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Carotid intima media thickness in rheumatoid arthritis detected by doppler ultrasound

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Abstract
Background: The excess mortality associated with rheumatoid arthritis is largely due to cardiovascular disease. Rheumatoid arthritis is of primary importance in atherogenesis. The intima-media thickness of extracranial carotid arteries is a measurable index of the presence of atherosclerosis.
Objective: To assess carotid intima-media thickness in rheumatoid arthritis by Doppler ultrasound.
Methods: Fifty-two Iraqi patients with rheumatoid arthritis were studied and compared with another fifty-two, healthy individuals matched for age and sex as a control group. Full history was taken and complete clinical examination was done for all individuals in both groups. Rheumatoid arthritis diagnosis was based on The American Rheumatism Association 1987 revised criteria for the classification of rheumatoid arthritis. Carotid intima-media thickness was measured by Doppler ultrasound. Results: There was a significant increase in the frequency of increased carotid intima-media thickness among individuals with rheumatoid arthritis (44.2%) control group (3.8%) compared healthy to (P-0.000001).
Conclusion: Increased carotid intima-media thickness occurs in high frequency in rheumatoid arthritis.

Keywords: carotid intima-media thickness, doppler ultrasound, rheumatoid, arthritis

Introduction

Rheumatoid arthritis (RA) is a common Chronic autoimmune disease associated with systemic inflammation, a female predominance and a prevalence of 1% that increases with age [1], the diagnosis is a clinical based on the characteristic joint manifestations [2, 3], The excess mortality associated with RA is largely due to cardiovascular disease, particularly ischemic heart disease [4, 10], In view of the importance of chronic inflammation in atherogenesis, the presence of RA per se may be of primary importance [11].

The prevalence of carotid atherosclerosis in RA is at least as high as in diabetes mellitus [12], The intima-media thickness (IMT) of extracranial index provides of carotid arteries an atherosclerosis in other vascular regions [3, 17] and has been shown to be associated with most risk factors for atherosclerosis [18, 20]. Recently, an increased thickness of carotid IMT determined by B-mode ultrasound has been shown to be directly associated with an increased risk of myocardial infarction and stroke in older adults without a previous history of cardiovascular disease Thus, increased carotid artery IMT has been proposed as a risk factor that maybe included in the algorithms for cardiovascular risk assessment [21].

The aim of study is to assess carotid intima-media thickness in RA by a non-invasive screening carotid Doppler ultrasonography.

Methods

A cross-sectional study was carried out at the Baghdad Teaching Hospital / Rheumatology Unit from December 2005 till September 2008. Fifty-two Iraqi patients with RA were diagnosed on base of the American Rheumatism Association 1987 Revised Criteria for the classification of rheumatoid arthritis [2].

Another fifty-two healthy individuals matched for age and sex were collected from relatives and accompanying persons of patients attending the Baghdad Teaching Hospital and to Rheumatology Unit, were studied as a control group. Full history and complete physical examination were done for both groups. Diseases that cause atherosclerosis and increase carotid intima-media thickness (IMT) were excluded from the study like diabetes mellitus and hypertension. Serum lipid profile and carotid IMT measured by Doppler ultrasound were done for both groups. Disease activity was assessed by disease activity score 28 (DAS 28). A signed consent was taken from all individuals studied. Ethical approval was obtained from the Ethics Committee of Baghdad University, College of Medicine, and Medical Department. All data coded and entered to computer using statistical package for social science (SPSS 16). Association between discrete variables measured by Chi-Square test and Fisher's exact test, by difference between continuous variables measured by t-test. P-value <0.05 was considered by Significant.

Results

The 52 patients with RA comprised of 43(50.6 %) females and 9(47.4%) males compared with 52 healthy individuals, 42 (49.4%) females and 10(52.6 %) males as a control group. The mean age was (47.46+11.37) years for the RA patients group, and (40.46+10.06) years for the control group (p-0.237) (Table-1).

The frequency of increased carotid IMT in 52 patients with RA was (44.2%) compared to (3.8%) in 52 healthy individuals (p-0.000001, odd ratio=0.05, 95%confidence interval=0.1 1-0.23) a as shown in (Table-2). There was a highly statistically significant relationship between severity of carotid IMT in RA patients in comparison to the control group (p-0.00002) as shown in (Table -3). We found highly significant relationship between increased carotid IMT and RA patients' disease activity score 28(DAS 28)

(p=0.00000000003) as shown in (Table -4).

