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Frequency of hematological disorders in Peshawar by bone marrow aspiration and trephine biopsy examination

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Abstract:

Objective: To determine the prevalance of various hematological disorders in district Peshawar by using bone marrow aspirate and biopsy.

Material and Methods: The study is a retrospective descriptive cross sectional study. It is conducted in Khyber Teaching Hospital, Peshawar. This study carried out from January 2016 to December 2016. Cases whose records were complete regarding the age, gender and bone marrow diagnosis were included in the study. Cases whose records were incomplete and were having aspirate specimens with inadequate material were excluded from the study. All the data of patients diagnosed with certain hematological disorders during the study period was retrieved and studied. The diagnoses were noted and results were drawn accordingly.

Results: The mean age of the study population was 30.7±7, with range of 1.5 -60 years. 63(45%) cases were males, while 76(55%) cases were females. Out of 139 patients, about 30 (21.7%) cases were diagnosed as having leukemias. This was followed by megaloblastic anemia which was seen in 26(18.8%) cases, idiopathic Thrombocytopenic purpura which was seen in about 26 patients (18.8%) cases and hemolytic anemia in 17(12.3%) cases. Metastatc infiltration, leshmeniasis and paroxysmal nocturnal hemoglobinuria were seen in 2(1.4%) cases each. Malaria and myelofibrosis was seen in 1(0.7%) cases each.

Conclusion: Leukemia was the commonest malignant hematological disorder in Peshawar. This was followed by megaloblastic anemia, which was commonest non hematological disorder in our region. Bone marrow aspirate and biopsy are important diagnostic tools to reach to final

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Introduction:

The haematological disorders are frequently encountered in the general population.[1,2] There is a wide range of hematological disorders in general public.[3-6] The disorder may be minute, like iron deficiency anemia; or it may be severe like bone marrow infiltration.[3-6] Bone marrow is an investigation that is necessary to reach to the final diagnosis in most of these disorders.[4,6] In certain cases, it is not uncommon that the underlying hematological disorder presents with very vague symptoms.[6] This poses a big problem for the clinician to reach the diagnosis.[1] Bone marrow examination is a very useful investigation in such cases to make the definitive diagnosis.[7]

The most frequently encountered hematological disorders in most clinical setup include Megaloblastic anemia, idiopathic thrombocytopenia purpura, aplastic anemia, and leukemias.[1] All these cases can be diagnosed by review of the bone marrow aspiration and biopsy.[1] The usual findings in megaloblastic anemia are a low hemoglobin and high mean cell volume.[1] It is caused because of deficiency of vitamin B-12 and folate due to deficienct in diet.[1,9] Leukemia is a malignant disorder in children and bone

Table-1: Comparison of demographic factors of the studied cases

Bone Marrow Findings	Frequency (n)	Percentage (%)
Leukaemias	30	21.7
Megaloblastc anemia	26	18.8
Immune thrombocytopenic purpura	26	18.8
Hemolytic anemia/erythroid hyperplasia	17	12.3
Aplastic anemia	9	6.5
IDA	9	6.5
ACD	8	5.7
Hypersplenism / Excessive peripheral destruction	5	3.6
Metastatic infiltration	2	1.4
Visceral leishmaniasis	2	1.4
Paroxysmal Nocturnal Hemoglobinuria	2	1.4
Malaria	1	0.7
Primary Myelofibrosis	1	0.7

IDA: iron deficiency anemia , ACD: anemia of chronic disorder

marrow examination is necessary for making its diagnosis.[6]

The frequency of different hematological diseases varies from region to region. Therefore, the present study was done with a rationale to determine the frequency of various haematological disorders through bone marrow examination in our region.

Material and Methods:

It was a retrospective cross sectional study. It was performed in the Pathology Department, Khyber Teaching Hospital, Peshawar. The study was done from January 2016 to December 2016. The sampling was done through non-probability purposive sampling. The reports of bone marrow aspirate and biopsy were studied. Data regarding age, gender and final diagnosis made by bone marrow aspiration and biopsy was recorded in a proforma. Results were analysed using SPSS version 18. Mean and standard deviation were calculated for quantitative variables e.g. age. Frequencies and percentages were calculated for qualitative variables like diagnosis and gender.

Inclusion Criteria: Cases of all ages and both sexes, having complete record of their age gender and bone marrow diagnosis.

Exclusion Criteria: Cases with incomplete records, or where there was a dry tap, or marrow was diluted, or sample was inadequate to make any diagnosis.

