

Letter to the editor

Clinical characteristics of childhood cancer in emergency room in a tertiary hospital in Pakistan

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INTRODUCTION

Worldwide, cancer is an important cause of mortality in children aged over 1 year.^[1] Numerically, the major cancers include acute lymphoblastic leukemia, CNS tumors and lymphomas.^[2–6] Cancer incidence is increasing in children globally as well as in Pakistan but the etiology is poorly understood.^[7] There are an estimated 160 000 new cases and 90 000 deaths per year worldwide in children aged under 15 years.^[8] The exact incidence in Pakistan is not known as there is no national tumor registry.

Early diagnosis in childhood is vital in terms of outcome.^[9–14] However, presentations are non-specific which may lead to a delay in both diagnosis and treatment and a poorer outcome.^[15–17]

Knowledge of common presentation and initial management of oncological emergencies is, therefore, essential for the emergency department (ED) care provider. Common oncological emergencies with which the emergency physician might encounter include tumor lysis syndrome, coagulopathy, hyperleukocytosis, mediastinal mass with airway obstruction and spinal cord compression all of which have substantial morbidity and mortality if left untreated. There is no previous data available on frequency and clinical presentations of childhood cancer in the emergency room from Pakistan, so our goal was to identify the presentation of childhood malignancy in ED.

METHODS

The Aga Khan University Hospital is a 600-bedded tertiary-care teaching hospital serving a population of

approximately 20 million. It has sub-specialists in all the major pediatric specialties.

A retrospective, chart review of patients presenting to the AKUH ED between January 2009 and December 2013 was undertaken. After approval from ethical review committee, data was retrieved through medical record and composed of six components: demographic, presenting symptoms, examination findings, laboratory investigation, diagnosis and outcome.

Data was collected on a proforma and transferred into SPSS for analysis. Percentages and frequency were used for descriptive statistics and mean (SD) and median (IQR) estimated for normally and non-normally distributed continuous variables respectively.

RESULTS

Over the 5 years period, 81 151 children were assessed in the ED. Of these, 59% were male and 41% female. A malignancy was diagnosed in 154, a rate of 1.9/1 000. The median age at presentation was 5.6 years (IQR 2.6–10). There were more boys (76, 62.3%), and common symptoms observed in the patients were fever (76.6%), weight loss (40.3%), pallor (38.3%) and petechial rash (24.7%). Childhood leukemia was the most common malignancy diagnosed with B-Cell ALL being the most common subtype. This was followed by CNS tumors with medulloblastoma being the most common. The median time between admission to the pediatric ward was 6 days (IQR 5–9 days) with a range of 3 to 25 days. Fever, weight loss and rash were the most common symptoms in children with leukemia. Headache

was the most frequent presentation of intracranial tumors whereas abdominal mass was the main finding in children with renal tumor and neuroblastoma (Table 1). Hepatomegaly was found in 66%, splenomegaly in 46% and lymphadenopathy in 51% of children with leukemia and lymphoma.

Laboratory data also revealed average hemoglobin of 8.76 ± 2.79 with minimum of 3.4 g/dL. Hyperleukocytosis was present in 26 (16.9%) children with the lowest total leukocyte count (TLC) of $0.7 \times 10^9/L$ and highest being $459 \times 10^9/L$ (Table 2).

Relevant radiological imaging was conducted on all children seeking emergency care depending on the presenting complaints. Mediastinal mass was detected in 6.6% of patients with leukemia and 9% of children

with lymphoma. All children suspected of having space occupying lesion (SOL) had evidence of intracranial tumor on CT head.

Leukemia was the most common in children less than 5 years of age. CNS tumors predominated in children between 5–10 years and lymphoma in those aged 10 years. The most common acute complication encountered was hyperleukocytosis 26 (16.88%), bleeding 25 (16.23%), breathing difficulty 24 (15.58%) with 6 (3.89%) requiring ventilator support and seizure 10 (6.49%). Shock was seen in 7 (4.54%), coma in 6 (3.89%), and cardiac failure secondary to anemia in 5 (3.24%) patients. From the ED, 73% were admitted to a ward and 24% to pediatric intensive care. Despite explanation, 3% of families were self-discharged. In terms of long-term outcome, 70 (47%) survived, 33 (22%) died at AKUH. Of the others, 41 (28%) were referred to other health care facility after starting treatment and 6 (4%) patients left against medical advice because of financial reasons.

Table 1. Demographics

Variables	Results
Age in years	5.6 (2.6–10)
Stratification of age, <i>n</i> (%)	
1 month to 5 years	74 (48.1)
5 to 10 years	44 (28.6)
10 to 16 years	36 (23.4)
Gender, <i>n</i> (%)	
Male	96 (62.3)
Female	58 (37.7)
Diagnosis, <i>n</i> (%)	
Leukemia	102 (66.2)
CNS tumors	19 (12.3)
Lymphoma	11 (7.1)
Others	22 (14.2)

Table 2. Laboratory parameters of suspected oncology patients presenting to emergency department

Variables	Results
Laboratory parameters	
Hb (g/dL)	8.75±2.79
TLC ($\times 10^9/L$)	53.3±92.0
Platelets ($\times 10^9/L$)	166.2±202.2
Serum K (mmol/L)	4.05±0.69
Serum Cr (mg/dL)	0.54±0.37
Serum Ca (mg/dL)	8.67±0.85
Serum phosphorus (mg/dL)	4.24±1.1
Serum uric acid (mg/dL)	4.94±2.81
Chest X-ray findings, <i>n</i> (%)	
Normal	118 (76.6)
Infiltrates/consolidation	23 (14.9)
Pleural effusion	8 (5.2)
Both	5 (3.2)
Computed tomography scan, <i>n</i> (%)	
CT brain for space occupying lesion	21 (13.6)
CT chest for mediastinal mass	10 (6.5)
CT abdomen for intra-abdominal mass	20 (13)
Blast, <i>n</i> (%)	
Peripheral smear for blast	77 (50)
Bone marrow for blast	102 (66.2)

DISCUSSION

It is estimated that about 150 cases per one million are diagnosed annually with cancer worldwide.^[18–19] The exact incidence of childhood cancer remains unknown in Pakistan owing to the absence of a National Cancer Registry, though available data estimates that 600 children per year are diagnosed^[9] representing 11% of the total number of new diagnoses.^[20] This is almost certainly an underestimate of the reality as a result of the lack of diagnostic facilities in many parts of the country.

There is little previous literature from lower-middle-income countries (LMICs) but some from high income countries. Jaffe et al^[21] in a study from Philadelphia reported cancer detection as 1 per 4 500 ED visits. Xing et al^[22] and Haase et al^[23] reported 22.8 cases of cancer being diagnosed per 100 000 children in pediatric ED from Michigan. These rates are much lower than ours suggesting that in high-income countries, children with cancer enter their respective health systems through different routes. In Pakistan, the ED is the main portal of entry to acute secondary care, which reinforces the need for vigilance and training emergency physicians.

The importance of history and physical examination is highlighted in this study and there is a good case for including a check list of relevant clinical signs on the standard ED admission form including: lymphadenopathy, hepatosplenomegaly, weight loss, oral ulcers of candida, and bruising. In children with

any of these signs, consideration of laboratory workup, especially complete blood count, film, chemistry, LDH and chest X-ray is important and an algorithm to guide investigation could help ED juniors.

In conclusion, in Pakistan, children with cancer often make their initial presentation to the ED. Delay in diagnosis can be disastrous and we have identified a number of warning signs of potential use to emergency doctors to enable this window of diagnostic opportunity to be seized.

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