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Sensorineural hearing loss in acromegalic patients under treatment

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Abstract

Acromegaly is a rare endocrine disease. Few studies have evaluated its association with hearing loss (HL) and the results are conflicting.

Aim: To evaluate the prevalence and features of HL in a group of patients being treated for acromegaly. To analyze peripheral and central auditory transmission.

Methods: Cross-sectional study. A group of 34 patients with acromegaly were submitted to metabolic evaluation, tonal audiometry and brainstem auditory evoked potentials. HL was considered when pure tone average was > 25 DBHL for low frequencies (250, 500, 1000 and 2000 Hz) or high frequencies (3000, 4000, 6000 and 8000 Hz). The patients were divided in group A (with HL) and B (without HL).

Results: Twelve patients (35.3%) had sensorineural HL (Group A), being 8 bilateral and 4 unilateral. No one had mixed or conductive HL. The prevalence of diabetes/impaired glucose tolerance was similar between the groups. The frequencies 3000, 4000, 6000 and 8000 Hz were the most affected and with a similar pattern in both ears.

Conclusion: sensorineural HL was found in 38.9% of cases. Neither clinical nor metabolic differences were noted between the groups, as well as in regards to peripheral and central auditory transmission.

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INTRODUCTION

Acromegaly is a rare endocrine disease, with an incidence of about five new cases per 1 million inhabitants every year[1]. Most of the cases are associated with a GH-secreting pituitary adenoma; which induces the synthesis of the insulin-like-1 growth factor (IGF-1), which is the main mediator of GH metabolic and cellular proliferation actions[1,2]. The main comorbidities associated with acromegaly are: cardiovascular disease, diabetes, systemic blood hypertension, sleep apnea, arthritis and bone metabolism disorders (osteoporosis)[2-5]. Among metabolic disorders, we may list carbohydrate metabolism disorders, such as diabetes mellitus , fasting glucose intolerance, insulin resistance, besides reduction in total cholesterol and increase in triglycerides[3,5].

So far, very few studies have shown the involvement of peripheral nerves and acroparesthesia; nonetheless, without reports of changes to the central nervous systems, except for the compressive changes caused by pituitary tumors[2,5,6]. The involvement of hearing in acromegaly has been studied by numerous authors, with inconsistent results so far.

Maj et al.[7] mentioned briefly a high incidence of conductive and mixed hearing loss in a group of 34 acromegalic patients.

Menzel[8] reported the case of a 72-year-old patient with bilateral sensorineural hearing loss with acromegaly, and such finding was associated to a temporal bone hypertrophy, with a resulting narrowing of the internal auditory meatuses, and pressure on the acoustic nerves.

In a study with 15 patients, Richards[9] found conductive hearing loss in five of the 30 ears investigated, associating this loss with otosclerosis, because in two cases they did unilateral exploratory tympanotomy, in which the stapes was fixed and was replaced by the prosthesis. In these cases, histopathological analysis of the footplates removed, showed active otosclerosis in one patient and inactive in another. Upon analyzing the auditory thresholds of the entire group and comparing it to a control population, stated that there was sensorineural hearing loss in varied degrees in 100% of the patients. There was no statistically significant association between disease duration or circulating levels of GH, although the results seemed to indicate that the hearing thresholds were worse in those patients with lower GH circulating levels.

In a controlled study with 56 individuals with acromegaly referred to pituitary surgery, Doig & Gatehouse[10], dis not find significant differences between the groups in relation to the auditory thresholds by bone and air conduction.

Crosara et al.[11] held a controlled study with a group of 15 patients (five men; 10 women; ages between 39-67 years) in which they used tonal audiometry, immittance measures and brainstem auditory evoked potentials (BAEP), and radiological studies of the temporal bone. Results showed a high rate of abnormal results in all frequencies tested, especially at 4 and 8 KHz. Only one patient had mixed hearing loss. As to the BAEP, only 11 patients were assessed, and two had altered results. In both cases, wave I latency was normal in both sides, while in one patient there was an extension of the I-III interval, and in another, intervals I-III and III-V were extended. The radiological assessment did not show changes to the middle ear, optical capsule or internal acoustic meatus. There was no correlation between the degree of hearing loss and GH levels.

Ozata et al.[6] assessed the central and peripheral nervous systems using BAEP in acromegalic patients. Moreover, they assessed somatosensory evoked potentials of the tibial and median nerves in a group of 10 acromegalic patients (nine men, one woman, aged between 21-65 years) with untreated active disease (GH higher than 1 ng/mL), compared to 20 healthy controls. Patients with changes in the glucose tolerance test of hypothyroidism were taken off the study. Finally, they showed significant extension in the median and tibial nerve potentials; nonetheless, all BAEP components were normal. Thus, the results suggest that there is peripheral nerve involvement without central nerve involvement in patients assessed.

Babic et al.[12] assessed a group of 30 untreated acromegalic patients, compared to a group of 20 patients in searching for evidence of conductive hearing loss. There was a higher prevalence of middle ear ventilation problems in acromegalic patients, seven (23%), compared to none in the control group, $p = 0.033$. Such patients were significantly older, with a longer disease duration and lower medium levels of growth hormone in comparison to acromegalic patients without this problem.

Pilecki et al.[13] held a study with 37 acromegalic (22 women, 15 men; mean age of 51.7 years, varying between 21.1-77.8 years) patients, compared to 47 healthy controls. They assessed peripheral nerve transmission, represented by the latency of the BAEP wave I, and the transmission at the level of the brainstem, represented by the I-V interpeak. In none of the cases they found alterations to the peripheral transmission. When the 74 traces were analyzed, they found normal interpeak I-V latency results in 34 cases (45.9%), latency extension in 33 cases (44.6%) and shortening in seven cases (9.5%). Such results suggested a non-homogeneous influence of acromegaly on brain function. The authors also suggested that the extension found in I-V intervals could suggest a reduction in the myelination of the auditory pathways of the brainstem, probably because of changes in glucose metabolism present in acromegalic patients. In the study, 12 patients had active disease, while the others were in its inactive stage; however, they did not describe the treatment success used to qualify these groups.