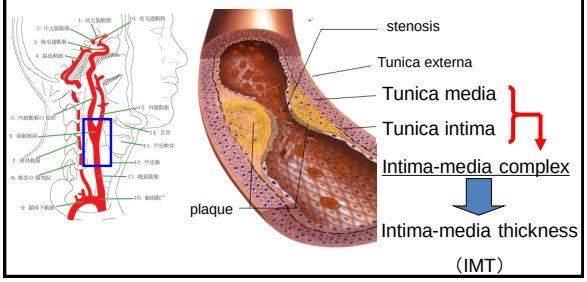
Factors affecting common carotid artery intima-media thickness in male workers aged 45 years

Yoshimasa Konno,
Tomohiro Inoue, Toru Honda, Yusaku Morita,
Masanori Ohta, Yasumasa Eguchi, Hiroshi Yamato
Department of Health Development,
University of Occupational and Environmental Health, Japan

Toru Nakagawa, Takuya Shiota, Suzushi Kusano,
Takeshi Hayashi, Masataka Irokawa
Hitachi Health Care Center, Hitachi, Ltd.

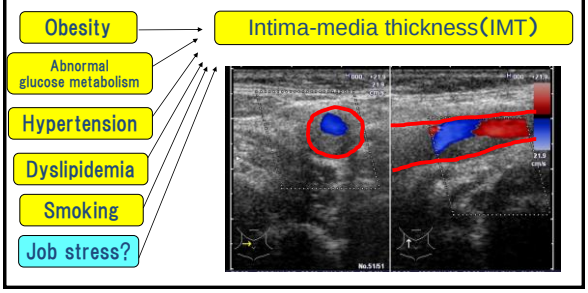
[Introduction]

Common carotid artery intima-media thickness (IMT) can be used as a surrogate marker for cardiovascular health.



[Aim]

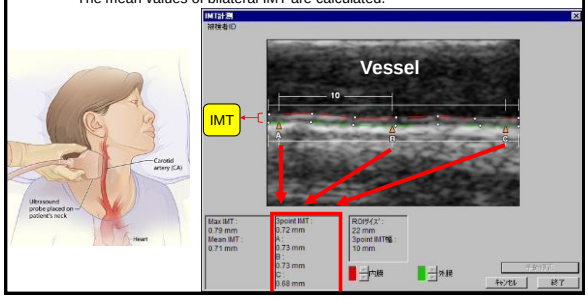
The aim of this study is to examine the relationship between cardiovascular disease (CVD) risk factors, job stress and IMT in a Japanese population sample.



[Methods]

1,924 male workers aged 45 years
at Hitachi Health Care Center, 2007 ～ 2011

B-mode ultrasonography (use of automatic-measurement software)
The mean values of bilateral IMT are calculated.



Job stress

The brief job stress questionnaire (BJSQ) was used.
It is similar to job content questionnaire (JCQ).

Quantitative job overload

"Working hard" "amount of work"
"no sufficient time to complete work"

Job Control

"Work at own pace" "making decisions at work"
"influence over worksite policy"

Social support(Supervisor support, Coworker support)

"the extent of to which an employee felt at ease when talking with a supervisor/coworker"
"the extent to which the supervisor/coworker could relied on when things got tough at work
"the extent of to which supervisors/coworkers were willing to listen to an employee's personal problem"

Dependent variable

IMT lesser group(≦1.0mm) vs developed group(＞1.0mm)

Independent variable

- **Obesity**; BMI, visceral-fat area (using abdominal CT scan), waist circumference
- **Blood pressure**; Systolic/diastolic blood pressure (SBP/DBP)
- **Glucose metabolism**; Fasting plasma glucose (FPG), HbA1c
- **Lipid metabolism**; Total cholesterol (TC), Low density lipoprotein cholesterol (LDL), High density lipoprotein cholesterol (HDL), LDL/HDL ratio, (TC-HDL)/HDL, triglyceride (TG)
- **Smoking status**; Brinkman index (cig/day × year)
- **Job stress**; Quantitative job overload, Job control supervisor/coworker support

If independent variables have correlation coefficient (r≧0.7) with each other, we chose the one and excluded the others.
We used logistic regression analysis after selecting variables by stepwise regression analysis.

[Result]

Characteristics of participants

* p<0.05
** p<0.01
*** p<0.001

variables	mean±SD IMT ≦1.0(n=1881)	mean±SD IMT 1.0 >(n=43)	
Visc. fat area (cm^2)	114.3 ± 51.4	142.0 ± 62.2	***
Waist circumference (cm)	86.1 ± 9.1	92.5 ± 10.1	***
BMI (kg/m^2)	24.0 ± 3.3	27.0 ± 3.5	***
SBP (mmHg)	118.9 ± 11.4	127.5 ± 9.1	***
DBP (mmHg)	76.6 ± 8.3	83.8 ± 7.6	***
FPG (mg/dl)	104.4 ± 21.4	127.7 ± 48.1	***
HbA1c (%)	5.4 ± 0.8	6.4 ± 1.7	***
TC (mg/dl)	203.4 ± 31.5	214.6 ± 47.7	*
TG (mg/dl)	144.4 ± 109.6	160.5 ± 109.3	
HDL (mg/dl)	55.1 ± 14.0	47.0 ± 9.9	***
LDL (mg/dl)	123.8 ± 29.6	143.1 ± 37.0	***
LDL/HDL ratio	2.4 ± 0.9	3.2 ± 1.2	***
(TC-HDL)/HDL	2.9 ± 1.1	3.8 ± 1.6	

[Result]

Characteristics of participants

* p<0.05
** p<0.01
*** p<0.001

variables	mean±SD IMT≦1.0 group	mean±SD IMT>1.0 group	
Brinkman index (cig/day×year)	290.3 ± 257.2	347.3 ± 295.2	
Quantitative job overload	6.4 ± 1.8	6.5 ± 1.7	
Job control	6.6 ± 2.0	6.8 ± 2.0	
Supervisor support	7.8 ± 1.9	8.3 ± 2.0	
Coworker support	7.3 ± 1.7	8.0 ± 2.0	*

[Result]

Logistic regression analysis before selecting variables

variables	Odds ratio	variables	Odds ratio
Obesity		Lipid metabolism	
Visc. fat area	1.01 ***	TC	1.01 *
Waist circumference	1.07 ***	TG	1.00
BMI	1.23 ***	HDL	0.94 ***
Blood pressure		LDL	1.02 ***
SBP	1.07 ***	LDL/HDL ratio	2.12 ***
DBP	1.11 ***	(TC-HDL)/HDL	1.55 ***
Glucose metabolism		Job stress	
FPG	1.02 ***	Quantitative job overload	1.02
HbA1c	1.65 ***	Job control	1.05
Smoking status		Supervisor support	1.13
Brinkman index	1.00	Coworker support	1.26 ***

* p<0.05 ** p<0.01 *** p<0.001

[Result]

Multiple Logistic regression analysis after selecting variables

	P value	Odds ratio	95%CI
SBP	<0.001	1.076	1.045 - 1.109
BMI	0.017	1.107	1.016 - 1.202
HbA1c	<0.001	1.633	1.356 - 1.945
LDL/HDL ratio	<0.001	2.160	1.617 - 2.903
Co-worker support	0.014	1.277	1.052 - 1.550

[Conclusions]

- We showed how much risk factors of CVD, including dyslipidemia, abnormal glucose metabolism, and hypertension, affects atherosclerosis.
- In addition, lower coworker support was found to be significantly associated with the development of subclinical atherosclerosis.