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DISCORDANCE BETWEEN HIP AND SPINE BONE MINERAL DENSITY USING DXA IN A SAMPLE OF IRAQI ANKYLOSING SPONDYLITIS PEOPLE.

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ABSTRACT

Background: Ankylosing spondylitis (AS) belongs to a family of rheumatic diseases known as spondylarthritides that characteristically cause spinal joint inflammation and bony fusion of the spine. **Aim of the study:** To measure the discorderance of Osteoporosis in the hip and spinal spines in ankylosing spondylitis in Iraqi people. **Patients and methods:** A cross sectional study of 70 ankylosing spondylitis patients were are treated with infliximab and etanercpt. All patients have assessment for bone mineral density by DXA for comparism and do another assessment for 35 participants as control. -Those 70 patients were categorized into two groups A and B. the 44 patients in a group A were treated with infliximab while the 26 patients in group B were treated with etanercept. **Results:** This study showed that the Discordance between spine and hip T-scores was significantly associated with ankylosing spondylitits disease ($P < 0.05$, table 1, figure 3). the major discordance about (15.7 %) while these in control are zero. The male gender was significantly associated with ankylosing sponfylitits disease ($P<0.05$). According to (BASDI) and (BASFI) scores at baseline (start of study) and after 6 months, both of (BASDI) and (BASFI) the mean of these scores at start of study and after 6 months did not show a significant differences between the two treatment groups ($P > 0.05$). Decrease in BASDI and DASFI scores after treatment; BASDI in Etanercept and BASFI for both treatments significantly decreased ($P < 0.05$). Disease duration (those $\leq$ 5 years) and those (> 5 years), there was no significant difference in T-scores for spine and hip. According to the age and BMI did not show a significant association with AS disease ($P > 0.05$). **Conclusions:** There is a positive Correlation between Ankylosing spondylitis and Osteoporosis in [the

pelvis and spinal spines]. The patient gender, the activity of the disease and the duration of disease had a positive correlation with the development of Osteoporosis in AS.

KEYWORDS: Ankylosing spondylitis, spondylarthritides, discorderance.

INTRODUCTION

Anklyosing spondylitis

Definition

Anklyosing spondyltis (AS) is a type of chronic arthritis of the spine and the sacroiliac joints (in the pelvis). The inflammation of the vertebra (spondylitis) can eventually lead to the fusion of chronic arthritis affect the bones, muscles and ligaments.[1,5]

Epidemiology

Anklyosing spondylitis is a disease that affect young people, who generally present at around 26 years of age. Men are more often affected than are women, with a ratio of 2 to 1.[2,3]

Prevalence and Risk Factors in AS

1. Prevalence: prevalence of AS is 0.1% 1.4% depending on population studied.
2. Race: the disease is more common in Caucasian than in other races.
3. HLA B 27: A person who is HLA B 27 positive has a 5% to 6% chance of developing the disease.[5]
4. Family history: there is a fivefold to 16- folds increase in aving AS if a first – degree relative has the disease.[3,10]

Osteoporosis

Osteoporosis is a disease in which bones become fragile and more likely to fracture. Osteoporosis is the most common type of bone disease, it increase the risk for breaking a bone. The most important cause of osteoporosis is genetic, this mean that the person had the risk from his or her parents.[6]

Osteoporosis in Ankylosing Spondylitis

Osteoporosis (OP) is a frequent complication in AS, even in early stages of the disease. Various factors that conceivably work in conjunction with one another also cause bone loss in AS (eg, genetic polymorphisms of vit D, low levels of osteoprote grin and sex steroid hormones, and impaired Ca vit D absorption).[4,7]

The Dual x – ray absorptiometry For Assessing bone Mineral Density (BMD) has a (role) in a patient with (AS)

Measurement of (BMD) at the femoral neck may provide the most accurate means of detecting osteopenia and (OP) and could assess fracture risk in AS patients. No guidelines are available for detection and treatment of OP in AS, most patient are young men, who are less likely to be screened.[8,9]

The Dual x – ray absorptiometry For Assessing bone Mineral Density (BMD) in Ankylosed patients treated with Etanercpt and infliximab

Measurement of (BMD) at the femoral neck may provide the most accurate means of detecting osteopenia and (OP) and could assess fracture risk in AS patients.[11]

Aim of the study

To study the discordance between the hip and spine Bone mineral density using DXA in Anklyosing spondylitis in Iraqi people.

