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Research Article

Is Osteoporosis an Extraintestınal Manifestatıon of Inflammatory Bowel Disease? (Osteoporosis and Inflammatory Bowel Disease)

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Abstract

Aim: The aim of this study is to determine the rates of osteoporosis and osteopenia in inflammatory bowel disease (IBD) patients and to evaluate the associated risk factors.

Material and Methods: Hundred inlfammatory bowel disease patients underwent DEXA scanning prospectivly. Osteopenia and osteoporosis were defined according to the WHO guidelines.

Results: 64% of patients were female and mean of age was 38.87 ± 12.92 (16 - 73) years. 62% of patients were ulcerative colitis, 34% were Crohn's disease and 4% were indetermine colitis. Osteopenia was detected in 41 of all inflammatory bowel disease and osteoporosis was detected in 10 patients. There was not a statistically significant relationship between lomber and femur T and Z scores and gender, menopause, site of involvement in all IBD patients. Osteopenia and osteoporosis rates were higher in Crohn's disease (61.7%) when compared with ulcerative colitis (45.2%).

Conclusion: In half of IBD patients osteoporosis and osteopenia were detected. Densitometry changes in ulcerative colitis are associated with steroid usage. Whereas higher rates of osteoporosis and osteopenia in Crohn's disease indicate that osteoporosis and osteopenia may be an extraintestinal manifestaion of Crohn's disease.

Keywords: Inflammatory Bowel Disease; Osteoporozis; Extraintestinal Manifestation

Introduction

Inflammatory bowel disease (IBD) is a syndrome, whose etiology is unknown, while in addition to personal, genetic, immunological factors, different environmental factors are found to be responsible for. As in other multi-systemic diseases, it has various clinical manifestations. It may affect other organs as well as the gastrointestinal system. Osteoporosis and osteopenia are among these extraintestinal manifestations that significantly raise the morbidity of the patients and influence over 42% of the patients, and they have driven the attention of medical scientists over the past years. It is believed that inactivity, prolonged use of corticosteroids, malnutrition and the disease itself play an outstanding role in the development this complication [1-4].

Osteoporosis is frequently encountered in people with IBD, and it has been observed that the bone mineral density is much lower when compared to healthy individuals [5,6]. Various risk factors have been indicated for osteoporosis observed in IBD [7].

It is known that the low bone mineral density in patients with IBD is either osteoporotic or osteopenic. The aim of this study is to determine the frequency of osteoporosis and osteopenia and its associated risk factors in patients with IBD (ulcerative colitis, Crohn's disease and indeterminate colitis).

Materials and Methods

Bone mineral density measurement is made with Dual Energy X-Ray Absortiometry (DEXA) scanning. From the DEXA results, the femur T score (standard deviation of bone mineral density in average young adults), Z score (standard deviation of bone mineral density of the patient age group), and the lumbar vertebra T and Z scores are used. T score between -1 and -1,5 is considered as osteopenia

and as osteoporosis at the level under -2,5 and normal at the level over -1, in accordance with the standards mentioned in the World Health Organization's guideline [8].

For this study, the approval of local ethical committee of the Istanbul Faculty of Medicine, the University of Istanbul, is received. SPSS 13,0 for windows XP (Chicago, USA) is used for statistical analysis. Averages and SD are applied for statistical analysis. Non-parametric tests, correlation analysis and logistic regression analysis are applied in the comparison of data.

Results

60% of the patients were women and the average age of the patients were 38.87 ± 12.92 (16 - 73) years. Of the patients, 62% had ulcerative colitis, 34% had the Crohn's disease and 4% had indeterminate colitis. Osteopenia is observed in 41 patients out of all patients with IBD, and osteoporosis is observed in 10 of the patients. The densitometry of 49 patients was normal.