Results:

About 139 cases were included in the study. The mean age of the study population was 30.7±7 years, with range of 1.5 -60 years. About 63(45%) cases were males, while 76(55%) cases were females.

Frequency of different hematological disorder is given in table 1.

Discussion:

The commonest hematological disorder in the present study was Leukemia, followed by megaloblastic anemia. In a study done by Khan MI in Peshawar, megaloblastic anemia was the commonest disease in study population, while leukemia was third in order seen in 22% cases.[1] In one study leukemia, was present in 11.3% of the cases.[6] Similar data is reported by Khan A and Shiddappa.[6,10] Similar results are reported in another studies done in Peshawar.[5,13] Megaloblastic anemia commonly presents as pancytopenia.[6]

In the present study, hypersplenism was seen in 3.5% cases. Such patients do not show any blasts or other atypical ceels in their bone marrow smears. When there is splenomegaly, the hematopoietic cells tend to accumulate in the splenic sinusoids.[11] This leads to peripheral cytopenias[11] In a local study done by Khan MI , excessive peripheral destruction was reported in about 9.4% cases.[1] In another study done in Saudi Arabia, a figure of 4.4% is reported for excessive peripheral destruction.[12]

In the present study, the aplastic anemia was seen in about 6.5% cases. In aplastic anemia, the bone marrow aspirate was hypocellular while the trephine showed increased fat spaces. The aplastic anemia may be due to congenital causes or acquired in origin.[1,14] Aplastic anemia is associated with failure of the bone marrow. This results in a decreased production of hematopoietuc cells.[14] This results in fever, anemia, pallor and bruises all over the body.[6] The com-

monest causes of bone marrow aplasia include drugs and viral infections like viral hepatitis.[15-17]

In our study, immune thrombocytopenic purpura (ITP) was observed in 18.8% cases. In ITP, the platelet count in peripheral blood is low but the megakaryocytes in the bone marrow aspirate are increased.[18] In a study done in Peshawar by Khan MI showed that ITP was sen in 3.6% of cases.[1] Similar data is reported by other local an international studies done so far.[3,6,19] The ususal presentation of cases with ITP is with brusies all over the body and mucosal bleeds.[20]

In the present study, iron deficiency anemia was seen in 6.5% cases. In such cases, the iron stores in the bone marrow are absent.[21,22] In a study done in Peshawar, about 3.3% cases had iron deficiency anemia.[1] In another study conducted by Khan A et al, it was proposed that about 7.6% patients had iron deficiency Anemia.[6] Ikram N et al from Islamabad represented the same data.[23]

In our study, it was shown that myelofibrosis and visceral leshmeniasis were among the rare disorders. Similar pattern was reported by Khan MI et al and Niazi M et al in their studies from Peshawar where it was reported that myelofibrosis and visceral leshmaniasis lie in the rarer spectrum of hematological diseases.[1,24] Similar finding is reported from Ghana.[2] In primary myelofibrosis, there is excessive production of platelet derived growth factor by the bone marrow megakaryocytes.this in turn activates fibrocytes to lay down collagen, and thus cause fibrosis of the bone marrow tissue.[1] In visceral leshmaniasis, there are amastigote forms of leshmania donovani in the bone marrow aspirate. Such patients present to the OPDs with complaints of fever, and on examination, there is hepatosplenomegaly.[25]

Conclusion:

Leukemia is the commonest hematological disorder in our region, followed by megaloblastic anemia. Myelofibrosis is the rarest disorder. Bone marrow aspiraton and biopsy can successfully make the final diagnosis of hematological diseases. Therefore, it is an important diagnostic tool in hematological workup.

Recommendations: Due to high incidence of leukemia and megaloblastic anemia in our region, it is recommended that public should be made aware about causes, prevention and treatment of these diseases. It will improve the health of the community.

Further studies should be done including large number of participants to generate bigger data which can be more representative of the actual population

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Role and contribution of authors:

Dr Asif Hussain Munir, collected the data, references and did the initial write up

Dr Muhammad Ihtesham Khan, critically review the article and made the final changes

Dr Safia Rahman, helped in collecting the data and references and discussion write up.

