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AUDIT OF HEMATOLOGICAL MALIGNANCIES IN A TERTIARY CANCER CARE CENTER: AN EXPERIENCE FROM SUB- HIMALAYAN REGION

Oncology

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ABSTRACT

Purpose: The incidence of hematological malignancies are increasing. There is sparse data regarding epidemiology of this subset of disease from Himalayan foothill in India. Extrapolation from other geographical terrain is not helpful as environment, ethnicity and health habits are different in this region.

Material and Method: A retrospective analysis was done for all proven hematological malignancies enlisted at Cancer Research Institute, Dehradun during 2012-2015. Data was analyzed for disease spectrum, demographic profile and age of presentation.

Results: Study noted 597 confirmed hematological malignancies during study period. Male predominance was noted in all subset. Non Hodgkin lymphoma was most commonly noted adult hematological malignancy (26.9%) while leukemias were commonest in pediatric age group. Unusually high proportion of multiple myeloma (24.4%) was noted as well.

Conclusion: Study depicted unique and interesting pattern of disease epidemiology in this geographical area. A more detailed epidemiological exercise should be carried out to identify the reason of such difference.

KEYWORDS

hematological malignancies, leukemia, lymphoma, himalayan region, epidemiology

Introduction:

Developing countries share large proportion of global cancer burden. By 2030, 13 million cancer related deaths are expected in this region of world. [1] India noted 62,648 males and 41,591 female cases of hematological malignancies [HM] with a clear incremental projection. [2] Incidence of malignancy is increasing in India. Being a large geographical area, the population distribution, connectivity and health facility are uneven. While primary health care facility has reached majority of locations, hilly terrain are peculiar due to long commuting distance and sparse population density. Uttarakhand is a state formed in 2004. It has estimated population of 10.08 million as per 2011 census. Eighty five percent of states area falls under hilly terrain. Oncological suspicion invariably leads to referral to cancer center as facility for oncological treatment are not available in majority of terrain. Dehradun being capital of state and geographically a gateway to Plains for these regions drains all such cases. Cancer Research Institute [CRI] being the only tertiary care center for oncology gets majority of referral. Although it is not possible to claim that data from this center represent states cancer prevalence, it surely represents a parallel occurrence pattern.

Methods: A retrospective analysis of all cases enlisted with confirmed diagnosis of HM during 2012 to 2015 was done. Data was retrieved through electronic database (managed in collaboration with Uttarakhand state council of science and technology; U-COST) and physical file form from medical record section. Data was analyzed for the diagnosis, demographic pattern of referral and distribution. Cases with unproven diagnosis were excluded. For HM, morphological diagnoses were accepted whenever available. Flowcytometry and immunohistochemistry was done in few cases and taken as diagnostic criteria. Cases which had suspicion of HM but not opted for investigation; either morphological or Flowcytometry/ immunohis tochemistry based tests were excluded. Data was analyzed for median age, sex distribution and diagnosis pattern.

Result:

During 2012-15, 597 cases were registered for confirmed hematological malignant condition in the institute. The median age of total cases enlisted was 43.5 years [range 1-92 years] with a clear male dominance [M: F =373 : 224]. Disease wise distribution in adult and pediatric age group was noted as per table I. Among leukemia category, 93 cases of acute lymphoblastic leukemia [ALL] were listed while acute myeloid leukemia [AML] were 55. Chronic lymphoid leukemia [CLL] and chronic myeloid leukemia [CML] were 23 and 67 each. Myelodysplastic syndromes [MDS] were 15. Fifty six cases were listed in acute leukemia category as their blast morphology was not typical of lymphoid or myeloid and Flowcytometry was not done.

Table I: distribution of various HM

HM disease	Adults (n)	Pediatric (n)	Median age [years]
ALL	31	60	18
AML	37	16	38
CML	52	15	58
CLL	16	-	68
MDS	11	3	52
Leukemia [morphology]	28	4	
NHL	140	18	55.2
Hodgkin Lymphoma	23	8	32.5
Multiple Myeloma	124	-	56
Plasmacytoma	11	-	64
Total	473	124	43.5

Referral pattern of multiple myeloma cases showed male dominance. Median age of 56 years was noted. Plasmacytoma and monoclonal gammopathy of unknown significance [MGUS] were noted among 11 cases. Lymphoma category also showed male dominance and majority

were non Hodgkin lymphoma [NHL] (140/163). The commonest diagnosis was B cell NHL while other categories were enlisted as well.