Ulcerative colitis involvement was 31% extensive, 14% left colon, 17% distal. Crohn's disease involvement was 8% ileal, 26% ileocolonic. Other extraintestinal manifestations was 7% ancilozan spondylitis/arthritis, 2% erythema nodosum, 2% renal calcul, 1% primer sclerosant cholangitis, 1% primer biliari cirrhozis, 1% deep vein thrombosis, 1% episcleritis, 1% pyoderma gangrenous. Disease activity was 65% active, 35% inactive, disease age was median 5 year (1 - 31 year) (Table 1).

When the complete group is taken into consideration, negative correlation has been found between the total dose of steroid use and the T lumbar values (r = -0.37, p = 0.014) and the Z lumbar values (r = 0.463, p = 0.006). However, when a sub-group analysis is made, this correlation is not encountered in ulcerative colitis while negative correlation is significant in patients with Chron's disease (as for the T lumbar r = 0.656, p = 0.006; as for the Z lumbar r = 0.746, p =0.003).

While significant association is not observed between the lumbar and femur T and Z scores and gender, smoking, state of menopause, the disease and the location of involvement in patients with IBD; positive correlation is found between the T femur and T lumbar scores and the body mass index (as for T femur r = 0.408, p = 0.28; as for T lumbar r = 0.445, p = 0.029).

The T femur and Z femur score values in patients with Chron's disease were significantly lower with respect to patients with ulcerative colitis (as for T femur p = 0.011, as for Z femur p = 0.007). Although the period of steroid use (ulcerative colitis: 7 ± 4,6 months, Crohn's disease: 5.8 ± 4.7 months) is longer and the dose (ulcerative colitis: 2112 ± 2015 mg, Crohn's disease: 1431 ± 860 mg) was higher in patients with ulcerative colitis when compared to the ones with Crohn's disease, there was not a statistically significant difference between the two (p = 0.328). The frequency of osteoporosis and osteopenia was higher in Crohn's disease (61.7%) with respect to ılcerative colitis (45.2%).

Discussion

The risk of osteopenia and osteoporosis has increased in patients with IBD. In a study carried on by Frei and his friends, 42% femoral osteopenia and 43% lumbar bone densitometry osteopenia is observed in 43% of the patients. Lumbar osteoporosis and 5% femoral osteoporosis is found in 14% of the patients [7]. In a study carried on in Iran, in 32.1% of the patients (53 patients) Lumbar (L1-L4) or in the femoral bone density measurement osteopenia or osteoporosis is observed. Among these patients, osteopenia is observed in 44 patients (26.7%) and osteoporosis is observed in 9 patients (5.4%) [9]. In our study, either osteopenia or osteoporosis is observed in almost half of the patients involved. 41% of the patients (41 patients) were osteopenic and 10% of them (10 patients) were osteoporotic. The frequency of osteopenia and osteoporosis was high within our patient group which shows conformity with literature.

It is known that the use of corticosteroids reduces bone loss in a rapid and significant way. Although the association between the use of corticosteroids and osteopenia is known, it is not clear whether the reason for the development of osteopenia in patients with IBD is associated with steroids or with other variables related to the disease. It is notified that the observation of higher osteopenia in the Crohn's disease with an extensive gastrointestinal involvement compared to ulcerative colitis might be associated with calcium and Vitamin D absorption disorder due to small intestinal involvement and malabsorption [5,10,11]. In our study, negative correlation has been found as well, between the steroid doses and the T lumbar and Z lumbar scores of patients with IBD. The T and Z femur scores of patients with Crohn's disease were significantly lower than the

Age/gender:	38.87+/-12.92 (16-73) years, M/F: 40/60
UC/CH/IC:	62/34/4
Normal/Osteopenia/Osteoporosis:	49/41/10
UC involvement:	%31 extensive, % 14 left colon, % 17 distal
CD involvement:	% 8 ileal, % 26 ileocolonic
Other extraintestinal manifestations:	%7 AS/arthritis, %2 EN, %2 RC, %2 PSC/PBC
	%1 DVT, %1 episclerit, %1 pyoderma gangrenous
Disease activity:	%65 active, %35 inactive
Disease age:	Median 5 year (1-31 year)

