others sought a certain position of the head or the entire body that might help to diminish their tinnitus. Still others tried to combine various remedies or to change their jobs (or both).

Relative Recovery or Development of Psychiatric Disturbance

All patients with a normal premorbid personality accepted relatively soon the fact of their tinnitus. The follow-up and treatment performed by the psychiatric staff were considered only an attempt to influence tinnitus positively with psychotropic drugs. In all other patients, we confirmed the development of psychiatric disturbances that were in agreement with the decompensation of a premorbid personality. The results of psychopharmacological therapy are shown in Table 1.

Tricyclic antidepressants were effective as monotherapy in a total of 27 cases. The reduction of SHT was confirmed in 19 patients (range, 10–30%), whereas 8 other patients reported no improvement. In seven persons, carbamazepine as monotherapy produced improvement (range, 20–50%). Prochlorperazine reduced tinnitus in six of eight patients by between

10% and 20%. A combination of carbamazepine and imipramine was administered in five patients, with a success rate of 10–30%. Finally, a combination of amitriptyline and dosulepine reduced tinnitus in five patients by approximately 10–20%.

DISCUSSION

Tinnitus always has both a subjective and an objective component. Intensity and frequency of tinnitus are measurable by audiometric examination. Consequently, these parameters are, in our opinion, objective. Subjective perception and realization of tinnitus by suffering patients depends on many psychological and psychiatric circumstances. Psychiatric stress and anxiety generally increase the sensitivity to all sensory stimulation; adequate psychiatric equilibrium increases one's resistance to negative stimuli. One patient could describe a tinnitus level as not acceptable, whereas another could live with the identical tinnitus level fairly comfortably [13].

The psychosomatic component of tinnitus is generally known and appreciated and leads us to try to improve the psychiatric resistance of patients suffering from tinnitus. Very often this is the only therapeutic possibility, because the pathogenetic basis of tinnitus remains unknown.

According to Bastecki et al. [20], some pharmaceuticals that influence psychosomatic components of other diseases, especially their affective components, can also positively influence a basic ear, nose, and throat disease. The mechanisms of psychopharmacological effects in tinnitus therapy are, at this stage, hypothetical. Anticonvulsant effects of carbamazepine can be presumed; this is less true of other psychotropic drugs. The report by Goodey [4] about the anticonvulsant effect of antidepressants is very curious and is seldom cited in the appropriate literature.

The oscillation of reduction of SHT values in our patients ranged between 0% and 30% through the application of antidepressants, from approximately 20% to 50% by the use of carbamazepine, and from 0% to 30% by prochlorperazine. Complete relief of tinnitus was not reported in any patient in our group. To evaluate the effectiveness of our therapy, one must consider that our group consisted only of very difficult cases, patients who were treated previously with reasonable polytherapy without any reasonable acceptable effect. They tended to show psychiatric disturbances; therefore, they were referred for psychiatric intervention.

From the point of view of the development of psychiatric disturbances by the persons suffering from tinnitus, the stage of defense is the most important. In this stage, very often patients decide whether and how the disease is realized, evaluated, and accepted by the physician. In some cases, we could confirm that the posi-

Table 1. Results of Pharmacological Therapy

Generic Drug Name	No. of Patients	DSHT (%)	DSHT Mean (%)
Imipramine	10	0–30	22.8
Amitriptyline	10	0–20	18.4
Dosulepine	7	0–20	15.0
Carbamazepine	7	20–50	35.0
Prochlorperazine	8	0–30	12.5
Carbamazepine-imipramine	5	10–30	21.0
Amitriptyline-dosulepine	5	10–20	17.0

DSHT = diminution of subjective heaviness of tinnitus.

tive acceptance by ear, nose, and throat physicians could lead to a very satisfactory effect and release of patients' difficulties. The need for psychiatric therapy should be evaluated by psychiatrists, and any such therapy should be administered by these specialists.

REFERENCES

- Hinchcliffe R. Prevalence of the commoner ear, nose and throat conditions in the adult rural population of Great Britain. *Br J Prev Soc Med* 15:128–140, 1961.
- Coles RRA, Davis AC, Haggard MP. Epidemiology of Tinnitus. In D Evered, G Lawrenson (eds), *Tinnitus*. Ciba Foundation Symposium 85. London: Pitman, 1981:16–34.
- Heller MF, Bergmann M. Tinnitus aurium in normally hearing persons. *Ann Otol* 62:73–83, 1953.
- Goodey RJ. Drug Therapy in Tinnitus. In JWP Hazzel (ed), *Tinnitus*. Edinburgh: Churchill Livingstone, 1987: 176–190.
- House JW. Panel of tinnitus control. Management of the tinnitus patient. *Ann Otol* 90:597–601, 1981.
- Hallam RS. Psychological Approaches to the Evaluation and Management of Tinnitus Distress. In JWP Hazzel (ed), *Tinnitus*. Edinburgh: Churchill Livingstone, 1987: 156–175.
- Fowler EP, J Zenkel A. Psychosomatic aspects of Ménière's disease. *JAMA* 148:1265, 1952.
- Marlow FI. Effective treatment of tinnitus through hypnotherapy. *Am J Clin Hypn* 15:162–165, 1973.
- Grossan M. Treatment of subjective tinnitus with biofeedback. *Ear Nose Throat J* 55:314–318, 1976.
- House JW. Treatment of severe tinnitus with biofeedback training. *Laryngoscope* 88:406–411, 1978.
- Weinschel EM. Some psychiatric consideration in tinnitus. *J Hillside Hosp* 128:67–92, 1955.
- House P. Personality of the Tinnitus Patient. In D Evered, G Lawrenson (eds), *Tinnitus*. Ciba Foundation Symposium 85. London: Pitman, 1981:193–203.
- Walford RE. People who hear a continuous hum. *Science [Chelsea]* 8:7–9, 1979.
- Stahle J, Lyttkens L, Larson B. Some Views on Medical Treatment in Ménière's Disease: Use of Urea and Target-Seeking Drugs. In G Thieme (ed), *Ménière's Disease*. Stuttgart: K-H Vosteen, 1981:199–208.
- Novotny M, Nekuda V. Lecba usnich selestu fenothiaziny. *Cs Otolaryngol* 35:291–295, 1986.
- Goodey RJ. Drugs in the Treatment of Tinnitus. In D Evered, G Lawrenson (eds), *Tinnitus*. Ciba Foundation Symposium 85. London: Pitman, 1981:263–278.
- Shea JJ, Emmet JR, Mays K, et al. Medical treatment of tinnitus. *Ann Otol* 90:601–607, 1981.
- Smolik P, Hahn A. Psychické poruchy a psychofarmaka u pacientu s tinnitem. *Prakt Lek* 70(14):545–548, 1990.
- Luria RE. The validity and reliability of the visual analogue mood scale. *J Psychiatr Res* 12:51–57, 1975.
- Bastecki J, Skovronski O, Boleloucky Z. Psychická symptomatic u nemocných s poruchami sluchu a rovnováhy a možnosti jejího psychofarmakologického ovlivnění. *Cs Psychiatr* 85:82–88, 1989.