Original Article

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Low Prevalence of Periodontitis in Acromegaly: Growth Hormone May Exert a Protective Effect

Akromegali ve Düşük Periodontit Sıklığı: Büyüme Hormonunun Koruyucu Etkisi Olabilir

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Abstract

Purpose: To evaluate bone mineral density (BMD) measurements and the presence of periodontitis in patients with acromegaly, as well as to inquire the impact of interfering factors.
Material and Method: Forty-seven acromegalic patients with any accompanying condition known to affect calcium-bone metabolism and 60 age-matched healthy controls were included. Age, gender, duration and activity of acromegaly, past-present therapy options, pituitary hormone profiles, replacement therapies, and the results of periodontal analysis were recorded.
Results: Eighteen patients were male (38.3%), 29 were female (61.7%). The mean age of the patients was 46.6±11.5 years, twenty-five (53.1%) had active, 22 (46.8%) had inactive acromegaly. The latter were older and had longer disease duration (p=0.04, p=0.003, respectively). Serum calcium and phosphorus levels, 24-hour urinary calcium excretion and BMD at the lumbar spine and femur neck insignificantly associated with disease activity (p>0.05). Osteoporosis was detected in 6 patients (12.76%). Periodontitis and advanced periodontitis were more common in control group (66.7% vs. 44.7%), (43.3% vs. 12.8%) (p=0.022, p=0.0001, respectively). There was no difference in chronic periodontitis and severity between active and inactive groups (48% vs. 40.9%; p=0.279). No difference was noted in other study parameters, as well. Repeated measures analysis of variance demonstrated statistically insignificant distribution between GH change in time and periodontitis subgroups.
Discussion: We demonstrated that acromegaly exerted no clear negative impact on vertebral BMD in the absence of overt hypogonadism. Regardless of disease activity, acromegaly cases exhibited lower rates of periodontitis with less severity which remained unchanged in the presence of accompanying metabolic disorders known to have negative impact on periodontal tissue. Chronic exposure to excess GH may have a protective role against periodontitis. *Turk Jem 2015; 19: 42-48*
Key words: Acromegaly, bone, growth hormone (GH), periodontitis, osteoporosis

Conflicts of Interest: The authors reported no conflict of interest related to this article.

Özet

Amaç: Akromegali hastalarında kemik mineral densitometre (KMD) ve periodontit varlığını ve etkileşimde bulunan faktörleri değerlendirmek.
Gereç ve Yöntem: Kalsiyum-kemik metabolizmasını etkileyen durumu olmayan 47 akromegali olgusu ve 60 yaş-cinsiyet eşleşmiş sağlıklı olgu çalışmaya alındı. Yaş, cinsiyet, akromegali süresi ve aktivitesi, geçmiş ve güncel tedaviler, hipofiz hormon profilleri ve replasman tedavileri, periodontal analiz sonuçları kaydedildi.
Bulgular: Yaş ortalamaları 46,6±11,5 yıl olan 18 erkek (%38,3), 29 kadın (%61,7) olgunun 25'inin (%53,1) aktif, 22'sinin (%46,8) inaktif hastalığı vardı. İnaktif hastalık grubu daha yaşlı idi, hastalık süreleri daha uzundu, sırası ile; p=0,04, p=0,003. Serum kalsiyum, fosfor düzeyleri, 24 saatlik idrar kalsiyum atımları, femoral ve lomber KMD değerleri ile hastalık aktivitesi ilişkisizdi (p>0,05). Altı hastada (%12,76) osteoporoz saptandı. Periodontit kontrol grubunda daha sık izlendi; %66,7 ve % 44,7, bu grupta ağırlıklı olarak şiddetli periodontit görüldü; %43,3 ve %12.8, (sırası ile; p=0,022, p=0,0001). Kronik periodontit sıklığı ve şiddeti, aktif ve inaktif akromegali grupları arasında farksızdı; %48 ve %40,9 (p=0,279). Tekrarlayan değerlerin varyans analizi testinde, zaman içinde büyüme hormonu değişimi ve periodontit alt grupları anlamlı dağılım göstermedi (p>0,05).

