Incident Cardiovascular Events among Individuals with Self-reported Subclinical Atherosclerosis

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space for abstract

BACKGROUND

- Atherosclerosis, including coronary artery disease, cerebrovascular disease and peripheral arterial disease, accounts for approximately 50% of the morbidity and mortality rates among individuals aged 50 years and older[1]

- More than 25 million people in the United States have at least one clinical manifestation of atherosclerosis, and in many more individuals, atherosclerosis remains a latent precursor of significant cardiovascular disease (CVD) events, including myocardial infarction and stroke[2]

- The rate of new myocardial infarction or stroke has been found to be dramatically higher in individuals with the highest carotid intima-medial thickness[3]

- Evidence is limited on the incidence of CVD events among individuals with subclinical atherosclerosis and on understanding the characteristics of individuals with subclinical atherosclerosis and incident CVD events

OBJECTIVES

- Estimate the incidence of CVD events among individuals with and without subclinical atherosclerosis

- Identify characteristics distinguishing individuals with subclinical atherosclerosis and incident CVD events

METHODS

Study Design

- **S**tudy to **H**elp **I**mprove **E**arly evaluation and management of risk factors **L**eading to **D**iabetes (SHIELD), a population-based survey conducted to better understand the risk for the development of diabetes, as well as disease burden

  - Based upon a screening questionnaire mailed to 200,000 nationally representative households, responses were obtained for 211,097 adults from 127,420 households (64% response rate)

  - A baseline survey (2004) was sent to 22,001 selected individuals derived from the screening respondents to capture self-reported information on health status, attitudes and behaviors, anthropometry, and medication use from this representative sample of the US population

  - Annual follow-up surveys were sent to individuals responding to the baseline survey. The 2005 (Year 1) survey had a response rate of 72%, and the 2006 (Year 2) survey had a response rate of 75%

METHODS (Continued)

Study Design (Continued)

- Baseline respondents were followed longitudinally for 2 years to observe incident self-reported CV events

Study Population

- Respondents were 18 years of age or older

- Only those individuals without a history of clinical CVD at baseline (i.e., no history of heart disease/ heart attack, stroke or revascularization) were included in the analysis

- Respondents were categorized as having subclinical atherosclerosis at baseline if they reported a diagnosis of narrow or blocked arteries or carotid artery disease

- CVD events included heart attack, stroke, angioplasty or heart bypass surgery

- An incident CVD event was defined as a new CVD event reported in either Year 1 or Year 2 without a history of a CVD event from the baseline survey

Statistical Analyses

- Incidence of CVD events was quantified as the number of new CVD events that were reported during the 2 years of follow-up since the baseline survey

- Demographic features, comorbidities, obesity, and smoking of individuals with atherosclerosis and incident CVD event were compared with respondents who did not report subclinical atherosclerosis at baseline but had a CVD event in the following 2 years, using two-sided chi-square tests

- Logistic regression analyses identified characteristics associated with subclinical atherosclerosis and incident CVD events. The model included respondents with incident CVD events, and age, gender, dyslipidemia, circulatory problems, diabetes mellitus, hypertension, and smoking were independent variables

- Statistical significance was set *a priori* at p <0.05

RESULTS

- 7,483 respondents completed the baseline survey and the Year 1 and Year 2 follow-up surveys

- 291 respondents reported a diagnosis of atherosclerosis at baseline

Incidence of CVD Events over 2 years

- 75 of 291 respondents (25.8%) with atherosclerosis had incident CVD events

- 878 of 7,192 respondents (12.2%) without self-reported diagnosis of atherosclerosis had incident CVD events

- **Unadjusted risk ratio = 2.1 (95% CI: 1.6 - 2.7)**

- **Adjusted risk ratio = 2.90 (2.18 - 3.85); adjusted for age, gender, comorbid conditions, and smoking**