Table 1: Demographic characteristics of 52 patients with RA and 52 health controls

Variables	patients n=52	controls	P-value
Age (years)	47.46±11.37	40.46±10.06	0.237
Gender			.
Male n (%)	9(47.4)	10(52.6)	0.500
Female n (%)	43(50.6)	42(49.4)	

P-value in significant; n, number, % percentile; NSAID, non-steroidal anti-inflammatory drugs, CHQ, chloroquine; DAS, disease activity score.

Table 2: Frequency of carotid IMT in 52 patients with RA and 52 controls

Carotid IMT				
Group	Increased	Normal	P-value	Odd ratio
95%CI	n. (%)	n. (%)		
RA n=52	RA n=52	29(55.8)		
0.11-0.23			0.00001	0.05
Controls n=52	2(3.8)	50(96.2)		

P-value is significant; IMT, intima-media thickness; CI, confidence interval

Table 3: Severity of carotid LMT in 52 patients with RA compared to 52 healthy controls

Severity	Patients	Controls	P-value
	n=52	n=52	
Normal (LMT<8mm) n. (%)	29(36.7)	50(63.3)	
Mild (LMT=8-12) n. (%)	7.(77.8)	2(22.2)	
Moderate (LMT12mm-16mm) n. (%)	1(100)	0(0)	0.00002
Severe (>16mm) n. (%)	15(100)	0(100)	

Table 4: Risk factors for occurrence of increased carotid IMT in patients with RA

Risk Factors Carotid LMT			P-value	Odd Ratio
Increased	Normal			
Age n.(years) -5.45-7.42	23(46.91=13.03)	29(47.89=10.08)	0.760	
Male n. (%)	5(55.6)	4(44.4)		
0.135-2.450				
Females n(%)	18(41.9)	25(58.1)		
Duration n.(years)	23(6.32±5.98)	29(7.96±5.15)	0.294	
Lipid profile				
Normal n. (%)				
0.655-21.47		27(60)		
Increased n (%)	5(71.4)	2(28.6)		
Das28				
Remission	0(0)	11(100)		
Low	2(100)	0(0)	0.00000	
Moderate	24(100)	0(0)	00000*3	
Severe	15(100)	0(0)		
Drugs				
Steroids n. (%)	5(55.6)	4(44.4)	0.349	1.7
0.4-7.4				
NASID n (%)	6(46.2)	7(53.8)	0.561	1.1
0.3-3.9				
CHQ. (%)	18(46.2)	21(53.8)	0.439	1.37
0.38-4.94				
Pencillamine n. (%)				
0.42-0.704	0(0)	1(100)	0.558	0.5
Methotrexate	19(74.5)	21(52.5)	0.229	1.8

Discussion

In the present study we found n significant association between increased carotid IMT and RA patients. Chronic inflammation and immune dysregulation characterizing RA have a key role in accelerating atherosclerosis. Persistent endothelial dysfunction predisposes to organic damage of the vascular wall that, in a preclinical stage, can be detectable by ultrasound measurement of carotid intimal medial thickness (IMT) [22, 24]. In the present study, there was a statistically significant increase in carotid IMT among RA patients compared with control group. This agreed with 'del Rincon I *et al*. [25]. Gerli R *et al*. [26], and Zal B *et al*. [2] studies. In the recent study, we found a statistically significant relationship between severity of increased carotid IMT and RA patients in comparison to control group. This agreed with del Rincon I *et al*. study [25]. In the present study, there was highly significant relationship between increased carotid IMT and Disease Activity Score 28(DAS28) of RA patients. This

agreed with del Rincon I *et al* study [25]. Because of the high prevalence of carotid atherosclerosis in RA, it is attractive to consider application of secondary prevention guidelines to patients with RA [28, 29] As the carotid IMT is a measurable index of recommend subclinical atherosclerosis, we intima-media of the carotid measurement thickness by Doppler ultrasound as a simple reading technique and a non-invasive screening detection and for early preclinical test management of atherosclerosis in rheumatoid arthritis patients.

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