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Özet

Tartışma: Çalışmamızda aşikar hipogonadizm dışlandığında akromegalinin vertebral KMD üzerine negatif etkisi olmadığı gösterildi. Hastalık aktivitesinden bağımsız olarak, akromegali olgularının periodontit sıklığı düşük bulundu ve bu bulgu periodontal dokuya negatif etkisi olduğu bilinen, eşlik eden durumlarla da değişmedi. Kronik artmış büyüme hormonu maruziyetinin periodontit bakımından koruyucu olabileceği sonucuna varıldı. *Turk Jem 2015; 19: 42-48*
Anahtar kelimeler: Akromegali, kemik, büyüme hormone, periodontit, osteoporoz

Çıkar Çatışması: Yazarlar bu makale ile ilgili olarak herhangi bir çıkar çatışması bildirmemiştir.

Introduction

Acromegaly is a disorder characterized by growth of many tissues due to uncontrolled oversecretion of growth hormone (GH) and insulin-like growth factor-1 (IGF-1) (1). Both GH and IGF-1 play important roles in calcium and bone metabolism at many steps. For instance, IGF-1 activates renal 1-hydroxylase enzyme and inhibits 24-hydroxylase, thus, increases serum calcitriol.

Acromegaly causes periosteal new bone formation, cortical thickening of the diaphysis of the long bones and joint space widening. Bone mineral density (BMD) is usually unpredictable due to interfering factors, predominantly accompanying hypogonadism in acromegaly (2,3). Eugonadal acromegalic patients exhibit increased cortical bone BMD at the distal radius, whereas spinal trabecular bone usually demonstrate insignificant change (4). In eugonadal acromegalic patients, serum osteocalcin, urinary hydroxyproline and pyridinoline levels are detected to be high and lumbar BMD values are within normal limits (5).

In acromegaly, osteoporosis is usually due to accompanying hypogonadism and results in decrease in lumbar vertebral BMD. Disease duration, serum IGF-1 levels and hypogonadism predict the prevalence of vertebral fractures (VF) (1,3). However, a high rate of incident VF has been reported in both active and controlled acromegalic patients. In a recent study, progression of VF has been documented in 20% of cases, despite long-term biochemical control of acromegaly. Progression of VF has not been detected to relate with BMD values or BMD changes over time (6).

Besides frontal bossing and changes in the lips and nose, growth of the mandibular bone, separation of the teeth, maxillary widening, and malocclusion of the mouth are frequently observed in acromegaly (1). Tooth mobility and loss, interdental spaces (diestema), and, rarely, gingival overgrowth are detected at periodontal examination. There is scant data about the periodontal findings in cases with acromegaly.

Periodontal disease is a localised inflammatory reaction of the tissues surrounding the teeth against bacterial infections (7). Its presence may be a risk factor for ischemic heart disease, pulmonary diseases, premature labor, and low birth weight. Other risk factors associated with periodontal disease are smoking, traumatic occlusion of the mouth and diabetes mellitus (8). It is the second well-identified cause for tooth loss and usually accompanies systemic diseases and is mainly separated into two main groups; gingivitis and periodontitis.

Gingivitis is an immune response against the microbial dental plaque located on the teeth and affects more than 90% of the population. Smoking, medications, pregnancy and hormonal changes during puberty may act on gingiva. Destruction is limited to gingiva and is reversible. Gingiva is found to be edematous and hyperemic (7,9). However, periodontitis is characterised by irreversible injury in periodontal tissues. Diestema and prominent tooth mobility are clear signs of periodontitis. Increment in probing depth, loss of attachment and demonstration of bone loss radiographically are required for the diagnosis. Periodontitis is a multifactorial disease and presence of periodontopathogenic bacteria is not the only factor necessary for its initiation and progression (10). Systemic diseases; cardiovascular diseases, diabetes mellitus, syndromes associated with neutropenia, rheumatoid arthritis, medications, and accompanying genetic and environmental factors may impact the pathogenesis of periodontitis and the response of the host to therapy (11).

