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Spectrum Of Hematological Diseases In Kashmiri Population: A 5-Year Hospital Based Study

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Abstract

Keywords: Spectrum of Hematological disease, Kashmiri Population, Hospital based study, Benign Hematological disorders, Malignant Hematological disorders

Introduction

The hematological disorders are common in Kashmiri population and prevails in all the age groups. These disorders range from simple, non neoplastic diseases to hematological malignancies. The diagnosis of these hematological entities requires extensive workup including relevant clinical history, examination and investigations like Complete Blood Count and Peripheral smear examination and Bone marrow examination including BMA and BMB followed by Immunophenotyping and Cytogenetic studies, wherever needed. The present study is undertaken to evaluate spectrum of various hematological disorders reported in our setup.

Material and Methods:

This was a retrospective study done in the department of Pathology, in a tertiary care hospital, over a period of five years from January 2015- December 2019. A total of 5287 cases were included in this study. The clinical details were taken from case sheets and BMA reports of the patients were collected from the bone marrow register of Pathology department. Then the data obtained was statistically analyzed.

The procedure of Bone marrow aspiration was done after giving 2% xylocaine as local anesthesia from posterior iliac spine. Leishman stained peripheral blood and bone marrow smears were studied. Bone marrow examination was done on Leishman stained bone marrow aspiration smears and imprint smears. The diagnosis among various hematologic disorders was confirmed by using the standard criteria.

Results: Out of 5287 cases, 1416 (26.78 % of total cases) were benign, 1774 (33.55 % of total cases) were malignant, 668 (12.63%) cases were screened for remission of which, 570 (85.32 % of cases to docu.remission) showed remission while 98 cases (14.67 % of cases to docu.remission) showed relapse. 1004 cases (18.98 % of total cases) resulted in no specific pathology and 425 cases (8.03 % of total cases) were inadequate for evaluation.

Table 1: Distribution of total number of cases included in the study

Total no. of Cases (B.M. Aspirates & Imprints)	**5287**

Benign Cases	**1416** (26.78 % of total cases)
Malignant Cases	**1774** (33.55 % of total cases)
To document remission Remission Relapse	**668** (12.63) 570 (85.32 % of cases to docu.remission) 98 (14.67 % of cases to docu.remission)
Cases with no specific pathology Inadequate to opine	**1004** (18.98 % of total cases) **425** (8.03 % of total cases)

Out of 1416 Benign cases, 640 cases (45.19 % of benign cases) were those of Dual Deficiency Anemia, 400 cases (28.24 %) were of Megaloblastic Anemia, 75 cases (5.29%) of Aplastic Anemia, 40 cases of iron Deficiency Anemia (2.82%) and 38 cases (2.68%) of Anemia of Chronic Diseases. Benign cases also included 73 cases (5.15%) of Immune Thrombocytopenic Purpura, 69 cases (4.59%) of Hypersplenism, 1 cases each of Congenital Dyserythropoietic Anemia 2 (0.7%) and Sideroblastic Anemia (0.7%). 55 cases of Hemophagocytosis (3.88%), 5 cases of Malarial Parasite (0.35%), 3 cases of Leishmania(0.21%), 10 cases of Post viral (myelosuppression) (0.7%), 5 cases of Pure red cell aplasia (0.35%), 5 cases of Hemophagocytic Lymphohistiocytosis (HLH) (0.35%).

