Overview of cytomorphology in hematological malignancies

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- (A) Introduction to morphology and pattern diagnosis in Neoplastic Hematopathology:
- (a): Approach to PBS
- (b): Approach to Bone marrow (aspirate & biopsy)

- (B) Case based discussion
- (1) Acute Lymphoblastic Leukaemia: One that was; and one that wasn't
- (2) A case of Tuberculosis that wasn't
- (3) Proptosis and the masquerading malignancy: Two cases
- (4) Lymphomas diagnosed from Bone marrow: Diagnosis established much before nodal histopathology. Two cases

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Peripheral Blood patterns

- Neutrophilia
- Leucoerythroblastic
- Abnormal mononuclear
- Erythrocytosis
- Thrombocytosis
- Eosinophilia
- Monocytosis
- Bicytopenia/Pancytopenia
- Leukemoid
- Leukopenia

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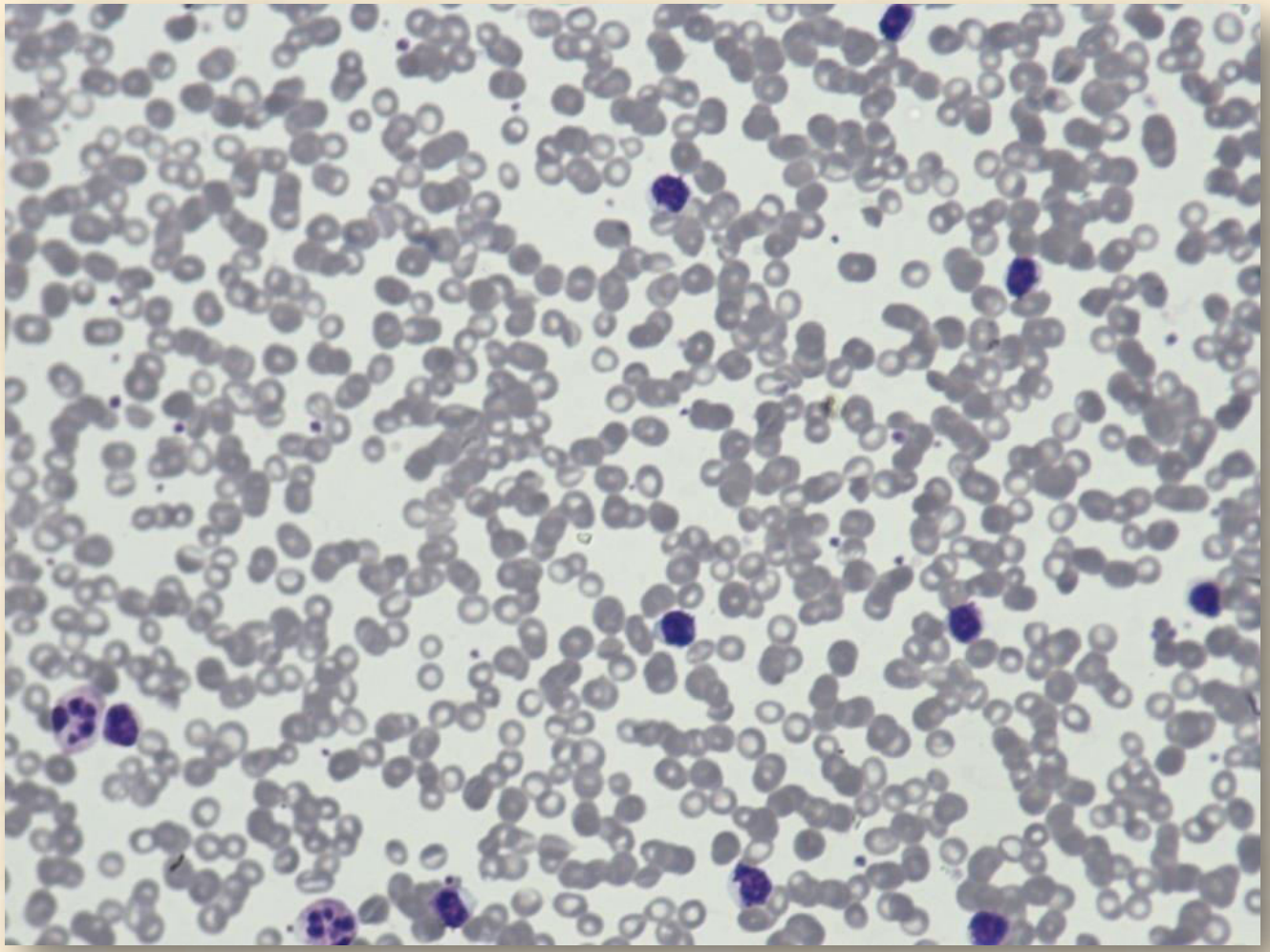
Bone marrow patterns

- Normocellular
- Hypocellular
- Erythroid preponderance/hyperplasia pattern
- Hypercellular/myeloid preponderance
- Megakaryocytic hyperplasia
- Bihyperplasia/panhyperplasia
- Lymphocytosis/plasmacytosis
- Mononuclear cell infiltration
- Foreign cell infiltration
- Granulomata/histiocytic proliferation

- Careful assessment of the blood elements is often the first step in assessment of hematologic function and diagnosis

- Examination of blood smears
  - yields important diagnostic information
  - allows broad differential diagnostic impressions
  - guidance on the further tests to be performed for any given provisional diagnosis

Examination of PBS



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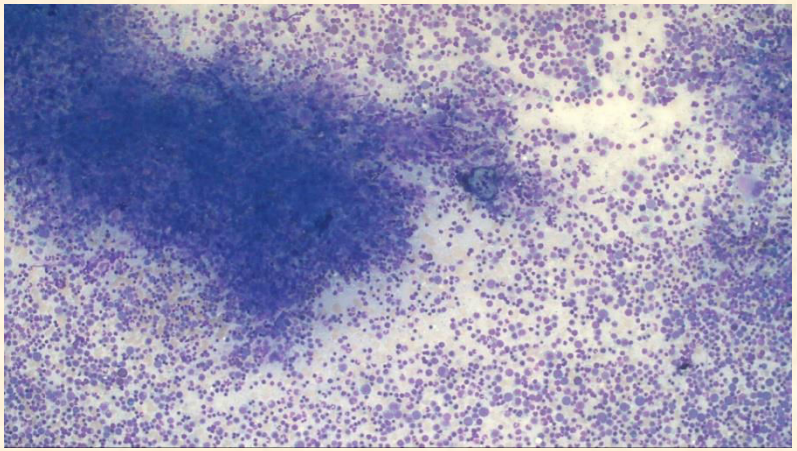
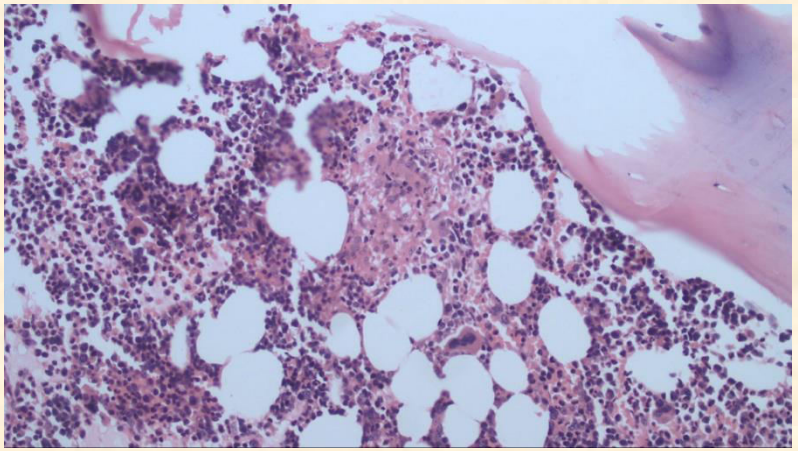
Bone Marrow Examination

- Diagnosis and management of many hematologic diseases depend on examination of the bone marrow

- Bone marrow examination usually involves two separate, but interrelated, specimens
  - BM Aspirate and BM Biopsy
  - Both are equally important





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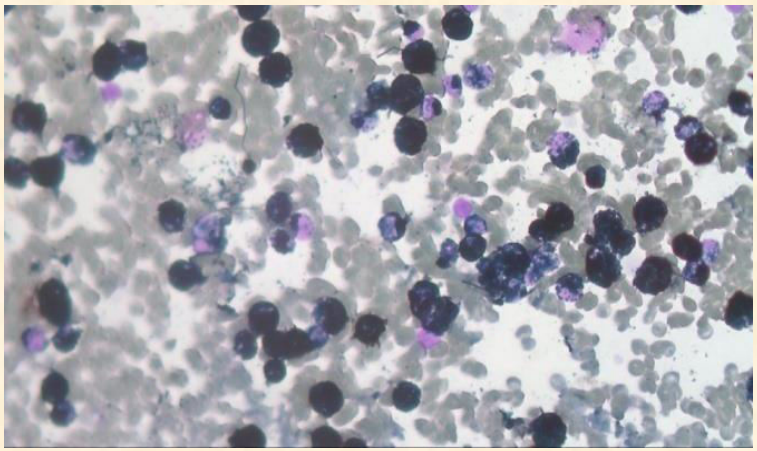
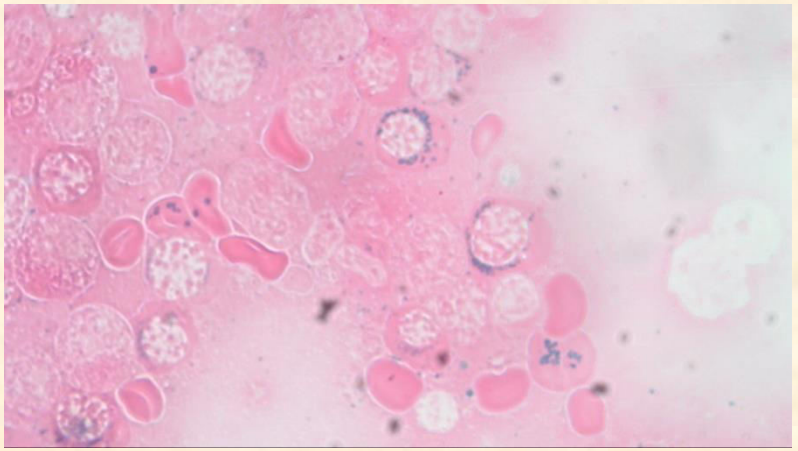
- Ancillary techniques in cytomorphology
  - Cytochemistry on PBS and BMA
  - Immunohistochemistry on BM Bx

Cytochemistry and Special stains





Case based illustrations

Interesting cases!!!

"I must admit, yours is one of the most baffling cases I've ever seen."

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CASE 1…

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- 15 yrs old girl presented with complaints of :

  - Mass per abdomen
  - Loss of appetite

  } × 02 wks

- Menstrual History , Past & Personal History - Not contributory

- Family History - Mother had tuberculosis

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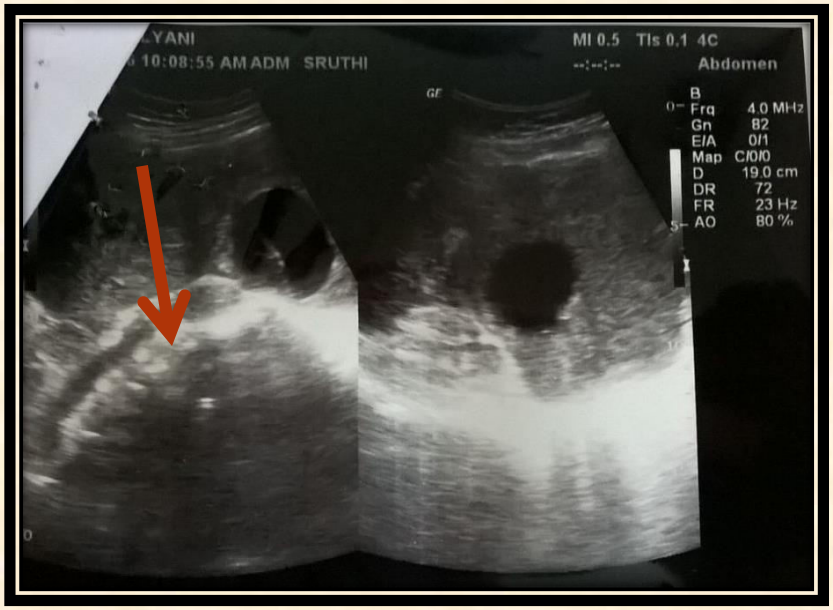
Examination…

- General Examination and other Systemic Examination – WNL

- Per Abdomen –
  - 15x15cm globular **Abdominopelvic mass**
  - Firm in consistency
  - Mobile
  - Well defined margins
  - No secondary changes over the skin

Imaging– Chest & Abdomen

- **USG**
  - Two well defined solid masses- Largest measuring 20×15 cm extending from pelvis to supraumbilical region
  - Pleural effusion



- **CT Scan Thorax & Abdomen**
  - Well defined solid cystic masses, largest measuring 24x17x8cm
  - Ascites & pleural effusion
  - Retroperitoneal and mesenteric lymph nodes enlargement

