Risk Assessment for Coronary Heart Disease in Patients with Hemophilia: A Single Center Study in the United States

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BACKGROUND

- In patients with hemophilia (PWH), coronary heart disease (CHD) occurs at a similar frequency as compared to the general population, but the contributing risk factors in hemophilia are not completely understood.
- In the US, PWH have twice the prevalence of symptomatic cardiovascular disease (CVD) and a 3-fold higher mortality from CVD than age-matched men without hemophilia.
- PWH have an increased prevalence of hypertension (HTN), a major risk factor for CHD.
- Primary care risk prediction scores such as the modified Framingham NCEP/ATP III risk equation are used to stratify patients for risk and prevention of CHD, but it is unclear if these risk scores can be accurately applied to PWH.

OBJECTIVES

1. Determine the prevalence of CHD risk factors in PWH.
2. Determine the 10-year risk for CHD in PWH using the modified Framingham NCEP/ATP III risk equation.
3. Compare CHD risk for PWH with the national norm; e.g. data from the National Health and Nutrition Examination Survey (NHANES).

METHODS

- Retrospective data analysis of PWH ≥ age 20; Single center, UCSD.
- CHD risk by modified Framingham NCEP/ATP III risk prediction equation.
- Statistical tests: Student T, Wilcoxon Mann-Whitney, Chi-squared homogeneity, Wilcoxon signed rank, one-sample binomial proportion.

PATIENT CHARACTERISTICS

	All	Severe Hemophilia	Non-severe Hemophilia	P-value
#of pts	89	44	45	
Mean age	42.1 ys	39.0 ys	45.2 ys	.0441
Race				.7188
White	47.2%	52.3%	42.2%	
Black	9.0%	9.1%	8.9%	
Hispanic	28.1%	22.7%	33.3%	
Other	15.7%	15.9%	15.6%	
Hemo A	79.8%	77.3%	82.2%	.5611
Hemo B	20.2%	22.7%	17.8%	
Inhibitor +	2.3%	4.6%	0.0%	.1731
HIV +	29.2%	47.7%	11.1%	<.0001
HepC +	59.5%	75.0%	44.4%	.0077

RESULTS

1. Compared to NHANES, PWH had lower cholesterol and low-density lipoprotein (LDL), less smoking, but higher blood pressure.
2. Patients with severe hemophilia had the most favorable lipid profiles.

	NHANES	All	Non-severe Hemophilia	Severe Hemophilia	P-value †
Risk Factors Used to Calculate Risk					
Mean Age	42.8 ys	42.1 ys	39.0 ys	45.2 ys	.0441
Mean Cholesterol	203.6	172.9*	180.3*	165.3*	.0835
Mean HDL	45.5	47.2	46.5	47.9	.6993
Mean Syst. BP	122.7	127.4*	127.2*	127.6*	.9007
HTN Treatment	11.0%	32.6%*	37.8%*	27.3%*	.2904
Current Smoking	32.1%	5.6%*	6.7%*	4.6%*	1.000
Risk Factors Not Used to Calculate Risk					
Mean Diast. BP	76.4	78.9*	77.6	80.3*	.2254
Mean BMI	26.7	28.2*	30.2*	26.2	.0068
Median Triglyc	147.6	125.0	130.0	118.5	.5712
Mean LDL	-	94.1	102.9	85.2	.0135
Diabetes	-	5.6%	6.7%	4.6%	1.0
History of CHD	-	2.3%	2.2%	2.3 %	1.000

* p-value <.05 compared to NHANES (Student's T, signed rank, binomial proportion)
† comparison between severe and non-severe hemophilia

10-Year Risk for CHD	NHANES	All Hemophilia	Non-severe Hemophilia	Severe Hemophilia
<10%	61.0 %	77.5%	66.7%	88.6%
10-20%	21.7 %	14.6%	24.4%	4.6%
>20%	17.3 %	7.9%	8.9%	6.8%
Chi-square GOF (NHANES)	p=.0049	p=.3274	p=.0008	p=.0049

Fisher's exact Chi-square test of homogeneity p=.0231

3. By modified Framingham scoring, PWH had lower risk for CHD than males in NHANES.

4. CHD risk was predicted to be lowest for patients with severe hemophilia.

	Hep C neg	Hep C pos	Hep C pos - viral load	Hep C + viral load
Lipid status				
Mean Cholesterol	185.5	163.7*	191.6	151.7*
Mean HDL	47.8	46.6	44.3	48.6
Mean LDL	105.3	85.4*	105.4	77.7*
Median Triglyc	140.0	114.0	133.0	110.0*

*p-value <.05 (pairwise comparison to Hep C Negative)

5. Favorable CHD risk scoring tracked with Hepatitis C status.

6. PWH with Hep C and a positive viral load had the most favorable lipid profiles.

10-Year Risk for CHD	NHANES	Hemophilia neg Hep C	Hemophilia pos Hep C	Hemophilia pos Hep C + viral load
<10%	61.0 %	78.8%	77.3%	80.0%
10-20%	21.7 %	9.1%	17.0%	11.4%
>20%	17.3 %	12.1%	5.7%	8.6%
Chi-square GOF (NHANES)		p=.0982	p=.0299	p=.0701

Fisher's Chi-square test of homogeneity p=.4144

7. PWH with Hep C and a positive viral load had the lowest risk for CHD by modified Framingham risk scoring.

CONCLUSIONS

- A higher proportion of PWH was classified as low risk for CHD compared to NHANES.
- Compared to NHANES, PWH had significantly better lipid profiles. This seemed to be a major factor in the classification of PWH into the low risk CHD category.
- Favorable lipid profiles were associated with positive Hep C infection status.
- However, Hep C infection has been reported to be associated with unfavorable CV outcomes.
- Therefore, composite CHD risk scoring in PWH with Hep C may underestimate true risk and must be applied with caution in the primary care setting.

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