Table 2: Benign hematological disorders

Diagnosis	No. of cases	% (among benign cases)
Dual Deficiency anemia	640	45.19
Megaloblastic anemia	400	28.24
Iron Deficiency Anemia	40	2.82
Aplastic Anemia	75	5.29
Anemia of Chronic Diseases	38	2.68
Congenital dyserythropoietic anemia type 2	1	0.07
Congenital sideroblastic anemia	1	0.07
Immune Thrombocytopenic purpura	73	5.15
Hypersplenism	69	4.59

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Hemophagocytosis	55	3.88
Malarial Parasite	5	0.35
Leishmania	3	0.21
Post viral (myelosuppression)	10	0.70
Pure Red cell Aplasia	5	0.35
Hemophagocytic Lymphohistiocytosis	5	0.35

Out of 1774 Malignant cases, cases of Acute myeloid Leukemia were most common (521) and constituted 29.36% of Malignancies followed by Acute Lymphoid Leukemias (410) constituting 23.11% of Malignancies and Multiple Myeloma (325) constituting 18.32% of Malignancies. Other malignant cases included Burkitt lymphoma, NHL infiltration, Chronic lymphocytic leukemia (CLL), Chronic myelogenous leukemia (CML), Myelodysplastic syndrome, Essential Thrombocythaemia , Myelofibrosis and Metastatic deposits of tumors like Neuroblastoma (15 cases), PNET (16) , Ewing Sarcoma (5), Round cell tumor (unclassified) (5), Rhabdomyosarcoma (5), Breast Metastasis (5) and Lung Metastasis (14).

Table 3: Malignant Hematological disorders (Supplemental aimages 1,2,3,4

Diagnosis	No. of cases	% (among malignant cases)
Acute Myeloid Leukemia	521	29.36
Acute Lymphoblastic Lymphoma	410	23.11
Burkitt lymphoma	5	0.28
NHL infiltration	95	5.35
Chronic lymphocytic leukemia (CLL)	80	4.50
Chronic myelogenous leukemia (CML)	140	7.89
Myelodysplastic syndrome	120	6.76
Essential thrombocythaemia	13	1.73
Myelofibrosis	10	0.56
Multiple Myeloma	325	18.32
Metastasis	55	3.10

Discussion:

The spectrum of hematological disorders is relatively different in the developing world than the developed countries.[1] The hematological disorders are common in Kashmiri population and prevails in all the age groups. These disorders range from simple, non neoplastic diseases to hematological malignancies.

In our study, Malignant cases constituted 33.35% of total cases while benign cases constituted 26.78% cases of total with the ratio of Malignant to benign of around 1.24:1 which is comparable to a study done

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by Dogar et al showing the ratio 1.13:1[2] This was in contrast to the other Indian studies which showed around 70% non malignant cases and 30% of Malignancies[7]

In the present study Nutritional deficiency anemia was the commonest disorder identified similar to a study done by Shashtri et al .[3] Dual deficiency anemia was commonest (640 cases), followed by Megaloblastic Anemia (400 cases) while iron deficiency anemia was diagnosed in only 40 cases. Similar findings were reported by Gandapur AS et al [8] Shaheen et al [9], Manan et al [10]. Possible reasons for higher incidence of megaloblastic anaemia in our setup is dietary factor (lack of Vitamin B12) due to poverty as majority patients coming to government hospital belong to poor socioeconomic strata. In other similar studies its frequency ranges from as low as 24% to as high as 68%.[4,5,6] . We encountered around 75 cases of Aplastic Anemia(5.29% of Benign, 1% of total) comparable to Gandapur et al (1.75%) [8] , 38 cases of Anemia of Chronic Diseases (2.68% of Benign) as documented in a study done by Khan et al.[12] showing 4.7% cases of ACD and 73 cases of ITP (5.3 %) comparable to findings of other series who observed 7.8% and 8.9% of ITP cases.[8, 11] Among the non malignant disorders, hemophagocytosis (3.88% of Benign) and hypersplenism (4.59%) were also common in contrast to other studies where these were less common.[2] In present study, hypoplastic marrow seen in10 cases (0.7% of benign). Among the less common disorders were Congenital Dyserythropoietic Anemia 2 (0.7%) , Sideroblastic Anemia (0.7%), Malaria, Leishmania(0.21%) Pure red cell aplasia (0.35%) and Hemophagocytic Lymphohistiocytosis (HLH) (0.35%) comparable to studies done by Khan et al. [12], Shingde et al.[7]

