The Age-Specific Incidence of Admission to the Intensive Care Unit for Acute Myocardial Infarction in Antigua and Barbuda

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ABSTRACT

This study was done to assess the age-specific incidence of admission for acute myocardial infarction in Antigua and Barbuda from 1990 to 2001. A retrospective review of Intensive Care Unit admissions for possible acute myocardial infarction was performed. Data obtained included age, gender, country of residence, electrocardiogram, creatine kinase results and intensive care unit outcome. There were 250 admissions, 194 (78%) having data available for review. Acute myocardial infarction was found in 107/194 (55.2%) patients, age 59.9 ± 13.7 years, 28% female, 70% from Antigua and Barbuda, 90/107 (85%) were between 35 and 75 years old. The incidence would be 7.5 per year or 9.7 per year if the confirmation rate documented was similar for all admissions. With a yearly population of 9555 men age 35 to 75 years in Antigua and Barbuda, with men accounting for 72% of acute myocardial infarctions, the incidence rate was 0.57 (confirmed) to 0.73 (all admissions) per year per 1000 men. For women, the yearly population was 10 822 age 35 to 75 years, and the incidence rate was 0.19 to 0.24 per year per 1 000 women. The mortality rate was 12/107 (11.2%), with women being older (67 vs 57 years, p = 0.001) and dying more often (17% vs 9%) compared with men. The mortality rate in the Intensive Care Unit was 0.07 per year for men, 0.04 per year for women per 1000 aged 35 to 75 years. In the United States of America (USA), the admission rate is 4.1 for men and 1.8 for women per year per 1000 aged 35 to 75 years; the mortality rate is 1.0 for men and 0.5 for women per year per 1000 aged 35 to 75 years. Rates of admission to the Intensive Care Unit for acute myocardial infarction in Antigua and Barbuda are 20%, and mortality rates are 10% of those reported in the USA.

La Incidencia Específica por Edad en los Ingresos a Unidades de Cuidados Intensivos por Infarto Agudo del Miocardio en Antigua y Barbuda

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RESUMEN

Este estudio se realizó con el fin de evaluar la incidencia específica por edad en relación con el ingreso por infarto agudo del miocardio en Antigua y Barbuda, desde 1990 a 2001. Se llevo a cabo un examen retrospectivo de los ingresos a la Unidad de Cuidados Intensivos por posible infarto agudo del miocardio. Los datos obtenidos incluyeron: edad, género, país de residencia, electrocardiograma, resultados creatina-quinasa y la evolución del paciente en la Unidad de Cuidados Intensivos. Hubo 250 ingresos, de los cuales 194 (78%) tenían datos disponibles para el estudio. El infarto del miocardio agudo se encontró en 107/194 (55.2%) pacientes, edad 59.9 ± 13.7 años, 28% hembras, 70% de Antigua y Barbuda, 90/107 (85%) tenían entre 35 y 75 años. La incidencia sería 7.5 por año o 9.7 por año si la la tasa de confirmación documentada era similar para todos los ingresos. Con una población anual de 9555 hombres de 35 a 75 años de edad en Antigua y Barbuda, y con los hombres dando cuenta del 72% del infarto agudo del miocardio, la tasa de incidencia fue 0.57 (confirmado) a 0.73 (todas los ingresos) por año por 1000 hombres. Para las mujeres, la población anual fue 10 822, la edad de 35 a 75 años, y la tasa de incidencia fue de 0.19 a 0.24 por año por 1 000 mujeres. La tasa de mortalidad fue 12/107 (11.2%), siendo las mujeres de mayor edad (67 vs 57 años, p *= 0.001) y muriendo con mayor*

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frecuencia (17% vs 9%) en comparación con los hombres. La tasa de mortalidad en la Unidad de Cuidados Intensivos fue 0.07 por año para los hombres, 0.04 por año para las mujeres por cada 1000, de 35 a 75 años de edad. En los Estados Unidos de América (EE.UU.), la tasa de ingreso es 4.1 para los hombres y 1.8 para las mujeres por año por 1000, de 35 a 75 años de edad; la tasa de mortalidad es 1.0 para los hombres y 0.5 para las mujeres por año por 1000, de 35 a 75 años de edad. Las tasas de ingreso en la Unidad de Cuidados Intensivos para el infarto agudo del miocardio en Antigua y Barbuda son de 20%, y las tasas de mortalidad son el 10% de las reportadas en los EE.UU.