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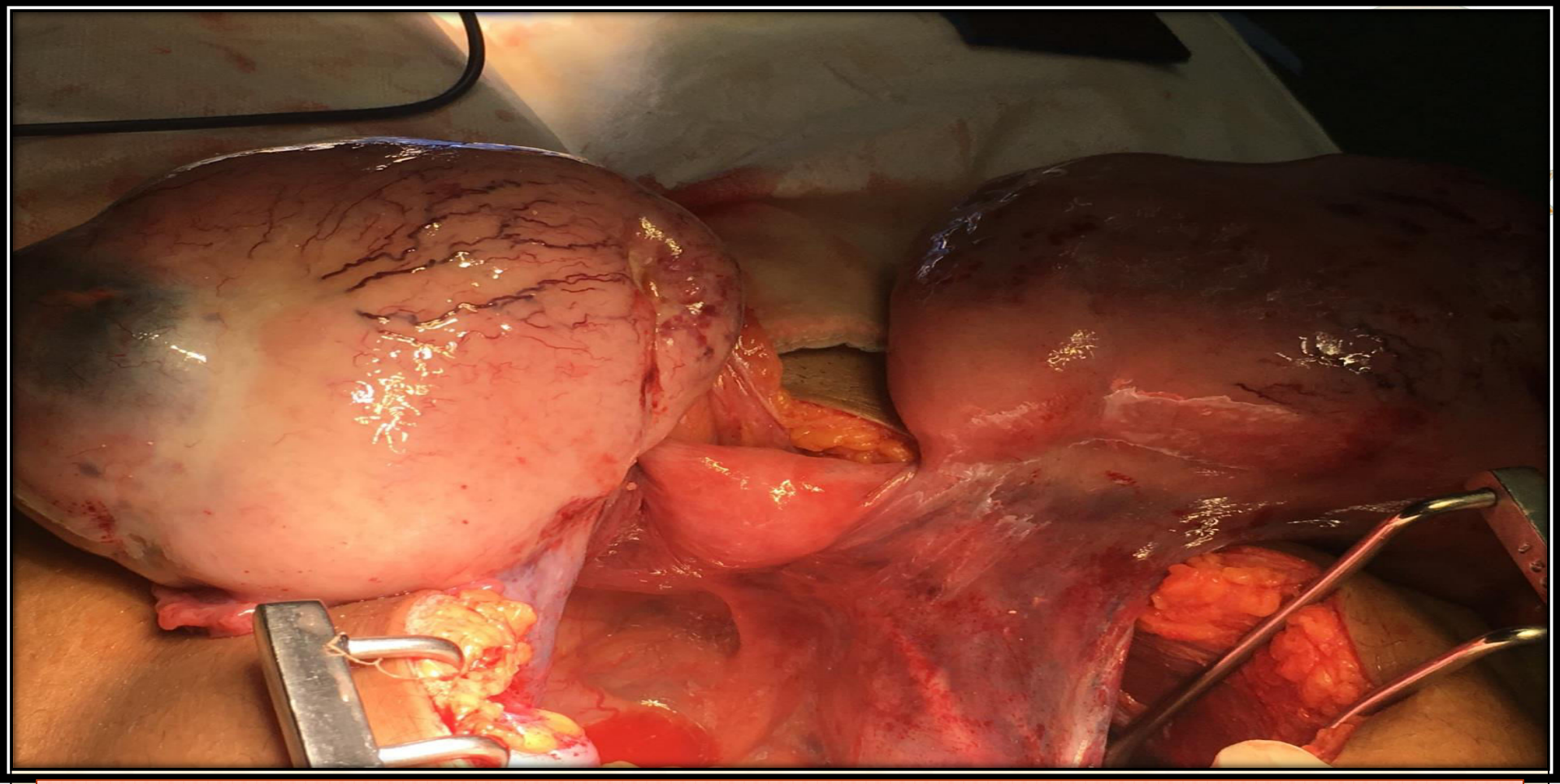
Salient Investigations…

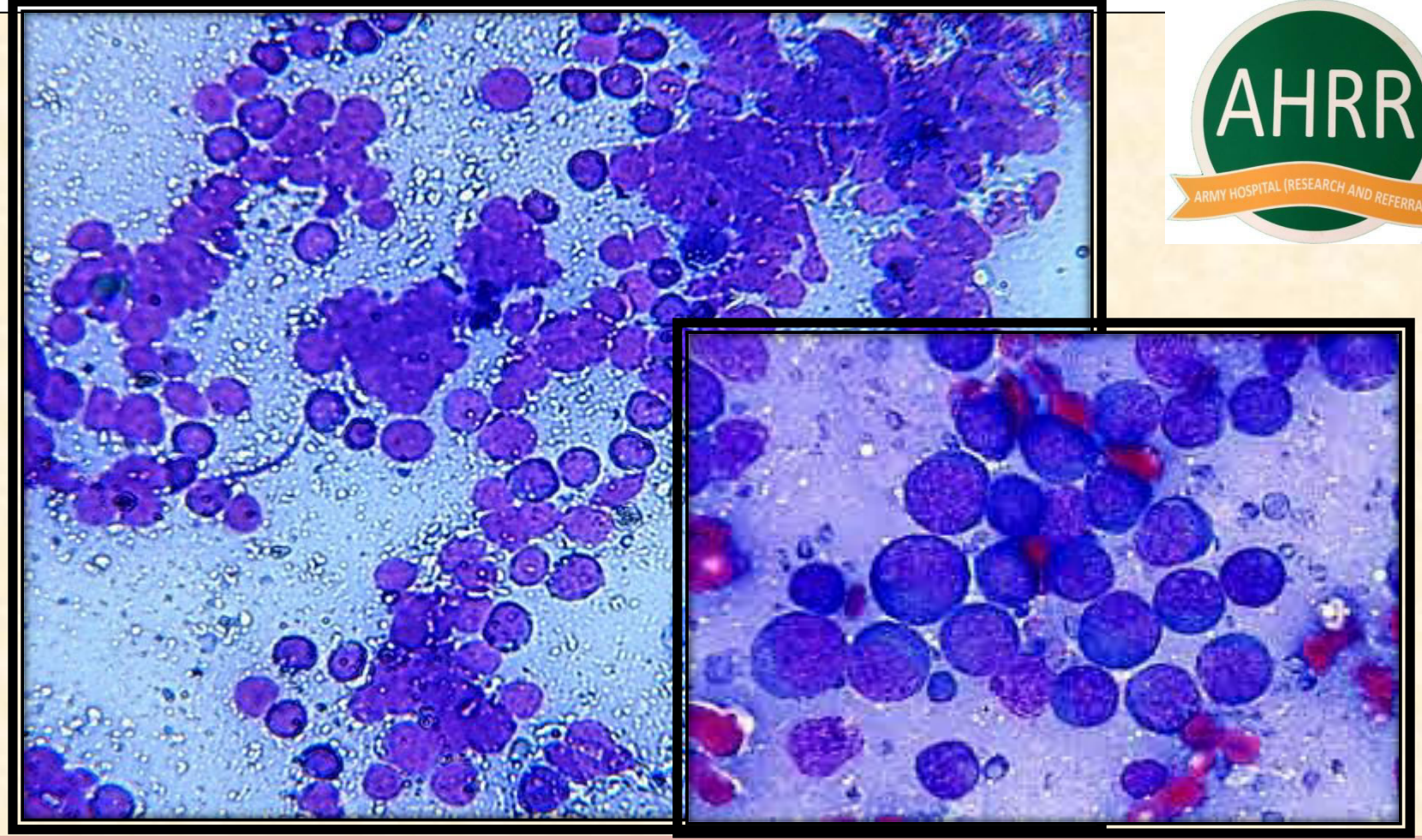
- **CBC, Serum biochemistry**
  - Apparently Normal
  - LDH – 2054 U/L
- **Tumour Markers**
  - CA 125 - 9.6 U/L
  - β HCG - 1.76 mIU/ml
  - CEA - 0.78ng/ml
  - AFP - 1.30
- **Clinical Diagnosis - B/L Dysgerminoma**



Staging laparotomy & Fertility sparing surgery-Right salpingo oopherectomy + Right Pelvic LN & Paraortic LN biopsy + Lt Ovarian biopsy + Total Omentectomy done

- Uterus normal
- B/L large solid ovarian masses
  - Right -15× 20 cm solid cystic mass
  - Left - 10× 10 cm with small cyst on surface

Mesenteric, Pelvic & Para aortic lymph nodes enlarged



Impression and scrape smear cytology

MGG Stain: 20x. Round cells singly dispersed with no definitive pattern. Moderate cytoplasm, vesicular chromatin and conspicuous nucleoli. Background: Lymphoglandular bodies

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Intraop Opinion…

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Atypical Lymphoid cells seen….!!!