PATIENTS AND METHODS

The patients were categorized into two groups; group A included 44 patients treated with infliximab, 5 mg / kg / dose every 6 weeks by intravenous infusion, and group B included 26 patients treated with etanercept, 50 mg weekly by subcutaneous injection. There were also 35 participants (healthy) as control. Data were collected by doing DXA by using machine of DXA, for the ankylosed 70 patients and the 35 healthy participants.

Statistical Analysis

Statistical package for social sciences version 20 (SPSS 20) was used for data input and analysis. T test for two dependent samples was used to test the significance of observed difference on mean levels for same subject before and after have treatment with biologic agents.

Minor discordance was defined as present when the difference between 2 sites was no more than 1 World Health Organization diagnostic class. Major discordance was present when 1 site is osteoporotic and the other is normal.

Multivariate logistic regression analysis (multinomial and binary) was used to specify factors predict discordance in spine and hip T scores.

RESULTS

Table 1 show there were 70 AS patients recruited in this study, into two groups according to treatment type: group A which included 44 patients, received infliximab and group B included 26 patients received etanercept.

Table 1: Characteristics of study sample according to study group.

Variables	Ankylosing Spondylitis		Control		P value
	N=70	100.0%	N=35	100.0%	
Age (y); mean±SD	36.84±8.63		36.31±14.22		0.814
Age Group (y)					0.337
• 20-44	61	87.1%	28	80.0%	
• 45-64	9	12.9%	7	20.0%	
Sex					**<0.001**
• Male	67	95.7%	13	37.1%	
• Female	3	4.3%	22	62.9%	
BMI (kg/m^2); mean±SD	26.73±3.46		26.27±3.77		0.532
BMI Category					0.113
• Normal	22	31.4%	17	48.6%	
• Over weight	39	55.7%	12	34.3%	
• Obese	9	12.9%	6	17.1%	

Mean Age & mean BMI did not show a significant difference between AS & control (P > 0.05, table 1). Grouping according to age as well as according to BMI did not show a significant association with AS disease (P > 0.05, table 1).

Male sex was significantly associated with AS disease (P < 0.05, table 1)

Table 2 show the characteristics of AS patients according to the treatment group, where 44 patients were treated (infliximab), and 26 patients were treated with Etanercept. No significant differences had been found in between both groups regarding the age and mean BMD and disease duration. I.

Table 2: Characteristics of AS patients according to treatment group.

Variables	Infliximab		Etanerecept		P value
	N=44	100.0%	N=26	100.0%	
Age (y); mean±SD	37.70±7.99		35.38±9.60		0.280
Age Group (y)					0.627
• 20-44	39	88.6%	22	84.6%	
• 45-64	5	11.4%	4	15.4%	
Sex					0.889
• Male	42	95.5%	25	96.2%	
• Female	2	4.5%	1	3.8%	
BMI (kg/m^2); mean±SD	26.59±3.12		27.98±4.03		0.655
BMI Category					0.460
• Normal	14	31.8%	8	30.8%	
• Over weight	26	59.1%	13	50.0%	
• Obese	4	9.1%	5	19.2%	
Duration of Disease					0.909
• ≤ 5 y	26	59.1%	15	57.7%	
• > 5 y	18	40.9%	11	42.3%	

Mean Age & mean BMI did not show a significant difference between both treatment regimens (P > 0.05, table 2). Grouping according to any of age, sex, BMI as well as according to disease duration did not show a significant association with AS disease (P > 0.05, table 2).

Table 3 showing BMD related characteristic of AS patients according to the treatment, also the discordance between the hip and spine T-score, where there is no significant differences between the two groups.

Table 3: BMD related Characteristics of AS patient according to treatment.

