www.jmscr.igmpublication.org
Impact Factor (SJIF): 6.379
Index Copernicus Value: 79.54
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossrefDOI: https://dx.doi.org/10.18535/jmscr/v6i9.154

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

Research Article

Bicytopenia/pancytopenia cases in a tertiary care hospital of Jungalmahal: A search for etiology

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Abstract
Introduction: *The population demography of Jungalmahal is quite different from the rest of West Bengal. We have evaluated the Bone marrow findings of cases presented with new onset bicytopenia/pancytopenia in a tertiary care hospital serving the population of Jungalmahal.*
Method: *A retrospective observational study of bicytopenia/pancytopenia cases was carried out from January 2016 to December 2017. Total 86 cases were included in the study and bone marrow findings were evaluated.*
Results: *Among pancytopenia cases, most common marrow findings were hypoplastic marrow and commonest etiology of bicytopenia cases was acute leukemia in our study population.*
Conclusion: *Data of bicytopenia cases are sparse, but bicytopenia cases need similar attention and thorough hematological investigations like pancytopenia cases.*
Keywords: *Acute leukemia, bicytopenia, hypoplastic marrow, pancytopenia.*

Introduction

Pancytopenia or bicytopenia are manifestations of vast and varied medical conditions. Diagnosis of pancytopenia is made when the Hb % <10gm/dl, total leukocyte count <4000/cumm and platelet count <1.0 L/cumm whereas in bicytopenia any two out of three are present.

Diagnostic approach in both bicytopenia and pancytopenia cases are similar and very limited data available on bicytopenias so we consider and included both pancytopenia and bicytopenia cases in our study. The Jungalmahal area comprises of part of Paschim Medinipur (including newly formed Jhargram district), Purulia and Bankura districts of West Bengal, India. The population demography of Jungalmahal is quite different from the rest of West Bengal and Paschim Medinipur district (including newly formed Jhargram district) have the highest percentage of tribal population in the state (census of India 2011). We have conducted our study in a tertiary care hospital serving the population of Jungalmahal. To our knowledge this is the first this

kind of study conducted in this region of eastern India.

Pancytopenia and bicytopenia cases require detailed clinical and hematological evaluation. The purpose of this study was to evaluate the bone marrow findings of bicytopenia and pancytopenia cases which help to reach a diagnosis.

Methods

A retrospective observational study of bone marrow findings of bicytopenia/pancytopenia cases was carried out from January 2016 to December 2017 in a tertiary care hospital of Jungalmahal. We included cases presented with new onset cytopenias (pancytopenia/bicytopenia) to the department of pathology for bone marrow aspiration and/or biopsy. We included cases of all age groups and both sexes. We have excluded cases of drug and transient infection induced cytopenias from our study. We have recorded history, including drug history, past and family history of all the cases. The detailed clinical examination findings were recorded. Complete hemogram report at presentation was recorded.

Bone marrow aspiration and biopsy (wherever available) slides were reevaluated along with peripheral blood smear slides prepared during the bone marrow procedure. Complete hemogram report of peripheral blood (3 part automated hematology analyzer report) was recorded. Bone marrow aspirate slides were stained by Leishmann stain and special stain (wherever performed) like Myeloperoxidase, Periodic Acid Schiff stain, Pearls Prussian blue stain slides were available for evaluation. The bone marrow biopsy slides processed and stained with Hematoxylin & Eosin stain were evaluated.

Results

Total 86 cases were included in the study from January 2016 to December 2017. The majority of the cases were either less than 20 years of age (29%) or in between >40 - 60 years of age (30%). Male to female ratio was 0.6:1. (Figure 1)

