Increased Arterial Stiffness in Juvenile Idiopathic Arthritis (JIA) Patients Compared with Matched Controls - a pilot study

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Purpose

Systemic arterial properties in adult patients with JIA are not well described. The aim of this study was to evaluate arterial properties in young adults with JIA compared with age- and sex-matched controls.

Methods

Nineteen patients (37.7±3.4 years) were randomly selected from a cohort of 88 JIA-patients who were followed from their first referral to Oslo University Hospital in 1980 -85 and had active disease more than 14 years after disease onset. Of the 19 patients, 2 had systemic JIA, 3 polyarticular RF negative, 1 polyarticular RF positive, 3 oligoarticular persistent, 5 oligoarticular extended, 3 enthesitis related, 1 psoriasis arthritis and 1 had undifferentiated arthritis. The patients were investigated after a mean disease duration of 29.2 ±1.3 years and compared with 19 age- and sex-matched controls.

Aortic root pressure and flow data were obtained no invasively by brachial arterial blood pressure, calibrated carotid arterial pulse trace and aortic annular Doppler flow recordings. The systemic arterial properties were described by the total arterial compliance (C), characteristic aortic impedance (Z_0), and peripheral arterial resistance (R) obtained from

estimation of 3-element windkessel model (WK) parameters (C, Z0, R), by Fourier analyses of central aortic pressure and flow data (Z0),

Results (Table)

The proximal aortic stiffness, evaluated by Z_0, was significantly higher, in the JIA-patients compared to the healthy controls (p=0.016). The patients also had lower total arterial compliance (C) (p=0.022), but the arterial resistance (R) was not different. The heart rate was higher in the patients than in the controls (p=0,043), but the blood pressure did not differ between the groups (p=0.443, p=0.535).

Conclusion

In spite of similar blood pressure, JIA patients have stiffer proximal aorta, and lower total arterial compliance than matched controls. This indicates that JIA-patients with long term active disease experience significant alteration of arterial function.

Table

Variables	JIA-patients Mean ± SD	Controls Mean ± SD	P-value (unpaired t-test)
BMI	25.7 ± 4.9	25.3 ± 4.0	0.785
Systolic blood pressure (mmHg)	117 ±15	114 ±11	0.443
Diastolic blood pressure (mmHg)	69 ± 9	68 ± 9	0.535
Heart rate (beats/s)	67 ± 11	60 ± 8	0.043
Cardiac output(l min -1)	5.3 ± 1.1	5.3 ± 0.9	0.982
R (mmHg/(ml/s))	1.04 ± 0.21	1.00 ± 0.23	0.564
Z_0 Windkessel Model (WK) (10^{-3} mmHg/ml/s))	77 ± 25	58 ± 20	0.016
C Pulse pressure method (PPM) (ml/mmHg)	1.21 ± 0.24	1.44 ± 0.34	0.022