

Pattern of Adulthood Hematological Malignancies in Khyber Pakhtunkhwa

Khan S^{1*}, Mir A^{2*}, Khattak BR³, Khan SN⁴, Iqbal K³ and Malik SN³

¹ Department of pathology laboratory, Hayatabad Medical Complex hospital (HMC), Peshawar-Pakistan;

² Rehman Medical Institute (RMI), Peshawar-Pakistan;

³ Hayatabad Medical Complex hospital, Peshawar-Pakistan; ⁴Department Medical Technology, University of Haripur, Haripur-Pakistan

ABSTRACT

Objective: To evaluate the frequency of adulthood hematological malignancies in Khyber Pakhtunkhwa population.

Material and Method: Descriptive observational study was conducted at diagnostic laboratory Rehman Medical Institute (RMI) and Hayatabad Medical Complex, Peshawar Pakistan, from December 2014 to December 2017. A total of 571 adult patients who suspected to have Hematological malignancies were included in the study. All these patients were examined in clinics by different physicians and referred to pathology department for bone marrow aspiration and trephine biopsy. Two ml of peripheral blood was collected in EDTA vacutainer tube and complete blood count, retic count along with peripheral film examination was done. Bone marrow aspiration and trephine biopsy samples were taken from all patients. Aspiration and trephine biopsy slides were examined and further immunohistochemistry and flowcytometry was done for complete diagnosis. All data was recorded, analyzed and presented in tables.

Results: Out of 571 suspected patients, 259 adult patients were diagnosed with different types of hematological malignancies. Out of total 186 (71.8%) were male and 73 (28.2%) were female. The age ranges of studied population were from 18 to 84 year with average age of 46.21 years. Out of them 96 (37.1%) were diagnosed with myeloid hematological malignancies and 163 (62.9%) were diagnosed with lymphoid hematological malignancies. Acute myeloid leukemia (22.3%), acute lymphoblastic leukemia (21.6%) and chronic lymphocytic leukemia (18.9%) were more prevalent hematological malignancies in this region while plasma cell leukemia, polycythemia rubra vera and hairy cell leukemia were least common hematological malignancies were found in adults. The frequencies of other hematological malignancies were lymphoma (10.4%), multiple myeloma (9.7%), chronic myeloid leukemia (7.3%), primary myelofibrosis (2.7%), Myelo dysplastic syndrome (2.7%) and essential thrombocythemia (1.1%) in total hematological malignancies.

Keywords: Adulthood hematological malignancies; Bone marrow examination; Immunohistochemistry; Flowcytometry

INTRODUCTION

Hematological malignancies constitute a heterogeneous group of malignant disorders including leukemias, myelomas and lymphomas [1]. These conditions emerge in cells of the bone marrow and the lymphatic system which ascertain such disorders as the main seed behind the morbidity and mortality in different regions of the world. International comparative data analysis revealed geographical diversity in the prevalence of hematological malignancies, with the highest rates being found in economically

developed regions and the lowest rates in areas of Africa and South Asia which may be a result of under-diagnosis and lack of registration facilities in developing countries [2].

Hematological malignancies are common, comprising approximately of 6.5% of all cancers worldwide [3]. It is the fourth most frequently diagnosed cancer in both men and women in developed countries of the world [4]. These are significantly more common in adults than in children [5].

A hematological malignancy is broadly divided into two groups according to their cell lineage as myeloid and lymphoid. The

Correspondence to: Khan S, Department of pathology laboratory, Hayatabad Medical Complex hospital (HMC), Peshawar, Pakistan, Tel: +913339118335; E-mail: shahtajmasood@yahoo.com

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common subgroups in lymphoid neoplasms are Lymphomas including Hodgkin and Non-hodgkin's lymphoma, Multiple Myeloma, Waldenstrom macroglobulinemia, Chronic Lymphocytic Leukemia and Acute Lymphocytic Leukemia. Myeloid neoplasms are mainly represented by Myeloproliferative Neoplasm, Myelodysplastic Syndrome and Acute Myeloid Leukemia [6,7].

Recent data showed that Non-hodgkin's lymphoma is the most common diagnostic group of adulthood malignancy and accounts for 2.7% of all cancers worldwide followed by leukemia 2.5%, Multiple Myeloma 0.8% and Hodgkin lymphoma 0.5% of all cancers. Globally 2.4% of all deaths from cancer occurred from Non-hodgkin's lymphoma, 3.2% from leukemia, 0.1% from Multiple Myeloma and 0.5% from Hodgkin lymphoma [3].