Table 1. Baseline characteristics of SHIELD respondents with and without subclinical atherosclerosis with an incident CVD event

| Characteristics	Atherosclerosis at baseline + incident CVD event (n= 75)	No Atherosclerosis at baseline + incident CVD event (n= 878)
Age, years, mean (SD)	68.1 (11.2)*	59.0 (14.5)
Men, %	59*	34
Race, % white	85	85
Income, % ≥$40,000/year	51	46
Dyslipidemia, %	81*	62
Circulatory problems, %	52*	16
Hypertension, %	80*	64
Diabetes mellitus, %	29*	43
Obese, body mass index ≥ 30 kg/m², %	47	57
Current smoker, %	20	18

*p <0.05

- Among individuals who experienced a CVD event, a significantly greater proportion of respondents with subclinical atherosclerosis, compared with respondents without subclinical atherosclerosis, were men, and reported dyslipidemia, circulatory problems or hypertension, p <0.05

- Significantly fewer respondents with subclinical atherosclerosis reported diabetes mellitus compared with respondents without clinical atherosclerosis, p <0.05

- There was no difference between respondents with subclinical atherosclerosis and individuals without atherosclerosis for race, household income, obesity or smoking

Predictors of Incident CVD Events

Figure 1. Relative risk of an incident CVD event among individuals with subclinical atherosclerosis
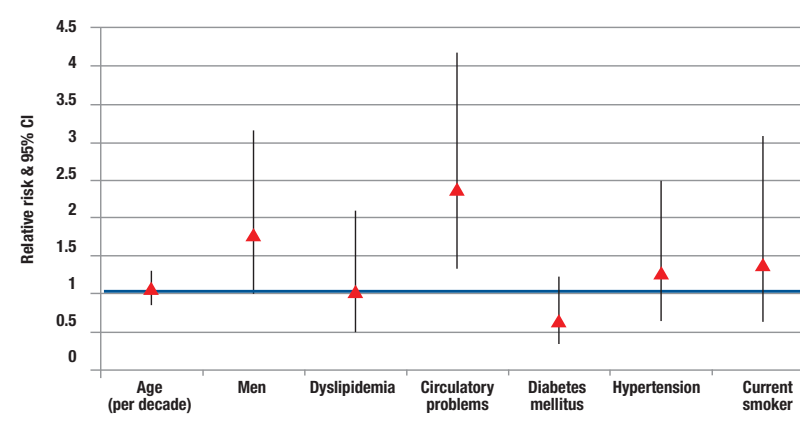
Relative risk = 1.0 indicates that there is no increased or decreased risk of CVD event. When 95% confidence interval crosses 1.0, then the association is not statistically significant.

- Logistic regression analyses demonstrated that men and individuals with a diagnosis of circulatory problems were at increased risk of experiencing a CVD event in the next 2 years, p <0.05

  - Among respondents with atherosclerosis, risk of incident CVD event was increased 2.4 times compared with respondents without circulatory problems, p = 0.003

  - Compared with women with atherosclerosis, men with atherosclerosis had a 77% increased risk of incident CVD event, p=0.05

LIMITATIONS

- CVD events and the diagnosis of atherosclerosis were self-reported and could not be confirmed through respondents' medical records

- CVD deaths were not captured in SHIELD and not included in the analysis

- Household panels, like the SHIELD study, tend to under-represent certain socio-economic extremes of the population and do not include military or institutionalized individuals

SUMMARY

- Incident CVD events were twice as high in respondents with subclinical atherosclerosis as in individuals without atherosclerosis, even after adjustment for risk factors

- Among those who experienced an incident CVD event, gender, dyslipidemia, circulatory problems and hypertension distinguished respondents with subclinical atherosclerosis from individuals without atherosclerosis

- Gender (men) and circulatory problems were significant predictors of increased risk of incident CVD events among respondents with subclinical atherosclerosis

CONCLUSIONS

- Self-report of subclinical atherosclerosis identified an extremely high-risk group with a >25% risk of CVD event in the next 2 years, with even higher rates in men and individuals with circulatory problems

- These characteristics may be useful for identifying individuals for more aggressive diagnostic and therapeutic interventions

List of Abbreviations

Abbreviation	Definition
CI	Confidence interval
CVD	Cardiovascular disease
SHIELD	Study to Help Improve Early evaluation and management of risk factors Leading to Diabetes

References
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