- Left ovarian mass resection was **NOT** carried out

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Histopathology Examination…

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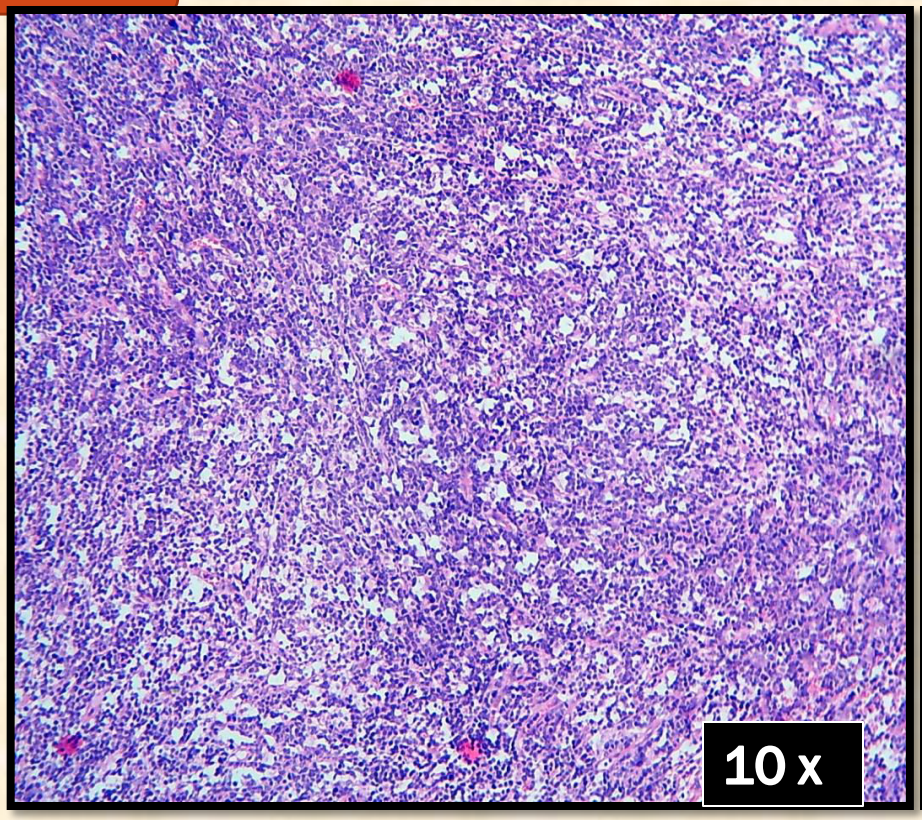
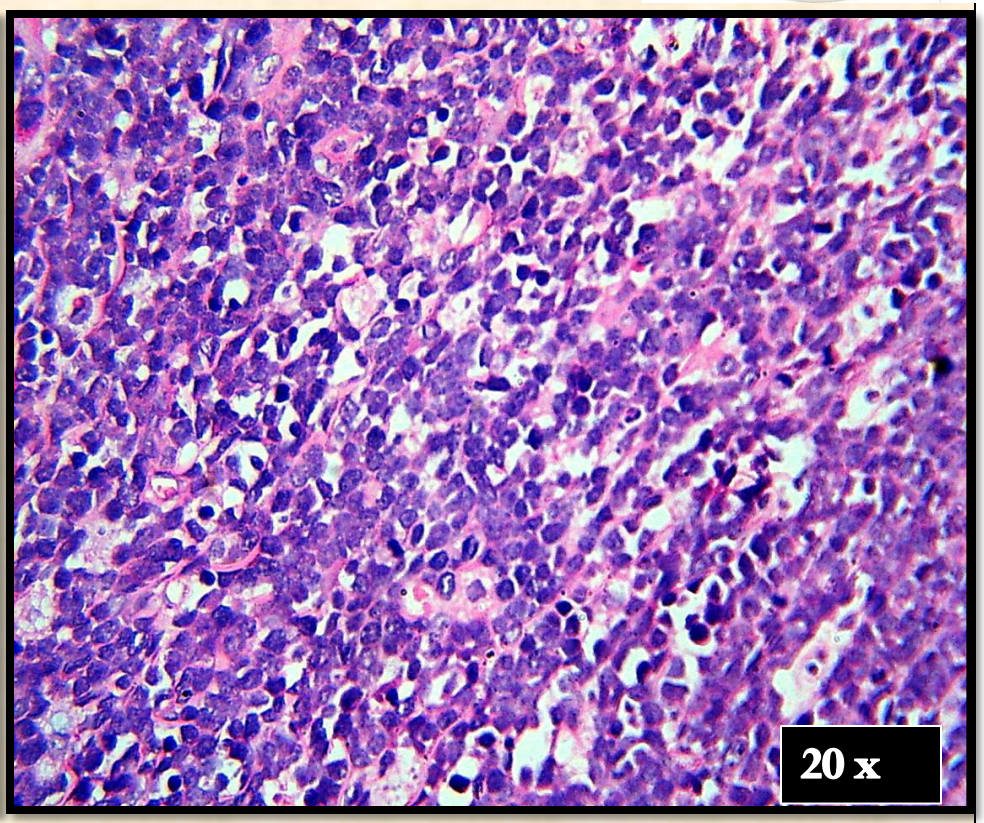
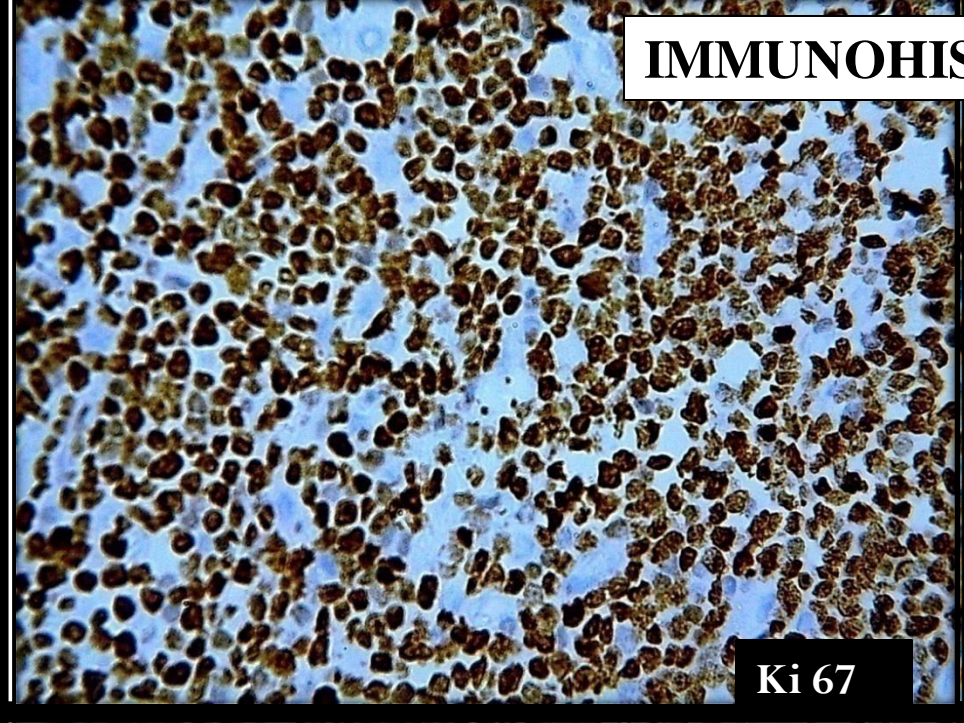
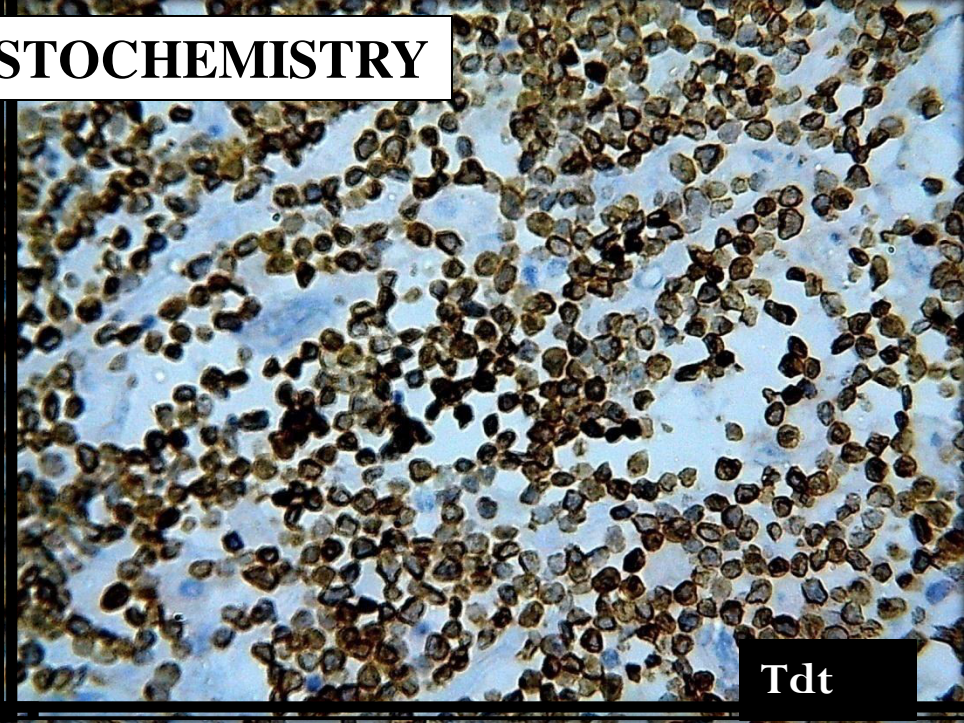


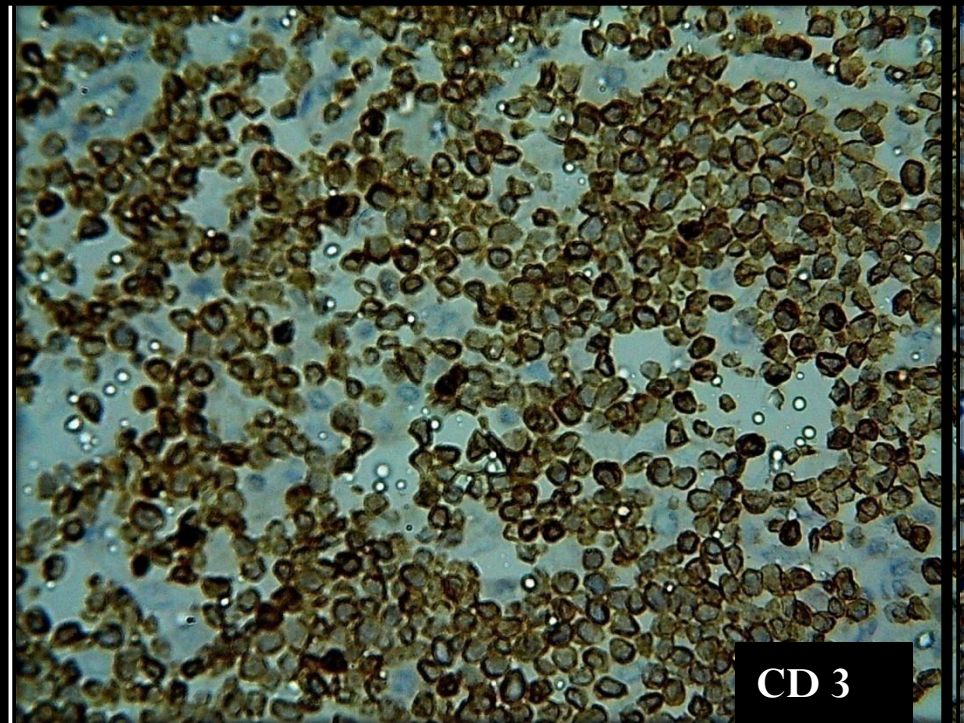


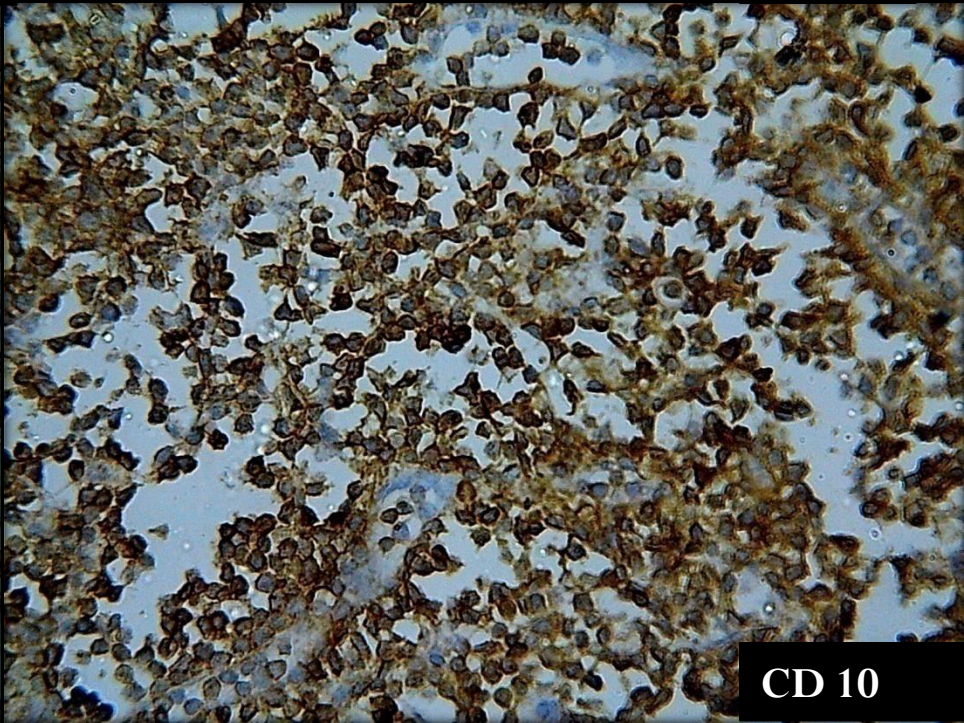
H&E STAIN: Ovarian tumour & Pelvic lymph node: Diffuse Infiltrate of large lymphoid cells completely effacing the parent architecture

IMMUNOHISTOCHEMISTRY









Positive :

LCA

CD3

CD5

Tdt

CD10

Ki67: 95%

Negative :

- PanCK
- EMA
- CD79a
- CD20
- BCL2
- BCL6

Immunohistochemistry

Diagnosis: T cell Acute Lymphoblastic Lymphoma/ Leukaemia involving Right ovary and pelvic lymph nodes

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Post-Operative…

- Her Haemoglobin started falling (10.5 g/dl→8 g/dl)
- TLC- 4500 /cumm → 12,000/cumm
- PBS revealed few blasts
- Subsequently Bone marrow was done

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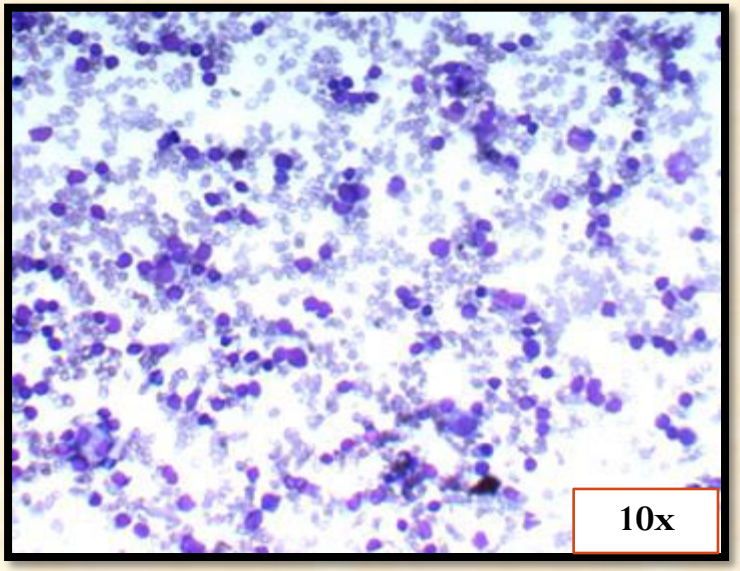
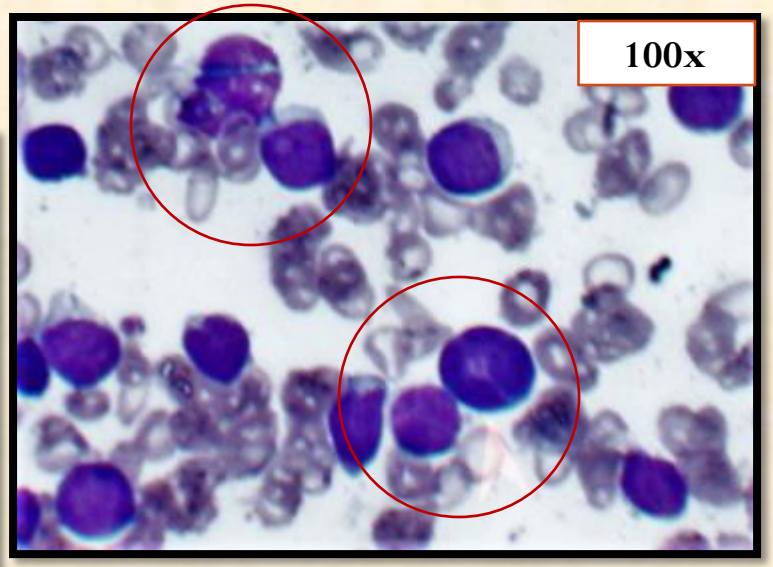
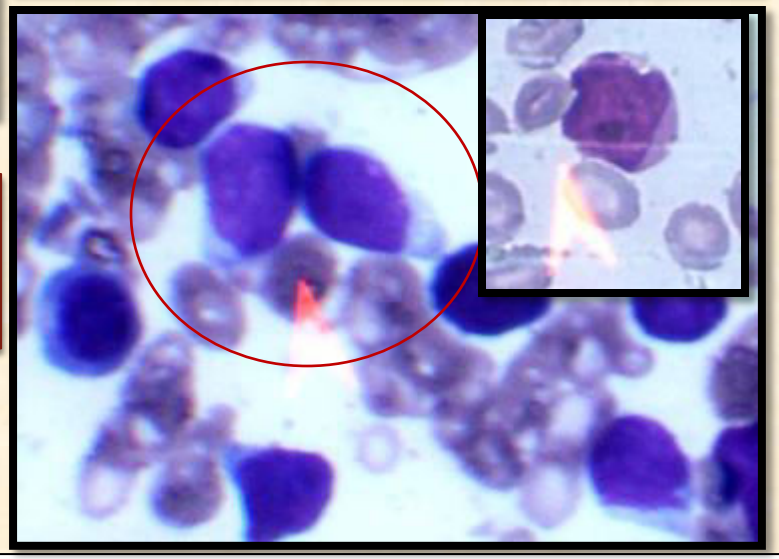
Bone marrow Aspiration…