The prevalence of adult Hematological malignancies varies from one country to another. In developing countries lymphoma and leukemia are the most frequent and this has been reported in different studies [8]. Results of one of the study conducted at Nigeria revealed prevalence of different hematological malignancies among different age groups. They concluded that the prevalence of Acute Myeloid Leukemia, Non Hodgkin Lymphoma and Hodgkin Lymphoma was highest in patients among 21-40 years of age. Chronic Myeloid leukemia, Chronic Lymphocytic Leukemia and Multiple Myeloma were common among 41-60 years of age. Myelofibrosis was seen among those between 61-80 years of age [5].

Another study conducted in Eastern Morocco by Elidrissi Errahhali et al showed that Non Hodgkin Lymphoma was the most prevalent hematological malignancy (29.7% of all Hematological Malignancies), followed by Hodgkin Lymphoma, Myeloproliferative Neoplasm, Multiple Myeloma, Chronic Lymphocytic Leukemia, Acute Myeloid Leukemia, Myelodysplastic Syndrom, Acute Lymphocytic Leukemia, and Waldenstrom macroglobulinemia. Majority of these cases were observed among patients of ≥ 60 years (40.4%) [6]. A study done by Hossain et al in Bangladesh showed Acute Myeloid Leukemia was most common comprising 28.3% (median age 35 years) followed by Chronic myeloid Leukemia 18.2%, Non Hodgkin Lymphoma 16.9%, Acute Lymphocytic Leukemia 14.1%, Multiple Myeloma 10.5%, Myelodysplastic Syndrom 4.5%, Hodgkin Lymphoma 3.9% with median ages of 40, 48, 27, 55, 57 and 36 years respectively. The least common was Chronic Lymphocytic Leukemia 3.7% with median age of 60 years [9].

The reason for conduction of this study is to determine the frequency/pattern of different adulthood hematological malignancies from different districts of Khyber Pakhtunkhwa-Pakistan and to drag the attention of concerned to wield the fatal conditions leading to unending massacre of human lives.

METHODS

It was a descriptive observational study conducted at hematology department, Rehman Medical Institute (RMI) and Pathology Department Hayatabad Medical Complex, Peshawar Pakistan. The study duration was from Dec, 2014 to Dec, 2017. In the present study a total of 571 adult patients who suspected to have Hematological malignancies were included in the study. All those patients who are previously diagnosed or currently on treatment were excluded.

All patients who visited to Rehman Medical Institute and these were examined in the clinics and bone marrow examination test was advised to all suspected patients. Two milliliter of peripheral blood was collected in K3 EDTA vacutainer tube (BD, USA) from all patients, to perform complete blood count (XN-1000, Sysmex, Japan), retic count and peripheral film examination. Bone marrow aspiration and trephine biopsy samples were taken from all patients in an aseptic environment in bone marrow sample collection room.

Bone marrow aspiration and trephine biopsy slides were examined under microscope (CX22LED, Olympus, Japan) and further immunohistochemistry and Flowcytometry (Cytoflex, Beckman coulter, USA) were applied for final diagnosis.

The patient data and diagnosis were recorded in Microsoft Excel 2010 and analyzed in SPSS-22 by descriptive statistics for frequencies. Analyzed data was presented in tables.

RESULTS

A total of 259 adult patients were diagnosed with different types of hematological malignancies among 571 suspected patients. Out of total, 186 (71.8%) were male and 73 (28.2%) were female. Adulthood Hematological malignancies is more common in male then female with ratio of 2.5:1. The age ranges of studied population were from 18 to 84 years with average age of 46.21 years. Out of 259 adult patients, 96 (37.1%) were diagnosed with myeloid hematological malignancies and 163 (62.9%) were diagnosed with lymphoid hematological malignancies. Acute Myeloid Leukemia (AML=22.3%), Acute Lymphoblastic Leukemia (ALL=21.6%) and Chronic Lymphocytic Leukemia (CLL=18.9%) were more prevalent hematological malignancies in this region while Plasma Cell Leukemia (PCL), Polycythemia Rubra Vera (PV) and Hairy Cell Leukemia (HCL) were least common hematological malignancies were found in adult suspected patients. The frequencies of other hematological malignancies were Lymphoma (10.4%), Multiple Myeloma (MM=9.7%), Chronic Myeloid Leukemia (CML=7.3%), Primary Myelofibrosis (MF=2.7%), Myelodysplastic Syndromes (MDS=2.7%) and Essential Thrombocythemia (ET=1.1%) in total hematological malignancies as shown in Table 1.