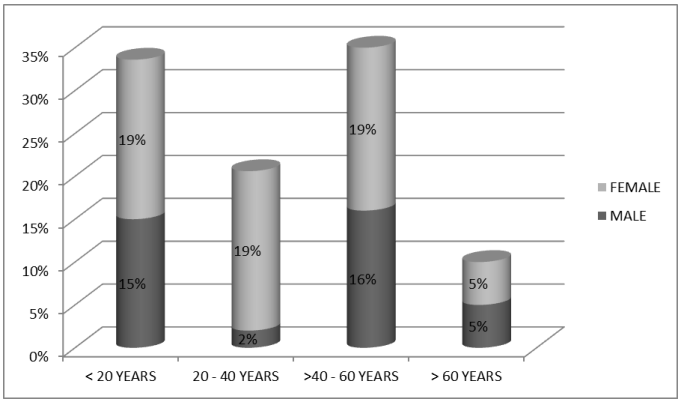

Figure 1: Age and sex distribution of pancytopenia/ bicytopenia cases

Among 86 cases, 50 cases (58%) were bicytopenia and 36 cases (42%) were of pancytopenia. (Figure 2)

The most common clinical presentation was pallor (100%) followed by generalized weakness (94%), fever (36%), recurrent infections and bleeding manifestations.

In bicytopenia cases 68% cases were of anemia with thrombocytopenia followed by anemia and leukopenia (32%).

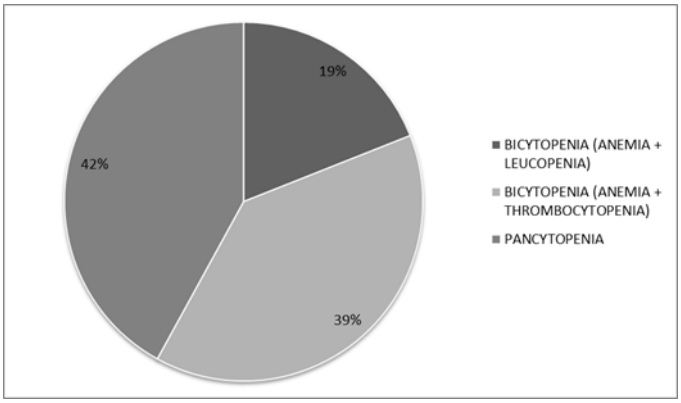

Figure 2: Distribution of pancytopenia/bicytopenia cases (n=86)

Among bicytopenia cases, most common etiology was acute leukemia (40%) whereas in pancytopenia cases, the most common bone marrow finding was hypoplastic marrow (Figure 3) 41.6% cases followed by acute leukemia, 22% cases.

Other causes of cytopenias (bicytopenia & pancytopenia) in this study population were megaloblastic anemia (10.5%), megakaryocytic thrombocytopenia, Myelodysplastic syndrome, hypersplenism, multiple myeloma and chronic lymphoproliferative disorders. (Table 1)

On further evaluation, among acute leukemia with cytopenias cases, 42.8% cases presented with leucopenia and 25% cases with normal total leukocyte count (TLC). In 78.5% cases of acute leukemia circulating blasts were present in peripheral blood, whereas in acute leukemia with leucopenia, 43% cases no circulating blast were present in the peripheral blood smear.

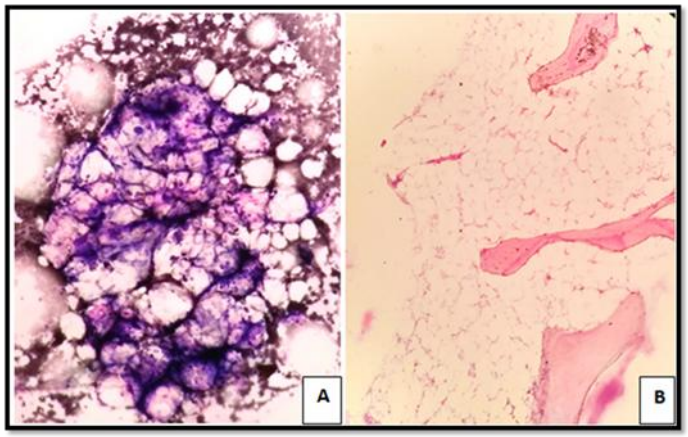

Figure 3: Photomicrograph: (A) Hypocellular marrow particle for age in bone marrow aspirate of a patient of hypoplastic marrow (40 x magnifications, Leishman stain). (B) Bone marrow biopsy show markedly hypocellular marrow for age of a patient of hypoplastic marrow (40x magnification, H&E Stain.)

