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Relationship Of Hips And Knees Osteoarthritis With Bronchial Asthma.

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ABSTRACT

Osteoarthritis has a severe impact on a person's life and productivity. We found increases in the occurrence of osteoarthritic changes in patients who have bronchial asthma, which increases the patients' disability and dependency. So we try to study the association between osteoarthritis and bronchial asthma. Thisstudy aims to estimate the relationship of hip and knee osteoarthritic changes in patients with bronchial asthma and show the factors contributed to these changes. This study involved 56 patients with bronchial asthma, age ≥40 years and another 45 matched controls. Body mass index, level of physical activity and functional impairment were assessed for all participants. Pain in hips and knees was assessed using the Numerical Rating Scale. Radiological images for both hips and knees were taken. The mean disease duration was 5.3±6.3 years. There were no differences in the occurrence of hip and knee radiographic osteoarthritis changes among asthmatic patients. Knee pain was more severe in patients than in controls (p value= 0.001). Asthmatic patients had more functional impairment (p value=0.005). No significant differences in the development of osteoarthritis in asthmatic patients. Asthmatic patients have more severe knee pain and more functional disability.

Keywords: Bronchial asthma, Hip, Knee, Osteoarthritis.

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INTRODUCTION

Osteoarthritis (OA): is a degenerative joint disease, occurring primarily in older people and characterized by erosion of the articular cartilage, hypertrophy of bone at the margins (i.e., osteophytes), subchondral sclerosis, and a range of biochemical and morphologic alterations of the synovial membrane and joint capsule. [1]

The burden of osteoarthritis: In 2010 WHO Global Burden of Disease Study, OA was the 11th cause of years lived with disability in the world but only 15th in 1990 [2] The burden was 6th in East Asia and high-income East Pacific countries, 10th in North America, 7th in Eastern Europe but 13th in Western Europe. OA was the main contributor to limitations in activities, with 22% difficulties in walking, 18.6% difficulties in carrying objects, and 12.8% difficulties in dressing attributable to OA in France. OA was also a contributor to the need for human assistance (9.2% of the need for help from immediate family, 11.8% help from health professionals, and 8.9% health service delivery attributable to OA). [3]

Bronchial Asthma: The burden of asthma, measured by disability and premature death, is greatest in children approaching adolescence (ages 10-14) and the elderly (ages 75-79). The lowest impact is borne by those aged 30-34. The burden is similar in men and women at ages below 30-34 years but at older ages, the burden is higher in men. The years of life prematurely lost, and the years of life lived with disability are added together and expressed as disability-adjusted life years (DALYs), which is the measure of the burden of disease. [4]

MATERIALSAND METHODS

Study design: This is an analytical cross-sectional study conducted in Respiratory and Rheumatology units in Basra General hospital (Basra /Iraq) and Baghdad Teaching Hospital, Medical City (Baghdad/ Iraq), from February 2017 till June 2018. Participants' verbal consent was taken for included in the study.

Sample selection: Fifty-six patients with bronchial asthma were involved in the study. Eligible patients included in the study were women and men ≥ 40 years age diagnosed to have bronchial asthma according to Joint ICS/NCCP (I) recommendations guidelines.[5] Exclusion criteria include; patient with a secondary cause of knee or hip OA like previous trauma and inflammatory arthritis. Another 45 volunteer nonrelative to the patients who were attended the hospital matched in age and gender participated in the study as a control group.

Data collection: Data collection was done using a questionnaire and interview. Demographic and clinical features were collected, these features include; age, gender, BMI, smoking status, menstruation for women, level of physical activity, duration of bronchial asthma, the frequency of attendances to emergency unit, the frequency of corticosteroid use, comorbidity, Numerical Rating Scale for hip and knee pain and WOMAC. The level of physical activity was measured using the General Practice Physical Activity Questionnaire (GPPAQ).[6] The use of corticosteroid was classified into 3 groups; regular: daily oral small or large dose, frequent: ≥3 times/year of oral or injectable courses, infrequent: < 3 times/year of oral or injectable courses. The pain on hips and knees was assessed using Numerical Rating scale (NRS) and it categorized into 0 no pain, 1-5 mild, 6, 7 moderate, ≥8 severe.[7] X-Ray for both hips AP view in the supine position and for both knees, AP view in standing position was taken for all patients and control volunteers. The radiological changes were assessed by the radiologist and classified according to the KL score [8, 9] Physical function and disability were measured by WOMAC. [10] BMI was calculated from height and weight and categorized into; normal (BMI 18.5-24.9 kg/m2), underweight (BMI <18.5 kg/m2), overweight (BMI 25-29.9 kg/m2), obese (BMI 30-40 kg/m2), and morbidly obese (BMI >40 kg/m2). [11]

Statistical Analyses: Statistical analyses were performed using the SPSS statistical package for Social Sciences (version 20.0 for Windows, SPSS, Chicago, IL, USA). Data are presented as mean ± SD, and number and percentage for qualitative variables. Quantitative data were tested using Student's t-test for the difference between two groups in normally distributed data. Qualitative relations were evaluated using the Chi-square test. The p-value of <0.05 was considered statistically significant.

