

## Peripheral Arterial Structure And Function In Young Survivors Of Childhood Cancer

Broberg O. (1), Maxedius A. (1), Öra I. (2), Liuba P. (1)

Pediatric Cardiology Lund Sweden (1), Pediatric Oncology Lund Sweden (2)

### Introduction:

Survivors of childhood cancer are at risk for cardiovascular complications earlier in life than the normal population. Besides cardiomyocyte damage it has been shown that chemotherapy also negatively affects the endothelial function. Peripheral arterial tonometry (PAT) is a measurement of endothelial dysfunction and a surrogate marker for atherosclerosis. Carotid dimensions and intima media thickness (CIMT) can be used to calculate arterial elastic properties such as distensibility and stiffness. These indices are linked to increased risk of future cardiovascular events.

### Methods:

58 survivors of childhood cancer of different diagnoses and treatments aged 20 to 30 years without any previous cardiac event or chronic disease and 53 healthy age matched controls were evaluated with PAT using the ENDOPAT-2000 (Itamar Medical). Finger plethysmographic probes were used to record pulsatile flow before and after 5 minutes of occlusion with a blood pressure cuff. The contralateral arm served as a control. A reactive hyperemia index (RHI) was yielded and the result was log transformed (LnRHI). Both left and right main carotid were examined with the Philips Epiq 7 ultrasonographic machine using the linear array L15-7io transducer. Maximum diastolic (DD) and systolic diameters (SD) were measured as well as CIMT. Blood pressure measurements were taken at the time of carotid ultrasound. Statistical analyses were done using SPSS.

### Results:

Baseline demographic data are seen in table 1. Diastolic blood pressure was significantly higher in patients. All parameters (stiffness index, strain and distensibility index) of carotid elasticity were highly different from the control group. The reactive hyperemic response was blunted compared to controls. CIMT did not differ.

Table 1	Group	N	Mean	Std. Dev.	P
Age (years)	Patient	58	25,76	2,50	ns
	Control	53	24,46	2,65	
Sex (male)	Patient	58(37)			
	Control	53(35)			
Body Mass Index (kg/height <sup>2</sup> )	Patient	58	24,56	3,82	ns
	Control	53	25,32	3,65	
SBP mmHg	Patient	58	119,43	12,21	ns
	Control	53	115,93	13,65	
DBP mmHg	Patient	58	77,30	9,17	0,016
	Control	53	73,59	6,49	
CIMT (mm)	Patient	55	0,46	0,06	ns
	Control	53	0,45	0,05	
SD (cm)	Patient	55	6,59	0,54	0,04
	Control	52	6,80	0,51	
DD (cm)	Patient	55	6,03	0,53	ns
	Control	52	5,91	0,47	
Stiffness Index ( $\beta$ ) (ln(SBP/DBP)/(SD-DD/DD))	Patient	55	4,84	1,41	< 0,001
	Control	52	3,18	0,99	
Distensibility Index (1/ $\beta$ *CIMT)	Patient	55	0,10	0,03	< 0,001
	Control	52	0,16	0,09	
LnRHI	Patient	53	0,67	0,29	0,001
	Control	47	0,85	0,22	

SD main carotid systolic diameter, DD main carotid diastolic diameter, SBP systolic blood pressure, DBP diastolic blood pressure, LnRHI reactive hyperemia index log transformed, CIMT carotid intima media thickness

### Conclusions:

These young childhood cancer survivors have decreased arterial elastic properties and endothelial dysfunction compared to healthy controls indicating increased risk for future cardiovascular disease.