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ATHEROSCLEROTIC CHANGES ON HEAD AND NECK BLOOD VESSELS IN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS

ATEROSKLEROTSKE PROMJENE KRVNIH SUDOVA GLAVE I VRATA U BOLESNIKA SA SISTEMSKIM ERITEMSKIM LUPUSOM

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Summary

The aim of this study was to evaluate the presence of atherosclerotic plaque of head and neck blood vessels and to determine the dynamics of circulation through the brain blood vessels in patients with systemic lupus erythematosus (SLE).

In 35 patients with SLE aged 37.67 ± 9.96 and whose disease lasted 3.8 ± 4.51 years, Doppler carotid ultrasonography was used to identify the presence of intima-media thickness or atherosclerotic plaque. Brain perfusion scintigraphy was done in 15 out of 35 patients in order to evaluate the dynamics in circulation through carotid and cerebral media arteries. Mea-

sured by Doppler ultrasound, 2/35 of examined lupus patients had a plaque and the 2/35 had an intimal-medial thickness. The results of perfusion scintigraphy in 15 examined patients out 35 with SLE showed that 5/15 had mild circulatory changes in carotidogram. 4/15 patients had mild changes in cerebra media arteries circulation, 1/15 had severe changes in carotid circulation and 5/15 patients had normal brain scintigraphy finding. Some of the patients with SLE have atherosclerotic changes and only the early detection of atherosclerosis may provide an opportunity for therapeutic intervention.

Key words

SLE, atherosclerosis, detection methods

Sažetak

Cilj rada je evaluirati prisustvo aterosklerotskog plaka na krvnim sudovima glave i vrata te procijeniti promjene u cirkulaciji kroz krvne sudove mozga u bolesnika sa sistemskim eritemskim lupusom (SLE).

U 35 pacijenata sa SLE prosječne životne dobi $37,67 \pm 9,96$ godina i dužine trajanja bolesti od $3,8 \pm 4,51$ godina uradila se Doppler ultrasonografija karotidnih arterija da bi se ustanovilo eventualno prisustvo zadebljanja intima-media zida krvnog suda ili prisustvo aterosklerotskog plaka. Perfuziona scintigrafija mozga uradi se u 15 od 35 pacijenata sa ciljem procjene

promjena u cirkulaciji kroz krvne sudove mozga. Mjerenje ultrazvučno 2/35 pacijenata sa lupusom su imali aterosklerotski plak, a 2/35 zadebljanje zida krvnog suda. Rezultati scintigrafije mozga su pokazali blage cirkulatorne promjene na karotidogramu u 5/15 pacijenata, 4/15 pacijenata su imali blage promjene u cirkulaciji kroz aa. cerebri mediae. 1/15 je imao teške promjene u karotidnoj cirkulaciji, dok je u 5/15 pacijenata nalaz bio uredan. U pacijenata sa SLE postoji određen stepen aterosklerotskih promjena te samo rana dijagnoza može doprinjeti pravodobnoj terapijskoj intervenciji.

Ključne riječi

SLE, ateroskleroza, dijagnostičke metode

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Introduction

Systemic lupus erythematosus (SLE) is perhaps best defined as a clinical syndrome, with a complex multifactorial aetiology characterized by inflammation and the involvement of most of the body's organs or systems. It is characterised by remissions and exacerbations and although the musculoskeletal system and skin are invariably affected, it frequently gives rise to manifestations in the kidney, heart, lung, central nervous system and vascular system (1). Vascular manifestations span a broad range from vasculitis, vasculopathy, vasospasm to thromboembolism and atherosclerotic disease and it is an increasingly important cause of morbidity and mortality (2). This is particularly troublesome among young female patients with lupus who would otherwise be protected from such a problem (3). There are no exact epidemiological data on frequency of atherosclerosis in general population and they all do refer to the consequences of the disease itself, such as coronary heart disease and stroke, and they are among ten leading causes of death in European countries. The aetiopathogenesis of accelerated atherosclerosis in lupus is uncertain, but likely to be multifactorial. Traditional cardiovascular risk factors such as age, hypertension, smoking, diabetes and dyslipidemia are important, however, the increased risk of coronary heart disease in lupus patients cannot be fully accounted for these traditional factors because the underlying disease and its treatment also play a significant role. The chronic inflammation and immune deregulation character-

ising systemic lupus erythematosus undoubtedly contribute to the accelerated vascular disease. SLE-related factors are likely involved in all stages of atherogenesis from formation of the atherosclerotic lesion to its rupture, as well as in the thrombotic event itself. The parallels between the inflammatory and immune-mediated mechanisms of both atherogenesis and systemic lupus erythematosus may provide the clue to understanding premature vascular disease in the patients with this disease (4,5).

Atherosclerosis, especially on carotid arteries, can be detected noninvasive with the use of: 1. Doppler ultrasound; 2. Computerized tomography (CT) and 3. Carotid angiostintigraphy and gammaencephalography (GEG).

