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Cystatin B, cathepsin L and D related to surrogate markers for cardiovascular disease

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Metadata Production

Metadata Swedish national data service
Producer(s):
Production Date: October 05 2017
Identification: SND1033-001

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Cystatin B, cathepsin L and D related to surrogate markers for cardiovascular disease

Cystatin B, cathepsin L och D relaterat till andra riskfaktorer för hjärt-och kärlsjukdom hos barn

Overview

Identification SND1033-001

Abstract

Objective: This study investigated potential associations between novel biomarkers for cardiovascular disease and other surrogate markers for health. **Methods:** Community sample of 170 (92 boys and 78 girls) children aged 8-11 years. Total fat mass (TBF) and abdominal fat (AFM) were measured by Dual-energy x-ray absorptiometry (DXA). Total body fat was also expressed as percentage of total body mass (BF%), and body fat distribution was calculated as AFM/TBF. Maximal oxygen uptake (VO2PEAK), systolic and diastolic blood pressure (SBP and DBP) and pulse pressure (PP) were measured. Echocardiography was performed. Left atrial size (LA) and left ventricular mass (LVM) were measured. A follow-up DXA scan was available in 152 children (84 boys and 68 girls). Frozen serum samples were analyzed for cystatin B, cathepsin L and cathepsin D. **Results:** Partial correlations between cystatin B versus lnTBF, lnBF%, lnAFM, AFM/TBF, VO2PEAK and PP were; $r=0.38, 0.36, 0.38, 0.29, -0.25$ and $0.25, P=0.001$ or less for all. Weaker predominantly non-significant correlations were found for cathepsin L, whereas cathepsin D was not related to any surrogate markers for health. No significant correlations were found between biomarkers and change in body fat over 2 years. **Conclusion:** Findings from this community-based cohort of young children show that surrogate markers for cardiovascular disease such as total fat mass, percent body fat, abdominal fat, body fat distribution, maximal oxygen uptake and pulse pressure were all associated with cystatin B. This was not found for cathepsin L or cathepsin D.

Unit of Analysis Group
Individual

Scope & Coverage

Keywords Risk Factors, Child, Cardiovascular Diseases, Cathepsin D, Skinfold Thickness, Cystatin B, Cathepsin L

Topics DEMOGRAPHY AND POPULATION, Medical and Health Sciences

Countries Sweden

Producers & Sponsors

Primary Investigator(s) Dencker, Magnus

Other Producer(s) Lund University

Sampling

Sampling Procedure

The study population was recruited among children at four different schools in Malmö, Sweden. All 477 children (boys = 259, girls = 218) attending third or fourth grade were invited to participate in the study. Out of these 477 children 248 accepted the invitation (boys = 140, girls = 108), and 172 children gave blood samples (it was optional to do so). Blood samples and a complete data set of other variables were available in 170 children (92 boys and 78 girls) resulting in an inclusion frequency of 36%.

Total universe/Complete enumeration

File Description(s)

Dataset contains 1 file(s)

Databas PONE-D-17-05749R2

Cases	248
Variable(s)	36

Variables List

Dataset contains 36 variable(s)