In the present study, the commonest malignant hematological disorder was Acute Myeloid Leukemia (AML) which was seen in 29.36% (521) cases. Acute Lymphoblastic Leukemia (ALL), was seen in 23.11% (410) cases. Thus, it was second commonest leukemic disorder next to AML in the present study. Similar results are reported in a study done by Shastry in India, AML was the commonest leukemia seen in about 3.6% cases, followed by ALL.[3] In contrast some other studies reported ALL as the most common leukemic disorder followed by AML [4]. Multiple myelomas was seen in 18.32% (325) cases in the present study. So it was common malignancy next to acute leukemias. Similar findings were presented by Khan et al.[12] These were followed by CML (7.89%), Myelodysplastic syndrome (6.86%) , NHL infiltration (5.50%) and CLL (4.35%). Our findings were comparable to studies done by Gandapur et al [8] (3.33% CML, 2.6% of CLL) and Parikh et al (6% of CML , 6% of CLL).[13] In our study, there were about 55 (3.10%) cases of metastasis which was comparable to a study done in india by Atla BL, about 4% patients showed infiltration in bone marrow.[14] Less common cases were ET (1.73) and MF (0.76) similar to the study done by Khan et al.[12]

Conclusion: A vast spectrum of benign and malignant hematological disorders is found to be prevalent in our set-up. The matter of concern is the increasing trend of Malignant hematological disorders in our population which requires further research to study the individual etiologies.

Key message: This study has been conducted in the valley of Kashmir to document the entire wide ranging spectrum of all Hematological disease entities and is the first of its kind from the region of Kashmir to have such vast ranging connotations.

This study will provide current and future Haematologists / Physicians /researchers with reliable data to delve into individual Hematological diseases and derive the incidence and prevalence of such disorders in the population of this region.

Foot notes:

Data availability statement: All data relevant to the study are included in the article,there are no contradictory statements.

Contributors: FM analysed the samples and compiled the data with help from NB and SG. SA, FM and NB designed the service evaluation. FM and SG identified samples, anonymised samples and collected data. SB analysed the data and wrote first draft of the manuscript. All authors critically reviewed the manuscript and approved the final version.

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Ethics statement: Patients consent not required. No unethical use of animals or other resources done in the study.

