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Experience with a Medicolegal Decision-Making System for Occupational Hearing Loss–Related Tinnitus

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Abstract: Owing to an increasing number of requests for compensation, a medicolegal decision-making system for tinnitus related to noise-induced hearing loss (NIHL) has been elaborated at the Federal Belgian Institute of Occupational Diseases. Experience with 113 patients, all of them claiming compensation for NIHL and tinnitus, is now available. The patients underwent an exhaustive audiological investigation, and their professional career and noise exposure were carefully and objectively documented. We reviewed the group of 35 "accepted" cases (i.e., with chronic tinnitus recognized as related to NIHL and financially compensated as an occupational disease) and analyzed the medicolegal arguments for acceptance or rejection. In these patients, tinnitus was mostly bilateral, was perceived on average at a frequency of 4 KHz and with a supraliminal intensity of 7.2 dB, and lasted on average for 7.3 years. To gain better insight into the relationship between cochlear damage and chronic tinnitus, we compared our group to a control group of 35 patients with similar hearing thresholds at 3 and 4 KHz but free of tinnitus. The main difference is a significantly steeper slope of the audiometric curve between 2 and 3 KHz in the tinnitus group. Furthermore, a notch in the distortion product–gram is noticed in 60% of the ears affected by tinnitus versus 9% of the ears in the control group. This abrupt discontinuity in the activity along the tonotopic axis of the auditory system—the main characteristic of NIHL—could be a factor eliciting tinnitus, as a correspondence between the audiometric notch and tinnitus frequency appears to exist.

Key Words: compensation; decision making; insurance; NIHL; tinnitus

Noise exposure has been considered as the most common cause of tinnitus [1]. The reported incidence of tinnitus in populations exposed to occupational noise varies broadly, probably depending on methods of questioning and testing. In the review by Axelsson and Prasher [1], percentages vary between 4.6% and 51.3%. There is some suggestion that the incidence of tinnitus is higher among claimants than among non-claimants. In agreement with Axelsson and Prasher, a reasonable assertion is that between 20% and 40% of workers exposed to occupational noise suffer from tinnitus. In a medicolegal context, tinnitus is mostly a subsidiary item of claim, additional to that for noise-induced hearing loss (NIHL). However, tinnitus may also be the principal or only complaint (e.g., in patients with a specific and selective noise-induced dip at or around 4 KHz but without obvious repercussion on their social hearing). Furthermore, as in some cases tinnitus may cause devastating (and objectifiable) effects on lifestyle and ability to work, it may attract higher levels of compensation than would hearing loss [2]. In such a medicolegal situation in which, for example, a patient claims compensation for an occupational disease, potential financial advantage may be a strong motivation for feigning

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or exaggerating. The essentially subjective nature of tinnitus renders very difficult—at least in some patients—reaching an equitable medicolegal decision about the presence and severity of tinnitus. This problem implies that, in each case, the assessment needs to involve a large set of parameters, combining both subjective and objective items [3].

Owing to an increasing number of requests for compensation, a medicolegal decision-making system for tinnitus related to NIHL has been elaborated at the Belgian Federal Institute of Occupational Diseases [4] and is now systematically used in current practice (Table 1). The proposed method is based on a rational, graduated progression in decision making: At each step, a fairly large number of elementary (cellular) decisions, easy to make and reproducible among different experts, lead to the higher decision level. Four such levels are worked out and formulated, involving 65, 12, 4, and 1 decisions, respectively. The final decision is to accept or reject the tinnitus as a true component of the occupational disorder (noise-induced cochlear damage). Directly related to this decision is the determination of the percentage of disability or impairment that may be attributed to this tinnitus component. This medical decision-making system demonstrated a high inter-rater consistency [4]. The main purpose of this approach is to offer optimal transparency in case of litigation. The final aim is maximal equity.