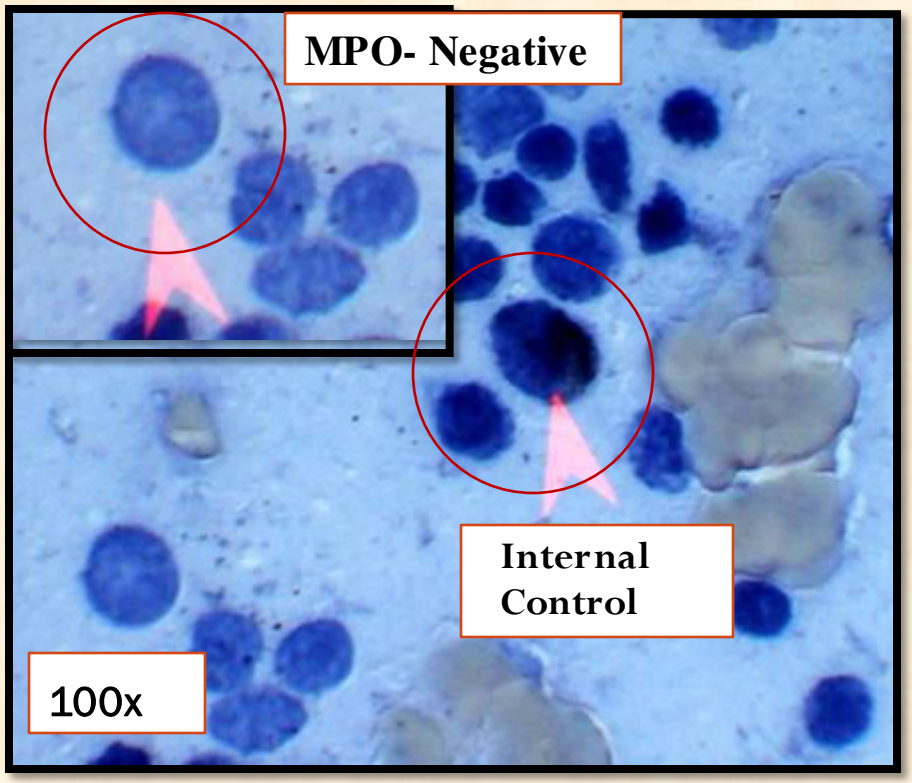




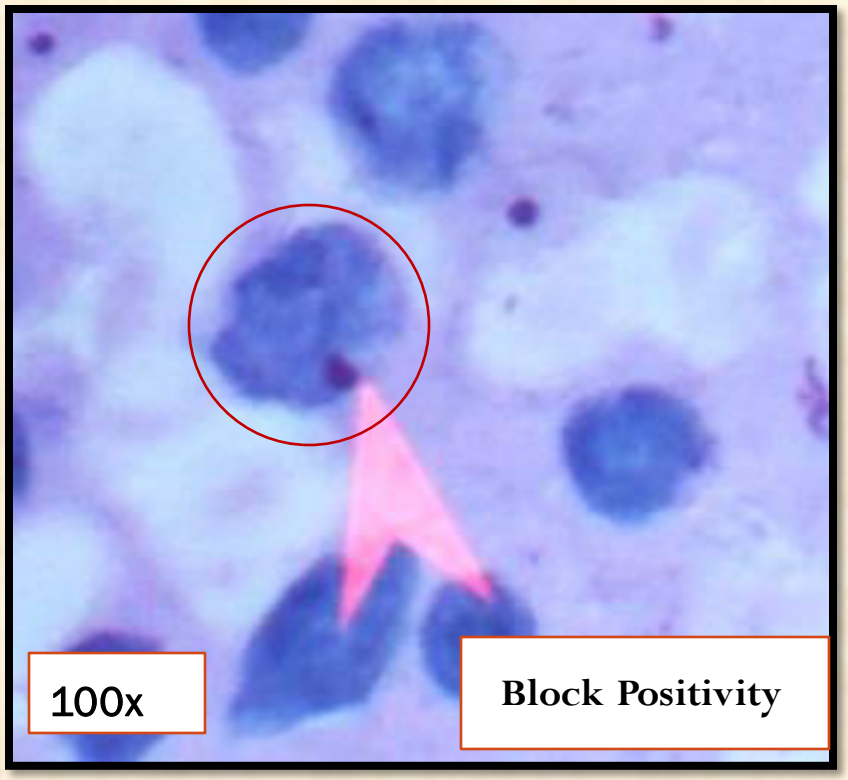


Blasts- 90% lymphoid Morphology

Cytochemistry…

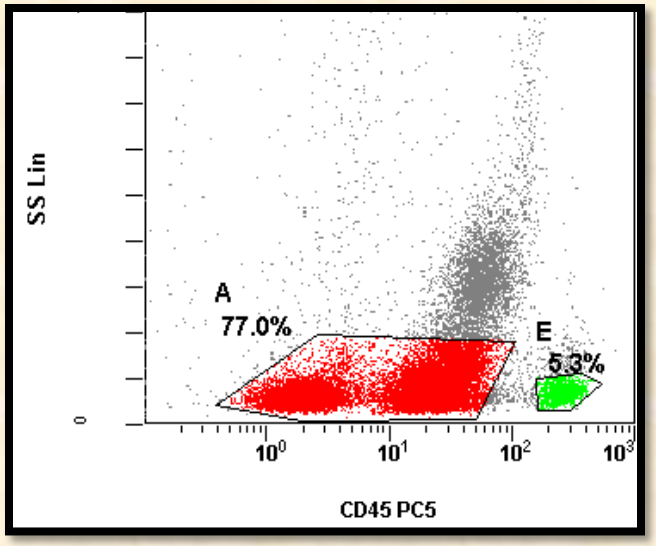


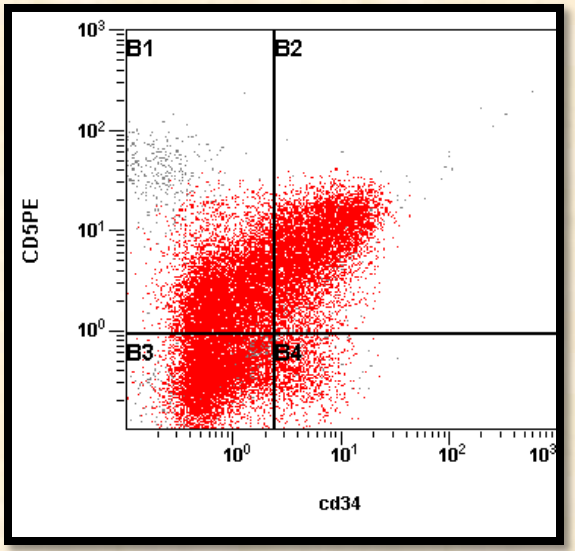
Myeloperoxidase stain

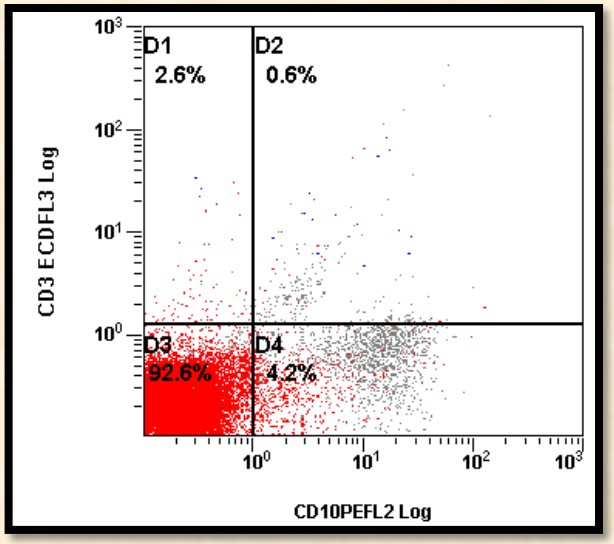


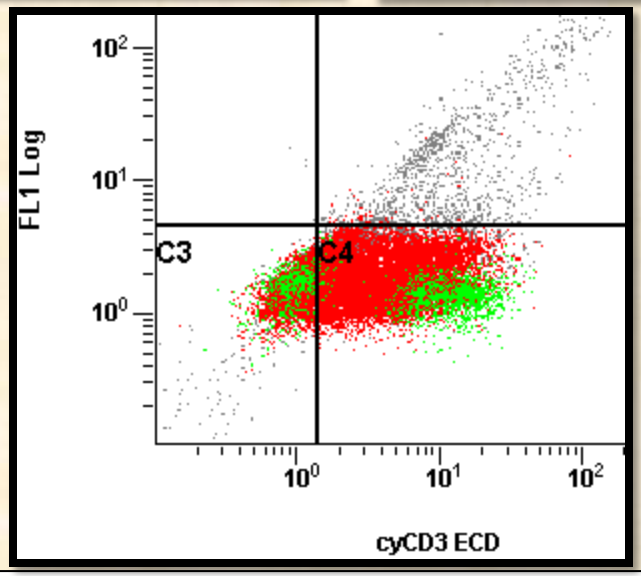
Periodic Acid Fast

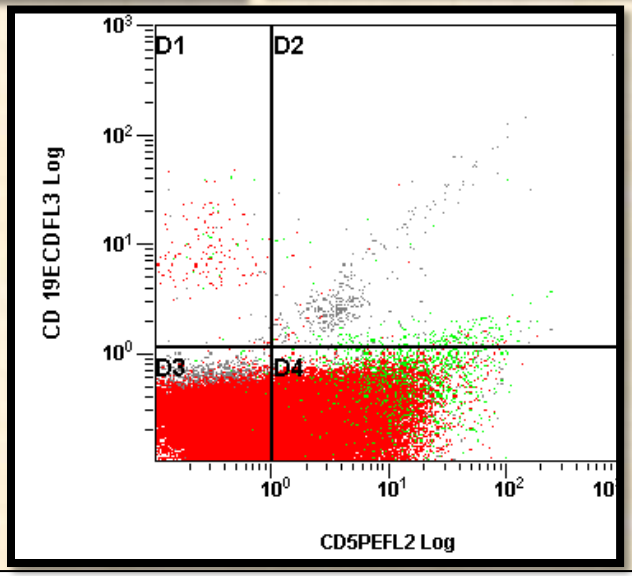
Immunophenotyping…











Immunophenotyping…

Positive	Negative
cCD3 (Moderate)	CD 19
CD 7 (Bright)	CD 13
CD 4 (Dim)	CD 33
CD 8 (Dim)	CD 79a
CD 5 (Dim)	CD 64
CD 34	MPO
TdT	

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Summary

- A 15 year old girl presented with Bilateral adnexal mass as an Abdominopelvic lump who was suspected to have germ cell tumour, underwent surgery.

- Intraop impression of lymphoma was made which helped in saving the other ovary and initiated hematological workup

- Diagnosed as a case of **T- ALL with extra lymphatic manifestations in the ovaries.**

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Treatment AugBFM Protocol…

- Tab Allopurinol 300mg stat then 100 mg 8 hrly
- Inj Levofloxacin 500 mg iv od
- Inj Rasburicase 1.5 mg od
- Inj Dexamethasone 4mg iv bd × *02 days*

↓

Tab Prednisolone 100mg od *(Upto 28 days then tapered over 10 days)*

- Inj Vincristine 2 mg iv push *(Day 1, 8, 15, 22)*
- Inj L Asparginase 10000 U in 100 ml NS *(Day 3,5,7,10,12,14,17,19,21)*
- Inj Daunorubicin iv 25 mg/m^2 in 100 ml NS *(Day 1, 8, 15, 22)*
- Tab Cifran 500 mg bd

PRESENTLY IN REMISSION

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Peculiarity about this case…

- Infiltration of leukemic cells to ovary mimicking malignant ovarian tumour
- Unusual case
  - It was firstly diagnosed in ovary by cytology with previous normal CBCs
  - T- ALL involvement as such is rare
- Increased relapse following remission
- Literature available for leukemic infiltration is rare

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CASE 2

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CLINICAL HISTORY

- 3 year old child presented with
- Fever x 2months not responding to antibiotics.
- Swelling right cervical lymph node x 2 months, progressively increasing.
- Splenomegaly x 2 months
- B/L proptosis with dilated veins over forehead and multiple scalp swellings x 3 days

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Contd...

