MP84-11. ASSOCIATION BETWEEN POLYCHLORINATED BIPHENYL (PCB) 153 EXPOSURE AND SERUM TESTOSTERONE LEVELS: ANALYSIS OF THE NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY (NHANES)

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INTRODUCTION AND OBJECTIVE:

Polychlorinated biphenyls (PCB) 153 are a category of aromatic hydrocarbon compounds manufactured for use in industrial applications. Herein, we examined the effects of PCB153 on serum testosterone levels. We hypothesized that men with higher serum levels of PCB153 are associated with lower levels of testosterone, potentially suggesting the detrimental effects of PCB as an endocrine disruptor in humans.

METHODS:

Using data collected from the 1999-2000 and 2001-2002 National Health and Nutrition Examination Survey (NHANES), we analyzed serum total testosterone and PCB153 levels, demographic data and comorbidities for men aged 18 years and older. Univariate and multivariate linear regression analysis was used to evaluate the association between total testosterone and serum PCB153.

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RESULTS:

A total of 557 men met inclusion criteria. Median age was 45.7 [33.4 - 60.4] years old while median serum of total testosterone and PCB153 levels were 479 [352.5 - 607] ng/dL and 0.20 [0.11 - 0.39] ng/g, respectively. Increasing age, higher BMI, higher levels of serum PCB153, lower levels of activity and a history of diabetes mellitus and coronary heart disease were associated with decreasing serum testosterone levels on univariate linear regression. Serum PCB153 levels were found to be negatively associated with serum testosterone levels on univariate analysis (estimate -179.67, $p<0.001$). On multivariate linear regression, increasing age (estimate -6.29 ng/dL per year of life, $p<0.001$) and BMI (estimate -7.08 ng/dL per unit BMI, $p<0.001$) were associated with declining serum testosterone levels.

CONCLUSIONS:

In this population-based analysis, we report an association between a decrease in serum testosterone with increasing serum levels of PCB153. This study represents by far the largest cross-sectional study showing the associations between environmental PCB exposure and serum androgens. Future research is necessary to assess variations of free and bound testosterone with PCB exposure as well as to ascertain the exact mechanism by which PCB affects testosterone production.

Table. Univariable and multiple linear regression analysis used to predict serum testosterone levels.

	Univariable linear regression analysis			Multiple regression analysis		
	Difference in testosterone levels (ng/dL)	Standard error	p-value	Difference in testosterone levels (ng/dL)	Standard error	p-value
Age (years)	-3.91	0.42	< 0.001	-6.29	0.46	< 0.001
BMI (kg/m^2)	-12.7	1.36	< 0.001	-7.08	1.13	< 0.001
PCB 153 (ng/g)	-179.67	32.38	< 0.001	-12.83	30.42	0.673
SHBG (nmol/L)	3.16	0.41	< 0.001	5.58	0.37	< 0.001
Annual family income ($)	-9.00	7.27	0.216	-0.62	5.35	0.907
Level of activity each day	25.35	7.60	0.001	12.52	5.70	0.028
Diabetes	-50.88	14.13	< 0.001	2.02	11.00	0.854
CAD	-119.58	32.38	< 0.001	-22.29	24.95	0.372
Prior stroke	-73.84	43.02	0.087	6.76	32.30	0.834
History of cancer	-28.96	31.41	0.357	-7.81	23.61	0.741