Experience with 113 patients is now available, all of them claiming compensation for NIHL and tinnitus. All these patients underwent an exhaustive but noninvasive audiological investigation, and their professional career and noise exposure were carefully and objectively documented. The group of 35 "accepted" cases (i.e., those with chronic tinnitus recognized as related to NIHL and financially compensated as an occupational disease) have been reviewed in detail. The present study analyzes the medicolegal arguments for claim acceptance or rejection and the characteristics of the tinnitus and occupational NIHL in these patients. To gain better insight into the relationship between cochlear damage and tinnitus, we compared our tinnitus patient group to a control group of 35 patients with occupational NIHL but free of tinnitus. We matched both groups for the importance of hearing loss at 3 and 4 KHz, the most sensitive frequencies for NIHL.

PATIENTS AND METHODS

We analyzed 113 consecutive patients who had a history of occupational exposure to noise and who claimed compensation for tinnitus and NIHL within the framework of the Belgian insurance system for occupational diseases. All requests were introduced in the period 2004–2008.

In each case, a detailed technical inquiry on working conditions and environment was performed by an

Table 1. Medicolegal Decision Making for NIHL-Related Tinnitus

Level 4
- 4.1. Final decision: Accept or reject
- 4.2. If tinnitus is accepted, what percentage of impairment or invalidity?

Level 3 (4 decisions)[a]
- 3.1. Is the patient reliable?
- 3.2. Besides the tinnitus, does the patient also demonstrate an occupational hearing loss?
- 3.3. Is there a link between tinnitus and occupational hearing loss?
- 3.4. Is the tinnitus disabling and, if so, to what extent?

Level 2 (12 decisions)[b,c]

Re: Level 3.1: Is the patient reliable?
- 2.1. Are measurements based on patient's responses reproducible?
- 2.2. Are different approaches of a same physiological phenomenon consistent?
- 2.3. Are subjective data concordant with objective data?
- 2.4. Are the anamnestic data compatible with the (psycho-)physiological data?

Re: Level 3.2: Besides the tinnitus, does the patient also demonstrate an occupational hearing loss?
- 2.5. Does the hearing loss show the characteristics of NIHL at functional hearing assessment?
- 2.6. Has the patient actually been exposed to harmful occupational noise?
- 2.7. Is the anamnesis and is the history of complaints suggestive for progressive occupational hearing loss?

Re: Level 3.3: Is there a link between tinnitus and occupational hearing loss?
- 2.8. Does the functional assessment of tinnitus (tinnitometry) suggest the etiology of cochlear noise damage?
- 2.9. Does the medical history demonstrate compatibility of tinnitus with the etiology of cochlear noise damage?
- 2.10. Is the anamnesis and is the history of complaints suggestive for tinnitus related to progressive occupational hearing loss?

Re: Level 3.4: Is the tinnitus disabling, and if so, to what extent?
- 2.11. Are there convincing objective elements?
- 2.12. Are there convincing subjective elements?

Level 1 (65 decisions)[a]

Re: 2.1. Are measurements based on the patient's responses reproducible?

Reproducibility of psychoacoustic data
- 1.1.& 1.2. Tone thresholds
  - Within one session
  - Over time
- 1.3 & 1.4. Speech thresholds
  - Within one session
  - Over time
- 1.5 & 1.6. Tinnitus identification
  - Within one session
  - Over time

Re: 2.2. Are different approaches of a same physiological phenomenon consistent?
- 1.7. Tone/speech audiometry
- 1.8. Recruitment assessment
- 1.9. Conventional thresholds/von Békésy thresholds
- 1.10. Prosthetic tone thresholds
- 1.11. Prosthetic speech intelligibility curves
- 1.12. Masking tests

(*continued*)

