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Health knowledge about symptoms of heart attack and stroke in adult survivors of childhood acute lymphoblastic leukemia

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Abstract

Purpose—Children with acute lymphoblastic leukemia (ALL), the most common pediatric malignancy, have a 5-year survival rate of better than 80%. Long-term survivors of childhood ALL, however, carry an elevated risk of early mortality from cardiac events and stroke, and a disproportionately high prevalence of dyslipidemia and obesity, presumably as an adverse effect of treatment.

Methods—As part of a clinical follow-up study of 70 young adult survivors of childhood ALL, we evaluated the degree to which this high risk group differed in knowledge about symptoms of heart attack and stroke from that of a population-based comparison group frequency-matched by age, sex, and body mass index. Questions from the Behavioral Risk Factor Surveillance System were used to assess health knowledge.

Results—Survivors of ALL scored considerably worse on symptom knowledge than did their population counterparts. The strongest association was observed for chest pain as a symptom of a heart attack: ALL survivors were 14-fold more likely than the comparison group to answer the question incorrectly. Seventy-seven percent of survivors failed to identify pain in the jaw, neck or back as a heart attack symptom.

Conclusions—These results indicate an important gap in knowledge, and underscore the need for health education among survivors of childhood leukemia that includes information about symptoms of myocardial infarction and stroke.

Keywords

Cancer; myocardial infarction; health education; adverse late effects

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Introduction

With cardiac and vascular diseases accounting for more than 871,000 deaths annually and reigning as the leading causes of mortality among adults in the United States (1), one might expect a fairly high level of health knowledge for symptoms of heart attack and stroke, at least among persons with a high risk profile. Long-term childhood cancer survivors in general, and acute leukemia survivors in particular, have a substantially elevated risk of cardiovascular disease and stroke as a late effect of treatment (2–6). Among survivors of pediatric acute lymphoblastic leukemia (ALL), the most common malignancy of childhood (7), potentially cardiotoxic effects of anthracyclines and high dose cyclophosphamide (8) are compounded by a disproportionately high prevalence of metabolic syndrome or its components, particularly dyslipidemia and obesity (9–15), thus reflecting a poor cardiac risk profile leading into adulthood. As part of a clinical follow-up study of young adult survivors of childhood ALL (9), we asked participants to complete a module of the Center for Disease Control and Prevention's Behavioral Risk Factor Surveillance Study (BRFSS; <http://www.cdc.gov/brfss/>) that asked health knowledge questions about symptoms of heart attack and stroke. We evaluated the degree to which adult survivors of childhood ALL differed in symptom knowledge from that of a population-based, frequency matched comparison group who completed the same module of the BRFSS.

Methods

Described in detail elsewhere (9), we recruited and evaluated 75 adult survivors of childhood ALL in 2004–2005 who received their leukemia treatment at one of three children's hospitals in the Minneapolis/St. Paul area and who participated in the Childhood Cancer Survivor Study (16). None of the subjects had a history of a cardiac event or stroke. Subjects completed a variety of clinical and laboratory examinations in the General Clinical Research Center at the University of Minnesota and completed several questionnaires, including Module 10 of the 2002 BRFSS which asked questions “*about your knowledge of the signs and symptoms of a heart attack and stroke.*” Written informed consent was obtained for each subject as approved by the Human Subjects Review Committees at the University of Minnesota and Children's Hospitals and Clinics of Minneapolis/St. Paul. For this analysis, we selected a comparison group from among Minnesota respondents of the 2003 BRFSS who answered the same questions on symptom knowledge of heart attack and stroke as that of study subjects using a frequency matching algorithm to produce a balanced distribution of 3 controls to each subject by age, sex, and body mass index. We excluded 5 subjects because of missing responses or problems with matching appropriate controls. Unconditional logistic regression, controlling for the three matching variables (age and body mass index as continuous variables) and educational level, was used to compare the relative odds of answering a question incorrectly. There were 12 questions that asked about heart attack or stroke, worded as follows: “*Which of the following do you think is a symptom of a [heart attack/stroke]? For each, tell me yes, no, or you're not sure.*” We considered ‘not sure’ answers to be incorrect.