Year wise distribution showed only marginal increase in enrolment over study years.[Table II] The sex ratio of enrollment showed similar trend over study years. Among adult population, female representation showed consistent increment over these 4 years of study while in pediatric age group, it remained almost same.

Table II: year wise incidences of HM

Year	Adult male (n)	Adult female (n)	Pediatric male (n)	Pediatric female (n)
2012	84	53	20	4
2013	66	38	21	11
2014	68	45	24	12
2015	67	52	22	10

Discussion:

Sub-Himalayan region encompasses unique geography and demography. To our knowledge, this is first of such data analysis showing incidence pattern of HM. We noted a different proportion of HM as Non Hodgkin lymphoma constituted 26.9% of total HM noted during study period. Proportion of multiple myeloma and acute lymphoid leukemia were 24.4% and 16.9%. Combined together acute leukemia [ALL+ AML] group had similar incidence as of NHL (26.9%). Yet the incidence was far less than what observed by others. Published data from India has shown acute leukemia as the most common HM [age adjusted incidence rate of 3.3/100000] followed by Non Hodgkin lymphoma and multiple myeloma.[2] Projected estimates of hemato-lymphoid cancer has shown significant increment and by 2020,NHL and Myeloid leukemia would contribute to majority of HM. [3] While pooled data analysis from Bangladesh has shown marked predominance of acute leukemia (64.3%), incidence of non-hodgkin lymphoma was noted to be higher than other HM in Pakistan and Singapore as well as in WHO registry. [1,4,5] Asian countries has shown similar higher incidence of NHL. A different pattern was noted in Europe. [6] Study cohort noted unusual high incidence of multiple myeloma (24.4%) while other study had noted lower incidence. A biased referral is hard to explain as study center is the preferred and single referral center during this period. Whether this incidence is an observation of chance or true pattern due to different geography and population root is not known.

The median age of ALL was noted as 18 years in this study. However 66% of ALL cases were pediatric thus causing lower median age. Median age of AML, MM, CML and NHL were similar to the published Indian data. This is in contrast to US data where older age incidences are common. [7, 8] A possible explanation for this early age occurrence has been given by lower life expectancy of this region. However similar age incidences were noted amongst developed Asian countries like Japan and Singapore where life expectancy is as good as western world. [9] A social neglect for old age population seeking health care is a hypothetical explanation and needs verification.

Study cohort noted 20.7% of HM in pediatric age group [up to 20 years]. HM constituted 47.2% of all pediatric malignancy cohorts. Amongst pediatric HM, ALL constituted 52.5 % followed by AML and CML. NHL constituted 15.2 % while HL was noted among 8 cases only. Leukemia has been noted to be the most common pediatric HM in studies from India, Asia and west. [10] This study noted a much skewed sex pattern. Male predominance was noted for almost all HM categories. Although similar skewed pattern of male dominance was noted in almost all HM studies. Male gender is probably more vulnerable to HM. A possible explanation is more outdoor and environmental exposure to them. [11] However similar male predominance was noted in solid tumors as well probably due to some universal advantage of female sex. [12] However health care seeking behavior of region should also be taken into account. Female with malignant condition or with suspicion of malignancy is less likely to seek treatment in rural and under developed regions. A social intervention and research is required in this area.

Conclusion:

This study represent first of its kind referral pattern analysis from a sub Himalayan referral cancer center. Study noted different pattern of occurrence in comparison to noted incidences. A larger population based registry is required to delineate prevalence of HM.

Compliance with ethical standards:

The study was duly approved by institutional research and ethical committee.

Funding: Grants: No external funding/grants received.

Consent: Being retrospective analysis of data, individual consent was not possible, Ethical committee clearance was taken.

This article does not contain any studies with human participants/ animal participants performed by any of the authors.

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