Table 1 (*Continued*). Medicolegal Decision Making for NIHL-Related Tinnitus

Re: 2.3. Are subjective data concordant with objective data?
1.13. Clinical examination
1.14. Impedance measurements/stapedius reflexes
1.15. Otoacoustic emissions: spontaneous otoacoustic emissions; transient evoked otoacoustic emissions
1.16. Otoacoustic emissions: distortion products otoacoustic emissions
1.17. Brainstem evoked response audiometry
1.18. Cortical evoked response audiometry
Re: 2.4. Are the anamnestic data compatible with the (psycho-)-physiological data?
1.19. Tinnitus mentioned already in medical documents prior to context of claim for compensation
1.20. Tinnitus mentioned at medical exam for occupational health and safety
1.21. Tinnitus mentioned from first contact with the Fund of Occupational Diseases
1.22. Evidence for therapeutic seek/therapy trial(s)
Re: 2.5. Does the hearing loss show the characteristics of NIHL at functional hearing assessment?
1.23. Type of hearing loss
1.24. Severity
1.25. Symmetry
1.26. Recruitment
Re: 2.6. Has the patient actually been exposed to dangerous occupational noise?
1.27. Type of exposure
1.28. Duration of exposure
1.29. Sound pressure levels
1.30. Individual technical protection
Re: 2.7. Are the anamnesis and the history of complaints suggestive for progressive occupational hearing loss?
1.31. Type of hearing complaints
1.32. Time history of complaints
1.33. Use of protection devices
1.34. Use of hearing aids (at work? in private life?)
1.35. Use of masking devices for tinnitus
Re: 2.8. Does the functional assessment of tinnitus (tinnitometry) suggest the etiology of cochlear noise damage?
1.36. Pitch matching
1.37. Masking possibility and minimal masking level
1.38. Loudness matching
1.39. Specific characteristics: pulsatile, bitonal, etc.
Re: 2.9. Does the medical history demonstrate compatibility of tinnitus with the etiology of cochlear noise damage?
1.40. Middle-ear pathology/surgery
1.41. Trauma capitis
1.42. Acute acoustic trauma
1.43. Inner-ear pathology, dizziness, vertigo, fluctuating hearing loss, Ménière's syndrome, sudden deafness
1.44. Eighth nerve pathology, schwannoma
1.45. Pharmacology
1.46. Poisoning, intoxication
1.47. Vascular pathology, hypertension
1.48. Neurological pathology, polyneuropathy, central nervous system disease
1.49. Psychiatric pathology
Re: 2.10. Are the anamnesis and the history of complaints suggestive for tinnitus related to progressive occupational hearing loss?
1.50. History of tinnitus (onset)
1.51. Relation to working activities, private life activities, etc.
1.52. Relief conditions
Re: 2.11. Are there convincing objective elements for the nature and severity of impairment/disability/handicap?
1.53. Presence/absence of proven therapeutic seek/demand (medical advice of one/several medical specialties; nonmedical treatments)
1.54. Trial of pharmacological treatment(s)
1.55. Personal purchase of physical devices (e.g., tinnitus maskers)
1.56. Consultation of a neuropsychiatrist
1.57. Psychiatric treatment
1.58. Psychiatric hospital admission
Re: 2.12. Are there convincing subjective elements for the nature and severity of impairment/disability/handicap?
1.59. Changes in daily life (ceasing specific activities, hobbies)
1.60. Sleeping troubles, use of hypnotic drugs
1.61. Avoiding specific eliciting or aggravating circumstances
1.62. Behavioral changes: irritability
1.63. Neurovegetative symptoms, headache
1.64. Influence on mood
1.65. Depression, tendency to suicide (all these to be confirmed by objective elements)

[a] A positive decision about all four of these essential aspects is requested for acknowledging the tinnitus as a part of the occupational disease and for providing compensation.
[b] As a general rule, possible answers are:
Affirmative: in agreement, evident, compatible, plausible, concordant.
Neutral: dubious, only partially in agreement, unclear, nonevident or nonrelevant item, or information lacking.
Negative: not in agreement, incompatible, discordant, unrealistic, unacceptable.
[c] In case of one or more "nonaffirmative" responses, the expert needs to make a weighing in order to come to a final positive or negative decision for each question of level 3.

engineer of the Federal Institute of Occupational Diseases. All patients were also requested to provide a copy of all medical documents in their possession and, when available, medical files were collected from the Occupational Health and Safety Service (including annual audiometric data).