Studies inquiring the association between periodontitis and systemic bone density reveal that subjects with low bone density have less number of teeth, more clinical attachment loss and more periodontitis. Low systemic bone density has been proposed to be a risk factor for progression of alveolar bone loss and has been claimed to increase vulnerability to periodontal destruction. An association has also been shown between serum estrogen levels and alteration in alveolar bone mineral density among post-menopausal women (12,13,14).

High serum GH, IGF-1, insulin-like growth hormone-binding protein-3 (IGF-1BP-3) and calcitriol levels directly act on bone and connective tissue in acromegaly. Accompanying hypogonadism, defects in glucose metabolism, malabsorption due to somatostatin analogues, which are used in acromegaly treatment, may all adversely affect the periodontal structures and bone. Besides hormonal changes, duration and activity of the disease may affect the course of periodontitis (5,15,16).

In this study, we aimed to evaluate BMD and the presence of periodontitis in patients with acromegaly and to inquire the impact of interfering factors.

Materials and Methods

This study was performed at outpatient endocrinology clinics of Başkent University Faculty of Medicine, Adana, Turkey between August 2010 and November 2012.

A total of 47 patients with the diagnosis of acromegaly and 60 age-matched healthy controls were included for periodontal analysis. The study was approved by the Local Ethics Committee (tracking #: K09/330) and all participants gave written informed consent.

The exclusion criteria included having any condition known to affect calcium and bone metabolism, such as being on

levothyroxine suppression therapy due to differentiated thyroid carcinoma, chronic renal failure, hyperparathyroidism, untreated hypothyroidism and/or hypocortisolism, and bisphosphonate use. As smoking is known to negatively affect periodontal health, it was regarded as an exclusion criterion, as well. Additionally, the participants were instructed not to use any interfering medication, such as anti-inflammatory and immune-suppressive drugs throughout the study period.

Physical examination was performed and all the exclusion criteria were also applied for the participants in control group.

An acromegalic male with central hypogonadism who used testosterone replacement therapy irregularly and another male with cured acromegaly who had celiac disease were not included. Two other acromegalic males with active disease were also excluded because of their total prosthesis.

The patients were evaluated regarding age, gender, duration and activity of acromegaly, past therapy options; medical, surgical, radiotherapy, combination therapies, current medical agents, pituitary hormone profiles, and replacement therapies.

Active acromegaly was defined if randomly measured GH was above 2.5ng/dl and IGF-1 above age-corrected limits with/without medical treatment. Patients with discordant measurements were considered as active, as well. Other pituitary functions were determined by evaluating pituitary hormones with end organ responses and performing dynamic tests where required (17).

Accompanying glucose metabolism disorders; impaired fasting glucose, impaired glucose tolerance as well as diabetes mellitus, hypertension and cardiovascular disease were also recorded.

In study group, patients who were on levothyroxine treatment due to central hypothyroidism with normal free thyroxine levels were considered euthyroid. Premenopausal women with central hypogonadism who were on cyclic estrogen/progesterone therapy were regarded as eugonadal as well as the men who were on testosterone replacement therapy with normal serum testosteron levels.

Serum calcium, phoshporus and 24-hour urinary calcium excretion levels were measured. BMD measurement was performed at the femoral neck and lumbar spine.

Study and control groups were both subjected to periodontal examination. Periodontal examinations were performed by the same experienced periodontist. Periodontal pocket depth (presence of an abnormal gingival sulcus near the point at which the gums contact a tooth) was evaluated using periodontal probe at six different points of each tooth. Individuals with probing pocket depth (PPD) between 4 mm and 6 mm and clinical attachment level of (CAL=amount of space between attached periodontal tissues and a fixed point, usually the cementoenamel junction) up to 4 mm were diagnosed as having chronic periodontitis with slight to moderate loss of periodontal support. Those with PPD 6 mm and CAL greater than 4 mm were regarded as having chronic periodontitis with advanced loss of periodontal support. Bleeding on probing, which was considered as an objective inflammatory parameter in periodontitis establishment, was measured using the gingival bleeding index (GBI). A GBI of ≤0.1 was considered low risk for the development of periodontitis. Tooth mobility levels were evaluated and classified as degrees; 1, 2, 3. Radiographic examination, tooth loss, diastemas (space or gap between two teeth) and malocclusion were also assessed (18,19).

