Death Within 48 Hours of Admission to the Emergency Department: The Value of Autopsy

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ABSTRACT: *Objective:* To identify factors that contribute to patient death within 48 hours of admission to the emergency department. *Materials and Methods:* A retrospective study of the patients who died within 48 hours of admission to the emergency department, from the years 2000 to 2003. The antemortem diagnosis and postmortem diagnosis were compared. *Results:* A total of 189 autopsies were performed. The mean age at death for men (41.4 years) was lower than that for women (48.6) ($p = 0.02$). In both men and women, cardiac system involvement was the leading cause of death (27.5%), with myocardial infarction at 21.2%. The other common causes of death for both genders were blunt trauma (20.1%), intoxication with alcohol and/or other drugs (13.8%), penetrating trauma (gunshot or stab injuries) (13.2%), pulmonary thromboembolism (7.9%), and death caused by other respiratory causes (7.4%). Death caused by pulmonary thromboembolism was more common in women, whereas death caused by strokes, burns, and penetrating trauma were seen almost exclusively in men. *Conclusions:* Our study found a considerable concordance between the presumed antemortem cause of death and the postmortem findings. Although the mean age of death caused by myocardial infarction in our study was 52.45 years, MI caused a significant number of deaths among adults younger than 40 years of age. **KEY INDEXING TERMS:** Postmortem; Antemortem; Autopsy; Cause of death; Intoxication; Pulmonary thromboembolism. **[Am J Med Sci 2007;334(2):87–91.]**

The number of patients presenting to emergency departments has shown a steady increase, with over 100 million visits in the United States in the year 2001.[1] Our emergency department cares for the multiracial community of South Brooklyn, New York. According to the census of year 2000, there are about 2.5 million people living in Brooklyn, with 7.54% Asian, 19.79% Hispanic, 36.44% African American, and 41.20% Caucasian.[2] On average, 54,000 patients were treated in the emergency department each year, with around 600 deaths occurring within the first 48 hours; 12.9% of deaths were subjected to postmortem studies. This study aims to find the significant causes of death within 48 hours of admission in this community and the concordance between the antemortem and postmortem diagnosis.

Materials and Methods

All the patients who died within 48 hours of admission to the emergency department from the year 2000 to 2003 and had postmortem studies were included in this study. A total of 233 postmortem examinations were performed from nearly 1800 deaths during this period. We decided to include data only from those patients in whom a complete autopsy and toxicology was performed (189 of 233), in order to make accurate statements about diagnosis. A retrospective chart review of these patients were done by two independent reviewers and compared to determine the age, sex, race, initial diagnosis, subsequent management, and postmortem reports. These patients were classified based on sex and race and were further divided into 4 age groups: 0 to 19 years, 20 to 39 years, 40 to 59 years, and 60 to 100 years. The data obtained was analyzed by using SPSS statistics analysis software version 13.0 for Windows. To determine statistical significance for categorical variables like age, sex and race, the χ^2 test was used. ANOVA and independent t tests were used for finding the effect of race and sex in each age group. The α level was set at 0.05.

Results

Of the 189 patients, 133 (70.37%) were male and 56 (29.63%) were female. Among 133 men, there were 4 Asians (3%), 20 Hispanics (15%), 33 African Americans (25%), and 76 Caucasians (57%). Among 56 women, there were 3 Asians (5%), 11 Hispanics (20%), 16 African Americans (29%), and 26 Caucasians (46%). The male and female racial distribution is shown in Figure 1.

Thirty-eight patients died after Advanced Cardiac Life Support was performed in the emergency department and before an adequate history could be taken. In all these 38 patients, the cause of death was determined by postmortem studies. Among the rest of the patients where an adequate history, physical ex-

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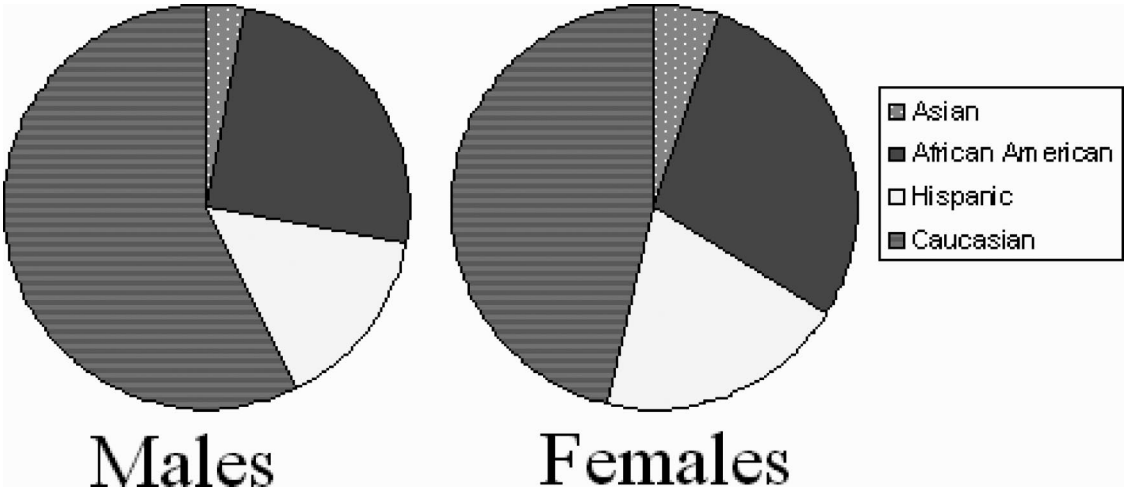