All patients underwent an exhaustive otological and audiological investigation at the Ear, Nose, and Throat Department of the Federal Institute of Occupational Diseases, including tone and speech audiometry (prosthetic audiometry when relevant), automatic audiometry (von Békésy), impedance audiometry, evoked response audiometry (including frequency-specific cortical responses to stimuli of 1, 2, and 3 KHz), recording of spontaneous and evoked otoacoustic emissions, and tinnitometry. Combined with the information from the medical history and the medical correspondence and documents, the data of the clinical and instrumental investigations were used to check the 65 items of level 1 of our decision-making system (see Table 1).

According to this decision-making system, 35 of the 113 claimants were recognized as having a tinnitus directly related to their NIHL and were specifically compensated for this tinnitus. Normally, the compensation for tinnitus is additional to that for NIHL but, in 23 cases, compensation was granted solely for the tinnitus, as the

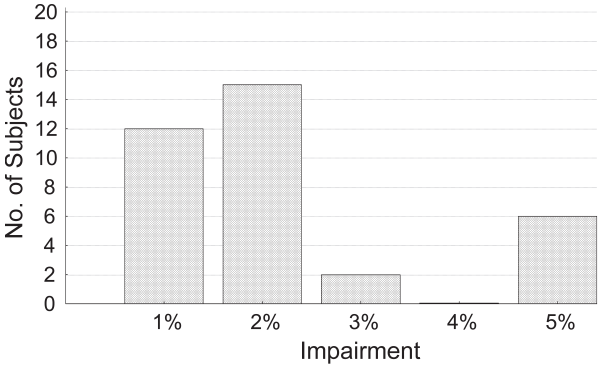

Figure 1. Percentages of impairment among study subjects with noise-induced hearing loss–related tinnitus (35 patients) whose cases were "allowed." These percentages are in addition to those allowed for hearing loss.

severity of the NIHL was insufficiently proved. Acceptance as an occupational disease automatically implies a proposal for withdrawal from the noisy workplace (with possible occupational recycling and compensation) or a technical adaptation.

For controls, we selected 35 subjects also with a history of occupational exposure to noise and also claiming compensation for NIHL in the same period but without complaints of tinnitus. The control group was matched for the criterion of a similar (on average) hearing loss at 3 and 4 KHz, accounting for a comparable cochlear damage due to noise. The average thresholds at 3 and 4 KHz for the tinnitus group are 54.83 and 61.17 dB, respectively, and for the control group are 54.57 and 61.30 dB, respectively.

RESULTS

Outcomes of the Decision-Making System

Arguments for a negative decision at level 4, implicating a rejection of the tinnitus component of the claim in 78 claimants, were as follows: At least one of the four decisions at level 3 had to be negative, but frequently two or even three of these decisions came out unfavorably.

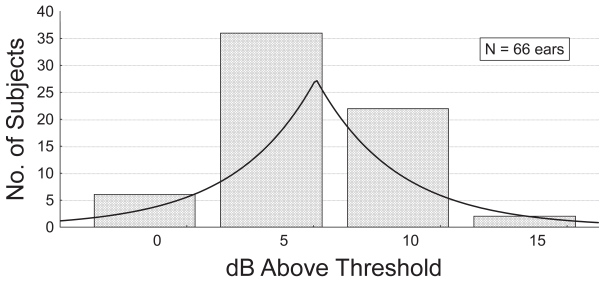

Figure 3. Distribution of perceived tinnitus intensities above the pure-tone hearing threshold (Lagrange fitting curve).