RESULTS

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There were no significant differences in demographical features among patients and controls except for smoking which was higher among controls (p value= 0.041) (table 1). Also table 1 shows the disease characteristic for the patients.

Table 1: Demographical features for patients and controls, and disease characteristics for the patients

Variables		Patients (N=56)		Controls (N=45)		P value
		Count	%	Count	%	
Age (years)	40-49	28	50.0%	19	42.2%	0.531 NS
	50-59	12	12.4%	14	31.1%	
	60+	16	28.6%	12	26.7%	
Gender	Male	21	37.5%	12	16.7%	0.290 NS
	Female	35	62.5%	33	73.3%	
Menstruation	Yes	16	44.4%	11	33.3%	0.460 NS
	No	20	55.6%	22	66.7%	
BMI	Normal	12	21.4%	10	22.2%	0.068 NS
	Overweight	10	17.9%	18	40.0%	
	Obese	31	55.4%	15	33.3%	
	Morbid obesity	3	5.4%	2	4.4%	
Smoking	Non smoker	31	55.4%	36	80.0%	**0.041**
	Passive smoker	15	26.8%	3	6.7%	
	Active smoker	5	8.9%	3	6.7%	
	Ex-smoker	5	8.9%	3	6.7%	
Physical activity	Inactive	19	33.9%	15	33.3%	0.401 NS
	Moderately inactive	17	30.4%	16	35.6%	
	Moderately active	12	21.4%	12	26.7%	
	Active	8	14.3%	2	4.4%	
Disease duration, mean±SD (range)		5.3±6.3 year (1month-30 year)				
EU admission, mean±SD		1.7±3.6 admission/year				
CS use	Infrequent	43	76.8%			
	Frequent	7	12.5%			
	regular	6	10.7%			
HT and/or DM, No. (%)	Yes	24	42.9%			
	No	32	57.1%			

BMI; body mass index, CS; corticosteroid, EU; emergency unit, DM; diabetes mellitus, HT; hypertension, NS; not significant, SD; standard deviation

The occurrence of radiographic osteoarthritic changes in the knees were more common among asthmatic patients either in one or both sides, however this occurrence didn't reached a significant level (p value= 0.058). The same findings were applicable for the occurrence of radiographic osteoarthritic changes in the hips (p value=0.104) (table 2).

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Table 2: Occurrence of radiographic osteoarthritic changes in one or both sides among patients and controls

		Patients		Controls		P value
		Count	%	Count	%	
Hip OA	No OA	48	85.7%	44	97.8%	0.104
	One side OA	7	12.5%	1	2.2%	NS
	Both sides OA	1	1.8%	0	.0%	
Knee OA	No OA	24	42.9%	27	60.0%	0.058
	One side OA	17	30.4%	14	31.1%	NS
	Both sides OA	15	26.8%	4	8.9%	

NS; not significant, OA; osteoarthritis

Table 3 showed the occurrence of hip radiographic osteoarthritic changes in a total number of sample (patients and controls) regardless of one or both sides are effected, as these changes were significantly higher among patients (p value= 0.04).

Table 3: Hip radiographic osteoarthritic changes in total sample

		Patients		Controls		Total
		Count	%	Count	%	
Hip P value= **0.04**	No OA	48	52.2%	44	47.8%	92 (100.0%
	OA	8	88.9%	1	11.1%	9 (100.0%)
Total		56	55.4%	45	44.6%	101 (100%)

OA; osteoarthritis

The complaint from pain in the knees and the severity of pain were significantly higher among asthmatic patients than among controls (p value=0.001) regardless of the presence or absence of radiographic osteoarthritic changes. While in the hips, the occurrence of pain and the severity of pain were higher in asthmatic patients but these higher value was insignificant (p value=0.162) (table 4).

Table 4: Severity of pain among patients and controls

		Patients		Controls		P value
		Count	%	Count	%	
Hip pain	No pain	34	60.7	31	68.9	0.162
	Mild	16	28.6	14	31.1	NS
	Moderate	3	5.4	0	.0	
	Severe	3	5.4	0	.0	
Knee pain	No pain	7	12.5	14	31.1	0.001
	Mild	16	28.6	21	46.7	
	Moderate	14	25.0	7	15.6	
	Severe	19	33.9	3	6.7	

NS; not significant

The functional impairment secondary to osteoarthritis of lower limbs as measured by WOMAC score was significantly higher in asthmatic patients (p value= 0.005) (figure 1).