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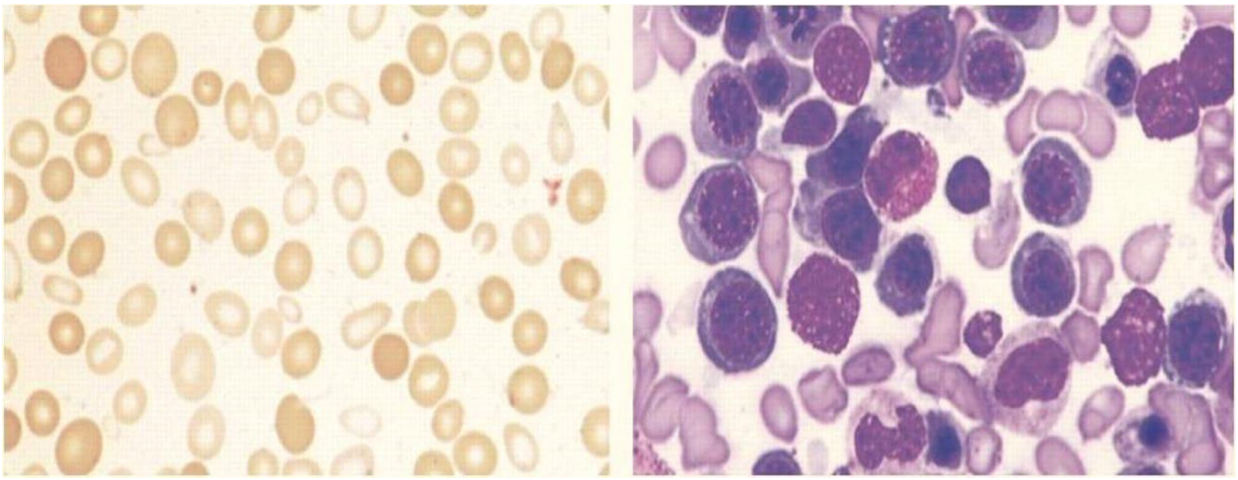
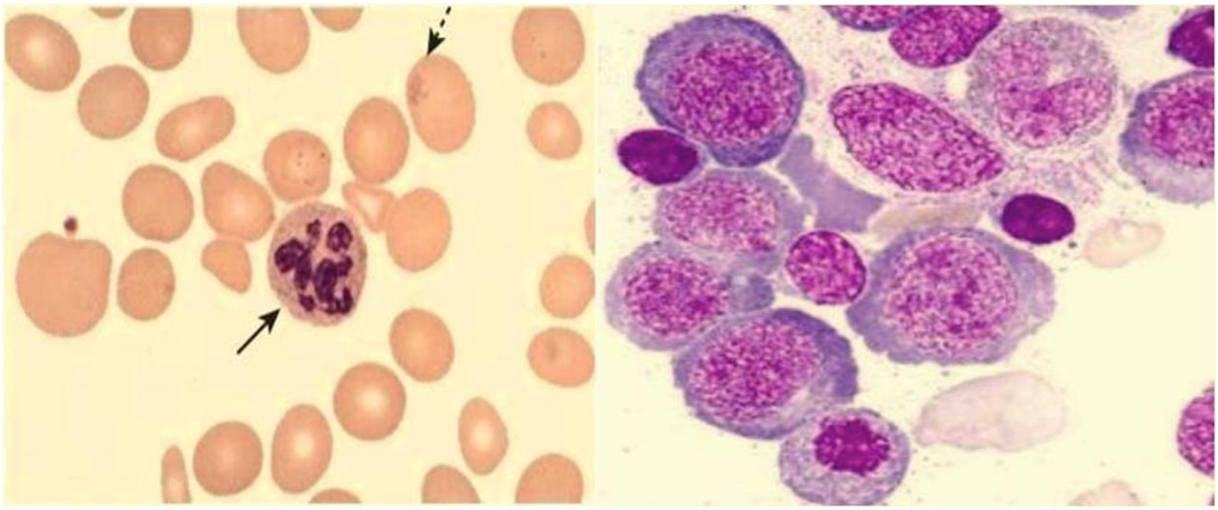
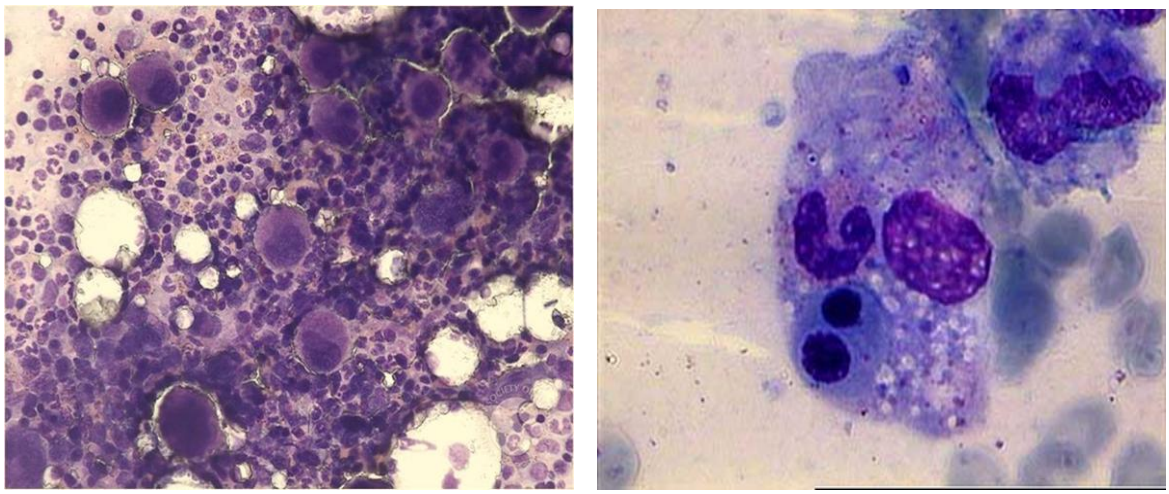
Dual Deficiency Anemia (PBF, BMA)