Figure 1. Relative distribution of various races among men and women in the study group.

amination and diagnostic tests were available, in 142 patients the initial diagnosis was similar to the diagnosis obtained by postmortem autopsy reports. In 7 patients, the initial diagnosis was different from the findings of the autopsy; whereas in 2 patients, the cause could not be determined after autopsy.

In both men and women, cardiovascular system involvement was the leading cause of death (27.5%). Among cardiac causes, myocardial infarction (MI) attributed to the maximum number of deaths (21.2%), followed by aortic aneurysms, cardiomyopathy, and congenital heart disease (6.3%). The second leading cause of death was blunt trauma including falls and motor vehicle accidents (20.1%), followed by intoxication with alcohol and/or drugs (13.8%), penetrating trauma, or injury due to gunshot or stab wounds (13.2%), pulmonary thromboembolism (7.9%), respiratory causes (pneumonia and bronchial asthma) (7.4%). Other causes included burns, gastrointestinal hemorrhage and perforation, intestinal obstruction, incarcerated hernia, malignancy, sickle cell crisis, hypothermia and sepsis. These causes were grouped together as "other" (9%). See Figure 2.

Cause of death differed by sex ($p < 0.001$), with fewer women dying from penetrating trauma than men (2% vs 18%) and more women then men from pulmonary thromboembolism (21% vs 2%). In women, cardiovascular diseases caused death in 32.1% of cases. The most common individual cause of death in women was pulmonary thromboembolism (21.43%), followed by blunt trauma (19.63%), MI (17.9%), other cardiac causes (10.7%), drug and alcohol intoxication/poisoning (8.9%), pneumonia (5.4%), and bronchial asthma exacerbation (3.6%). The most common cause of death was blunt trauma for Caucasian women and pulmonary thromboembolism for African American and Hispanic women. See Figure 3 and Table 1.

In men, death caused by MI and other cardiac diseases was the number-one cause of death (29.3%). Blunt trauma and penetrating trauma were the second and third leading causes of death (18.8% and 18%, respectively). Drug and alcohol intoxication/poisoning accounted for 15.8% of the deaths. The other causes of death were pneumonia (4.5%), burns (3.0%), cerebrovascular accidents (3.0%), pulmonary thromboembolism (2.3%), and bronchial asthma exacerbation (1.5%). The cause of death could not be determined in one Caucasian man and one African American man. African American and Caucasian men died mostly of cardiac causes; predominantly MI. Hispanic men died mostly of penetrating trauma. See Figure 4 and Table 1.

A comparative analysis of the causes of death in men and women is shown in Figure 5.

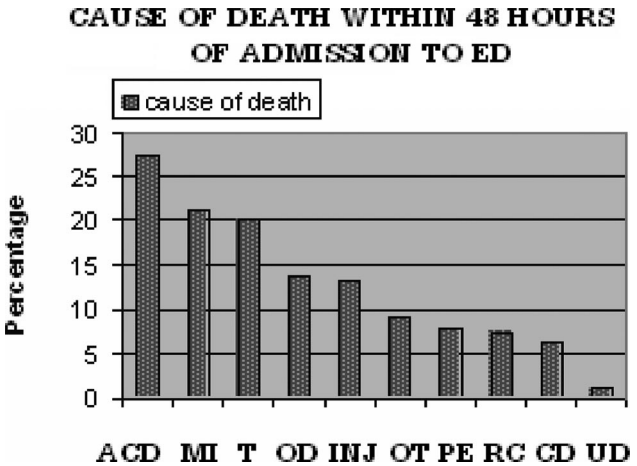

Figure 2. Most common causes of death within 48 hours of admission in all patients. ACD indicates all cardiac causes; MI, myocardial infarction; T, trauma; OD, intoxication with drug with/without alcohol; INJ, gunshot with/without stab injury; OT, other; PE, pulmonary thromboembolism; RE, respiratory causes (pneumonia and bronchial asthma); CD, cardiac causes other than MI; UD, undetermined.