Reliability was registered as 38 times negative. The negative decision never occurred singly. The concomitant occupational NIHL received 25 negatives, 2 of which were the sole negative decision. As regards the relation between tinnitus and NIHL, 57 times the decision was negative, 5 times as the sole negative decision. The degree of impairment came out as 24 times negative, 2 times as the sole negative decision. The distribution of allowed impairment percentages is given in the histogram in Figure 1.

Tinnitus Characteristics in the Cases Considered as Related to NIHL and Recognized as Occupational Disease

The tinnitus was bilateral in 31 of the accepted cases and unilateral in 4 cases (3 left, 1 right). The histogram in Figure 2 shows the distribution of perceived tinnitus frequency in the 66 investigated ears (tinnitotopy). In most cases, tinnitus was located at 4 KHz. The histogram in Figure 3 shows the distribution of perceived tinnitus intensities above the pure-tone hearing threshold. On average, the tinnitus was perceived as 7.20 $\pm$ 3.4 dB above the threshold. On average, the tinnitus has existed for 7.3 years, with a large spread.

Comparison with the Matched Control Group

The subjects with NIHL-related tinnitus were slightly younger than our control subjects (48.9 vs. 53.5 years,

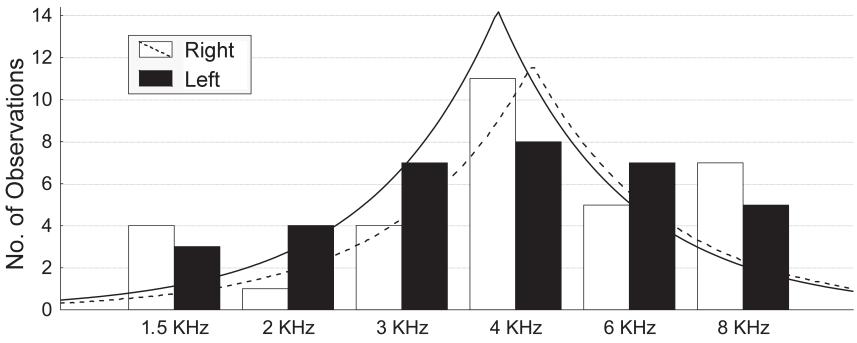

Figure 2. Distribution of perceived tinnitus frequency in the 66 investigated ears (tinnitotopy; Lagrange fitting curve).

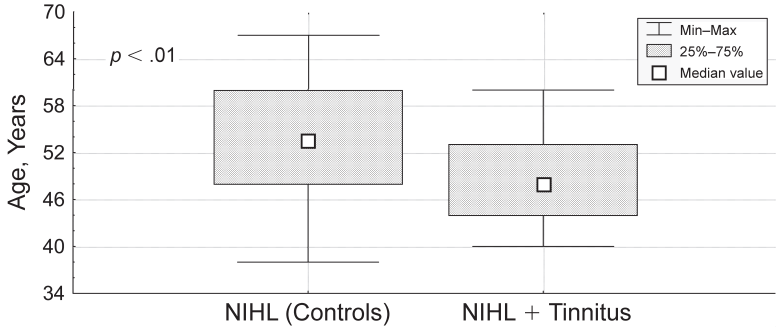

Figure 4. Age of subjects with tinnitus related to noise-induced hearing loss (*NIHL*) and control subjects with NIHL but free of tinnitus.

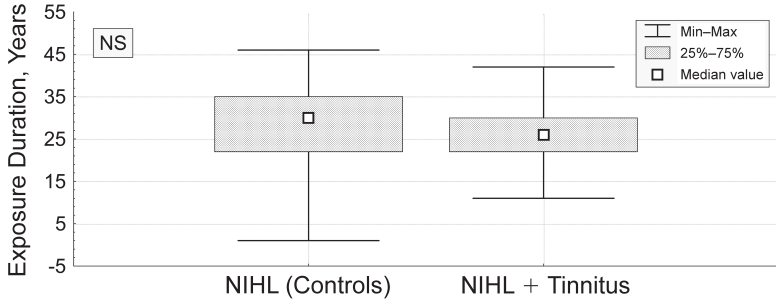

Figure 5. Duration of noise exposure in the tinnitus group and in the control group, both with noise-induced hearing loss (*NIHL*). (*NS* = not significant)

on average; Fig. 4). The difference is significant ($p < .01$, Mann-Whitney test). Duration of noise exposure was slightly less in the tinnitus group than in the control group (25.7 vs. 28.7 years, on average; Fig. 5). However, the difference does not reach the .05 significance level (Mann-Whitney test).

