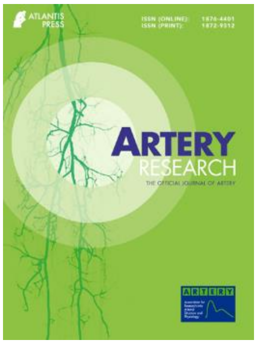

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7.2: POOR SLEEP QUALITY RELATED TO WORSE VASCULAR FUNCTION IN INDIVIDUALS WITH MULTIPLE SCLEROSIS

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2 diabetes (T2DM) patients.(1) Angiogenesis is regulated by circulating vascular growth factor, notably, angiopoietin (Ang)-1, Ang-2 and vascular endothelial growth factor (VEGF).(2) We studied the relationship between PSN and circulating vascular growth factors, Ang-1, Ang-2 and VEGF in T2DM patients.

Method: PNS was assessed by vibration perception threshold (VPT) using Horwell's neurothesiometer, and serum levels of Ang-1, Ang-2 and VEGF were also measured by Elisa in 107 T2DM patients and 93 nondiabetes subjects (controls). PNS was defined as VPT>25V.

Results: The overall prevalence of PNS was 11.2% higher in T2DM patients (10.1% vs. 1.1%, $p=0.012$) than controls. T2DM patients had higher mean VPT (12.1±7.8 vs. 7.3±3.8 V, $p<0.001$) than controls. Compared to those without PNS, PNS patients had lower Ang-2 levels [0.4 (0.2 − 0.8) vs. 0.8 (0.4 − 1.1) nmol/l, $p=0.03$] and higher VEGF levels [120 (60.8 − 254.4 vs. 59.4 (17.2 − 146.8), $p=0.037$], but no difference in Ang-1 levels. VPT was associated, positively with VEGF levels ($r=0.22$, $p=0.003$), and negatively with Ang-1 ($r=-0.17$, $p=0.024$), but not with Ang-2.

Discussion: Diabetes is associated with high prevalence of PNS and elevation of circulating vascular growth factors. PNS patients had imbalanced levels of circulating vascular growth factors, which may indicate impaired angiogenesis.

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7.1

THE DETRIMENTAL EFFECTS OF LIVE FIREFIGHTING ON ARTERIAL FUNCTION IN FIREFIGHTERS

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Background: Aging is associated with increased arterial stiffness and wave reflection, which is predictive of all-cause cardiovascular (CV) mortality (1-3). Firefighters have the highest cardiovascular mortality of any occupational group (4). High levels of heat stress, physical exertion, and elevated arterial stiffness (5) during/following firefighting provide a susceptible milieu for CV events.

Purpose: To describe the differential effects of age following live firefighting on cardiac, arterial function and wave reflection.

Methods: Firefighters aged 18-37yrs (n=18, YA) or 38-55yrs (n=17, MA) participated in a staged 12-minute live firefighting scenario. Blood pressures (BP), pulse wave analysis, pulse wave velocity (PWV) and hemodynamic measurements were obtained at rest, immediate and 30 minutes post-firefighting using an automated ambulatory blood pressure monitor (Mobil-O-Graph, I.E.M, Germany).

Results: YA increased heart rate and PWV more than MA in response to live firefighting ($p<0.01$). YA also decreased systemic arterial compliance ($p<0.01$) immediately post-firefighting more compared to MA, which returned to baseline values at 30-minutes. MA had higher PWV, total vascular resistance, and diastolic BP than YA ($p<0.01$). Systolic BP, pulse pressure, and reflective magnitude increased immediately post-firefighting for YA ($p<0.01$) but not in MA ($p>0.05$).

Conclusions: Young and MA firefighters exhibit differential cardiovascular responses to live firefighting. Although MA had higher PWV, diastolic BP and higher peripheral resistance they exhibited attenuated changes following live firefighting. Thus, arterial and hemodynamic parameters in younger firefighters appeared to change in a direction associated with increased risk to a greater degree than observed in older firefighters.

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7.2

POOR SLEEP QUALITY RELATED TO WORSE VASCULAR FUNCTION IN INDIVIDUALS WITH MULTIPLE SCLEROSIS

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Background: Poor sleep quality has been related to poor vascular function and higher risk of cardiovascular disease in the general population. Persons with multiple sclerosis (MS) exhibit a high cardiovascular risk, and report poor sleep quality. To date, the association between sleep quality and vascular health in MS has not been investigated. Objective: To investigate differences in vascular health between good and poor quality sleepers with MS. Methods: After a 10 minute rest in the supine position, resting heart rate (HR) and brachial blood pressure (BP) were collected.Aortic SBP, augmentation index (AIX), HR normalized AIX (AIX@HR75), subendocardial viability ratio (SEVR), end systolic pressure (ESP), and central pulse wave velocity (PWVc) were measured with applanation tonometry in individuals with MS (n=49). Carotid intima-media thickness (IMT) and beta-stiffness were measured with carotid ultrasound, and peak forearm blood flow (FBF Peak) was measured with strain gauge plethysmography. Sleep quality was measured with the Pittsburgh Sleep Quality Index (>5 was categorized as poor sleep quality). Age was used as a covariate.

Results: AIX@HR75 and SEVR were different between groups, even with age as a covariate, suggesting higher vascular risk for the poor quality sleepers with MS.

Conclusions: This study shows that within the MS population, poor quality sleepers have a higher cardiovascular risk than good quality sleepers. Whether poor sleep raises their cardiovascular risk more than in the general population is an area of future investigation.

	Good quality sleepers with MS (n=23)	Poor quality sleepers with MS (n=26)	Effect of sleep quality		Effect of age	
	Mean (SD)	Mean (SD)	p	Partial Eta^2	p	Partial Eta^2
N Female (%)	18 (75%)	22 (82%)				
PSQI score	2.9 (1.5)	9.7 (3.1)				
Age	44 ±13	52 ±10				
BMI	26.9 ±5.4	28.1± 5.6	.582	0.007	.584	0.007
HR	64 ±10	65± 8	.136	0.048	.014*	0.125
SBP	116 ±14	122 ±14	.384	0.017	.025*	0.105
DBP	72 ±9	74 ±10	.457	0.012	.559	0.007
MAP	86± 10	90 ±11	.403	0.015	.175	0.040
Aortic SBP	106 ±14	114 ±14	.223	0.032	.001**	0.200
AIX	21.1 ±13.7	30.0± 9.0	.082	0.064	<.001**	0.282
AIX@HR75	15.1± 12.0	25.5± 7.6	.007**	0.150	.001**	0.211
SEVR	158± 21	147 ±18	.026*	0.103	.160	0.042
ESP	96 ±12	103± 14	.213	0.034	.007**	0.148
PWVc	6.7± 1.4	7.5± 1.4	.200	0.036	.007**	0.146
PWVc/MAP	0.078± 0.014	0.084 ±0.016	.376	0.017	.063	0.073
IMT	0.51± 0.11	0.53 ±0.12	.571	0.007	<.001**	0.342
Beta	7.3 ±2.3	8.1± 2.7	.785	0.002	.002**	0.193
FBF Peak	17.8 4.4	17.2 6.6	.988	0.000	.185	0.038

* $p<0.05$** $p<0.01$