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The Prevalence of Tumor Lysis Syndrome in Children and Adolescents with Cancer in Hamedan Province, Iran

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Abstract

Background: Tumor lysis syndrome caused by widespread tumor cell damage may lead to electrolyte imbalances and express as metabolic disturbance causing clinical abnormalities.

Patients and Methods: All patients younger than 16 years with documented malignancy candidate for chemotherapy, in Hamedan province of Iran were enrolled.

Results: Out of 69 cancer patients the laboratory form of tumor lysis syndrome was detected in 8 patients (11.6%) and its clinical form was observed in 2 patients (2.9%). Those two patients with clinical tumor lysis syndrome were treated using hydration, allopurinol, rasburicase and dialysis with good metabolic response.

Conclusion: Although our sample size was limited we found a comparable prevalence of tumor lysis syndrome among our patients in comparison with previous studies. Further evaluation of the prevalence of this syndrome among Iranian cancer patients is recommended.

Keywords: Tumor Lysis Syndrome, acute renal failure, oncology, childhood, metabolic, Iran.

Introduction

Dear Editor

Metabolic disturbances caused by destruction of cancer cells are characterized by laboratory form of tumor lysis syndrome (TLS) including hyperkalemia, hyperphosphatemia, hyperuricemia and hypocalcemia, which are seen in about one-fourth of pediatric cancer patients, as well as its clinical form (renal failure, convulsion and arrhythmia), which happens in 4-8% of cases [1]. It arises most commonly in specific cancer types, hyper-leukocytosis, extensive extra-medullary disease, pre-treatment hydration status and acidic urine [2]. In a study carried out in Tehran, Iran, 23.17% of non-Hodgkin's lymphoma (NHL) patients had laboratory signs of tumor lysis syndrome, and 50% those with laboratory findings developed the clinical form [3]. It should be noted that even in case of anuria, renal function can be reversed among these patients by appropriate management [4,5].

We studied the prevalence of TLS in childhood and adolescent cancer patients in Hamedan province, Iran. Cancer patients younger than 16, diagnosed in pediatric oncology department of Hamedan University of Medical Sciences' hospital during 2012 to 2013 were enrolled in this descriptive, cross-sectional study. Patients, who did not consent to continue their treatment plans in this center, were excluded from the study. Laboratory examinations were performed for potassium, phosphorus, calcium, uric acid, blood urea nitrogen, and creatinine at the start of study, and daily until patients stabilized (for two weeks), and compared with reference ranges [6]. Out of 71 cancer patients enrolled in this study two patients were excluded because of lack of consent to continue their treatment plan. Sixty nine patients who completed the study included 40 males (58%), and 29 females (42%), with median age of

Table 1: Number of patients with different malignancies developing tumor lysis syndrome.

Cancer type	Number of Patients	Number of LTLS	Number of CTLS
ALL	34	2	0
AML	7	0	0
NHL	6	3	2
Neuroblastoma	5	1	0
Ewing Sarcoma	3	0	0
Wilm's Tumor	3	0	0
Histiocytosis	3	0	0
Hodgkin's Lymphoma	3	0	0
Hepatoblastoma	2	1	0
Brain tumor	2	1	0
Rhabdomyosarcoma	1	0	0
Total	69	8	2

LTLS: Laboratory Tumor Lysis Syndrome; CTLS: Clinical Tumor Lysis Syndrome; ALL: Acute Lymphoblastic Leukemia; AML: Acute Myelogenous Leukemia; NHL: Non-Hodgkin Lymphoma.

6.62 ± 4.19 years. The types of cancer among our patients can be seen in table 1.

Serum potassium and uric acid levels were high in 2.9% of patients at the start of treatment, and this increased to 8.7% and 5.8% respectively at the end of the first week. Hyperphosphatemia was detected in 1.4% of patients and no patient had hypocalcemia at the baseline laboratory evaluation; after one week these raised to 4.3% and 7.2% respectively. In total laboratory TLS occurred in 11.6% of patients (8 patients), with 3 patients having NHL, two patients having ALL, and one patient for every cases of neuroblastoma, hepatoblastoma and brain tumor (Table 1). Two patients (2.9% of total patient population and 25% of patients with laboratory TLS) progressed to acute renal failure (clinical TLS). These patients, both had NHL, had very high uric acid level (27 mg/deciliter in the first and 43 mg/deciliter in the second patient respectively), and were treated with rasburicase and hemodialysis with acceptable response.

Our percentage of patients developing either laboratory (11.6%) or clinical (2.9%) TLS were somehow lower than a survey carried out in Tehran (laboratory TLS in 23.17% and clinical TLS in 11.85% of patients) 3. According to a study by Ahn et al. [7], 20.7% of their cancer patients developed laboratory TLS with 52.9% of these patients developing acute renal failure. Among their patients Burkitt's lymphoma was the most common predisposing cancer. Clinical TLS was detected in only 1.9% of cancer patients' reported by Stefanowicz et al. [8], during 2007 which is in line with our findings (2.9%).

Conclusion

Although our sample size was limited we found a comparable prevalence of tumor lysis syndrome among our patients in comparison with previous studies. Further evaluation of the prevalence of this syndrome among Iranian cancer patients is recommended.

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