The pattern of hearing loss is shown in Figure 6 at the average hearing levels (±1 standard deviation) for 1, 2, 3, 4, and 6 KHz for the subjects with tinnitus (66 ears) and without tinnitus (70 ears), respectively. Hearing levels at 3 and 4 KHz were used to match the two groups. However, variances differed highly significantly ($p < .001$) between the two groups for all frequencies; the spread was smaller in the tinnitus group. Further, a Mann-Whitney test indicated that, except for 3 and 4 KHz, the hearing loss was more pronounced in the group without tinnitus ($p < .001$ always). Furthermore, the pattern of the two averaged audiometric curves was different: The typical 4-KHz notch was lacking in those in the control group. A sign-test revealed that the difference in hearing level between 4 and 6 KHz was highly significant between the two groups ($p < .001$): In the tinnitus group, the hearing level improved at 6 KHz as compared with 4 KHz; in the control group, the 6-KHz value was worse.

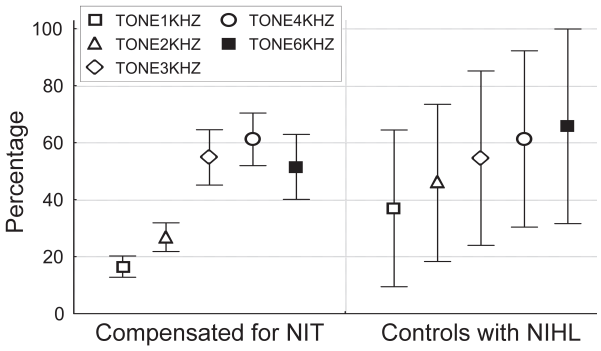

Figure 6. Average hearing loss (±1 standard deviation) for 1, 2, 3, 4, and 6 KHz for the subjects with noise-induced tinnitus (*NIT*; 66 ears) and without tinnitus (70 ears) but with noise-induced hearing loss [*NIHL*], respectively. Hearing levels at 3 and 4 KHz were used to match the two groups.

Distortion Product Otoacoustic Emissions

Distortion product otoacoustic emission (DPOAEs) were recorded according to the usual distortion product–gram (DP-gram) procedure, the DP-gram being a plot of the amplitude (in dB SPL) of the distortion products as a function of the stimulus frequency. The DP elicited by the nonlinear intermodulation between two sinusoids of frequencies f1 and f2 along the basilar membrane was measured at 2f1–f2. A fixed ratio of f2/f1 = 1.22 was set for all the measurements, and the level of the two pure tones was 70 dB hearing level (HL). The equipment was able to test frequencies from 1,000 to 8,000 Hz. According to Attias et al. [5], DPOAEs are considered to be present only if values (in decibels sound pressure level) are larger than at least two standard deviations above the upper noise floor at the corresponding frequency. We observed a notch (3–4 KHz) in the DPOAEs in 39 of the 66 ears with tinnitus but in only 6 of the 70 control ears ($p < .001$, Chi-square test).

DISCUSSION

Reliability of the Subject

Medicolegal decision making has to rely on maximum objectivity. A few basic points are helpful in assisting medical criticism and experience. First, reproducibility requires an internal reference. Inconsistent responses are suspicious. Also, when, within an exhaustive assessment, those topics for which the patient's assertion can be objectively controlled systematically demonstrate reliability, a reasonable assumption is that those for whom such an objective control is impossible are also credible. This is particularly true when the patient ignores which of the items can be objectively controlled.