- Child was investigated with blood tests, FNAC of lymph node and bone marrow aspirate at outside hospital
- Diagnosed as acute lymphoblastic leukemia on bone marrow and reactive lymphadenopathy on FNAC.
- Referred to AHRR for further management

Investigations

- Hb: 3.3 gm/dl
- RBC : $1.63x10^6$/mm3
- Hct: 12.9%
- TLC: 3780/mm3
- DLC: 42;48;02;08
- Plt: $280x10^3$/mm3
- CRP: 114
- ESR: 120
- VMA: > 100

PBS

Bicytopenia with microcytic RBC, anisopoikilocytosis, tear drop cells and 2-3 NRBC/100 WBCs

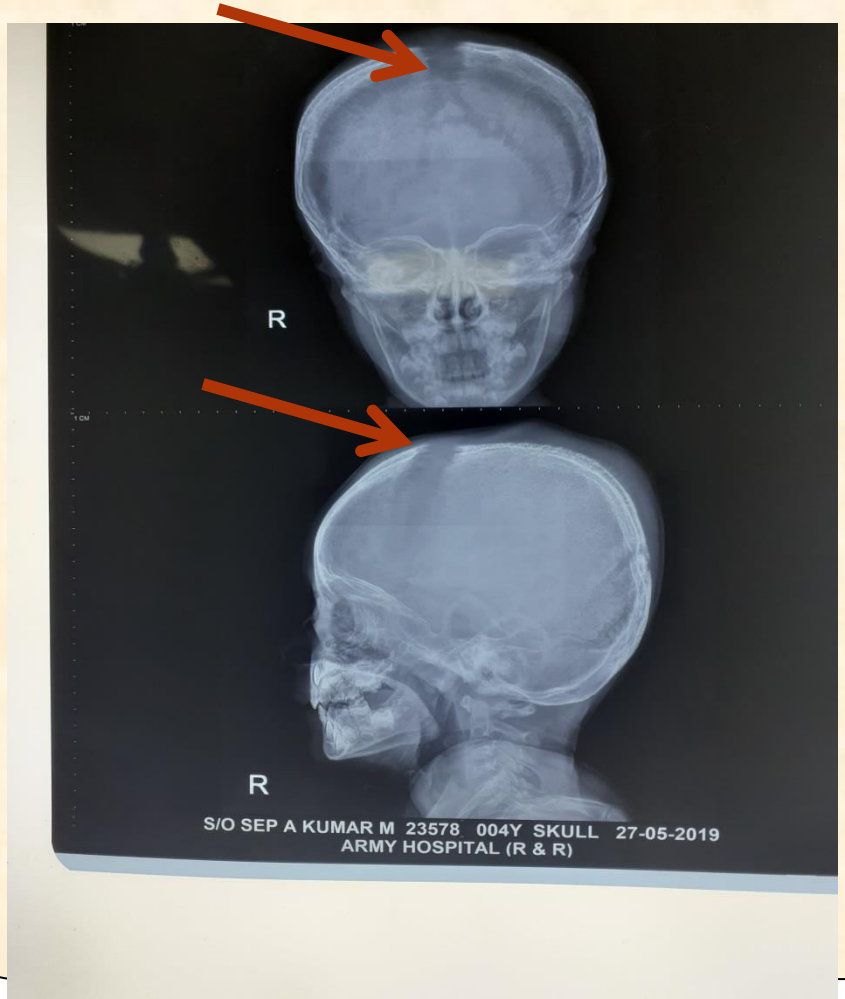
Leucopenia with relative lymphocytosis and few atypical lymphocytes.

FLOWCYTOMETRY

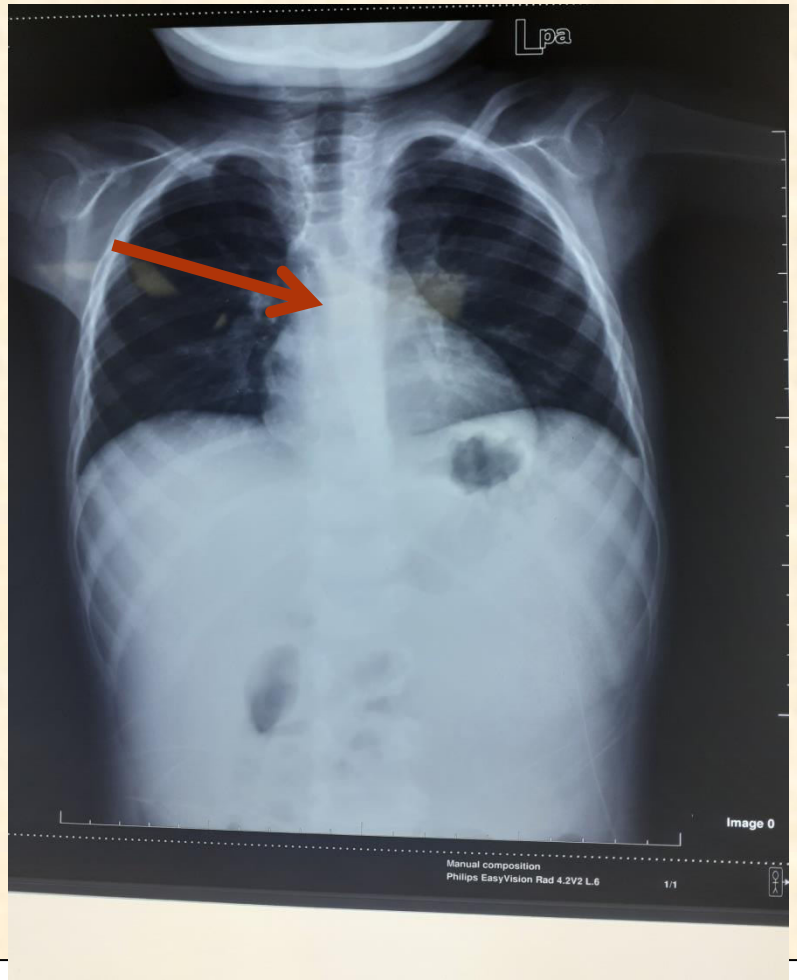
Absent CD45 and low SSc cells which are positive for CD38 and negative for CD34, Tdt, CD117,CD19,cCD3 and MPO

RADIOLOGY

X-RAY CALVARIA

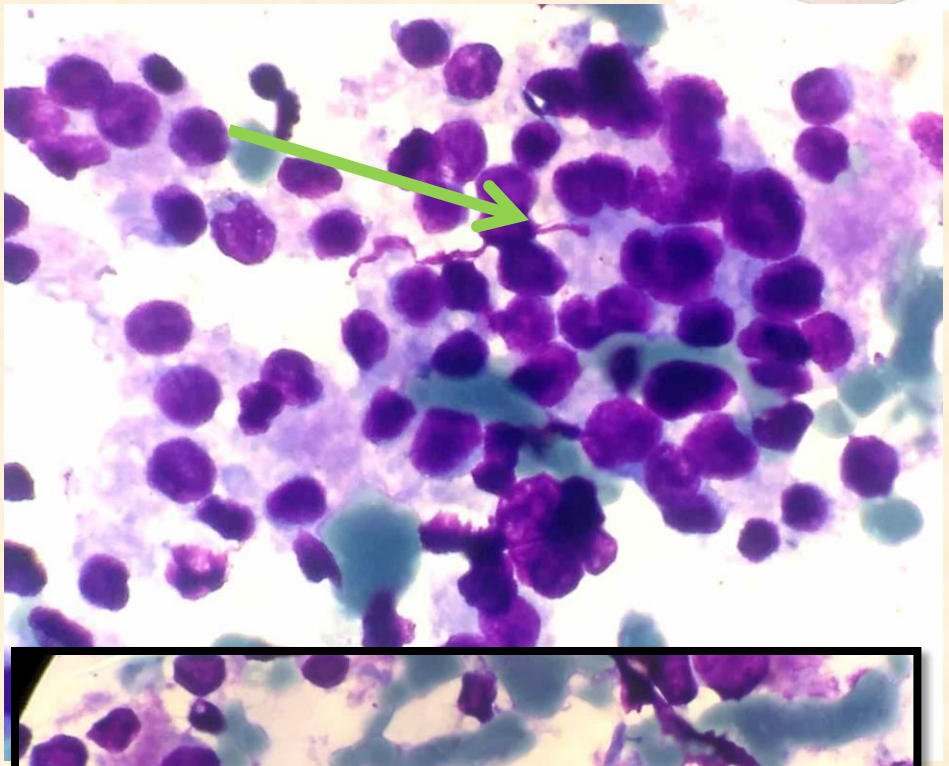


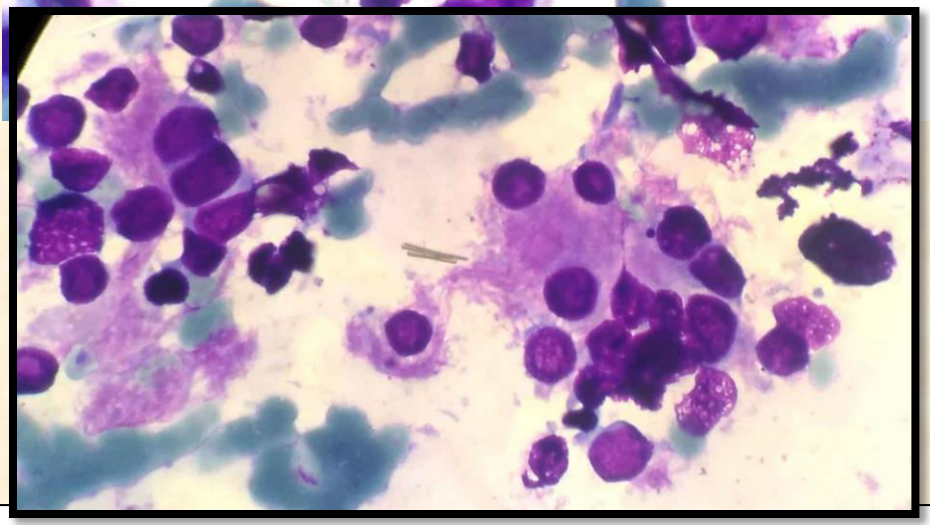
X-RAY ANTERIOR MEDIASTINUM



Bone marrow aspirate and biopsy (review)

- Small round blue cell tumor
- Rosettes.
- On IHC, **positive for NSE and synaptophysin** and negative for CD99 & myogenin.
- Metastatic deposits of **<u>Neuroblastoma</u>**





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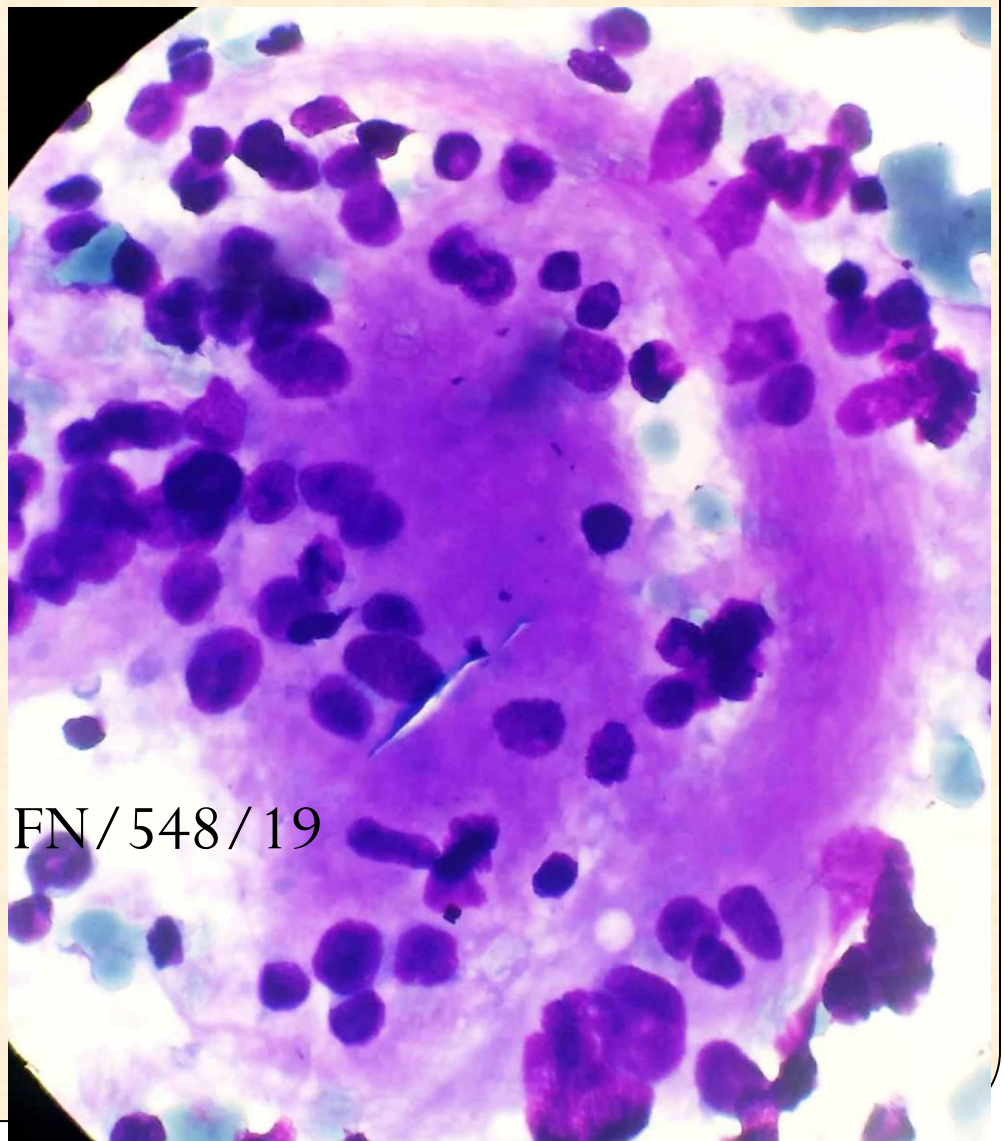
FLOW CYTOMETRY