Doppler ultrasound is very useful method in diagnosis of vascular changes on extra-cranial blood vessels, it is a noninvasive method, not expensive and with no radiation effects on patients. Color Doppler of carotid artery can show the intima-media thickness or the presence of atherosclerotic plaque (6).

Electron beam computerized tomography is being used in order to identify carotid artery calcification.

Perfusion brain scintigraphy (angioscintigraphy and gammaencephalography) using Technitium 99 can be used in patients in order to evaluate the dynamics of circulation through brain blood vessels. It is a simple and noninvasive method with low radiation effects on patients and with very high sensitivity (7).

Patients and methods

In 35 patients with SLE (diagnosed according to the revised ACR criteria from 1997), aged 37.67 ± 9.96 and whose disease lasted approximately 3.8 ± 4.51 years, Doppler carotid ultrasonography was used to identify the presence of intima-media thickness or atherosclerotic plaque. Brain perfusion scintigraphy (angioscintigraphy and gammaencephalography) with ^{99}Tc was done in 15 out of 35 patients, due to technical limitations, in order to evaluate the dynamics in circulation in carotids and cerebral media arteries.

Average age of our patients, hospitalized between 2002 and 2004, was 37.67 ± 9.96 years, from 21 to 56 years. Among them 33 were women and 2 were men. The patients were also evaluated with respect to their serological findings and inflammatory mediators like measurement of serum C3 complement component, circulating immune complexes (CIC) and a high sensitive test for C-reactive protein. The damage assessment in our patients was investigated, and the mean score according to SLICC damage index was 23.67 ± 2.51 . There

were no co-morbidity diseases in our patients, but four of them had diabetes mellitus as a consequence of long-time corticosteroid treatment. All patients were treated with NSAID and corticosteroids, and 80% (28 patients) were treated with immunosuppressive therapy as well. Four patients were excluded from this study because one was younger than 18 years of age, one was pregnant and two were with end renal failure. The extra cranial carotid arteries were examined ultrasonographically; both right and left common carotid arteries were examined in multiple projections to identify the presence of atherosclerosis - that is, plaque, defined as a focal protrusion of surrounding wall. The intima-media thickness was measured as well.

Brain perfusion scintigraphy (angioscintigraphy and gamma encephalography) with ^{99}Tc was used to examine the perfusion through brain blood vessels using ^{99}Tc -DTPA as a contrast. ^{99}Tc -DTPA was applied intravenously (2 ml) and the gamma camera connected to digital computer was used to monitor the brain perfusion.

Results

Measured by Doppler ultrasound, 2/35 of examined lupus patients had a plaque and the 2/35 had an in-

tima-media thickness. In 31 patient measured by Doppler ultrasonography the finding was normal.

The results of perfusion scintigraphy showed that 5/15 had pathological changes in radioisotope carotido-

Table. Doppler sonography of carotid arteries in patients with SLE
 Tablica. Doppler sonografija karotidne arterije u bolesnika sa SLE

	n-35	%
Plaque	2	5.7
Intima-media thickness	2	5.7
Normal finding	31	88.6

Discussion

This study, using two different methods, assessed the presence or absence of atherosclerosis and its magnitude in patients with systemic lupus erythematosus. The main finding was that the atherosclerotic changes are present in certain number of patients with lupus. More changes were found using brain scintigraphy which is expectable considering the fact that with this method we can have an inside of brain blood vessels and the dynamics in circulation and that Doppler ultrasound can show only changes on extra-cranial blood vessels. Manzi and al. (5) used B- mode ultrasonography in patients with lupus in order to identify the presence of atherosclerosis and 40% of their patients had atherosclerotic

Conclusion

Considering the number of pathological carotidograms (although the number of patients is small) these preliminary results could contribute in better diagnosis of changes in extra and intracranial blood vessels, like stenosis, occlusion, aneurism or athero-

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gram (mild circulatory changes).

Four out of fifteen patients (4/15) had mild changes in cerebra media arteries circulation. One patient (1/15) had severe changes in circulation in both carotid arteries and in 5/15 patients perfusion brain scintigraphy was normal.

All patients had high levels of circulating immune complexes, C reactive protein and low values of C3 complement component.

changes. Our results show that 2/35 of examined lupus patients had a plaque and that other 2/35 had an intima-media thickness. Similar findings are reported by Mary J. Roman and al. (4), whose odds ratios for atherosclerosis in the patients with systemic lupus erythematosus were 4.8 and in the study reported by Asanuma et al. (6) same ratios were 9.8.

High values of CRP and CIC parameters and low values of C3 complement component are excellent markers of inflammation in patients with lupus, and it is known by now that there is strong connection between inflammatory and immune-mediated mechanisms of both atherogenesis and SLE.

sclerotic changes. In patients with systemic lupus erythematosus, the prevalence of carotid artery atherosclerosis is elevated and the early detection of atherosclerosis may provide an opportunity for therapeutic intervention.

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