Reports or indications about the existence of tinnitus prior to any compensation claim (e.g., in the file of the occupational medicine physician) support reliability. Similarly, documents proving a search for relief of tinnitus before any claim for compensation are highly relevant in this context (e.g., repeated medical consulting, acupuncture, purchase of tinnitus maskers). Verifiable changes in the daily life or behavior of a tinnitus patient may imply plausibility (e.g., terminating an activity within a choir) and reflect severity as experienced by the patient.

Concomitant Occupational NIHL

Twenty-five claims were rejected because of lack of concomitant occupational NIHL. A detail to be mentioned is that to be considered meaningful, the hearing threshold shift (air conduction) at 4 KHz in the best ear has to be at least 25 dB above normal value [6]. Attias et al. [5] define NIHL as a hearing threshold of more than 25 dB HL at the high-frequency range.

Relation between Tinnitus and NIHL

Reasons to consider the relation between tinnitus and NIHL as improbable stem from medical history and anamnestic data (e.g., onset of tinnitus), clinical and audiological findings, subjective characteristics of tinnitus (e.g., pulsating), tinnitometry (e.g., 125 Hz), low pitch, and data obviously pointing to an etiology other than that of NIHL (e.g., sudden deafness, Ménière's disease, otosclerosis, trauma capitis, commotio labyrinthi, blast injury, middle-ear disease, hypertension, cerebrovascular lesion [as evidenced by magnetic resonance imaging], side effect of drugs).

Degree of Severity and Allowed Impairment or Disability

For reasons of maximum objectivity in determining an impairment percentage, the estimation of the degree of severity—particularly in a medicolegal context—must rely as far as possible on factual and verifiable data. Such data are, for example, provided by the extent and intensity of the medical-paramedical assistance-seeking behavior specifically related to the tinnitus, particularly before the claim for compensation was introduced. Also, purchase of devices (e.g., a tinnitus masker) for relieving tinnitus and personal expenses for alternative treatments may be relevant information.

The following rating scale is indicative (all items specifically concern tinnitus):

1. Level 0 Neither medical nor alternative assistance-seeking
2. Level 1 Consulting the home physician; looking for alternative medicine; treatment with sedatives, hypnotics
3. Level 2 Consulting an ear, nose, and throat specialist or a neurologist; treatment with Betahistine and vasoactive drugs; physical treatments; tinnitus maskers; psychological treatments
4. Level 3 Referral to a psychiatrist; treatment with antidepressive and psychotropic drugs; psychotherapy
5. Level 4 Psychiatric hospitalization for major behavioral troubles; treatment with major psychiatric drugs

Our series included only one level-4 case, but, according to the patient himself and to his home physician, the tinnitus was a secondary problem. Three patients were referred to a psychiatrist but required no more than a short treatment. In the case of a serious psychiatric problem, the medical expertise of a psychiatrist would obviously be requested. The reason behind a negative decision 4 in level 3 ("Is the tinnitus disabling and, if so, to what extent?") was mostly that, when patients were examined, the tinnitus had disappeared or was disappearing. In other cases, patients reported the tinnitus (in addition to the hearing loss) but did not consider it as actually disabling.

Perceived Frequency of Tinnitus (Tinnitotopy)

Our observation here is that the correspondence in frequency between an audiometric notch and tinnitus is in agreement with the literature. Okumura et al. [7] also noticed a strong correlation between tinnitus frequency and hearing loss. The presence of whistling tinnitus was found to be correlated significantly with high-frequency hearing loss [8].

Perceived Intensity of Tinnitus

The observed tinnitus sensation levels are also in agreement with values reported in the literature. Those

obtained by Andersson [9] were not higher than 16 dB supraliminally.

