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Tinnitus Program at Brasília University Medical School

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Abstract: Over the last 6 months, all patients seen at the otologic clinic of Brasília University Medical School answered a questionnaire designed to identify and describe the symptom of tinnitus. A total of 500 patients reported and described this symptom. They underwent physical examination, laboratory tests and audiological evaluation. In their order of frequency, presbycusis, chronic otitis media, otosclerosis, acoustic trauma, Menière's disease, ototoxicity, and vestibular schwannoma were found. Tinnitus was rated as minor in 81%, moderate in 18%, and severely disabling in 1%. Those who requested treatment for tinnitus were treated medically. Central vasodilators, vestibular suppressants, calcium channel blockers, anticholinergic drugs, anticonvulsant drugs, and gingko biloba were used with variable results. Tinnitus maskers were not used, but hearing prostheses were fitted when indicated. Treatment failed in the 1% with severe disabling tinnitus, and they were entered in a double-blind, randomized protocol for intratympanic dexamethasone injection. Under topical anesthesia, 0.2 ml of a 4-mg/ml dexamethasone solution (0.8 mg per injection) or 0.2 ml of normal saline was injected just posterior to the umbo. Patients remained supine for 20 minutes with the injected ear up and received four injections at 1-week intervals. Preliminary results are reported. Tinnitus is a very frequent symptom among our otologic patients, but most of them would not mention the symptom spontaneously, probably because for 81% it was mild. Curiously, the 5% of the severely disabling type tend to exhibit no clear cause, whereas the mild and moderate cases usually have an identifiable etiology.

Keywords: drug injection; tinnitus; treatment

The senior author's interest in tinnitus began in 1989 during research fellowship under professor Harold Schuknecht at the Massachusetts Eye and Ear Infirmary. At that time, he tried to find a pathological correlate for cochlea-generated tinnitus, and the results were reported in two publications [1,2]. Later, he had the good fortune to meet professor Abraham Shulman during a meeting of the Prosper Menière's Society in Colorado. In 1997, Professor Shulman came to Brasília and conducted a 2-day course on tinnitus. After this appearance, several young members of the otolaryngology department at Brasília University Medical School also became interested in the symptom of tinnitus, and we decided in our department to set up a protocol for the study of tinnitus. This article describes the protocol and reports on some preliminary results of ongoing investigations.

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MATERIAL AND METHODS

A detailed questionnaire (Fig. 1) describing the symptom of tinnitus was submitted to every patient seen at our otology clinic during the last 6 months. All patients who had the symptom underwent otoscopy and careful head and neck physical examination, including auscultation of the great vessels and temporomandibular joint palpation. A routine complete blood count, blood glucose analysis, Na^+/K^+ level in serum, urinalysis, and T_3, T_4, and thyroid-stimulating hormone levels were

Identification

Name _____

No. _____

Age _____

Gender _____

Date _____

1. Tinnitus duration:
   - ❑ less than 6 months
   - ❑ 6 months–1 year
   - ❑ 1–2 years
   - ❑ 2–5 years
   - ❑ more than 5 years
2. Clinical onset:
   - ❑ sudden
   - ❑ insidious
3. Clinical course:
   - ❑ continuous
   - ❑ intermittent
4. Worsening factors: _____
5. Affected ear (side):
   - ❑ left
   - ❑ right
   - ❑ both
   - ❑ not able to establish
6. Severity (mark the appropriate rate):
   1 2 3 4 5 6 7 8 9 10
7. Hearing loss association (which ear?):
   - ❑ no hearing loss
   - ❑ left ear
   - ❑ right ear
   - ❑ both ears
8. Tinnitus quality:
   - ❑ rain
   - ❑ whistle
   - ❑ waterfall
   - ❑ pulsatile
   - ❑ ringing
   - ❑ roaring
   - ❑ butterfly
   - ❑ click
   - ❑ other
9. History:
   - ❑ noise exposure
   - ❑ ototoxic agents
   - ❑ cranial trauma
   - ❑ previous otologic surgery
   - ❑ previous otologic disease
   - ❑ Menière's disease
   - ❑ migraine
10. Previous treatment:
    - ❑ no
    - ❑ yes

    Specify treatment: _____

    Results: _____

Figure 1. Brasília University Hospital Otology Clinic questionnaire used to identify tinnitus patients and to describe the symptom.

obtained. Complete audiometric evaluation was carried out in all patients with tinnitus, and brainstem evoked response audiometry was performed whenever necessary for the diagnosis. Computed tomography and magnetic resonance imaging were used when indicated.

RESULTS

Through the questionnaire applied to all our otology clinic patients, we identified 500 tinnitus sufferers in the most recent 6 months. In the order of their frequency, presbycusis, chronic otitis media, otosclerosis, Menière's disease, noise-induced hearing loss, ototoxicity and acoustic neuroma from drugs were the most common diagnoses obtained in tinnitus patients. Other miscellaneous diagnoses included middle-ear tumors and some with no clear-cut diagnosis, among them three cases of severe disabling tinnitus. As for severity of tinnitus, it was mild in 81%, moderate in 18%, and of the severe disabling type in 1%.

