Original article

Trends in mortality of adult patients diagnosed with myeloid leukemia from 1994 to 2011 in southeastern Brazil

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ABSTRACT

Objective: To evaluate trends in mortality among adults with myeloid leukemia in the Vale do Paraíba, State of São Paulo.

Methods: Data from the Brazilian National Health Service database DATASUS provided the number of deaths caused by myeloid leukemia and the number of inhabitants per year in the Regional Health Division XVII from 1994 to 2011. Registries were categorized according to gender into four age ranges (over 20 years, 20–49, 50–69 and over 70 years) for an estimation of the annual percent change for age-adjusted mortality rates. The percent changes were calculated using the Joinpoint regression analysis model.

Results: Overall, a significant decline per year was demonstrated for the entire sample (over 20 years) across the 18-year period studied (annual percent change: −5.59%; 95% CI: −8.5 to −2.5% for males; *p*-value < 0.05 and −7.02%; 95% CI −11.2 to −2.8% for females; *p*-value < 0.05) with no significant difference between genders. In an analysis using two Joinpoints, significant drops were observed from 1994 to 2001 (annual percent change: −21.22%; 95% confidence interval: −27.9 to −13.9%; *p*-value < 0.05) and from 1994 to 2003 (annual percent change: −12.86%; 95% confidence interval −22.2 to −2.5%; *p*-value < 0.05) for men and women, respectively. The declining trends were greatest for patients aged over 70 years with the age-adjusted mortality rates in younger groups declining non-significantly except for males aged 50–69 years old.

Conclusion: Our data suggest a significant decline per year in age-adjusted mortality rates of adult patients diagnosed with myeloid leukemia from 1994 to 2011 in the Vale do Paraíba, State of São Paulo.

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Introduction

It is widely accepted that the assessment of mortality data is a useful tool for monitoring outcomes in patients with hematologic malignancies, particularly in countries where survival estimates from cancer registries are not broadly available.[1,2] This information may be relevant to the strategic planning of health managers and enable the implementation of measures to improve services that treat these kinds of diseases.

Myeloid leukemia is a group of hematologic malignancies divided into acute and chronic subtypes, some of which require expensive treatment regimens while others are potentially lethal. In Brazil, the Ministry of Health has demonstrated the mortality rates for leukemia in general[3] but there are insufficient data to support discussions regarding death rates from myeloid leukemia.

Therefore, in order to provide comprehensive and regionalized information which reflect the characteristics and needs of the local population, an exploratory analysis of the mortality trends due to myeloid leukemia was performed in the Vale do Paraíba, State of São Paulo.

Methods

This study was carried out in the Centro de Hematologia do Vale (CHV). The CHV consists of medical oncohematological professionals from the following services: Pio XII Hospital in São José dos Campos and the Regional Hospital of the Vale do Paraíba, located in the city of Taubaté. These non-teaching hospitals are referral centers of the Regional Health Division XVII, composed of 39 municipalities in the Vale do Paraíba. They have treated patients with hematologic malignancies under the Brazilian National Health Service (SUS) since early 1999. Together, the services that comprise the CHV attend all adult SUS patients diagnosed with acute myeloid leukemia (AML) and more than 110 patients with chronic myeloid leukemia (CML).

Data from the SUS database, DATASUS (Health Information, TABNET, statistical data), available on the Brazilian Ministry of Health website[4] were considered for inclusion in the analysis. Registries from the Regional Health Division XVII (Vale do Paraíba), provided the number of deaths per year due to myeloid leukemia (categorized as C92 according to the International Classification of Diseases 10 [ICD-10] from 1996 to 2011 and as 205 according to ICD-9 from 1994 to 1995). This classification comprises the following diseases: AML, CML, subacute myeloid leukemia, acute promyelocytic leukemia (APL), acute myelomonocytic leukemia, myeloid leukemia otherwise specified and myeloid leukemia not otherwise specified. To obtain a set of data with adequately specified characteristics, registries were grouped according to gender into seven age ranges: 20–29, 30–39, 40–49, 50–59, 60–69, 70–79 and more than 80 years. Registries (Health Information, TABNET, demographic and socioeconomic data) also provided the number of residents per year according to the above-mentioned age ranges and the 2000 standard million population; thus the death rates per 100,000 inhabitants were calculated (crude mortality rate). These groups were

compared using the one-way analysis of variance (ANOVA), and Kruskal–Wallis test with Dunn's multiple comparisons test. p-values less than 0.05 were considered statistically significant. The annual percent change (APC) of the age-adjusted mortality rates based on the 2000 standard million population was also estimated by fitting a straight-line regression to the natural logarithm of the rates, with calendar year used as a regressor variable in Joinpoint regression analysis[5] using the Joinpoint Regression Program (version 4.0.4).[6] The APC were considered significant when the 95% confidence intervals (95% CI) excluded zero (p-value < 0.05). In order to compare the data, the same method was adapted to perform APC analysis of age-adjusted mortality rates among patients with myeloid leukemia from all regions of Brazil.

Results

The crude mortality rate rose as the age increased with this phenomenon being observed equally in men and women; similar crude mortality rates were found between 20 and 49 years, 50 and 69 years and over 70 years (Figure 1). Based on these initial findings, data were categorized according to gender into four age ranges (over 20, 20–49, 50–69 and over 70 years) for the APC estimation of age-adjusted mortality rates. Overall, significant declines per year in the age-adjusted mortality rates were demonstrated for the entire sample (over 20 years) across the 18-year period studied (APC: −5.59%; 95% CI: −8.5 to −2.5% for males; p-value < 0.05 and APC: −7.02%; 95% CI: −11.2 to −2.8% for females; p-value < 0.05); no significant difference was found between the genders (Figure 2). In an analysis performed with two Joinpoints, significant declines were observed from 1994 to 2001 (APC: −21.22%; 95% CI: −27.9 to −13.9%) and from 1994 to 2003 (APC: −12.86%; 95% CI: −22.2 to −2.5%) for men and women respectively (Figure 3). The declining trends were greatest for patients aged over 70 years old with the age-adjusted mortality rates in younger groups
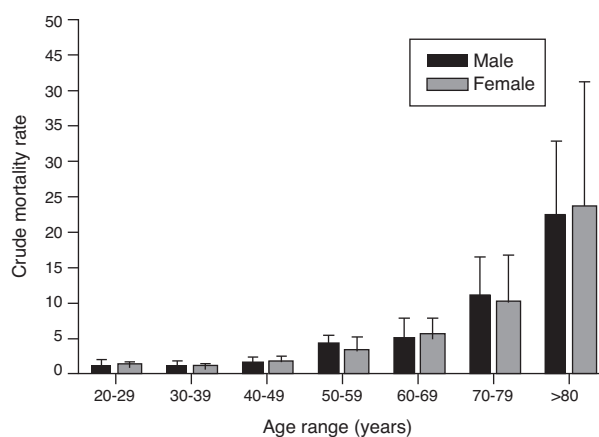
Figure 1 – Estimated crude mortality rate (per 100,000 inhabitants) according to age range and gender. Data are expressed as mean ± standard deviation (error bars). Similar values were observed for the 20- to 49-year age group, 50- to 69-year age group and over 70-year age group (Kruskal–Wallis test with Dunn's multiple comparisons test).