Hypertension and Diabetes among Siberian Yupik Eskimos of St. Lawrence Island, Alaska

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SYNOPSIS

CHANGING DIETS AND LIFESTYLES contribute to an increase in the prevalence of cardiovascular disease and diabetes in Alaska Natives. To examine the problem in detail, we have begun a systematic screening of various ethnic groups by carrying out a pilot study of Siberian Yupik Eskimos ages 39 and over. Mean LDL and HDL levels were 157 mg/dl and 63 mg/dl. Mean fasting insulin was 7.0 microunits/ml; and mean BMI, 27.1. Fasting insulin level was significantly related to both diastolic blood pressure and fasting triglyceride levels, but not to systolic blood pressure, total cholesterol, LDL cholesterol, or HDL cholesterol levels. Of the 66 people screened, 27% had evidence of hypertension.

The prevalence of cardiovascular disease and diabetes, historically low among Eskimos, is increasing among Alaskan Eskimos *(1–3)*. In September 1992, we screened 66 Siberian Yupik Eskimos ages 39 years and over (56% women) living on St. Lawrence Island, Alaska (a population closely related to the Eskimos of nearby Siberian Chukotka Peninsula), for non-insulin-dependent diabetes mellitus (NIDDM), impaired glucose tolerance (IGT), insulin resistance syndrome, and coronary artery disease. The sample represented 57% of the population in this age group. Of the 66 people screened, 27% had evidence of hypertension.

Methods

We followed the protocol from the Strong Heart Study *(4)* to a great extent, and the same laboratory (Medlantic Research Institute) performed blood chemistries. We obtained nutritional data from all participants, and based NIDDM and IGT diagnoses on World Health Organization definitions *(5)*. Other measurements included fasting insulin (FI) and lipid levels, bioimpedance body fat percentage, body mass index (BMI), electrocardiogram, and blood pressure. We measured blood pressure with a mercury sphygmomanometer and took three readings after participants had rested 5 minutes in the sitting position, with diastolic blood pressure defined at the fifth Korotkoff sound.

Table 1. Blood pressure, body mass index, and diabetes in Eskimo adults of St. Lawrence Island, Alaska

Sex	Age	n	Systolic BP		Diastolic BP		BMI		Diabetes
			Mean	s	Mean	s	Mean	s	Prevalence (%)
Males	18–24	0							
	25–34	0							
	35–44	5	113.8	13.2	74.0	11.0	26.9	3.4	0
	45–54	10	113.2	8.9	71.2	6.0	27.1	2.7	0
	55–64	8	117.9	14.3	70.5	12.0	25.4	4.9	13
	65–74	4	114.3	11.5	66.3	7.6	30.4	3.1	0
	75+	3	111.3	4.9	55.3	7.2	23.9	6.1	0
Females									
	18–24	0							
	25–34	0							
	35–44	3	120.3	5.5	79.7	4.7	27.0	5.0	0
	45–54	13	114.3	18.4	71.1	8.4	27.9	7.7	8
	55–64	6	123.2	22.7	71.0	13.3	28.6	4.4	0
	65–74	9	129.9	16.6	62.4	8.1	27.1	5.1	22
	75+	5	133.0	14.6	66.4	14.7	25.9	2.9	40

Table 2. Siberian Yupik study participants with evidence of hypertension, 1992

Age	Males			Females		
	# HTN	n	% HTN	# HTN	n	% HTN
18–24		0			0	
25–34		0			0	
35–44	0	5	0	0	3	0
45–54	1	10	10	2	13	15
55–64	2	8	25	1	6	17
65–74	1	4	25	7	9	78
75+	1	3	33	3	5	60
Total	5	30	17	13	36	36

Results

Blood pressure data are shown in Table 1. We found high mean serum levels LDL (157 mg/dl) and HDL (63 mg/dl). The mean FI of 7.0 microunits/ml appeared low given the high mean BMI of 27.1. Six people (9%) had NIDDM (95% CI 2% to 16%), and eight (12%) had IGT (95% CI 8% to 16%). Participants with diabetes were more frequently women (83%) and had higher mean systolic blood pressure than normoglycemic participants (139 mmHg in contrast to 117 mmHg), body fat percent (37.3% in contrast to 26.6%), and triglyceride level (91 mg/dl in contrast to 74 mg/dl).

Twelve of the 66 participants (18%) were taking antihypertensive medications. An additional six had a mean systolic pressure ≥140 mmHg or a mean diastolic pressure ≥90 mmHg. Hence, 18 participants (27%) had evidence of hypertension. Table 2 shows the distribution of these 18 people by age and sex.

We used multiple linear regression to analyze associations between FI and either blood pressure or serum lipids while adjusting for body fat percent, age, sex, and antihypertensive medication use. Fasting insulin was significantly related to both diastolic blood pressure (coefficient=1.19, P=0.0024) and fasting triglyceride (coefficient=5.15, P=0.0023) but not to systolic blood pressure, total cholesterol, LDL, or HDL levels.

Conclusion

Not much can be said about the prevalence data because of the small sample size. Screening many more people will provide more reliable information. Although NIDDM prevalence was not high compared to other indigenous North American populations *(6)* or to non-native U.S. residents, elements of the insulin resistance syndrome exist in these sub-Arctic people.

Comparing these data to those collected among native residents of Chukotka in 1991 shows that among people ages 45 to 64, mean glucose levels and prevalence of NIDDM and IGT appeared to be lower among Chukotka residents. However, methodologic differences may account for these observations.

Rapidly increasing rates of NIDDM and cardiovascular disease are well documented in people who have westernized their lifestyle (dietary changes, decreased physical activity, and increased prevalence of obesity). Further screening and comparison of data from both sides of the Bering Straits may elucidate preventable aspects of the deleterious effects of lifestyle changes among indigenous people.

References

1. Schraer, C. D., and others: Prevalence of diabetes mellitus in Alaskan Eskimos, Indians and Aleuts. Diabetes Care 11: 693–700 (1988).
2. Young, T. K., and others: Prevalence of diagnosed diabetes in circumpolar indigenous populations. Int J Epidemiol 21: 730–736 (1992).
3. Davidson, M., and others: Cardiac mortality in Alaska's indigenous and non-native residents. Int J Epidemiol 22: 62–71 (1993).
4. Howard, B. V., and others: Risk factors for coronary heart disease in diabetic and non-diabetic Native Americans: the Strong Heart Study. Diabetes 41: (Supp. 2) 4–11 (1992).
5. WHO Expert Committee on Diabetes Mellitus: Second report. WHO Technical Report Series 646. World Health Organization, Geneva, Switzerland, 1980.
6. Harris, M. L., and Hamman, R. F., editors: Diabetes in America. Publication No. (NIH)85-1468. National Institute of Arthritis, Diabetes, and Digestive and Kidney Diseases, Bethesda, MD, (1985).