When the severity was mild, treatment of the tinnitus was not required. In the moderate cases, control was achieved by medical means. Vestibular suppressants (diazepam), calcium channel blockers (flunarizine), anticonvulsant drugs (clonazepam), and gingko biloba were the drugs used frequently in treating these patients. We did not use tinnitus maskers, but hearing aids were fitted whenever necessary for hearing loss, with secondary benefits for the symptom of tinnitus.

For the 1% of patients with tinnitus of the severe disabling type, we started a protocol for treatment with dexamethasone intratympanic injection. This is a double-blind, prospective and randomized protocol. Briefly, after topical anesthesia of the tympanic membrane, 0.2 ml of a 4-mg/ml dexamethasone (0.8 mg of dexamethasone) or the same amount of saline solution was injected with a tuberculin syringe just behind the umbo of the affected ear. After the injection, affected patients remained supine with the head turned 45 degrees and the injected ear up for 20 minutes. Four injections at 1-week intervals were performed. The series of injections could be repeated if necessary. After the treatment, affected patients answered a questionnaire (Fig. 2) in which they evaluated the subjective results monthly. Thus far, we have entered five patients in this protocol, the results of which are shown in Table 1.

COMMENTS

A comparison of the diagnosis we arrived at in our tinnitus patients with those listed in Table 1 of the senior author's study of 1990 [1] reveals a remarkable coincidence. Infection (chronic otitis media), drug ototoxicity, acoustic trauma, Menière's disease, otosclerosis, and presbycusis are present in both lists. The patients of the 1990 study were selected from the temporal bone collection of the Massachusetts Eye and Ear Infirmary who conformed to one criterion: having had cochlea-generated tinnitus at some point during their lifetime. Therefore, a seemingly reasonable assumption is that

Identification

Name _____

No. _____

Age _____

Gender _____

Date _____

1. Tinnitus severity is:
   ❑ remission ❑ unchanged
   ❑ much better ❑ worse
   ❑ a little better
2. Severity (mark the appropriate rate):
   1 2 3 4 5 6 7 8 9 10
3. Change in tinnitus quality?
   ❑ no ❑ yes
   Specify: _____
4. Complications?
   ❑ no ❑ yes
   Specify: _____

Figure 2. Brasília University Hospital Otology Clinic questionnaire used to evaluate results of tinnitus treatment with intratympanic dexamethasone injection.

the vast majority of the tinnitus population with which we are dealing in this study also had cochlea-generated tinnitus.

The fact that we were able to assemble 500 tinnitus patients in only 6 months from our otology clinic shows how frequent the symptom truly is among otologic patients. However, 81% of the tinnitus patients had a very mild complaint that probably would not be mentioned had we not specifically asked about it. Another 18% had moderate-intensity tinnitus that was easily controllable by medical means. Only five patients (1%) had severely disabling tinnitus. These were not controlled by usual medical treatment and therefore needed some new answer to their problem.

In 1997, Sakata et al. [3] reported on 3,041 patients with cochlea-generated tinnitus treated with intratympanic injection of dexamethasone. The symptom showed significant improvement in 75%. As we had good reasons to believe that most of our patients had cochlea-generated tinnitus, we decided to use intratympanic dexamethasone injection to treat those with the severe disabling type. Previous studies [3,4] were not double-blind, prospective, and randomized, so we decided to follow such methods in this study.

Although very preliminary, our results point out clearly a strong placebo effect on tinnitus sufferers. Table 1 summarizes the results of treating two patients with saline injections, reporting much improvement of the symptom for 5 months and some improvement for 2 months. This outcome, indeed, is not unexpected, as we know that a final common pathway [5] for tinnitus must exist where affect is associated with the symptom. We hope to be able to answer the question about effectiveness of dexamethasone intratympanic injection for tinnitus treatment in 1 year, as more patients are enrolled and treated according to our protocol. For now, at least, the need for prospective, double-blind, randomized trials of this treatment method seems fairly clear.

Table 1. Results of Intratympanic Dexamethasone Injection

Patient	Severity Before Injection	Final Tinnitus Evaluation	Follow-Up
Dexamethasone group			
1	10	Little better	In treatment
2	7	Little better	In treatment
3	9	Remission	2 months
Control group			
1	5	Much better	5 months
2	10	Little better	2 months

CONCLUSIONS

Even though tinnitus is a very common symptom among otologic patients in Brasília, only 1% of them have the severe disabling type that demands innovative treatments. Efficacy of intratympanic dexamethasone injection for treatment of severe disabling tinnitus must await the results of prospective double-blind randomized trials to be proclaimed unequivocally.

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