File Databas PONE-D-17-05749R2

	Name	Label	Question
1	SND_study	SND-study 1033	-
2	SND_dataset_..	SND-dataset 1033-001	-
3	SND_version_..	SND-version 1.0	-
4	SEX	Sex	-
5	Age_yrs_	Age years	-
6	height_	Body height	-
7	Body_mass_kg_..	Body mass Kg	-
8	BMI	Body mass index (BMI)	-
9	CSTB_AU_	Cystatin B	-
10	ctsl1_	Cathepsin L	-
11	ctsd_a	Cathepsin D	-
12	tbf_incr	Total fat mass increase	-
13	bf_incr	Total body fat mass percent increase	-
14	afm_incr	Abdominal fat increase	-
15	afm_tbf0	Body fat distribution baseline	-
16	lbn_incr	Lean body mass increase	-
17	ln_tbf	Total fat mass ln	-
18	ln_bf0	Body fat percent ln	-
19	ln_afm	Abdominal fat ln	-
20	afm_tbf	Body fat distribution	-
21	max_o2_k	Maximal oxygen uptake indexed for body mass	-
22	map_mm0	$=(v18/3)+((2*v19)/3)$	-
23	sbp_mm	Systolic blood pressure mm/Hg	-
24	dbp_mm	Diastolic blood pressure mm/Hg	-
25	pp_mm0	Pulse pressure= $v23-v24$	-
26	vilo_hr0	Resting heart rate	-
27	lvm_h_g	Left ventricular mass indexed for height= $v55/(v10/100)$	-
28	la_h_mm	Left atrial size indexed for height= $v56/(v10/100)$	-
29	rwt	Relative wall thickness	-
30	tanner_l		-
31	tanner_c		-
32	max_hr_	Maximum heart rate	-
33	rer	Respiratory exchange ratio	-
34	afm_kg0	Abdominal fat baseline	-
35	tbf_kg	Total fat mass kg	-

File Databas PONE-D-17-05749R2

	Name	Label	Question
36	bf_	Total body fat percent	-

Variables Description

Dataset contains 36 variable(s)

File : Databas PONE-D-17-05749R2

SND_study: SND-study 1033

Value	Label	Cases	Percentage
1033		248	100.0%

Information: Type: discrete, Format: numeric, Missing: *

Statistics (NW/ W): Valid: (248 / -) Invalid: (0 / -)

SND_dataset: SND-dataset 1033-001

Value	Label	Cases	Percentage
1		248	100.0%

Information: Type: discrete, Format: numeric, Missing: *

Statistics (NW/ W): Valid: (248 / -) Invalid: (0 / -)

SND_version: SND-version 1.0

Value	Label	Cases	Percentage
1		248	100.0%

Information: Type: discrete, Format: numeric, Missing: *

Statistics (NW/ W): Valid: (248 / -) Invalid: (0 / -)

SEX: Sex

Value	Label	Cases	Percentage
1	boys	140	56.5%
2	girls	108	43.5%

Information: Type: continuous, Format: numeric, Range: 1-2, Missing: *

Statistics (NW/ W): Valid: (248 / -) Invalid: (0 / -) Mean: (1.435 / -) StdDev: (0.497 / -)

Age__yrs_: Age years

Information: Type: continuous, Format: numeric, Range: 7.909650924-11.06304, Missing: *

Statistics (NW/ W): Valid: (248 / -) Invalid: (0 / -) Mean: (9.798 / -) StdDev: (0.624 / -)

height_: Body height

Information: Type: continuous, Format: numeric, Range: 122-162, Missing: *

Statistics (NW/ W): Valid: (248 / -) Invalid: (0 / -) Mean: (140.875 / -) StdDev: (7.248 / -)

File : Databas PONE-D-17-05749R2

height_ : Body height

Body_mass__kg_ : Body mass Kg

Information: Type: continuous, Format: numeric, Range: 20-65, Missing: *
Statistics (NW/ W): Valid: (248 / -) Invalid: (0 / -) Mean: (34.835 / -) StdDev: (7.654 / -)

BMI: Body mass index (BMI)

Information: Type: continuous, Format: numeric, Range: 12.8-28.1336565096953, Missing: *
Statistics (NW/ W): Valid: (248 / -) Invalid: (0 / -) Mean: (17.417 / -) StdDev: (2.813 / -)

