Pediatric tumors are a specific group of tumors different from adult tumors. In spite of the low incidence, pediatric tumors are a serious threat to children's health and one of the main causes of death for children. In this study, the incidence data of pediatric malignant tumors in Guangzhou between 2000 and 2004 was collected and analyzed to explore the incidence pattern of pediatric tumors and provide a reference for the prevention and treatment of pediatric tumors.

Materials and Methods

Source of the cases

The incidence and mortality data of pediatric tumors (age of no more than 14 years) between 2000 and 2004 were from Guangzhou Cancer Registry. The cancer registration in Guangzhou follows the ‘Guidelines in cancer registration in China’ and ‘Registration and statistics of cancer in local community’[1,2]. In five years, 594 new cases (330 males and 264 females) and 157 death cases (81 males and 76 females) of pediatric malignant tumors were registered and verified. The annual demographic information with 5-year-old interval of Guangzhou population was provided by the Information Center of Guangzhou Public Security Bureau. Eight urban districts were covered by the Guangzhou Cancer Registry with a resident population of 3.68 millions, including 663 000 children.

Statistical analysis

According to the "Guidelines in cancer registration in China" and 'Registration and statistics of cancer in local community'[1,2], and with reference to the registration requirements in 'Cancer Incidence in Five Continents Volume IX' by the International Agency for Research on Cancer (IARC) / International Association of Cancer Registries (IACR)[3], MS-FoxPro and the IARCcrgTools software[4] of IARC/IACR (http://www.iarc.fr/iarccrgtools.htm) were used for reviewing, collating and analyzing the incidence and death data of pediatric tumors between 2000 and 2004 in original cancer registration database.
and calculating the incidence and mortality of pediatric tumors. The International Classification of Diseases 10th edition (ICD-10) was used to code and classify the registered incidence and death data. Chi-square test was used to compare the incidence of pediatric tumors in different years and ages.

Results

Diagnosis

Between 2000 and 2004, 594 new cases of pediatric tumor were reported in Guangzhou, of which 319 had histopathologic diagnosis and 207 had cytologic diagnosis, accounting for 88.6% of the total.

Incidence and mortality

Between 2000 and 2004, the incidence of pediatric tumor in Guangzhou was 17.91/100 000, with 18.92/100 000 in males and 16.70/100 000 in females; the mortality of pediatric tumor in Guangzhou was 4.73/100 000, with 4.65/100 000 in males and 4.83/100 000 in females.

The ranks of incidence and mortality

The five pediatric tumors with the highest incidence were lymphoid leukemia, central nervous system tumor, non-Hodgkin's lymphoma, myeloid leukemia and non-specific cell type of leukemia in turn, with the incidences of 4.39/100 000, 2.59/100 000, 1.81/100 000, 1.08/100 000 and 1.08/100 000, respectively, whose new cases accounted for 61.28% of the total. The five pediatric tumors with the highest mortality were non-specific cell type of leukemia, central nervous system tumor, lymphoid leukemia, non-Hodgkin's lymphoma and liver cancer in turn, with the mortalities of 1.44/100 000, 0.93/100 000, 0.48/100 000, 0.42/100 000 and 0.33/100 000, respectively, whose death cases accounted for 76.43% of the total.

Comparison of incidence in different years

Between 2000 and 2004, no significant difference was found among the incidences of pediatric tumor in different years ($\chi^2 = 2.285, P = 0.684$) (Figure 1), illustrating the stable incidence of pediatric tumor in Guangzhou in these five years.

Comparison of age-specific incidence

As shown in Figure 2, the incidence was 77.52/100 000 in 0-year-old group, 21.49/100 000 in 1 to 4-year-old group, 9.66/100 000 in 5 to 9-year-old group, and 17.11/100 000 in 10 to 14-year-old group, with significant difference among these four groups ($\chi^2 = 307.602, P < 0.001$).

Comparison of age-specific incidence of several common pediatric tumors

Lymphoid leukemia, central nervous system tumor, non-Hodgkin's lymphoma and myeloid leukemia were the most common tumors in children, whose age-specific incidences are shown in Figure 3.

Discussion

The incidence of pediatric tumor is 10.1 to 15.8/100 000 in 27 countries in Europe[6], while in China, the incidence of pediatric tumor varies from region to region. The National Office for Cancer Prevention and Control collected the cancer incidence data in 2004 from 43 domestic cancer registries: the average incidence of pediatric tumor was 14.91/100 000 in 18 cities (prefecture-level cities and provincial-level cities), and 7.23 /100 000 in 25 rural areas (counties and county-level cities), the average incidence of pediatric tumor in cities was two times of that in rural areas[6]. Between 2000 and 2004, the incidence in Guangzhou was 17.91/100 000, which exceeded the national average incidence in urban areas. Therefore, the prevention and
control of pediatric tumor in Guangzhou should be paid attention and strengthened.

The incidence-based ranks of adult malignant tumors have slight difference in various regions. Between 2000 and 2002, the five tumors with the highest incidences in Guangzhou were lung cancer, liver cancer, nasopharyngeal carcinoma, breast cancer and colon cancer in turn, whose new cases accounted for 57.40% of the total. Our results showed that the ranks of pediatric tumors was completely different from those of adult tumors. The five pediatric tumors with the highest incidences were lymphoid leukemia, central nervous system tumor, non-Hodgkin's lymphoma, myeloid leukemia and non-specific cell type of leukemia in turn, which was consistent with some reported results. In Guangzhou, the five pediatric tumors with the highest incidences all distributed in the blood system, lymphatic system and central nervous system, which would help to focus the research on the pediatric cancer etiology.

In our study, the incidences of pediatric tumors were significantly different in four age groups (χ² = 307.602, P < 0.001). Chen et al. and Zhang et al. have reported that the incidences of pediatric tumors in 0-year-old group and 1 to 4-year-old group were higher than those in 5 to 9-year-old group and 10 to 14-year-old group. Therefore, 0 to 4-year-old children should be the main objects of cancer prevention and treatment.

Mortality/incidence ratio (M/I) can be used as an important indicator evaluating the malignancy and treatment of tumors. With higher malignant level of tumor and worse efficacy of treatment, the M/I ratio will be larger, close or equal to 1; while with lower malignant level of tumor and better efficacy of treatment, the M/I ratio will be smaller. In this study, 594 new cases of pediatric tumor and 157 death cases were recorded, with the M/I ratio of 0.26, indicating the prognosis of pediatric tumor was not bad. Among the five pediatric tumors with the highest incidences, lymphoid leukemia had the best prognosis with the M/I ratio of 0.11; central nervous system tumor had the worst prognosis with the M/I ratio of 0.39. Therefore, central nervous system tumor should be the focus of prevention and treatment of pediatric tumor.

References