PBF:findings in Megaloblastic Anemia , **BMA** : Erythroid hyperplasia & megaloblastoid erythropoiesis



ITP: Increased Immature Megakaryocytes (BMA) Hemophagocytosis (BMA)



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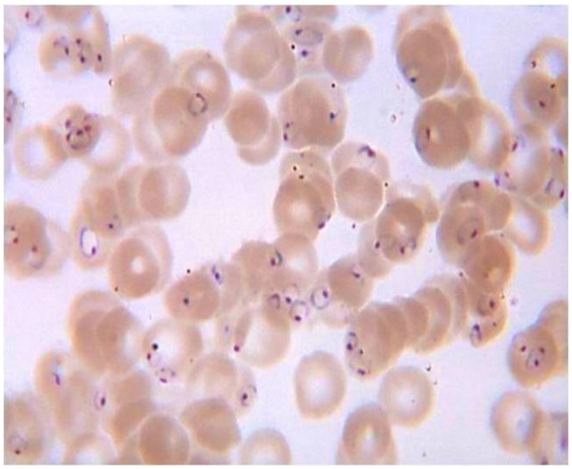
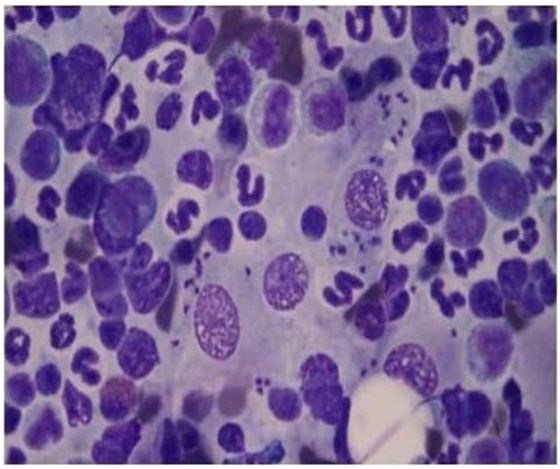
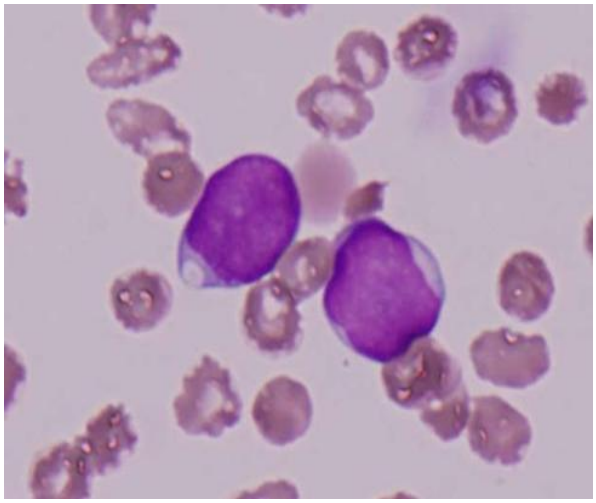