Pattern of Hearing Loss

Our tinnitus and control groups were matched for similar average thresholds at 3 and 4 KHz. This may be interpreted as a similar cochlear damage specifically due to noise, which fits with a comparable duration of noise exposure. Average ages are slightly different (48.9 and 53.5, respectively). In normal subjects, this age difference would account for a shift of up to 5 or 6 dB on 6 KHz [6] but, in subjects with NIHL, the superimposed effect of presbycusis in the notch zone (3, 4, 6 Hz) has been shown to be considerably reduced [10]: Hair cells lost from one cause cannot be "re-lost again" from another cause. Nevertheless, those in the tinnitus group seem to have been exposed at a younger age than those in the control group.

The main audiometric differences between our two groups are as follows:

1. A significantly higher hearing loss at the nonmatched frequencies in the control group
2. A steeper slope of the curve between 2 and 3 KHz in the tinnitus group (0.028 dB/Hz vs. 0.009 dB/Hz)
3. A lack of notch effect in the control group

These findings seem to point to the existence of a relationship between the occurrence of tinnitus and a marked imbalance between hearing levels at the different frequencies, particularly 2 and 3 KHz. König et al. [11] compared 30 patients having NIHL without tinnitus and 41 (nonmatched) patients having NIHL with tinnitus. Those authors found that tinnitus patients had less overall hearing loss than did patients without tinnitus. Moreover, the maximum steepness of the audiogram was higher in patients with tinnitus (–52.9 ± 1.9 dB per octave) as compared to patients without tinnitus (–43.1 ± 2.4 dB per octave).

This abrupt discontinuity in the activity along the tonotopic axis of the auditory system could be a factor facilitating perceptual auditory misinterpretation (tinnitus), as a correspondence appears to exist between audiometric notch and tinnitus frequency. Differences in the audiometric patterns of the two groups are partially to be explained by concomitance of other hearing pathologies in the control group (nosocusis). A scotopic hearing loss at 3–4 KHz is known to be highly NIHL-specific.

Distortion Product Otoacoustic Emission

Hitherto, only a few reports have commented on tinnitus, NIHL, and DPOAEs, and they are to some extent controversial [12]. DPOAEs were found to correlate moderately and negatively with the audiometric thresholds [13], but Shupak et al. [14] concluded that, in subjects with beginning NIHL, the DP-gram is not significantly correlated with pure-tone audiometry. Attias et al. [5] and Ozimek and Wicher [12] found in subjects with NIHL and tinnitus a notch shape of the DPOAEs that clearly reflected the hearing loss notch. Our data from the tinnitus group support these last observations. The difference with those in the control group is probably due to the more severe hearing damage at 1, 2, and 6 KHz.

CONCLUSION

As it is not objectifiable, tinnitus remains a difficult item for medicolegal assessment and compensation in an insurance context. A decision-making system based on an exhaustive investigation and a four-level decision structure proves to be helpful. An aggregate of multiple choice decisions ("yes," "no," "partially") on elementary questions leads to a decision on the next level, which in turn determines—together with the other decisions on the same level—the conclusion at a still higher level. The four main decisions at level 3 each pertain to a specific independent aspect and appear to be, in comparable proportions, the limiting factor for acceptance of the tinnitus as an occupational disease. Furthermore, cases with a single negative decision at level 3 are a minority. The analysis of the files in which NIHL-related tinnitus was recognized and compensated as an occupational disease shows tinnitus characteristics that are in full agreement with what is known from the clinical and epidemiological literature (thus out of medicolegal context).

Comparison with a matched group of patients claiming compensation for NIHL without tinnitus reveals that NIHL-related tinnitus is associated with a more specific audiometric profile of cochlear damage due to noise. This specificity mainly concerns the notch at 4 KHz and the steep slope of the audiometric curve between 2 and 3 KHz. Patients with NIHL-related tinnitus have also been exposed on average at a younger age than were patients with NIHL alone.

A major advantage with the use of the decision-making system is that the final medicolegal decision relies on standardized criteria and becomes perfectly transparent in case of litigation. The final aim is maximal equity in compensation.

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