Variables	Infliximab		Etanerecept		P value
	N=44	100.0%	N=26	100.0%	
T score at spine; mean±SD	-0.63±1.63		-0.12±2.09		0.262
BMD status at Spine					0.476
• Normal	26	59.1%	17	65.4%	
• Osteopenia	10	22.7%	7	26.9%	
• Osteoporosis	8	18.2%	2	7.7%	
T score at hip; mean±SD	-0.24±1.93		-0.65±2.27		0.450
BMD status at Hip					0.966

• Normal	23	52.3%	13	50.0%	
• Osteopenia	12	27.3%	7	26.9%	
• Osteoporosis	9	20.5%	6	23.1%	
Discordance between spine and hip T scores					0.419
• No discordance	17	38.6%	14	53.8%	
• Minor discordance	20	45.5%	8	30.8%	
• Major Discordance	7	15.9%	4	15.4%	

There was no significant difference in mean T scores (at both hip and spine) between the two treatment regimens (P > 0.05, table 3). There was no significant association between degree of discordance (between hip and spine T scores) and given treatment regimen (P > 0.05, table 3).

Table 4 show the mean BASDI and BASFI before and after treatment (6 months) according to the treatment group, There was no significant difference between two treatment groups (P > 0.05 table 4).

Table 4: BASDI and BASFI scores according to treatment group of AS patients:

Variables	**Infliximab**		**Etanerecept**		**P value**
	N=44	**100.0%**	**N=26**	**100.0%**	
BASDI scores					
• Before treatment	5.99±1.16		5.46±1.45		0.097
• After treatment	5.70±1.00		4.78±1.59		**0.004**
• Before - After	0.29±1.22		0.68±1.36		0.415
P value (Before –After)	0.121		**0.019**		---
BASFI scores					
• Before treatment	3.09±1.53		3.02±1.34		0.851
• After treatment	2.06±0.87		2.06±1.05		0.982
• Before - After	1.03±1.15		0.96±0.78		0.771
P value (Before –After)	**< 0.001**		**< 0.001**		---

Both of mean BASDI-before & mean BASFI-before did not show a significant difference between the two treatment groups (P > 0.05, table4).

As it is shown in table (5) there is no significant difference in the BMD at both sites (hip and spines) according to the disease duration. There was also no significant association between disease duration with the BMD status at both sites (hip and spines) or T-score discordance (P > 0.05, table 5).

Disease duration did not significantly influence the decrease in BASDI and BASFI scores after treatment (P > 0.05, table 5).

Table 5: BMD related Characteristics of AS patient according to treatment.

Variables	Disease Duration				P value
	≤ 5 y		> 5 y		
	N=41	100.0%	N=29	100.0%	
T score at spine; mean±SD	-0.34±1.97		-0.59±1.6		0.559
BMD status at Spine					0.863
• Normal	26	63.4%	17	58.6%	
• Osteopenia	9	22.0%	8	27.6%	
• Osteoporosis	6	14.6%	4	13.8%	
T score at hip; mean±SD	-0.55±1.93		-0.18±2.24		0.948
BMD status at Hip					0.493
• Normal	23	56.1%	13	44.8%	
• Osteopenia	9	22.0%	10	34.5%	
• Osteoporosis	9	22.0%	6	20.7%	
Discordance between spine and hip T scores					0.931
• No discordance	18	43.9%	13	44.8%	
• Minor discordance	16	39.0%	12	41.4%	
• Major Discordance	7	17.1%	4	13.8%	
Difference in BASDI	0.60±1.32		0.19±1.19		0.179
Difference in BASFI	1.04±0.73		0.95±1.36		0.142

Table 6: Results of logistic regression analysis.