Laboratory Analyses and BMD Measurements

GH measurements were performed with immunometric assay (Immulite Growth Hormone, Diagnostic Products Corp., CA, USA), IGF-1 measurements were done with highly sensitive and specific immunoradiometric methods (Diagnostic Systems Laboratories, DSL -5600 ACTIVE). Serum calcium and 24-hour urinary calcium excretion levels were determined using the colorimetric method (Roche Modular P-Roche). Serum phosphorus was analysed via phosphomolibdate method (Architect C16000-ABBOTT).

BMD measurements were performed using dual energy x-ray absorptiometry (DXA) (Hologic QDR 4500, Hologic IIc., Waltham, MA, USA) at the lumbar vertebra (L1-L4) and femur neck. T and Z scores were evaluated using the new NHANES III reference criteria. Osteopenia (a T score between -1 and -2.5) and osteoporosis (a T score of less than 2.5) were defined according to the criteria of the World Health Organization.

Statistical Analysis

The SPSS software (Statistical Package for the Social Sciences, version 17.0, SSPS Inc, Chicago, IL, USA) was used for statistical analyses. Categorical variables were given as number and percentage, continuous variables are presented as means ± SD, if distributed normally and as median - minimum-maximum, if distributed not normally. Standard descriptive analysis, independent samples T-test, the Wilcoxon test, Chi-square, Mann-Whitney U test, Spearman's correlation coefficient, and the repeated measures ANOVA were used where appropriate. A p value of less than 0.05 was considered statistically significant.

Results

A total of 47 acromegalic patients [18 males (38.3%) and 29 females (61.7%)] with a mean age of 46.6±11.5 years were included in study. Fourteen subjects (29.8%) were on medical therapy only, whereas 33 (70.2%) were subjected to combination therapy, i.e medical therapy following surgery (24-72.2%), medical therapy following radiotherapy (1-2.1%), and medical therapy following surgery and radiotherapy (8-24.2%). Of the cases on medical therapy only; 23 patients (48.9%) were using octreotide, 21 (44.7%) were on octreotide and cabergoline; dopamine agonist simultaneously, and 3 (6.4%) patients were using pegvisomant only.

Hormonal assessment of disease activity revealed that 25 (53.1%) patients had active acromegaly, whereas 22 (46.8%) had inactive disease. Inactive acromegaly group was older and had longer disease duration (p=0.04 and p=0.003, respectively). Serum calcium and phosphorus levels, 24-hour urinary calcium excretion and BMD values at the lumbar spine and femur neck exhibited insignificant difference between the active and inactive acromegaly groups. Details are given in Table 1.

Twenty-one patients (44.7%) had glucose metabolism disorder at various severities. Twenty cases (42.6%) had hypertension and two (4.3%) had cardiac disease. Active and inactive disease groups did not differ regarding therapeutic options, glucose metabolism

disorders and cardiac disease (p=0.457, p=0.202, p=0.123, respectively), however, more patients in active acromegaly group had hypertension, as might be expected (p=0.042).

Among 13 female cases with active disease, nine (69.2%) were premenopausal, whereas seven (43.8%) were premenopausal among 16 female cases with inactive acromegaly (p=0.264). Postmenopausal cases were older (57.1±5.1 years vs. 37.7±5.5 years) and had longer duration of disease [median: 6 (1-17) years versus median: 2 (1-12)], as may be expected (p=0.039 and 0.001, respectively). However, they exhibited statistically indifferent lumbar and femur BMD measurements regarding to disease activity and menopausal status (p=0.964, p=0.94 and p=0.188, p=0.469, respectively).