- CD 45/SSc plot
  - 60% cells in the absent CD 45/SSc plot
  - Positive for CD 56 and negative for TdT, CD 34, CD 19, CD 10, MPO, HLA-DR, cCD3, sCD 3, CD 4, CD 8

- Opinion in Flow Cytometry- Metastatic deposit of CD 56 positive tumour likely Neuroblastoma

FNAC CERVICAL LYMPH NODE

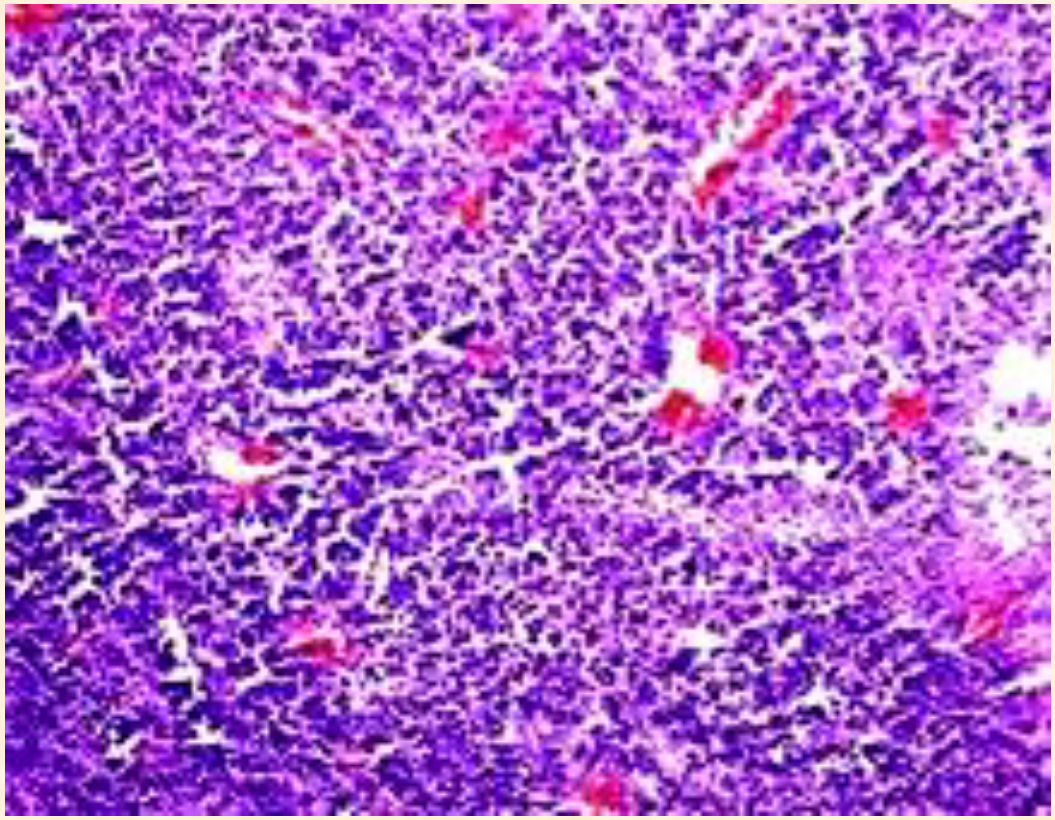
- Similar findings suggestive of metastatic deposits of Neuroblastoma



- FN/548/19

CERVICAL LYMPH NODE BIOPSY

- Cervical lymph node biopsy suggestive of poorly differentiated metastatic Neuroblastoma , schwannian stroma poor.



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Conclusion

- Points to be emphasised in this case
  - Neuroblastoma is a very close mimic to lymphoblastic lymphoma
  - Diagnostic dilemma, especially when marrow is involved
  - Flowcytometry is a very useful aid in diagnosing this lesion and excluding acute leukemia.

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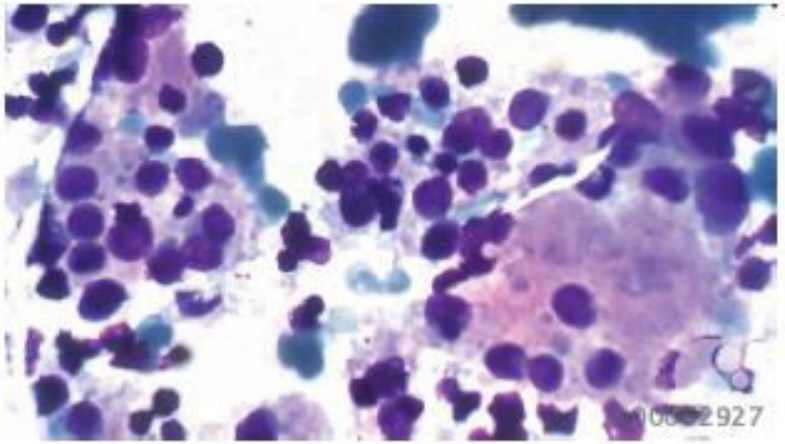
Neuroblastoma mimicking Acute Lymphoblastic Leukemia 2

Author: Ankur Ahuja, DM; Tathagata Chatterjee; S Venkatesan; Kanwaljeet Singh; GPS Gahlot; Devika Gupta

Category: Laboratory Hematology > Body fluids: abnormal cells and microorganisms with cross-references to specific diagnoses when appropriate > Metastatic tumor cells in body fluids

Published Date: 02/12/2020



3.5 yrs old child presented with fever, Right cervical lympadenopathy with progresive increase in size, splenomegaly, bilateral proptosis for past 2 months. Her hemoglobin was 3.3 g/dl, Total WBC count was 3780/cumm,

Case 3

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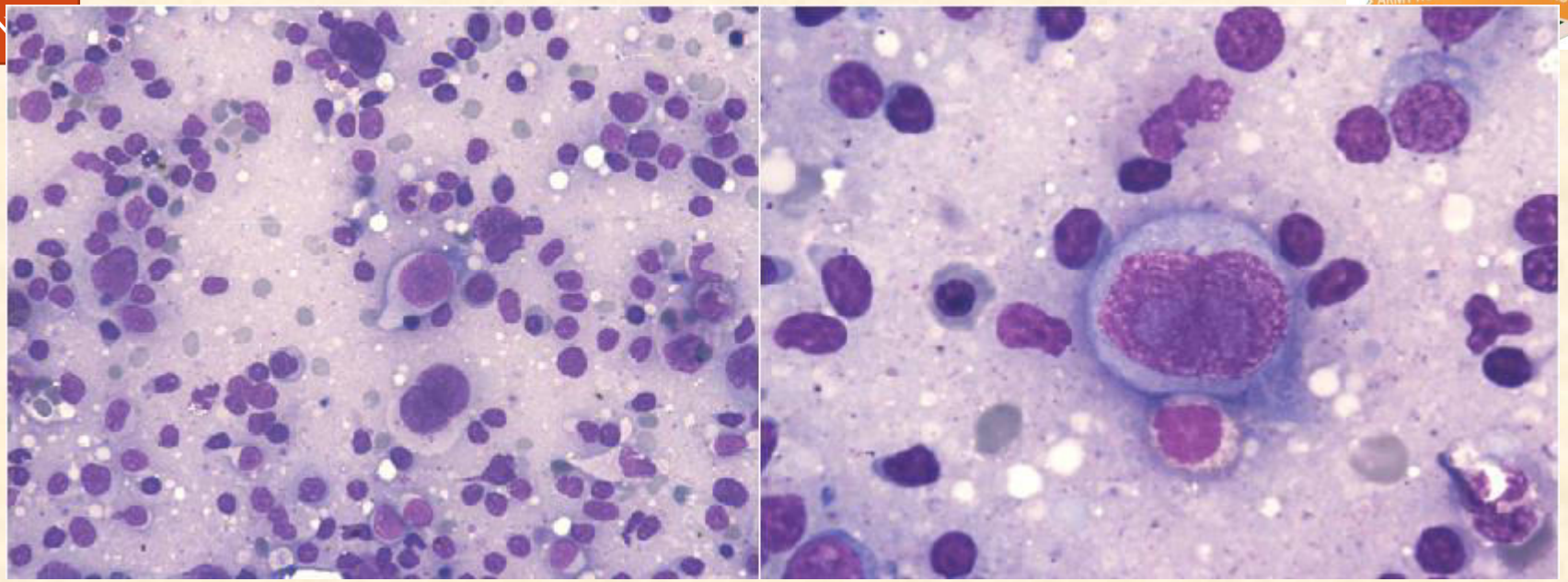
History

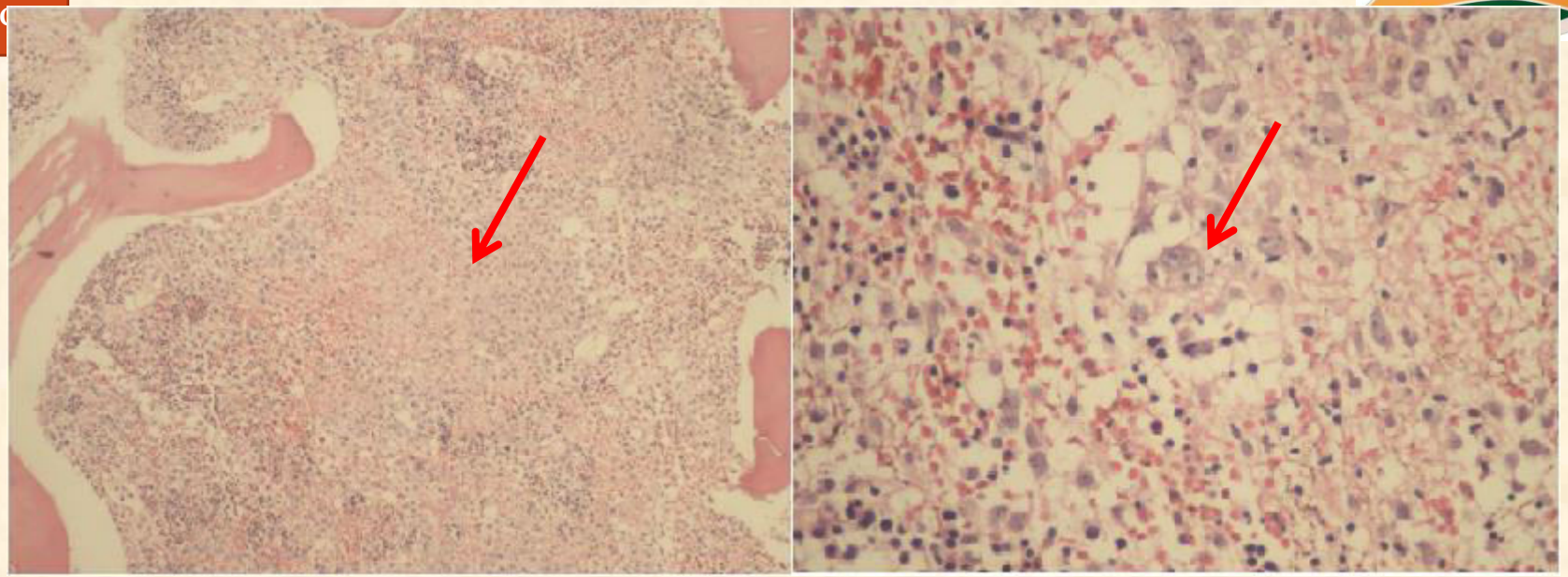
- A 15-year-old female with H/O fever and cervical swelling for 2 months duration
- H/o itching all over the body
- H/o weight loss (4 kg in 2 months) and drenching night sweats+/ splenomegaly+ (3 cm)
- PUO under evaluation - ?hemato-lymphoid malignancy