CSTB__AU_ : Cystatin B

Information: Type: continuous, Format: numeric, Range: 2.97703604917136-5.91836830917136, Missing: *
Statistics (NW/ W): Valid: (170 / -) Invalid: (78 / -) Mean: (4.145 / -) StdDev: (0.412 / -)

ctsl1_ : Cathepsin L

Information: Type: continuous, Format: numeric, Range: 4.23744491588419-5.46433763588419, Missing: *
Statistics (NW/ W): Valid: (170 / -) Invalid: (78 / -) Mean: (4.843 / -) StdDev: (0.203 / -)

ctsd__a : Cathepsin D

Information: Type: continuous, Format: numeric, Range: 6.24481303424414-7.71006042424414, Missing: *
Statistics (NW/ W): Valid: (170 / -) Invalid: (78 / -) Mean: (6.924 / -) StdDev: (0.275 / -)

tbf_incr: Total fat mass increase

Information: Type: continuous, Format: numeric, Range: -3.9902-14.4141, Missing: *
Statistics (NW/ W): Valid: (223 / -) Invalid: (25 / -) Mean: (2.014 / -) StdDev: (2.458 / -)

bf__incr: Total body fat mass percent increase

Information: Type: continuous, Format: numeric, Range: -10.9565192-10.5824574, Missing: *
Statistics (NW/ W): Valid: (222 / -) Invalid: (26 / -) Mean: (0.564 / -) StdDev: (3.793 / -)

afm_incr: Abdominal fat increase

Information: Type: continuous, Format: numeric, Range: -5.7166-5.8411, Missing: *
Statistics (NW/ W): Valid: (223 / -) Invalid: (25 / -) Mean: (0.95 / -) StdDev: (1.277 / -)

File : Databas PONE-D-17-05749R2

afm_tbf0: Body fat distribution baseline

Information: Type: continuous, Format: numeric, Range: -0.324694671926086-1.17571075754659, Missing: *
Statistics (NW/ W): Valid: (222 / -) Invalid: (26 / -) Mean: (0.0218 / -) StdDev: (0.0869 / -)

lbn_incr: Lean body mass increase

Information: Type: continuous, Format: numeric, Range: 1.789-12.043, Missing: *
Statistics (NW/ W): Valid: (222 / -) Invalid: (26 / -) Mean: (5.94 / -) StdDev: (2.217 / -)

ln_tbf: Total fat mass ln

Information: Type: continuous, Format: numeric, Range: 0.29266961396282-3.34416837121393, Missing: *
Statistics (NW/ W): Valid: (246 / -) Invalid: (2 / -) Mean: (1.744 / -) StdDev: (0.655 / -)

ln_bf0: Body fat percent ln

Information: Type: continuous, Format: numeric, Range: 1.83143795304623-3.82193619707309, Missing: *
Statistics (NW/ W): Valid: (246 / -) Invalid: (2 / -) Mean: (2.82 / -) StdDev: (0.486 / -)

ln_afm: Abdominal fat ln

Information: Type: continuous, Format: numeric, Range: -0.862749964946125-2.43422720204576, Missing: *
Statistics (NW/ W): Valid: (246 / -) Invalid: (2 / -) Mean: (0.738 / -) StdDev: (0.746 / -)

afm_tbf: Body fat distribution

Information: Type: continuous, Format: numeric, Range: 0.268292682926829-0.492913385826772, Missing: *
Statistics (NW/ W): Valid: (246 / -) Invalid: (2 / -) Mean: (0.369 / -) StdDev: (0.0462 / -)

max_o2_k: Maximal oxygen uptake indexed for body mass

Information: Type: continuous, Format: numeric, Range: 17.47-58.33, Missing: *
Statistics (NW/ W): Valid: (247 / -) Invalid: (1 / -) Mean: (38.999 / -) StdDev: (7.406 / -)

map__mm0: $=(v18/3)+((2*v19)/3)$

Information: Type: continuous, Format: numeric, Range: 58.0000000000003-94.1111111111112, Missing: *
Statistics (NW/ W): Valid: (246 / -) Invalid: (2 / -) Mean: (74.68 / -) StdDev: (5.966 / -)

sbp__mm: Systolic blood pressure mm/Hg

Information: Type: continuous, Format: numeric, Range: 85.666666666667-131.333333333333, Missing: *
Statistics (NW/ W): Valid: (246 / -) Invalid: (2 / -) Mean: (104.337 / -) StdDev: (8.529 / -)