Table 1: Bone marrow findings in cases presented with cytopenias (bicytopenia/pancytopenia)

BM FINDINGS	PANCYTOPENIA	BICYTOPENIA		TOTAL	PERCENTAGE
		ANAEMIA + LEUKOPENIA	ANAEMIA +THROMBOCYTOPENIA		
Acute Leukemia	8	5	14	27	31.4
Hypoplastic Marrow	15	0	2	17	19.8%
Megaloblastic Anemia	3	5	1	9	10.5%
Cellular Marrow With Normoblastic Erythroid Hyperplasia	6	2	1	9	10.5%
Myelodysplastic Syndrome	1	1	3	5	6%
Megakaryocytic Thrombocytopenia	0	0	8	8	9%
Plasma Cell Dyscrasia	0	0	1	1	1.2%
Chronic Lympho proliferative Disorder	0	0	1	1	1.2%
Cellular marrow suggestive of Hypersplenism	1	4	1	6	7%
Non-Conclusive (Diluted marrow aspirate)	2	0	1	3	3.5%
Total	36	17	33	86	100%

Discussion

Bicytopenia/pancytopenia cases have diverse etiology, including nonmalignant and malignant causes. So cases presented with bicytopenia or pancytopenia require detail hematological investigations.

In our study most common age group was >40 - 60 years, followed by <20 years. The finding is similar to the study conducted by Gayathri B N, et al where mean age was 42 years.[1] Among the study population Male: Female ratio was 0.7:1 which is in concordance with the study by Dagdia et al.[2]

The common presentation was pallor (100%) and generalized weakness (94%) in cytopenia cases. Hepatomegaly and splenomegaly were present in 12% & 24% cases respectively. These findings were quite similar to other studies.[1, 2]

Frequency of etiologies of cytopenias cases differ in different study population as it depends on geographic variation, the sociodemographic profile of the study population, nutritional status and food habit of that population along with other factors like study design, referral population etc.[3] In most studies, conducted in different parts of India, megaloblastic anemia was the most common etiology in pancytopenia cases.[1, 4-6] In a study with large series of cases from western India, hypersplenism and infection were most common etiology.[7] But according to a multicenter study conducted in eastern India by Dasgupta S et al, aplastic anemia was the most common etiology of pancytopenia in this region.[8] In another study conducted by Sindhu R, et al in Eastern India, Orrisa, hypoplastic anemia was the most predominate cause of pancytopenia.[9] A Study conducted in Nepal also show hypoplastic marrow was predominate finding among pancytopenia cases.[10] Whereas another study conducted in Nepal show aplastic anemia was the second most common cause of pancytopenia followed by megaloblastic anemia.[11] In the present study, we also find most frequent marrow findings of pancytopenia cases was hypoplastic marrow. A Study conducted in North-East India, where 63% population were Bengalis hematological malignancies and hypoplastic marrow was the predominate etiology.[12] In our study hypoplastic marrow and hematological malignancy constitutes (23/36) 64% of pancytopenia cases. (Table 1) Among bicytopenia cases the most common etiology was acute leukemia. This finding was similar to Naseem S, et al study conducted in North India, but their study population was pediatric.[3] Data of bicytopenia cases among adults are lacking.

Most common cytopenias among bicytopenia cases were anemia with thrombocytopenia followed by anemia with leukopenia which is similar to Naseem S, et al study. [3]

Among acute leukemia with cytopenias cases, majority (68%) presents with normal or low total leukocyte count as in Naseem S, et al study (In Naseem S, et al study, minority of cases (46/269) presented with high TLC with circulating blasts).(3)

Conclusions

From this study, we can conclude:

i. Hypoplastic marrow is the most frequent cause of pancytopenia in this area similar to the East India region and unlike other part of India.

ii. Bicytopenia cases need similar attention and thorough hematological investigations like pancytopenia cases as in our study acute leukemia is the most frequent etiology in bicytopenia cases and in a considerable percentage of cases of acute leukemia with leukopenia circulating blasts were absent in peripheral blood.

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