Table1: Demographical and other characteristics of the patients (UC: ulcerative colitis, CD: Crohn's disease, IC: Indetermine colitis, M: male, F: female, AS: ancilozan spondylitis, EN: erythema nodosum, RC: renal calcul, PSC: primer sclerosant cholangitis PBC: primer biliari cirrhozis, DVT: deep vein thrombosis.

scores of the patients with ulcerative colitis. While in Crohn's disease the higher observation of osteopenia might be due to small intestine involvement and malabsorption, although use of steroid is lower, it may well be considered that osteopenia and osteoporosis is an extraintestinal manifestation of Crohn's disease.

In a study carried on by Lora FL and her colleagues, the variables associated with osteopenia and osteoporosis are compared to the disease activity index, use of corticosteroids, rare physical activity, body mass index (BMI) and the previous operations, and no association has been found [6]. In the regression analysis made within the context of the study carried on by Frei and his colleagues, negative correlation has been found between the lumbar disk Z score and the BMI, the intestinal resection number, topic corticosteroid and the azathioprine. The cumulative corticosteroid dose is a predicator for topic corticosteroid, age and the pathological T score of intestinal resection. Negative correlation has been found between the femoral Z score and BMI, age, topic corticosteroid and the AZA and only low BMI is a predicator for pathological femoral T score. As a result, it is recommended that the use of corticosteroids and intestinal resection are significant risk factors for lumbar osteoporosis; and that as heredity might be an important factor, it is necessary to evaluate the bone densitometry of all the patients with IBD independent from use of corticosteroids [7]. In our study we have found out that only low BMI is a risk factor for a change in the densitometry.

In a study in which the analysis of ten variables considering bone demineralization in patients with Crohn's disease is made, age, gender, state of nutrition, smoking, period of disease, hormonal condition, inflammatory syndrome, the place of involvement: ileal, colic, or ileocolic, total steroid dose and intestinal resection have been evaluated. In 58.5% of the patients, bone demineralization has been observed. Ileum involvement and corticotherapy have been determined as predictive for bone demineralization. It has been determined that the Chron's disease is highly risky for bone demineralization. Smoking, prolonged period of disease, ileal involvement and use of systemic corticosteroids have been found out to be predictive values for bone loss [12]. In another study, it has been notified that disease activity and corticosteroid treatment in patients with Crohn's disease is associated with bone loss [13]. Gender, age and BMI are the major factors determining the bone mineral density in patients with Crohn's disease [14,15]. The bone density of young patients with IBD who didn't receive and corticosteroid treatment is found out to be lower than the ones with healthy controls. Therefore it is recommended for the patients with IBD that their bone density be measured in the earlier phases of the disease [16]. In our study, we could not find any relation between the lumbar and femur T and Z scores and age, gender, disease involvement and menopause. This might have resulted from the variety of patient groups. In our study, only a positive correlation between the femur and lumbar T score and the BMI is observed.

While low mineral density is frequent in Crohn's disease and ulcerative colitis, there is a more close realtion in Crohn's disease. In a study where bone density has been evaluated, it is observed that while low density is associated with pathogenesis in Crohn's disease, it is associated with corticosteroid treatment in ulcerative colitis [17,18]. In our study as well, the femur T and Z scores are observed to be significantly lower in patients with Crohn's disease than in the patients with ulcerative colitis.

Conclusion

In conclusion, in our study the bone densitometry is low in patients with IBD, and we have observed osteopenia and osteoporosis in almost half of our patients. Although the corticosteroid dose is higher and the period of its use is longer in patients with ulcerative colitis, osteoporosis and osteopenia is more frequently and significantly observed in patients with Crohn's disease. Although the variations of densitometry are seen to be associated with the use of corticosteroids in ulcerative colitis, osteoporosis and osteopenia in Crohn's disease might be an extraintestinal symptom of the disease in relation to the pathogenesis.

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Volume 2 Issue 2 April 2019