Osteoporosis was detected in 6 subjects (12.76%) in study group. One acromegalic man exhibited low femur bone density, whereas five patients-two premenopausal and three postmenopausal women-demonstrated osteoporosis at the lumbar spine.

Periodontal examination findings in acromegaly and control groups (n=60) were evaluated. Twenty-six patients with acromegaly (55.3%) did not exhibit periodontitis. Of 21 patients (44.7%) with acromegaly and periodontitis; 15 (31.9%) had slight to moderate periodontitis and 6 (12.8%) had advanced periodontitis. Twenty-two acromegalic patients (46.8%) exhibited macroglossi. More number of cases had periodontitis in control group, advanced periodontitis being dominantly (p=0.022 and p=0.0001, respectively). Details are given in Table 2.

There was no difference in the total number of cases with chronic periodontitis between active and inactive acromegaly groups (48% vs. 40.9%) (p=0.279). There was no statistically significant difference in severity of periodontitis between the groups, as well (details are shown in Table 3). The presence of periodontitis also exhibited any relationship with menopausal state (p=0.521). There was not a relationship between the presence of periodontitis and menopausal state.

Besides similar periodontal findings, active and inactive acromegaly groups exhibited statistically insignificant difference with regard to calcium-BMD analyses.

Study parameters in acromegaly patients (n=47) were compared with regard to periodontal disease and its severity; 26 subjects were without periodontitis, 15 were with slight to moderate periodontitis and 6 patients were with advanced periodontitis. There was no difference between the groups in terms of serum calcium and phosphorus levels, final GH and IGF-1 levels, presence of hypertension, glucose metabolism disorder and/or cardiac disease (p=0.121, p=0.604, p=0.590, p=0998, p=0.253, p=0.081, and p=0.782, respectively).

Considering the negative impact of glucose metabolism disorders on periodontal structures, acromegaly cases were compared with

Table 1. Comparison of general features and bone parameters of active and inactive acromegaly patients

Disease activity (n=47)	Active group (n=25)	Inactive group (n=22)	p
Age (years)	43.4±11.4	50.32±10.7	0.040
Gender (F/M) (%)	52/48	72.7/27.3	0.229
Duration of acromegaly (year)	2 (1-10)	5 (2-17)	0.003
Serum GH (ng/ml)	4.01 (0.38-56)	0.82 (0.09-2.4)	0.0001
Serum IGF-1 (ng/ml)	417 (232-1356)	173 (57-252)	0.0001
Serum Ca (mg/dl)	9.44±0.38	9.44±0.42	0.989
Serum P (mg/dl)	4.19±0.66	3.93±051	0.143
Urinary Ca (mg/day)	105 (10-380)	105 (10-300)	0.134
Lumbal T score (total)	-0.9 (-4.0-2.0)	-0.65 (-4.0-2.0)	0.842
Femoral neck T score	-0.10 (-3.0-2.0)	-0.1 (-2.0-2.0)	0.375

GH: Growth hormone, IGF-1: Insulin like growth hormone-1
Mean ± Standard Deviation, Median (Minimum-Maximum)

Table 2. Documentation of general features and periodontological examination of Acromegaly group and Control group

	Acromegaly group (n=47)	Control group (n=60)	p
Age (year)	46.6±11.5	50.32±8.5	0.146
Gender (F/M) (n)	29/18	34/26	0.599
Active/Inactive Acromegaly (n/n)	25/22	-	-
Glucose Metabolism Disorder n (%)	21/47 (44.7)	-	-
Cases without periodontitis n (%)	26/47 (55.3)	20/60 (33.3)	0.023
Total # of chronic periodontitis n (%)	21/47 (44.7)	40/60 (66.7)	0.022
Slight to moderate periodontitis n (%)	15/47 (21.9)	14/60 (23.3)	0.321
Advaced periodontitis n (%)	6/47 (12.8)	26/60 (43.3)	0.0001
Macroglossi n (%)	22/47 (46.8)	-	-