Variables	Discordance between Spine & Hip T scores	P value	OR	95% Confidence Interval for OR	
				Lower Bound	Upper Bound
Age 20-45 y	Minor	0.734	1.236	0.364	4.192
	Major	0.602	0.616	0.100	3.799
	Any	0.328	2.046	0.488	8.583
Male sex	Minor	0.875	0.899	0.236	3.418
	Major	0.369	0.304	0.022	4.100
	Any	0.271	0.406	0.082	2.020
Normal weight	Minor	0.144	5.327	0.566	50.094
	Major	0.944	1.083	0.115	10.250
	Any	0.201	3.180	0.540	18.726
Overweight	Minor	0.569	1.809	0.235	13.923
	Major	0.109	0.177	0.021	1.476
	Any	0.979	0.980	0.212	4.538
Ankylosing Spondylitis	Minor	0.228	2.066	0.636	6.715
	Major	.*	---	---	---
	Any	0.340	1.258	0.785	2.016

Duration ≤ 5 y	Minor	0.307	0.535	0.161	1.777
	Major	0.677	1.483	0.233	9.447
	Any	0.521	0.695	0.229	2.109
Infliximab	Minor	0.185	2.116	0.698	6.417
	Major	0.551	1.560	0.361	6.739
	Any	0.136	2.118	0.789	5.683
Background levels; 46-64 y for age group, female for male sex, obese for weight categories, control of Ankylosing Spondylitis, duration > 5 y for duration, and Etanerecept for Infliximab. *excluded from the equation because no comparison could be done (zero for control).					

(NB) All factors were no significant predictors for discordance (P > 0.05, table 6).

Table 7: Distribution of study sample according to sex, study group, and discordance between spine and hip T scores.

Discordance between spine and hip T scores	**Male**		**Female**		**P value**
	N	**%**	**N**	**%**	
A) Both study groups					0.302
• No Discordance	39	48.8%	16	64.0%	
• Minor Discordance	31	38.8%	8	32.0%	
• Major Discordance	10	12.5%	1	4.0%	
Total	80	100.0%	25	100.0%	
B) Ankylosing Spondylitis					0.277*
• No Discordance	31	46.3%	0	0.0%	
• Minor Discordance	26	38.8%	2	66.7%	
• Major Discordance	10	14.9%	1	33.3%	
Total	67	100.0%	3	100.0%	
C) Control					0.491
• No Discordance	8	61.5%	16	72.7%	
• Minor Discordance	5	38.5%	6	27.3%	
• Major Discordance	0	0.0%	0	0.0%	
Total	13	100.0%	22	100.0%	
*The minimum expected cell count is less than one. Chi-square results may be invalid.					

There was no significant association between discordance and sex in each of study groups (P > 0.05, table 7).

DISCUSSION

In this study, both study groups had a positive correlation between ankylosing spondylitis and the development of osteoporosis.

In this study (7%) of the patients had major discordance, and 26% of participants had minor discordance. The participants who have hip osteoporosis (17 patients 24,28%) are higher than lumber osteoporosis (13 patients 18,57%).

This study also had 35 healthy participants as control, 24 females and 11 males, show that the T-score in the hip are higher than that in the lumbar spines.

According to the duration of the disease and the development of osteoporosis the average of duration of disease is about (6years).

Most of these patients (ankylosing spondylitis) not take prophylactic therapy as Ca^{+2} and vit. D3. While 7 patients who are aklylosed and take prophylactic treatment with vit. D3 and Ca^{+2} had normal BMD and this go with the strong effect of prophylactic treatment to decrease the risk of osteoporosis. A study by (Zhiming Lin, jieruo Gu, Peigen He in Chinese of 664 AS patients by the revised New York criteria for AS and 25 USP A (undifferentiated spondylo arthropathy) patients, in this study the change in BASDI and BASFI via Etanercept and Infliximab treatment show a significant positive Correlation ($P < 0.01$).

CONCLUSIONS

1. The activity of the disease and the duration of disease had a positive correlation with the development of Osteoporosis in AS.
2. The Osteoporosis in the pelvis is more than that in the spinal spine in both those treated with infliximab and Etenarcept.
3. The severity of activity of the disease also act as predictor for the development of Osteoporosis.
4. The prophylactic therapy for prevention of Osteoporosis play a role in decreasing the risk of development of Osteoporosis.

RECOMMENDATIONS

1. The early diagnosis of AS is essential to prevent the osteoporosis (pelvis, spinal spines) for patient with AS.
2. Annual DXA for patients with AS should be essential for patients with AS.
3. Prophylactic therapy with Ca^{+7} and vit.D_3 are essential to decrease the risk of development of osteoporosis in patient with ankylosing spondylitis.

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