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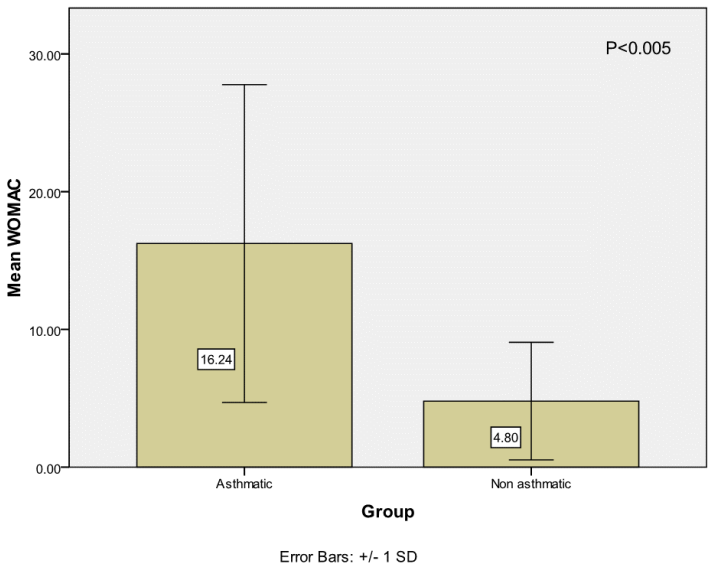

Figure 1: mean of WOMAC in asthmatic and nonasthmatic group

Table 5 showed that knee pain severity was significantly related to the presence of radiographic osteoarthritic changes in asthmatic patients (p value=0.007) but it was unrelated in controls (p value=0.639).

Table 5: Relation between knee pain and radiographic OA among patients and controls

			Knee radiographic OA changes			Total
			No changes	Single side	Both sides	
Patients	Knee pain	No pain	6(25.0%)	1(5.9%)	0(.0%)	7(12.5%)
P= 0.007		Mild	11(45.8%)	3(17.6%)	2(13.3%)	16(28.6%)
		Moderate	4(16.7%)	6(35.3%)	4(26.7%)	14(25.0%)
		Severe	3(12.5%)	7(41.2%)	9(60.0%)	19(33.9%)
	Total		24(100%)	17(100%)	15(100%)	56(100%)
Controls	Knee pain	No pain	10(37.0%)	4(28.6%)	0(.0%)	14(31.1%)
P=0.639		Mild	12(44.4%)	7(50.0%)	2(50.0%)	21(46.7%)
NS		Moderate	4(14.8%)	2(14.3%)	1(25.0%)	7(15.6%)
		Severe	1(3.7%)	1(7.1%)	1(25.0%)	3(6.7%)
	Total		27(100%)	14(100%)	4(100%)	45(100%)

NS; not significant, OA; osteoarthritis

Table 6 showed the effects of disease duration, frequency of emergency unit admission, menstruation (in women), corticosteroid use, and presence of HT and/or DM in development of radiographic OA in asthmatic patients. Only number of emergency unit admission was associated with significant effect in development of OA in asthmatic patients (p value= 0.044).

Table 6: Effect of disease characteristic on development of radiographic OA in asthmatic patients

	No OA	OA	P value
Disease duration(y), mean±SD	4.90±7.60	5.60±5.48	0.689 NS
EU admission/year, mean±SD	0.64±1.59	2.32±4.30	**0.044**
Menstruation, No.(%)			
Yes	6(60.0%)	10(38.5%)	0.285 NS
No	4(40.0%)	16(61.5%)	
CS use, No.(%)			0.062 NS
Infrequent	20(90.9%)	23(67.6%)	
Frequent	0(.0%)	7(20.6%)	

Regular	2(9.1%)	4(11.8%)	
HT and/or DM, No.(%)			
Yes	9(40.9%)	15(44.1%)	0.813 NS
No	13(59.1%)	19(55.9%)	

CS; corticosteroid, DM; diabetes mellitus, EU; emergency unit, HT; hypertension, NS; not significant, OA; osteoarthritis, SD; standard deviation.

DISCUSSIONS

In this study we try to deal with two diseases that cause severe disability and physical impairment. The diagnosis of radiographic osteoarthritis is depend on KL score ≥2, so grade 1 means no OA.[8,9]

The main findings in our study is that occurrence of radiographic changes of osteoarthritis in hips and/ or knees either in one or both sides were similar in asthmatic patients and general population (controls) (p value= 0.104, 0.058 respectively). While when we talking about these changes in hip in general regardless of effect in one or both sides, we found significant higher frequency among asthmatic patients (p value= 0.04). Up to our knowledge there is no previous study that dealt with osteoarthritis in bronchial asthma.We found that asthmatic patients suffered from more severe pain in knees than general population (controls) (p value= 0.001) and that pain mostly occurs in presence of radiographic changes of OA. In the other hand these asthmatic patients have same incidence and severity of pain in hips as general population (p value= 0.162).One of most important and dreadful finding is that function impairment measured by WOMAC score was very high among asthmatic patients with lower limb OA. This finding make the asthmatic patients more dependent on others because the burden of asthma and additional burden of OA.We found that the frequency of emergency admission in asthmatic patients which reflects the severity and uncontrollability of BA was associated with higher risk for development of OA. This study has some limitation related to small number of patients and controls and the needs for more precise method for diagnosis of early osteoarthritic changes. Also we didn't concerned about the physical activity through previous person life and we didn't study the genetic effects of OA. In conclusion: asthmatic patients has no significant higher risk of OA (hip and knee), but has more severe knee osteoarthritic pain and more functional impairment. Osteoarthritis in BA affected by controllability of disease and emergency admission.

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