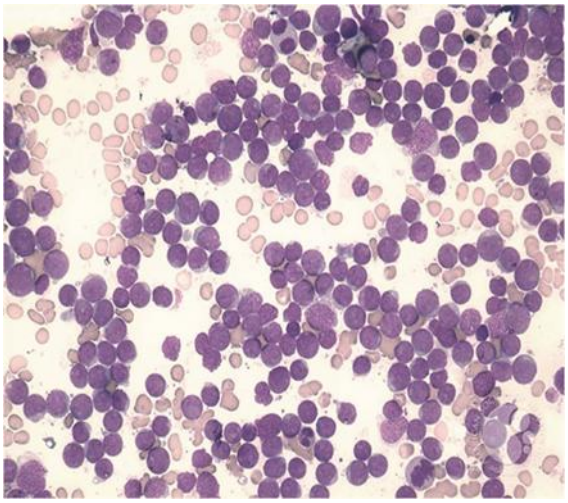
Malarial parasite: showing numerous ring forms.



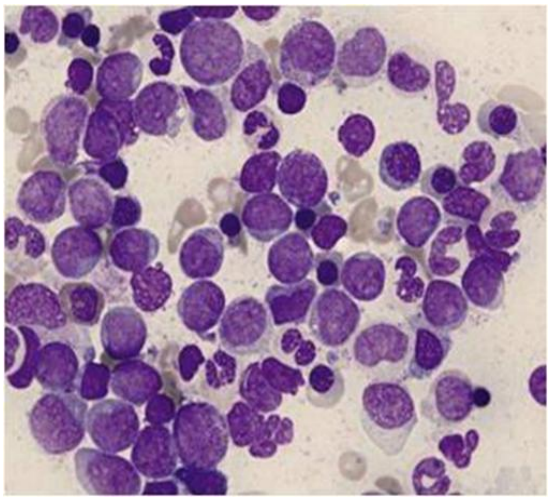
Intracellular form of *Leishmania* amastigotes