References:

1. Khan MI, Ahmad N, Fatima SH. Haematological disorders; analysis of hematological disorders through bone marrow biopsy examination. Professional Med J 2018; 25(6):828-834.
2. Addo GB, Amoako YA, Bates I.The role of bone marrow aspirate and trephine samples in haematological diagnoses in patients referred to a teaching hospital in Ghana. Ghana Med J. 2013; 47(2):74-8.
3. Padasaini S, Parsad KBR, Rauniyar SK, Shrestha R, Gautam K, Pathak R, et al. Interpretation of bone marrow aspiration in hematological disorders.J Pathol Nepal 2012; 2: 309-12.
4. Syed NN, Moiz B, Adil SN, khurshid M. Diagnostic importanceof bone marrow examination in non hematological disorders. J Pak Med Assoc 2007; 57:123-5
5. Stiffer S, Babarovic E, Valkovic T, Seili-Bekafigo I, Stem-berger C, Nacinovic A, et al.Combined evaluation of bone marrow aspirate and biopsy is superior in the prognosis of multiple myeloma. Diagn Pathol 2010;5:30.
6. Khan A, AqeelM, Khan TA, Munir A. Pattern of hematological diseases in hospitalized paediatric patients based on bone marrow examination. JPMI. 2008. 22(3); 196-200.
7. Bain BJ.Bone marrow aspiration. J ClinPathol 2001;54:657-63.
8. Jauhar S, Balckett A, Srireddy P, Mckenna P.Pernicious anemia presenting as catatonic without signs of anemia or macroytosis. Br J Psychiatry 2010; 197:244-5.
9. Shinwari N, Raziq F, Khan K, Uppal FT, Khan H.Pancytopenia: experience in a tertiary care hospital of Peshawar, Pakistan.Rawal Med J 2012; 37:370-3.

10. Shiddappa G, Mantri N, Antin SS, Dhananjaya.Megaloblastic Anemia secondary to Vit B-12 and folate deficiency presenting as acute febrile illness and P.U.O: A prospective study from tertiary care hospital.Sch J AppMed Sci 2014; 2:422-5.
11. Erwa E.Hypersplenism. J Biol, Agricul Health Care 2012; 2:98-9.
12. Bashawri LA.Bone marrow examination, indication and diagnostic value. Saudi Med J 2002; 23:191-6.
13. Hamayan M, Khan SA, Muhammad W. Investigation on the prevalence of Leukemia in NWFP of Pakistan. Turk J Cancer 2005; 35: 119-22.
14. Biswajit H, Pratim PP, Kumar ST, Krishna GB, Aditi A. Aplastic anemia a common hematological abnormality. N Am J Med Sci 2012; 4:384-8.
15. Rauff B, Idress M, Shah SA, Butt S, Butt AM, Ali L, et al.Hepatitis associated aplastic anemia .Virol J 2011;8:87.
16. Braun S, Pantel K.Clinical significance of occult metastasis in the bone marrow of breast cancer patients. Oncologist 2001; 6:125-32.
17. Weiss G, Goodnough LT.Anemia of Chronic disorders.N Engl J Med 2005; 352: 1011-23.
18. Muhury M, Mathai AM, Rai S, Naik R, Muktha R, Sinha R.Megakaryocytes Alteration in thrombocytopenia: Bone marrow aspiration study. Indian J Pathol Microbiol 2009; 52: 490-4.
19. Jubelirer SJ, Harpold R.The role of bone marrow examination in the diagnosis of ITP: case series and literature review. ClinAppl Thromb Hemost 2002; 8:73-6.
20. Jan MA. Thrombocytopenia in children. J Postgrad Med Inst 2004; 18: 353-8.
21. Akhtar S, Ahmed A, Ahmad A, Ali Z, Riaz M, Ismail I. Ironstatus of the Pakistan -Current issues and strategies. Asia Pac J Clin Nutr 2013; 22: 340-7.
22. Okinda NA, Riyal MS .Bone marrow examination at Agha Khan University Hospital Nairobi. East Afr Med J 2010; 87:4-8
23. Ikram N. Hassan K, Bukhari K.Spectrum of hematologic lesions amongst children, observed in 963 consecutive Bone Marrow biopsies. J Pak Inst Med Sci 2002; 13: 686-90.
24. Niazi M, Raziq F.The incidence of underlying pathology in pancytopenia - An experience of 89 cases. J Postgrad Med Inst 2004; 18:76-9.
25. Piaroux R, Gambarelli F, Dumon H, Fontes M, Dunan S,Mary C, et al.Direct examination of bone marrow aspiration, myeloculture and serology for diagnosis of visceral lieshmaniasis in immune compromised patients.J Clin Microbiol1994; 32:746