  ?kala-azar



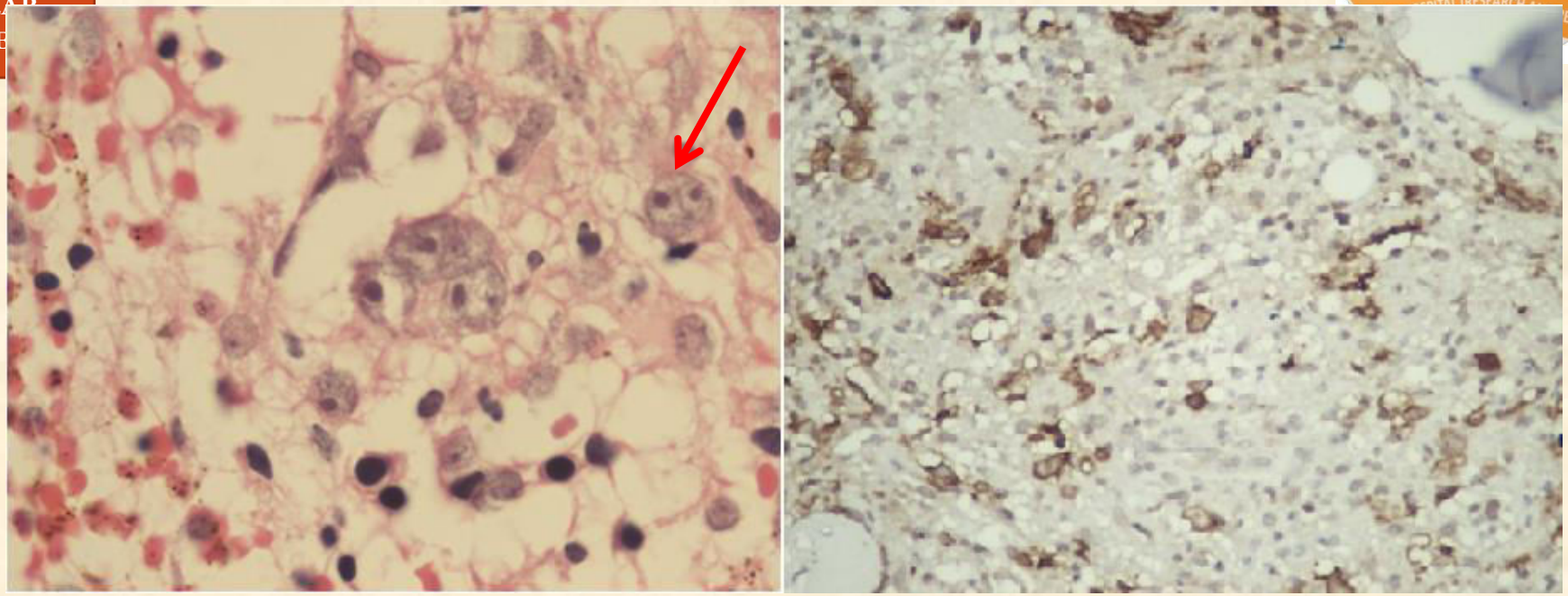
Left panel: Bone marrow aspirate showing large mononuclear and binucleate cells with mature lymphocytes in background (Jenner Giemsa x 400)

Right panel: Bone marrow aspirate classical RS (Jenner Giemsa x 1000)



Left panel: Bone marrow biopsy showing cellular marrow with foci of necrosis (H&E stain x 100)

Right panel: Bone marrow biopsy showing large mononuclear and multinucleated cells with prominent eosinophilic nucleoli suggestive of RS cells (H&E stain x 400)



Left panel: Bone marrow biopsy showing classical RS cells (H&E stain x 1000)

Right panel:These cells are immunopositive for CD 30 (IHC x 400)

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Bone marrow involvement by Hodgkins lymphoma (HL)

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- Primary extranodal presentation of HL - **<0.25%**
- **Bone marrow lacks lymphatics** - infiltration of bone marrow by Hodgkin's lymphoma indicates vascular dissemination of the disease (**stage IV**)
- BM involvement in Hodgkin's lymphoma varies with the histologic subtype:
  - 10% in classical Hodgkin's mixed cellularity
  - 1% in lymphocyte predominant Hodgkin's and lymphocyte rich classical Hodgkin's lymphoma
  - 3% in Nodular Sclerosis subtype

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Bone marrow involvement by Hodgkins lymphoma (HL)

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- Bone marrow are **usually cellular**
- But in some instances, hypocellularity with loose sparsely cellular connective tissue with scattered cells
- **Necrosis** is usually seen post-therapy and can also present at diagnosis
- **Fibrosis** is a common finding - not limited to the nodular sclerosis or lymphocyte depletion variants

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Bone marrow involvement by Hodgkins lymphoma (HL)

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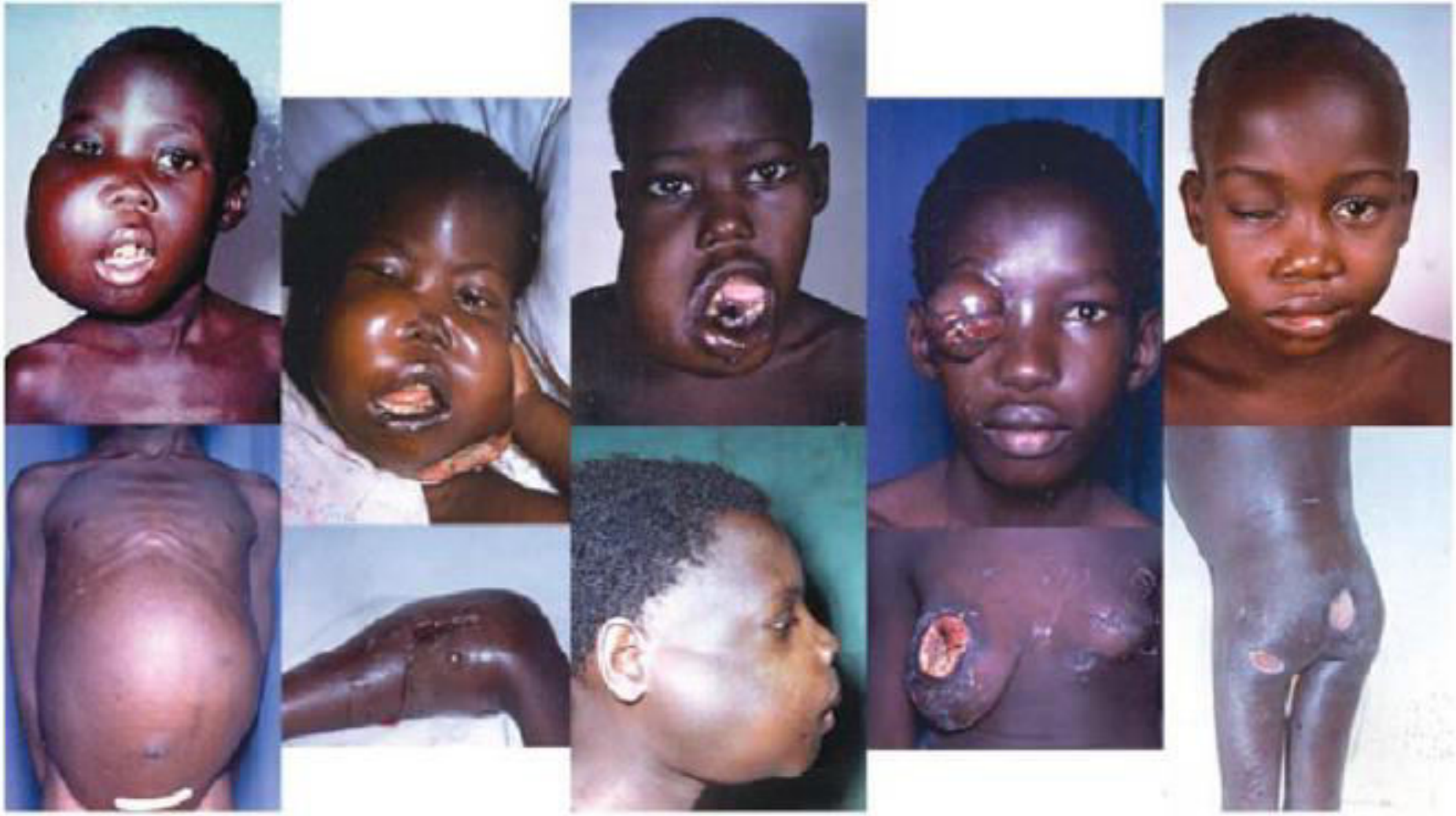
- **Definitive** - the presence of typical R-S cells or mononuclear variant in a cellular background typical of HL with such cells in other specimens

- **Highly suspicious** - presence of atypical cells lacking features of R-S cells or mononuclear variant in a cellular background typical of HL with histologically proven disease elsewhere of involvement

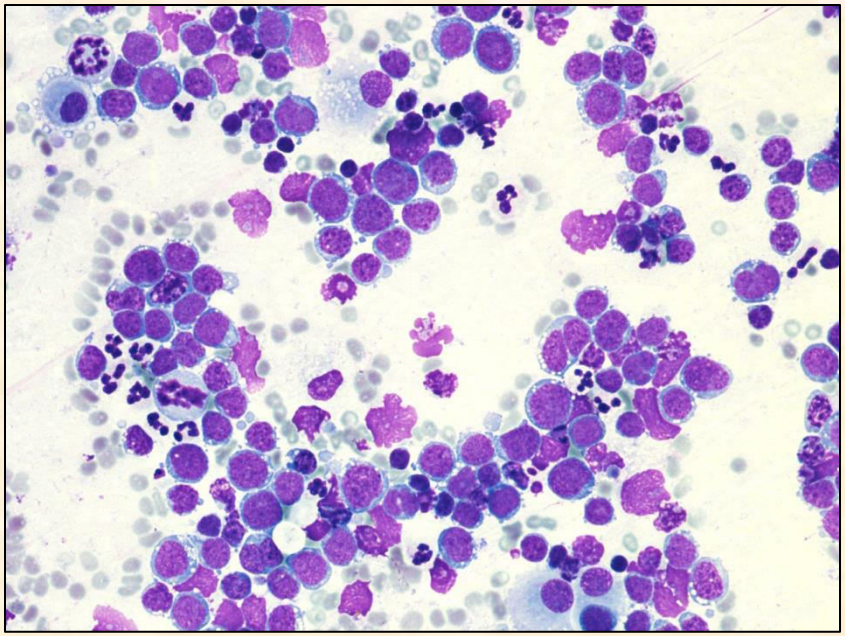
- **Suspicious** - foci of fibrosis in the absence of typical R-S cells or mononuclear variant with HL diagnosed elsewhere

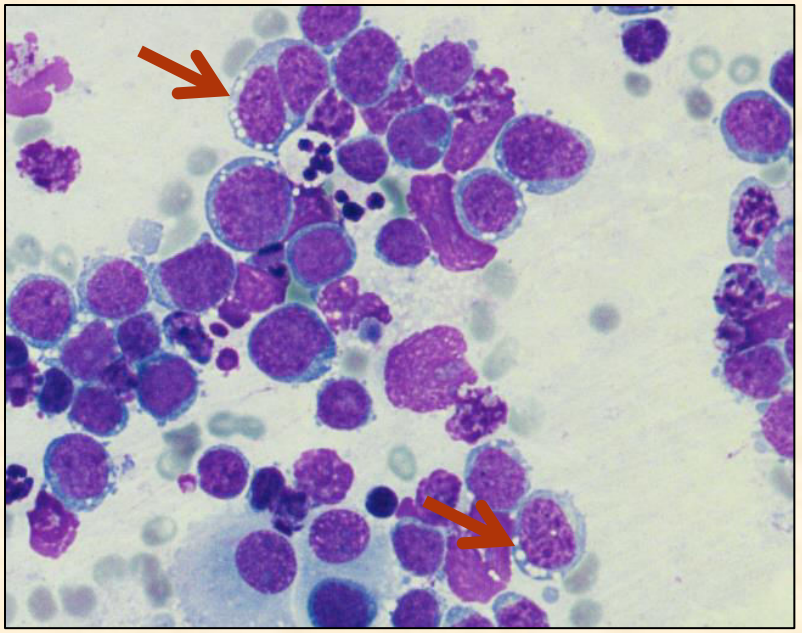
Case 4



- 4 yr old child, presented with right jaw swelling
- Associated breathlessness with right side pleural effusion
- Peripheral blood examination was normal.
- Biopsy of jaw lesion and pleural fluid were sent for assessment with a clinical impression of PNET/RMS

