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The Association between Osteoarthritis of the Knee Joint and Chronic Venous Insufficiency of the Legs

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Background: The possible association between osteoarthritis of the knee joint and chronic venous insufficiency of the legs needs to be investigated because some risk factors are common to both.

Objective: To evaluate the association between knee osteoarthritis and chronic venous insufficiency of the legs.

Design: Case controlled prospective randomized study, non-blind.

Setting: Outpatient clinic, Ibn Sinna Teaching Hospital, Iraq.

Method: Thirty patients with knee osteoarthritis and thirty control cases with no knee symptoms were evaluated clinically for chronic venous insufficiency.

Result: Knee osteoarthritis was significantly associated with leg edema (P value 0.002), varicose veins (P value 0.011) and abnormal leg veins (whether varicose veins alone or spider veins or both), (P values 0.02). The presence of chronic venous insufficiency may contribute to the severity of osteoarthritis.

Conclusion: An association does exist between knee osteoarthritis and chronic venous insufficiency of the legs. Further studies are needed to investigate the association including the possibility of pathogenic contribution.

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Osteoarthritis (OA) of knee joint is a very common disorder, 20-40% of individuals aged 75 years and older have radiographic OA; about one-third of them are symptomatic[1]. The morbidity of knee OA is high; it is one of the first five causes of physical disability in non-institutionalized elderly persons[2].

The etiologic and pathogenic factors of OA are numerous; they include obesity, age, sex, overuse and a low grade pre-inflammatory state[1,3-10].

Some of the risk factors for knee OA, such as prolonged standing, age, sex and trauma are also involved in chronic venous insufficiency (CVI) of the legs[2,5]. Furthermore, CVI is also associated with an inflammatory component originating locally in the lower limb circulation[11,12].

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The aim of this study is to evaluate the association between knee osteoarthritis and chronic venous insufficiency of the legs.

METHOD

A randomized case series of 30 patients with OA of the knee joint and 30 control cases were recruited; age and sex matched, but had no knee symptoms. Both were evaluated for physical signs of OA and for clinical evidence of CVI.

Both groups were studied for clinical evidence of CVI of the legs. Clinical diagnosis of CVI depended on the clinical features listed in the CEAP ("Clinical, Etiology, Anatomic and Pathophysiology") classification in which the clinical CVI is based on the presence or absence of any of the following: telengiectases (spider veins), varicose veins, edema and skin lesions[13].

Patients with chronic inflammatory joint disease, patients with lumbar root symptoms or radiculopathy and cases with evidence of systemic cause of bilateral leg edema were excluded.

The 2 x 2 contingency tables of the chi-square test were used to detect significant differences between the groups.

RESULT

Thirty cases with OA and 30 control cases were included in the study. Their age range was 38-71 years; 24 were females and 6 were males. Knee OA was confirmed by X-ray, 26 of 30 were grade 2-4 of Kellgren and Lawrence grading 1. All the other four patients had crepitus and joint space narrowing, and three of these four patients had subchondral sclerosis as well.

Table 1 shows the personal characteristics of OA patients and the controls. Table 2 shows the differences in clinical features between the OA and the control group. Some of the CVI features were more frequent in the knee OA group, such as leg edema, varicose veins and muscle cramps. Women in menopause were frequent in the OA group. Some physical signs of OA (quadriceps wasting and tibiofemoral crepitus) were seen to less extent in the control asymptomatic cases.

Table 3 shows the differences in selected features between OA patients without leg edema and OA patients with leg edema.

Table 1: Personal Characteristics of OA Patients and the Controls

Parameter	Patients	Controls
Total number	30	30
Age (Mean ± SD)	56.77 ± 8.93	56.43 ± 8.21
Age range (year)	38 - 71	45 - 77
Female/male ratio	26/4	26/4
Occupation		
Full time physical	4	3
Part time physical	0	0
Mixed physical and sedentary	24	24
Sedentary	2	3