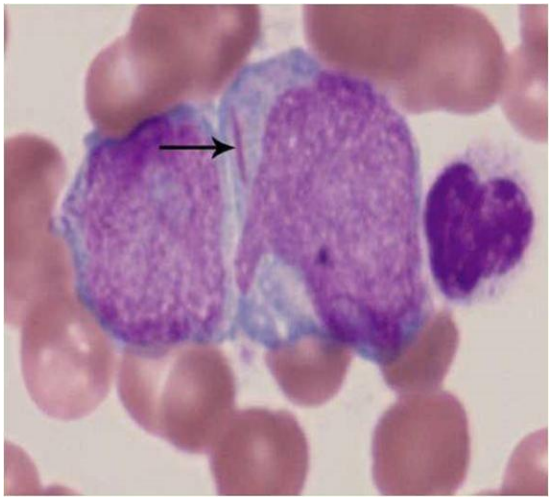
AML with Minimal Differentiation



AML without maturation



AML with Maturation



Myeloblast showing Auer rod

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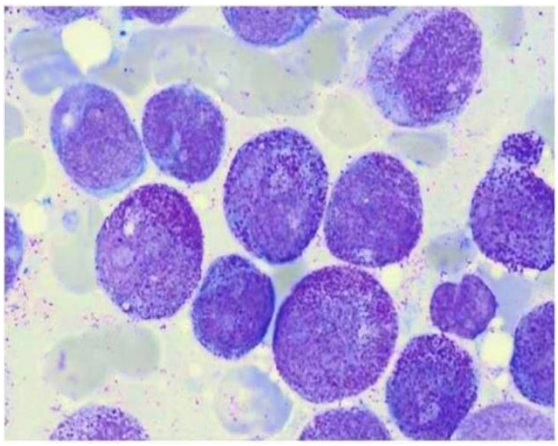
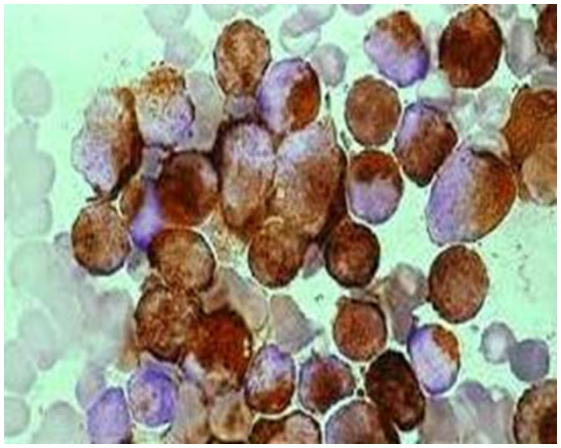
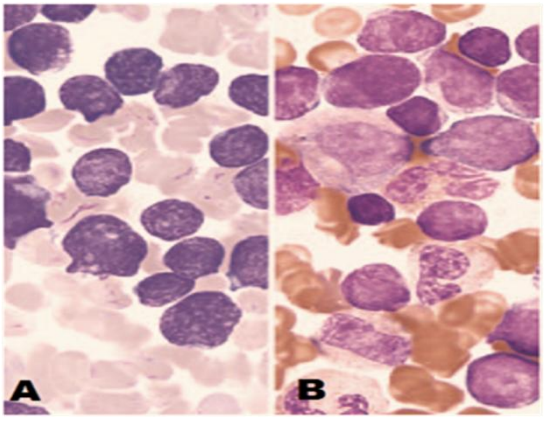
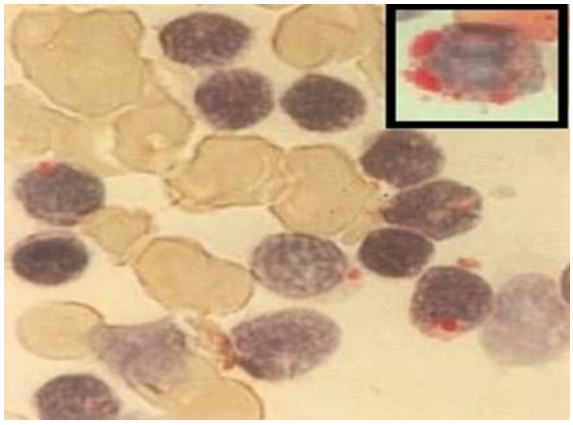


APML

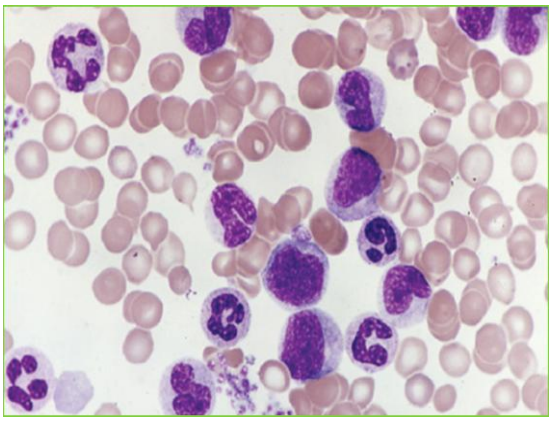


Strong MPO positivity

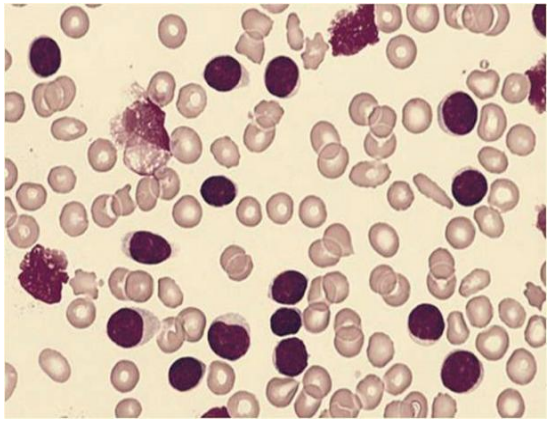




L1 morphology with uniform-sized blasts. Periodic Acid Schiff Positivity (B) L2 with more blast cell variation.