Tablo 3. Distribution of periodontitis in acromegaly group regarding disease activity

	n	Cases without periodontal pathology (n)	Cases with slight to moderate chronic periodontitis (n)	Cases with advanced periodontitis (n)
Active Acromegaly	25	13	7	5
Inactive Acromegaly	22	13	8	1
p		0.625	0.539	0.113

regard to the presence of glucose metabolism disorder. Keeping in accordance with the literature, 13 (61.9%) of 21 patients with the disorder was found to have chronic periodontitis, while 8 (38.1%) of 26 patients with normal glucose metabolism had periodontitis of various severity (p=0.043). Presence of other metabolic disorders, i.e. hypertension or cardiac disease, was found not to associate with periodontitis.

By taking a T score of 0 as the cut-off value, acromegaly cases were grouped as the ones with or without osteoporosis/osteopenia. Twenty-seven patients (57.4%) had lumbar osteoporosis/osteopenia, whereas femoral osteoporosis/osteopenia was detected in only 15 subjects (31.9%). Disease activity exhibited no impact on the presence of osteoporosis/osteopenia at lumbar and femoral BMD (p=0.533 and p= 0.177, respectively). Presence of periodontitis did not show a relationship with osteoporosis/osteopenia at either site, as well (p=0.369 and p=0.549). Repeated measures analysis of variance performed to investigate the relationship between the GH change in time at least three sequential time points and periodontitis subgroups exhibited (GH change in time at least three sequential time points and periodontitis subgroups), statistically insignificant distribution [GH (median: minimum-maximum); GH1: 10.0 (0.52-40.0), GH2: 6.89 (0.38-200), GH3: 4.53 (0.35-56)].

Discussion

GH has been demonstrated to act on bone via interacting directly on GH receptors on osteoblasts and via increasing local IGF-1 production (autocrine and paracrine effect). IG-1 contributes to the differentiation of osteoblasts. GH deficiency has been demonstrated to associate with bone loss and osteoporosis, however, the impact of excess GH on bone tissue is less clear (20,21,22). In the present study investigating bone density and periodontital tissue, a new site of trabecular bone, among acromegaly cases, no statistically difference was found between active and inactive acromegaly subgroups in serum calcium and phosphorus levels, urinary calcium excretion and BMD measurements in the presence of similar rates of periodontitis. Periodontitis has been detected less frequently with less severity in study group. Severity of periodontitis has also been shown not to associate with accompanying metabolic problems, e.g., hypertension, cardiac disease or glucose metabolism disorder, and with biochemical and hormonal parameters, such as serum calcium, phosphorus, GH and IGF-1 levels and menopausal status. Thus, acromegaly seems to exert a protective effect against periodontitis with neutral effect on vertebral BMD in the absence of overt hypogonadism.

Active acromegaly in the presence of high serum GH and IGF-1 levels have been shown to impair bone quality and increase the risk of bone fragility. It has been detected to associate with hypercalciuria and negative calcium balance (23). High bone turnover has been detected by measuring changes in biochemical markers of bone metabolism and histomorphometry among acromegalic patients.

Markers for bone turnover, predominantly the resorption markers, have been shown to increase and the latter have been demonstrated to correlate positively with serum GH and IGF-1 (24). However, keeping in accordance with our findings, the negative effects mentioned above have not been shown in DXA-BMD measurements and normal or even high bone density has also been demonstrated in acromegaly (25).

