Descriptive epidemiology of childhood cancers in Bangalore, India

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While fairly complete and reliable incident data on childhood cancers are available from the registries in India, mortality and survival information is not. Information concerning the latter was obtained by the Bangalore cancer registry through active follow-up involving visits to homes of patients. Between 1982 and 1989, 617 cases of cancers in childhood were registered, giving an age-standardized incidence rate of 84.8 and 48.4 per million in male and female children, respectively. Active follow-up provided mortality/survival information in 532 or 86.2 percent of these cases. Overall, observed five-year survival was 36.8 percent (both genders combined) with a relative survival of 37.5 percent when childhood mortality in the general population was taken into account. The five-year relative survival was best for thyroid carcinoma (100 percent) followed by Hodgkin’s disease (73 percent) and retinoblastoma (72.9 percent). Survival was comparatively low, being 9.9 percent in acute nonlymphatic leukemia and less than 20 percent in rhabdomyosarcoma and the category grouped as ‘other malignant neoplasms.’ Survival in Hodgkin’s disease was influenced by clinical stage at presentation, but was not statistically significant possibly due to small numbers. Cancer Causes and Control, 1996, 7, 405-410

Key words: Childhood cancers, incidence, India, mortality, survival.

Introduction

Children below 15 years of age constitute a little over one-third of the total population (all ages) but form less than five percent of the total cancer burden in the population of Bangalore as well as in other population-based cancer registries in India. Nonetheless, cancers in childhood are important for several reasons. Geographic and ethnic differences in the occurrence of childhood cancer have been described. Recent advances in chemotherapy have resulted in dramatic improvement in survival in several types of childhood cancer. Although some genetic and extrinsic factors have been associated with the etiology of cancers in childhood, there remain wide gaps in such knowledge. Lastly, from the viewpoint of cancer control, particularly in the context of developing countries like India, there is a need to detect cancers such as Hodgkin’s disease at an early curable stage of the disease.

Since few studies on the incidence, mortality, and survival experience of malignancies during childhood have been reported from a developing country, the present...
report attempts to give a comprehensive account of the descriptive epidemiology of these cancers.

Materials and methods

As part of the National Cancer Registry Programme of the Indian Council of Medical Research, a Population Based Cancer Registry (PBCR) was started from 1 January 1982 at Kidwai Memorial Institute of Oncology (KIMIO), Bangalore. The registry covers the area of Bangalore Urban Agglomeration with a total population of 4.1 million and a male:female ratio of 1:0.9. The basic pattern of working of the registry has been described earlier and it has been estimated that the coverage of cancer cases by the registry is over 90 percent.

All cancers in children below 15 years of age that were diagnosed between 1 January 1982 and 31 December 1989 and registered in the PBCR of Bangalore constituted the study group. Both ICD-9 and ICD-O-1 both Topography and Morphology) were used to code all neoplasms in the registry. Childhood cancers were classified according to the scheme given by Birch et al., with the slight modification adopted by Stiller and Bunch. Over 90 percent of the childhood cancers registered had a microscopic confirmation of the diagnosis.

Case records of all patients with Hodgkin’s disease (HD) were once again reviewed for abstracting information on pretreatment Ann Arbor staging. This provided a better assessment of the clinical extent of the disease at the time of initial diagnosis. Incidence and mortality rates were calculated, respectively, for all cases registered with the registry and all cancer deaths of children for the period 1 January 1982 to 31 December 1989. The rates were standardized according to the world population for the three five-year age groups. Both the incidence and mortality rates were expressed per million population of children and standard errors of the rates also were calculated.

Trained social investigators conducted active follow-up, through visits to homes of patients mainly to determine the vital status, whether the patient was alive or dead, and if the latter, the date of death. Matched deaths and patients who were in attendance at KIMIO were excluded from active follow-up. These constituted 24 percent of cases. A combination of visits to homes and last hospital attended was done for the remainder. The cut-off date for determining vital status was 1 January 1995. Patients who had died during 1995 but were alive on 1 January 1995 were considered alive for the purpose of this analysis.

Of the 617 cancers registered, information on vital status was available for 488 of them and partial follow-up information was available in 44 cases, with no follow-up information in the remaining 85 cases. Thus, 532 of 617 cases (86.2 percent) were included for survival analysis.

Observed survival was based on death from all causes. Patients with partial follow-up were censored as and when they were lost to follow-up, and observed survival proportions were computed using the Kaplan Meier method of calculating survival. For HD, clinical stage and histologic subtype at presentation also were examined. The effects of age and mortality from all causes of death were removed by computing survival relative to that expected in the total population of Bangalore by age and gender using the life table method.

In order to determine the fatality ratio as well as to assess the statistical significance, the regression model of Cox was used. Calculation for both survival and proportional hazard (fatality) ratio of Cox was done using the EGRET software package.

All survival analyses were computed separately for male and female children. Since the small differences noticed between the genders were either not statistically significant or were accounted for by very small numbers, the results of survival analysis are presented for both genders combined.

Results

Incidence and mortality

The average annual incidence rate (IR) per million population of children by age group and gender is given in Table 1.

Table 2 gives the number of cases, average annual age standardized rate (ASR) per million children with standard error (SE), and male:female ratio of ASR of individual childhood cancers. In general, ASRs were higher in male compared with female children. This was most notably seen in Hodgkin’s disease where the male:female ratio of the ASR was 7.8. The ASRs were nearly identical in both genders with respect to astrocytoma, ‘other brain tumors,’ retinoblastoma, Wilms’ tumor, Ewing’s sarcoma, and the category classified as ‘other malignant neoplasms.’ Only osteosarcoma among the bone tumors, germ cell tumors,