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INTRODUCTION

Cardiovascular diseases, including heart disease, cerebrovascular disease and hypertension, account for over 25% of the deaths in the Caribbean region in 1990 (1) and about 40% of the deaths in Antigua and Barbuda in 1997 (2). The interest in the diagnosis of acute coronary artery syndromes has increased in the Caribbean with the lifestyle changes and availability of expertise in the region. The diagnosis and treatment of acute myocardial infarction and coronary artery disease in the Caribbean is a topic of current interest (2–8).

The prevalence of coronary heart disease is not well documented for Afro-Caribbean patients, although epidemiologic data would suggest that risk factors and mortality may be less for persons of African ethnicity in the Caribbean than in the United States of America (USA) (10, 11). Echocardiographic studies in Afro-Caribbean patients in Antigua experiencing congestive cardiac failure or atrial fibrillation are more likely to have hypertensive rather than ischaemic findings compared with overseas patients (12, 13). This study was an attempt to assess the incidence of acute myocardial infarction over a 12-year period in Antigua and Barbuda.

SUBJECTS AND METHODS

A retrospective review of Intensive Care Unit (ICU) records for admissions for possible acute myocardial infarction was undertaken. The ICU at Holberton Hospital in St John's, Antigua, is the only facility providing care for patients with acute chest pain syndromes in the country. There are no specific criteria for admission and the admission policy is generous to avoid misdiagnosis. All admissions in years from 1990 to 2001 were included. Data included age, gender, electrocardiographic and creatine kinase results, outcome in the ICU and country of origin. Myocardial infarction was confirmed if chest pain was accompanied by electrocardiographic or cardiac enzyme elevation (14).

Based on population estimates for men and women in Antigua and Barbuda, age-specific rates of myocardial infarction were calculated. Holberton Hospital is the only full service hospital in Antigua with the only ICU in a country of 70 000 people, average per capita income about $US5000, 70% from tourism. The population is self-described as African ethnicity (Black) 90%, mixed race 8% and other 2% in the last census. Comparisons between men and women were made using two sample *t* test and chi-square analysis using STAT101 software (15). Stastical significance was equated to $p < 0.05$.

RESULTS

A total of 250 patients were admitted to the ICU at Holberton Hospital between January 1990 and December 2001. Of these, 194/250 (77.6%) had records available for review. Acute myocardial infarction was confirmed in 107/194 (55.2%). The average age was 59.9 ± 13.7 years with a range of 24 to 86 years. Women accounted for 30/107 (28%) of cases. Women were significantly older than men, 66.6 ± 12.5 *versus* 57.0 ± 13.2 years ($p = 0.001$). The mortality in the ICU was 12/107 (11.2%), with women dying more often than men, 16.6% versus 9.3% (p = NS). The population was from Antigua and Barbuda in 70% of cases, from other CARICOM countries in 7% and from other overseas countries in 23%.

Of those experiencing acute myocardial infarction, 5 (5%) were less than 40 years old, 26 (24%) from 41 to 50 years, 25 (23%) from 51 to 60 years, 28 (25%) from 61 to 70 years and 23 (22%) over 70 years old. The population records from the Health Information Division of the Ministry of Health of Antigua and Barbuda showed a male population of 9079 in 1991, 9522 in 1995 and 10 064 in 1998 for an average of 9555 men age 35 to 74 years for the three years (2). For women, the population was 10 289 in 1991, 10 784 in 1995 and 11 394 for 1998, for an average of 10 822 women age 35 to 74 years for the three years (2). Of those experiencing myocardial infarction, 17/107 (16%) were less than 35 years or over 74 years of age.

The number of confirmed myocardial infarction for the 12-year period was 90 or 7.5 per year for patients age 35 to 74 years. Assuming the same rate of confirmation for patients whose records were not available would give a number of 116 or 9.7 per year for patients aged 35 to 74 years.

Men aged 35 to 74 years accounted for 72% of myocardial infarctions or 5.4 to 7.0 per year. This would be 0.57 to 0.73 admissions for myocardial infarction per year per 1000 men 35 to 74 years of age. Women age 35 to 74 years accounted for 28% of myocardial infarctions or 2.1 to 2.7 per year. This would be 0.19 to 0.24 admissions for myocardial infarction per year per 1000 women age 35 to 74 years of age.