File : Databas PONE-D-17-05749R2

sbp__mm: Systolic blood pressure mm/Hg

dbp__mm: Diastolic blood pressure mm/Hg

Information: Type: continuous, Format: numeric, Range: 43.666666666667-79.666666666667, Missing: *
Statistics (NW/ W): Valid: (246 / -) Invalid: (2 / -) Mean: (59.851 / -) StdDev: (6.032 / -)

pp__mm0: Pulse pressure= $v23-v24$

Information: Type: continuous, Format: numeric, Range: 26.666666666667-67, Missing: *
Statistics (NW/ W): Valid: (246 / -) Invalid: (2 / -) Mean: (44.486 / -) StdDev: (7.623 / -)

vilo_hr0: Resting heart rate

Information: Type: continuous, Format: numeric, Range: 54.333333333333-123.333333333333, Missing: *
Statistics (NW/ W): Valid: (246 / -) Invalid: (2 / -) Mean: (81.97 / -) StdDev: (10.404 / -)

lvm_h_g: Left ventricular mass indexed for height= $v55/(v10/100)$

Information: Type: continuous, Format: numeric, Range: 24.763288-94.8466283783784, Missing: *
Statistics (NW/ W): Valid: (248 / -) Invalid: (0 / -) Mean: (50.637 / -) StdDev: (12.054 / -)

la_h__mm: Left atrial size indexed for height= $v56/(v10/100)$

Information: Type: continuous, Format: numeric, Range: 11.805555555556-26, Missing: *
Statistics (NW/ W): Valid: (248 / -) Invalid: (0 / -) Mean: (19.797 / -) StdDev: (2.306 / -)

rwt: Relative wall thickness

Information: Type: continuous, Format: numeric, Range: 0.181818181818182-0.514285714285714, Missing: *
Statistics (NW/ W): Valid: (248 / -) Invalid: (0 / -) Mean: (0.304 / -) StdDev: (0.0608 / -)

tanner_1

Information: Type: continuous, Format: numeric, Range: 1-2, Missing: *
Statistics (NW/ W): Valid: (248 / -) Invalid: (0 / -) Mean: (1.02 / -) StdDev: (0.141 / -)

tanner_c

Information: Type: continuous, Format: numeric, Range: 0-4, Missing: *
Statistics (NW/ W): Valid: (230 / -) Invalid: (18 / -) Mean: (1.443 / -) StdDev: (0.884 / -)

File : Databas PONE-D-17-05749R2

max_hr_ : Maximum heart rate

Information: Type: continuous, Format: numeric, Range: 132-223, Missing: *
Statistics (NW/ W): Valid: (247 / -) Invalid: (1 / -) Mean: (186.802 / -) StdDev: (15.936 / -)

rer: Respiratory exchange ratio

Information: Type: continuous, Format: numeric, Range: 0.7-1.18, Missing: *
Statistics (NW/ W): Valid: (247 / -) Invalid: (1 / -) Mean: (1.019 / -) StdDev: (0.0726 / -)

afm__kg0: Abdominal fat baseline

Information: Type: continuous, Format: numeric, Range: 0.422-11.407, Missing: *
Statistics (NW/ W): Valid: (246 / -) Invalid: (2 / -) Mean: (2.796 / -) StdDev: (2.367 / -)

tbf__kg: Total fat mass kg

Information: Type: continuous, Format: numeric, Range: 1.34-28.337, Missing: *
Statistics (NW/ W): Valid: (246 / -) Invalid: (2 / -) Mean: (7.133 / -) StdDev: (5.194 / -)

bf_ : Total body fat percent

Information: Type: continuous, Format: numeric, Range: 6.24285714285714-45.6925925925926, Missing: *
Statistics (NW/ W): Valid: (246 / -) Invalid: (2 / -) Mean: (18.853 / -) StdDev: (9.306 / -)