Results

Mean age for both the 70 ALL subjects and the 210 adults in the population comparison group was 29 years (range 18–45), both groups were 59% female, and the distribution of body mass index for both groups was 43% at <25, 24% at 25–29, and 33% at ≥30. Survivors were slightly less likely to be a current smoker (17.1%) than were those in the comparison group (18.6%). The Table shows the wording of each question, a comparison of the percentage of incorrect answers for each question, and the adjusted odds ratios with corresponding 95% confidence intervals quantifying the strength of the association for answering incorrectly between ALL

survivors and the comparison group. With only two exceptions, one each for heart attack and stroke, ALL survivors scored worse on symptom knowledge than did their population counterparts. The strongest association was observed for chest pain as a symptom of a heart attack, in which ALL survivors (5.7%) were 14-fold more likely than the comparison group (0.5%) to not answer the question correctly as a symptom. The highest percentage of incorrect answers by ALL survivors (77%) was for the question asking if pain in the jaw, neck or back was a heart attack symptom. Differences in results were not observed between the ALL survivors who received cranial irradiation during their treatment course and those who did not receive cranial irradiation.

Discussion

These results indicate that young adult survivors of childhood ALL have less accurate knowledge about symptoms of myocardial infarction and stroke than a normative population, despite their treatment-related elevated risk for mortality from cardiac and vascular events.

Although we cannot explain the unexpected findings, these data suggest a need for effective health education about symptoms of myocardial infarction and stroke, and by inference, about the elevated risk for adverse cardiac and vascular sequelae among long-term survivors of childhood leukemia and other pediatric cancers that include cardiotoxic therapy or are associated with treatment-potentiated obesity. Moser and colleagues (17) emphasize the need for early identification and treatment of acute coronary events and stroke, and note, as have others (18–21), that patient delay in seeking medical intervention is a major factor limiting delivery of definitive treatment. Reflecting the remarkable improvements in survival rates for most childhood cancers over the past several decades (22), especially ALL (23), the National Cancer Institute's SEER Program estimates that nearly 228,000 persons aged 27 years or younger have or had cancer during childhood (24). This high prevalence supports the growing understanding that health service issues affecting childhood cancer survivors, particularly as they relate to cardiovascular health, are significant as they progress into age groups with increasing risk of adverse health outcomes (25–31). Although our results do not allow assessment of health outcomes as a function of health knowledge, the poor general understanding of heart attack and stroke symptoms among these ALL survivors highlights the need for special efforts to increase awareness of risk factors for potential adverse health outcomes related to cancer and its treatment, both for the survivors themselves and for the primary care providers who follow them as adults after transition from pediatric cancer care (32).

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Table

Comparison of symptom knowledge[#] of myocardial infarction and stroke between 70 young adult survivors of childhood acute lymphoblastic leukemia and 210 frequency matched controls

<i>“Which of the following do you think is a symptom of a [heart attack/stroke]? For each, tell me yes, no, or you’re not sure.”</i>	Percentage who answered <u>incorrectly</u>			
	ALL Survivors	Controls	OR [*]	95% CI
Heart attack symptoms				
Pain or discomfort in the jaw, neck or back	77.1	55.2	2.8	1.5 – 5.2
Feeling weak, lightheaded, or faint	38.6	21.9	2.3	1.2 – 4.1
Chest pain or discomfort	5.7	0.5	14.0	1.5 – 131
Sudden trouble seeing in one or both eyes ^a	55.7	70.1	0.5	0.3 – 0.9
Pain or discomfort in the arms or shoulders	24.3	6.2	5.2	2.3 – 11.6
Shortness of breath	15.7	5.7	3.3	1.3 – 8.1
Stroke symptoms				
Sudden confusion or trouble speaking	28.6	10.0	3.8	1.8 – 7.9
Sudden numbness or weakness of face, arm, or leg, especially on one side	8.6	4.3	2.2	0.7 – 6.7
Sudden trouble seeing in one or both eyes	44.3	26.7	2.1	1.2 – 3.8
Sudden chest pain or discomfort ^a	61.4	61.0	0.98	0.5 – 1.7
Sudden trouble walking, dizziness, or loss of balance	34.3	7.6	6.6	3.1 – 13.7
Severe headache with no known cause	61.4	37.6	2.6	1.5 – 4.6

[#] From the Behavioral Risk Factor Surveillance System

^a Decoy symptom

^{*} Odds ratios and confidence intervals adjusted for age, sex, body mass index, and educational level