We have performed a liberal selection bias for excluding hypogonadism and found out that disease activity exhibited no clear impact on BMD in acromegaly. In addition, there was no statistically significant difference between pre-menopausal acromegalic patients and their older postmenopausal peers in BMD values. Our finding is compatible with the literature reporting the neutral effect of acromegaly on vertebral BMD in the absence of hypogonadism (4,5). However, one can argue that inactive acromegaly cases and the postmenopausal ones in this study were older and naturally had longer duration of disease, thus, this may have blunted their axial BMDs. DXA, the method we performed is currently the most commonly used one for determining bone health. However, it has some limitations. Atherosclerotic plaques, vertebral deformities and osteoarthritis may cause falsely high BMD measurements. Besides, DXA measures areal BMD-grams per square centimeter - and its 2-dimensional (2D) BMD measurement may probably be negatively affected by bone enlargement in acromegaly. It also does not give details about cortical and trabecular bone and bone micro-architecture which are very important for fracture risk assessment (24). High-resolution quantitative computed tomography (HR-QCT) is a method that permits the in vivo assessment of the bone micro-architecture and the volumetric BMD. Its measurements are comparable to 2D histomorphometry and 3D microcomputed tomography of transiliac bone biopsies (25). In a very recent study, the negative effect of acromegaly has been demonstrated on trabecular bone microarchitecture using HR-QCT in the distal radius and tibia in eugonadal patients. In that study, hypogonadism has been strictly defined and, besides, young acromegalics without sex hormone replacement therapy and postmenopausal women have also been excluded. This approach has resulted in a younger group of patients with shorter duration of disease and less contributing factors. However, the resultant relatively low number of participants necessitates this study to be re-performed on a larger number of eugonadal acromegalic patiens by using vertebral HR-QCT (26).

We were unable to exclude our postmenopausal patients due to low number of participants and that may be considered as a limitation of our study. However, a complementary parameter, periodontal analysis, was performed in addition to DXA to investigate an additional area of trabecular-alveolar bone. We assume that lower rates of chronic periodontitis among acromegalic patients support the reliability of our DXA-BMD measurements.

Our findings impose the idea that in the absence of overt hypogonadism, excess GH may not have a negative effect on trabecular BMD. Nevertheless, it should be kept in mind that normal BMD does not imply a risk-free profile for vertebral

fractures. Progression of VF in controlled acromegaly cases with normal BMD is a supportive observation for this proposal (6).

Periodontitis is an important area of interest for periodontists due to the fact that it causes irreversible destructive injury to alveolar bone and the net effects of GH and IGF-1 on periodontal structures are not clear. Osteoblast are regulator cells of bone metabolism, they limit bone matrix synthesis or bone resorption under various conditions. Human periodontal ligament cells (PDL) act like osteoblasts; they are the master cells regulating the resorption and synthesis of connective tissue of periodontal structures (27,28). GH is an important factor acting on the gingival tissue and alveolar bone. Besides their effects on osteoblasts, GH and IGF-1 have been demonstrated to increase the secretion of bone morphogenic protein-2 (BMP-2) and bone morphogenic protein-4 (BMP-4) from human dental pulp fibroblasts (29). GH has been reported to increase alveolar bone formation in an experimental study on rat periodontium (30). Accordingly, in a recent study, acromegalic patients have been shown to exhibit less periodontitis (8). This effect may be partially attributed to the not negative impact of acromegaly on trabecular bone (4). The findings of our study are compatible with the data mentioned above. It is possible that chronic exposure to excess GH may even have a protective effect against periodontitis. Knowing that postmenopausal state is a risk factor for periodontitis, detection of similar number of postmenopausal and premenopausal cases with periodontitis in our cohort is a supportive data to the above mentioned data (14). After grouping our cases with regard to the presence of osteoporosis/osteopenia, it was observed that there was no difference in the prevalence of periodontitis between the groups. We were unable to demonstrate the protective effect of chronic excess GH exposure on the periodontal tissue statistically by using the repeated measures analysis of variances, however, we assume that if the number of acromegalic participants could be increased, the statistical significance would be evident.

Our study has some limitations. The relatively low number of participants is one of them, and therefore we had to perform a liberal approach regarding the inclusion of hypogonadal patients. Not performing HR-QCT and not measuring resorption markers are the other limitations.

In conclusion, in the present study, we have demonstrated that acromegaly exerts no clear negative impact on vertebral BMD in the absence of overt hypogonadism. Regardless of disease activity, acromegaly cases exhibit lower rates of periodontitis with less severity which remains unchanged in the presence of accompanying metabolic disorders known to have negative effects on the periodontal tissue. Chronic exposure to excess GH may have a protective role against periodontitis. We believe this information requires to be confirmed by studies with larger sample sizes.

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