Table 1: Pattern of Adulthood Hematological Malignancies in Khyber Pakhtunkhwa Pakistan.

Adulthood Hematological Malignancies	Frequencies	Pattern of Adulthood H.M	
Myeloid Adulthood Hematological Malignancies	96 (37.1%)	Diagnosis	% Age
		AML	22.3
		CML	7.3
		MF	2.7
		MDS	2.7
		PV	2.1
		ET	1.1
Lymphoid Adulthood Hematological Malignancies	163 (62.9%)	ALL	21.6
		CLL	18.9
		Lymphoma	10.4
		MM	9.7
		HCL	0.8
		PCL	0.4
Total	259 (100%)		100

Abbreviation: AML=Acute myeloid leukemia, CML=Chronic Myeloid leukemia, MF= Myelofibrosis, MDS=Myelodysplastic Syndromes, PV= Polycythemia Rubra Vera, ET= Essential Thrombocythemia, ALL= Acute Lymphoblastic Leukemia, CLL= Chronic Myeloid Leukemia, MM= Multiple Myeloma, HCL= Hairy Cell Leukemia, PCL= Plasma Cell Leukemia, HM= Hematological Malignancies.

DISCUSSION

The present study was conducted at Khyber Pakhtunkhwa where

hematological malignancies are common and non-existence of national malignancies registry and no previous data or study are available on pattern of adulthood hematological malignancies [10]. There are geographic and racial differences in the epidemiology of adulthood hematological malignancies in the globe [11]. Childhood hematological malignancies were most prevalent in south central Asia and least common in southern Africa while adulthood hematological malignancies are most frequently found in economically developed regions and the lowest rates in areas of Africa and South Asia [12,13].

The present study was carried out to determine the pattern of adulthood hematological malignancies in Khyber Pakhtunkhwa. This study result revealed that adulthood hematological malignancies were more common in male comparatively female with ratio of 2.5:1. This result is almost similar with result of Smith et al. (2011) study [4].

In current study Acute Myeloid Leukemia (22.3%), Acute Lymphoblastic Leukemia (21.6%) and Chronic Lymphocytic Leukemia (18.9%) were found predominant adulthood hematological malignancies followed by Lymphoma (10.4%), Multiple Myeloma (9.7%), Chronic Myeloid Leukemia (7.3%), Primary Myelofibrosis (2.7%), Myelodysplastic Syndromes (2.7%), Polycythemia Rubra Vera, (2.1%), Essential Thrombocythemia (1.1%), Hairy Cell Leukemia (0.9%), Plasma Cell Leukemia (0.4%). This study result is relatively different from Hossain et al. (2014) in Bangladesh result revealed that Acute Myeloid Leukemia was most common comprising 28.3% followed by Chronic myeloid Leukemia 18.2%, Non Hodgkin Lymphoma 16.9%, Acute Lymphocytic Leukemia 14.1%, Multiple Myeloma 10.5%, Myelodysplastic Syndrom 4.5% and Hodgkin Lymphoma 3.9% [9].

The frequency of Polycythemia Rubra Vera is 2.1% which is lower in present study which compares to previous study conducted in Pakistan (Shaikh Zayed Hospital, Lahore) by Ammar and Aziz (2017) revealed that frequency of PV is 8.0% [14]. It is to keep in mind that the frequency of Polycythemia Rubra Vera in this study is only evaluated in those suspected adult patients of Myeloproliferative Neoplasm in which bone marrow examination were indicated or advised. In more hospital setups in this region, Polycythemia Rubra Vera patients are diagnosed with molecular diagnosis (PCR for JAK-2 mutation, CALR and MPL) without bone marrow examination as per WHO criteria [15].

CONCLUSION

Hematological malignancies are common in this part of the world, with lymphoid malignancies being more common than myeloid malignancies, and no age or gender is exempted. Acute lymphoblastic leukemia and chronic lymphocytic leukemia is most common in adulthood lymphoid hematological malignancies while hairy cell leukemia and plasma cell leukemia is rare in Khyber Pakhtunkhwa region. Present study also concluded that adulthood hematological malignancies are common in male compare to female with ratio of 2.5:1.

CONFLICT OF INTEREST

The authors have no conflict of interests to disclose.

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