Chronic Myeloid Leukemia



Chronic lymphoid Leukemia

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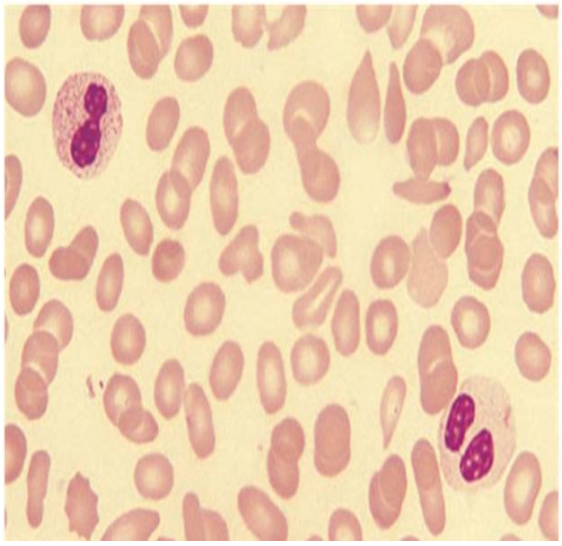
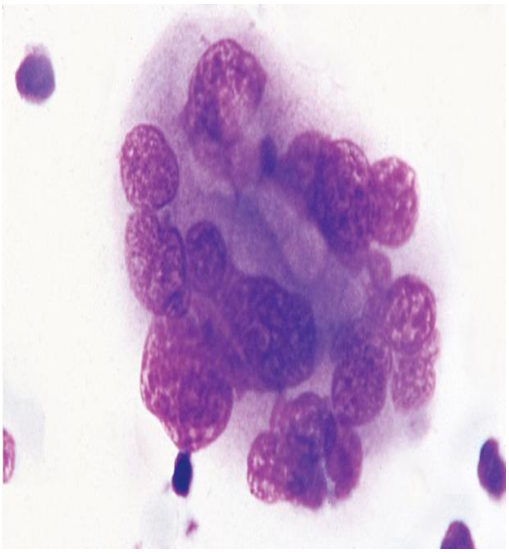
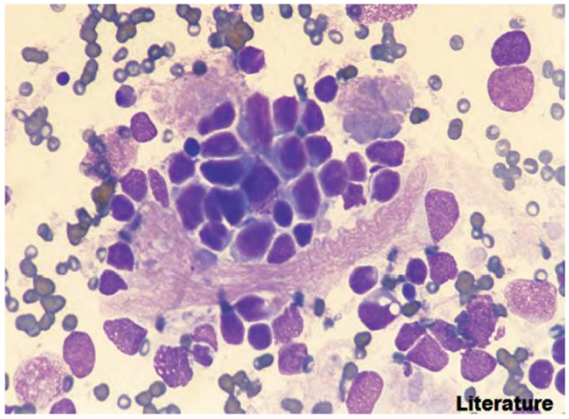


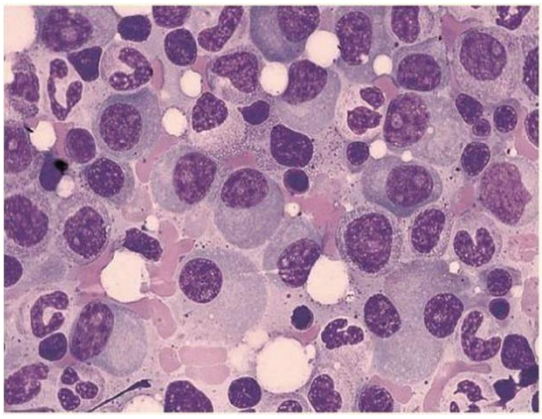
MDS: Hypolobated & hypogranular Neutrophil



MDS: Hyperlobated Megakaryocyte



BMA: Metastatic deposits



Multiple Myeloma : Immature Plasma cells

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