Table 2: Comparison of Clinical Features between OA Patients and the Controls

Clinical feature	Patients (Number and %)	Controls	*p*- value*
Knee pain	30 (100)	0 (by criteria)	
Aggravation by standing	30 (100)	0	0.000
Relief by raising leg	13 (43.3)	0	0.000
History of prolonged standing	20 (66.7)	15 (50)	0.19
History of knee/leg trauma	9 (30)	3 (10)	0.05
Menopausal women	19 (63.3)	11 (36.7)	0.04
Muscle cramps	21 (70)	0	0.000
Restless leg	1 (3.3)	0	0.000
Itching leg	6 (20)	0	0.000
Knee restriction	19 (63.3)	0	0.000
Leg edema	18 (60)	6 (20)	0.002
Quadriceps wasting	9 (30)	3 (10)	0.05
Tibiofemoral crepitus	22 (73.3)	7 (23.3)	0.000
Abnormal leg veins	15 (50)	6 (20)	0.02
Varicose veins	8 (26.7)	1 (3.3)	0.011

* Using 2×2 contingency tables of the chi-square test; considering a P value less than 0.05 to be significant

Table 3: Comparison of OA Patients with Leg Edema and No Edema

Number of Patients	OA + Edema (n=18)	OA + No Edema (n=12)	*p*- value*
Relieved by elevation	8 (44.4%)	5 (41.7%)	0.88
Movement restriction	14 (77.8%)	5 (41.7%)	0.04
Quadriceps wasting	7 (38.9%)	2 (16.7%)	0.02
Cramps	15 (83.3%)	6 (50%)	0.05
Definite osteophytes	15 (83.3%)	11 (91.7%)	0.51
Perichondral sclerosis	14 (77.8%)	7 (58.3%)	0.04

* Using 2×2 contingency tables of the chi-square test; considering a p value less than 0.05 to be significant

DISCUSSION

In a previous study of comorbidities between OA (any joint) and other diseases, an association was found between OA and deep vein phlebitis and thrombophlebitis[14].

In this study, abnormal leg veins were significantly more in OA group compared to the control group (P value 0.02, table 2). The difference between OA and control group in the presence of varicose veins was significant. Leg edema of no systemic cause was also significantly different between OA (60%) and controls (20%), P value 0.002.

Furthermore, knee movement restriction, quadriceps wasting and perichondral sclerosis were more frequent in OA subgroup with leg edema compared with OA subgroup without leg edema. These findings suggest that CVI may contribute to the pathogenic mechanisms of knee OA. The small numbers of the subgroups do not allow firm conclusions regarding etiopathogenic contribution; however these findings should encourage further studies in this field.

The association between knee OA and CVI of the leg might be due local pre-inflammatory condition in CVI and its possible impact on the osteoarthritic process. Evidence is accumulating

that a limited inflammatory component does exist in osteoarthritis in the joint area and systemic. It is well known that mild patchy synovitis is a feature of OA. In a study of 41 patients with knee OA, it was found that nearly 50% of them have B-cell infiltration of their knee synovium which is believed to be antigen driven B-cell expansion[10]. In a study on cartilage of hip OA marked decrease was found in the major scavenger (EC-50D) of reactive oxygen species suggesting an increased oxidative damage[8]. The blood level of C-reactive protein (CRP) has been found to be significantly associated with functional disabilities and other disease parameters of knee or hip OA[15]. In another study, the plasma high sensitive CRP (hs-CRP) was significantly elevated in 40% of patients with knee OA[9].

CVI of the legs is associated with several molecular aspects of inflammation. Neutrophils from patients with CVI showed increased superoxide production and increased expression of several adhesion molecules[11]. Increased 1L-8 levels and enhanced CD35 (a complement receptor) expression on red cells were shown to occur in ankle blood samples of patients with certain stages of CVI[1]. A white cell trapping hypothesis suggest that activated leukocytes are trapped in the microcirculation of the lower limbs of patients with CVI, their trapping may lead to local release of inflammatory substances which can mediate tissue damage[16,17]. Even in the early stages of CVI, there is a regional capillary dilatation and increased capillary leakage[18].

CONCLUSION

There is an association between knee OA and CVI of the legs. The influence of the inflammatory component of CVI of the legs on knee OA needs further investigations.

Potential conflicts of interest: No

Competing interest: None **Sponsorship**: None

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Ethical approval: The study was approved by the research committee of the college of medicine, Mosul, Iraq.

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