DISCUSSION

Cardiovascular disease in general and coronary artery disease, in particular, is emerging as a problem in developing countries (16). Although patients of African ethnicity in the USA appear to have a risk of coronary artery disease similar to patients of European ethnicity (17, 18), Afro-Caribbean patients may have a lower risk (10, 11). This series of mostly Afro-Caribbean patients from Antigua and Barbuda demonstrate a hospital admission rate of 0.73 per year per 1000 men aged 35 to 74 years old and 0.24 per year per 1000 women age 35 to 74 years old. These values are 18% of that reported for men in the USA, 4.1 per 1000 men aged 35 to 74 years old and 13% of that reported for women in the USA, 1.8 per 1000 women 35 to 74 years of age (19) (Figure). The in-

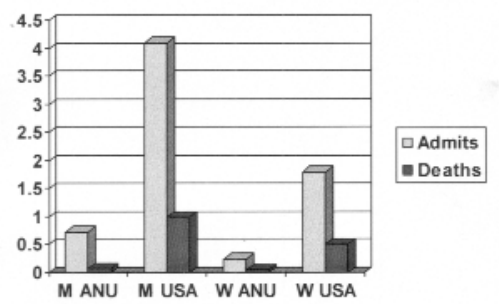

Figure: The incidence of ICU admission for acute myocardial infarction in men and women in Antigua and the United States of America.

M = men, W = Women, ANU =Antigua, USA = United States of America

hospital mortality rate of 0.07 per year per 1000 for men and 0.04 per year per 1000 for women is similarly lower than the USA rates of 1.0 for men and 0.5 for women (19). The hospital discharge rate for myocardial infarction in Antigua and Barbuda would be much less than the rate of 4.97 per year per 1000 patients 45 to 64 and 12.70 per year per 1000 patients over 65 years in the USA (20). These data would suggest a lower rate of myocardial infarction for patients in Antigua and Barbuda than for patients in the USA.

The problem of collecting data on acute coronary events in developing countries is well known (21). Death certificates are often inaccurate and out-of-hospital events may not be well documented (21). In developed countries about 33% of patients experiencing myocardial infarction may not reach the hospital and this number may reach 50% in developing countries (22). Even assuming 50% of patients experiencing myocardial infarction in Antigua did not reach the hospital, the theoretical rates for myocardial infarction compared to the USA would still be only 25% of the age-specific rate in the USA (19). About 25 to 40% of myocardial infarctions in developed countries are unrecognized (23, 24). This number is unknown for Antigua and Barbuda and elsewhere in the Caribbean.

Although the electrocardiogram remains very useful in the assessment of myocardial infarction (25), newer biochemical markers are assuming a more significant role (26). The diagnosis of myocardial infarction could be improved by using newer markers for myocardial infarction such as troponin T or I and creatine kinase MB mass in the Caribbean (27). A more aggressive approach to the diagnosis of acute coronary syndromes in the Caribbean and a more aggressive approach to treatment, including the use of thrombolytic agents, may be warranted (28).

Although heart disease affects patients of African and European ethnicity in equal numbers, there may be nuances in the modes of presentation. Death from hypertensive heart disease is greater and death from coronary artery disease is less in African American compared with European American men (29). Congestive heart failure in an Afro-Caribbean population is less likely to be associated with documented ischaemic heart disease (30). Patients of African ethnicity in the USA with a positive nuclear imaging study have less coronary artery obstruction than those of European ethnicity (31). Coronary artery calcium determined by electron beam tomography and atherosclerosis on angiography are significantly greater in Asian-Indian and Caucasian patients than in patients of African ethnicity in the USA (32–34). Adults of Asian Indian descent in Trinidad had cardiovascular death rate 2.6 times the rate for those of African descent, independent of major cardiac risk factors (35).

Risk factors may not carry the same significance. For example, cholesterol levels in women of African ethnicity in the USA were not predictive of cardiac or overall mortality (36). Although hypertension, left ventricular hypertrophy and diabetes mellitus in men and women and obesity in women were predictive of mortality in Tobago, West Indies, cholesterol level was not associated with cardiac or overall mortality (37). There may be fundamental ethnic differences in disease mechanism that may require "ethnic-specific" approaches (38).

The low rate of admission for acute myocardial infarction in Antigua and Barbuda represents the experience in a particular place and time. A western life-style has emerged in the past 20 years as income in Antigua and Barbuda has risen from $US2000 per capita in 1980 to about $US7000 in 2000, corrected for inflation. The prevalence of coronary artery disease and acute myocardial infarction may increase, perhaps dramatically, in the coming years. Incidence figures for acute coronary syndromes should be carefully monitored.

"The only way for a rich man to be healthy is by exercise and abstinence, to live as if he were poor." Paul Dudley White

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