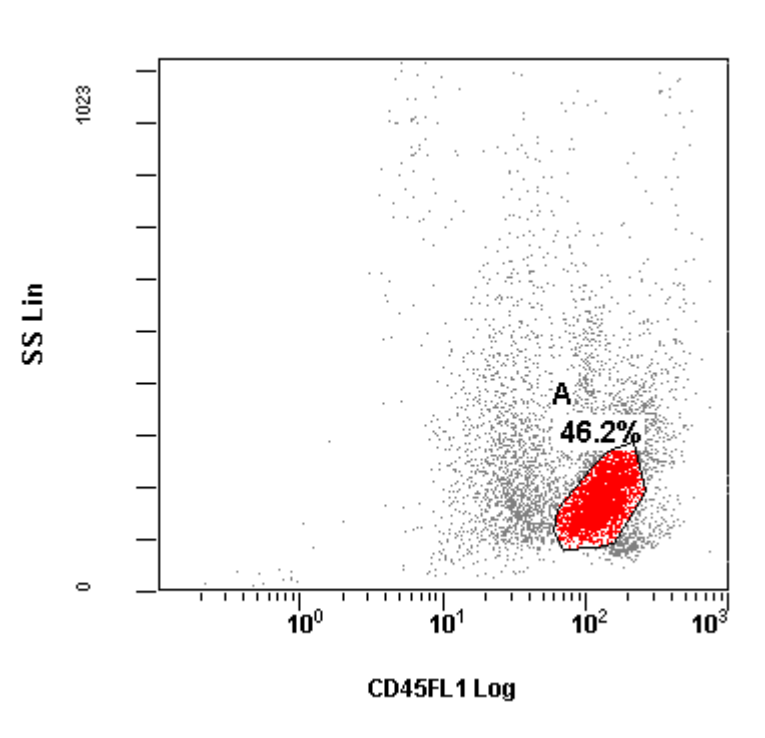
Pleural fluid cytology

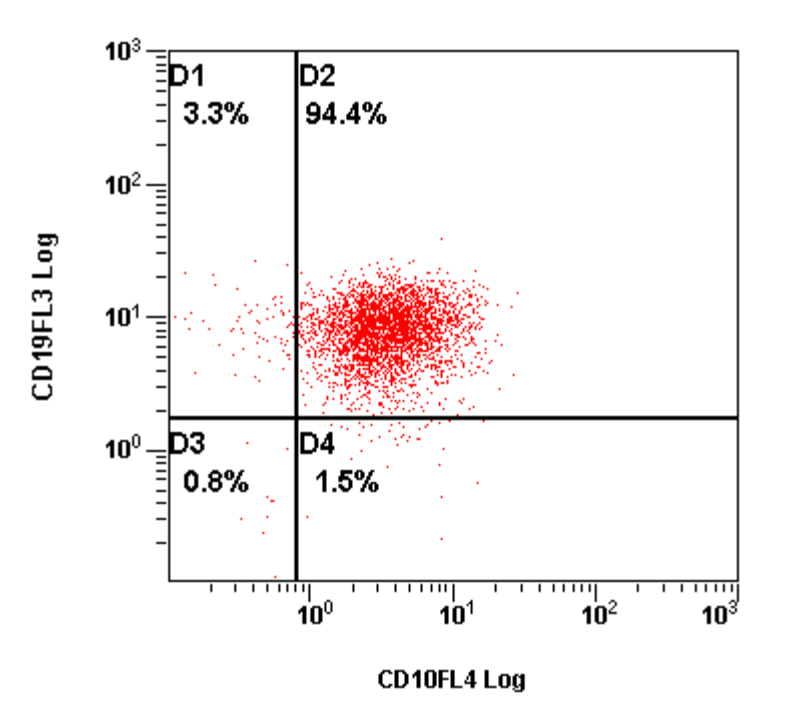


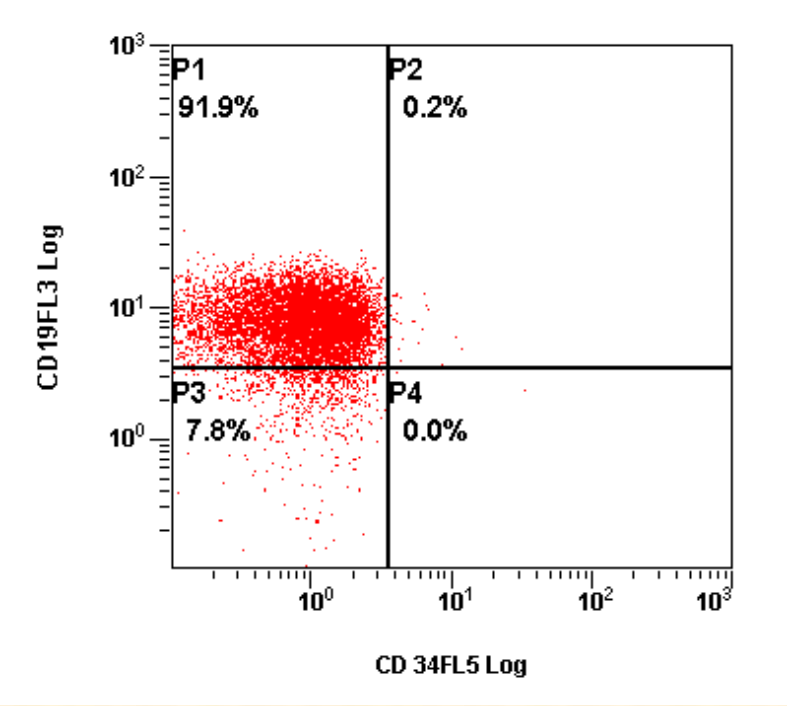


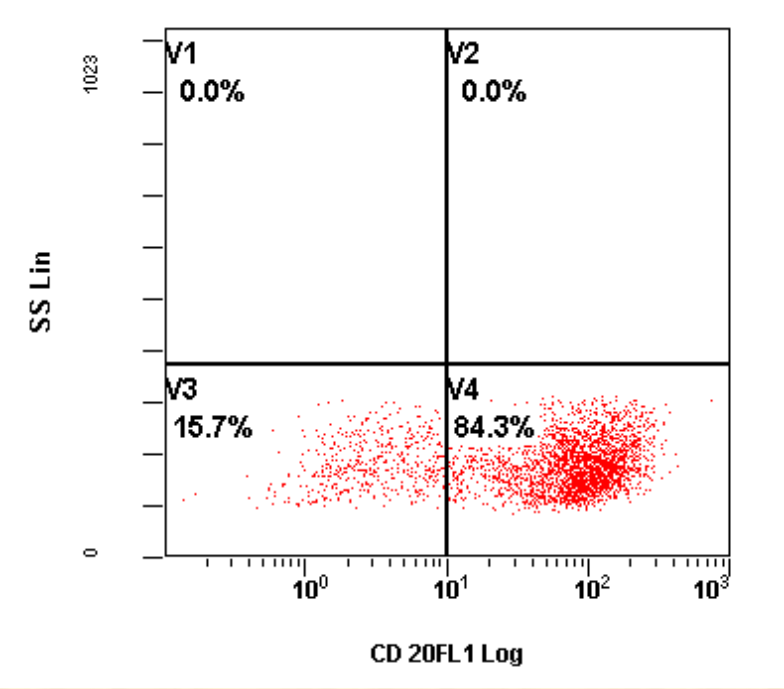
Left panel: Pleural fluid cytology reveal a highly cellular smear (MGG stain x 400)
Right panel: Pleural fluid cytology reveal large lymphoid cells with moderate amount of basophilic cytoplasm with vacoulations, nuclei with open nuclear chromatin, inconspicous nucleoli (MGG stain x 1000)
S/o hematolymphoid malignancy

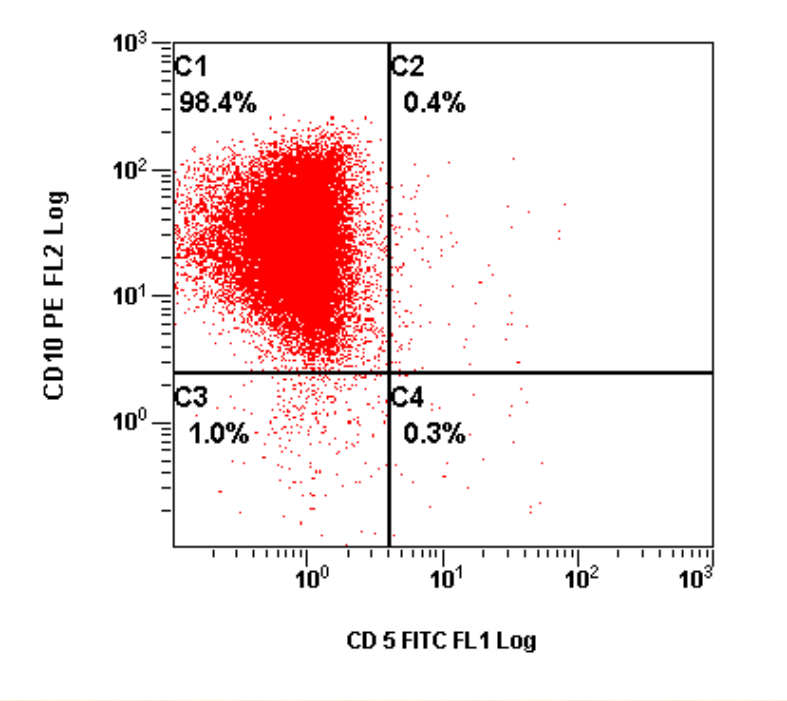
Flow cytometry

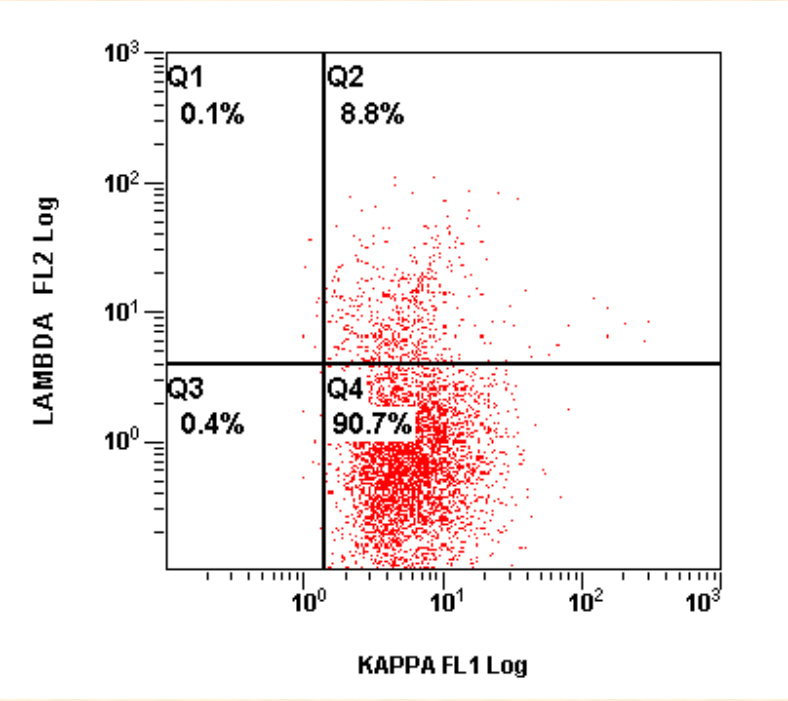





P1
91.9%
P2
0.2%
P3
7.8%
P4
0.0%
CD19FL3 Log
CD 34FL5 Log


V1
0.0%
V2
0.0%
V3
15.7%
V4
84.3%
SS Lin
CD 20FL1 Log


C1
98.4%
C2
0.4%
C3
1.0%
C4
0.3%
CD10 PE FL2 Log
CD 5 FITC FL1 Log


Q1
0.1%
Q2
8.8%
Q3
0.4%
Q4
90.7%
LAMBDA FL2 Log
KAPPA FL1 Log

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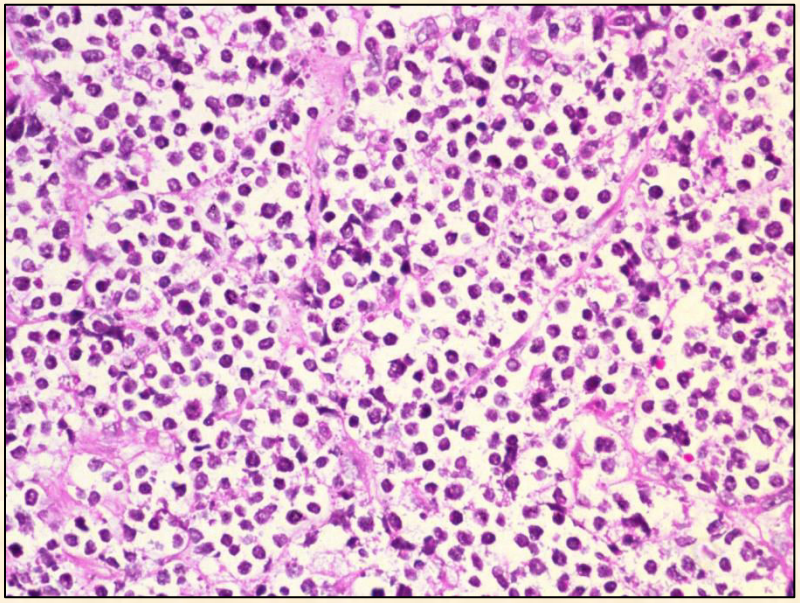
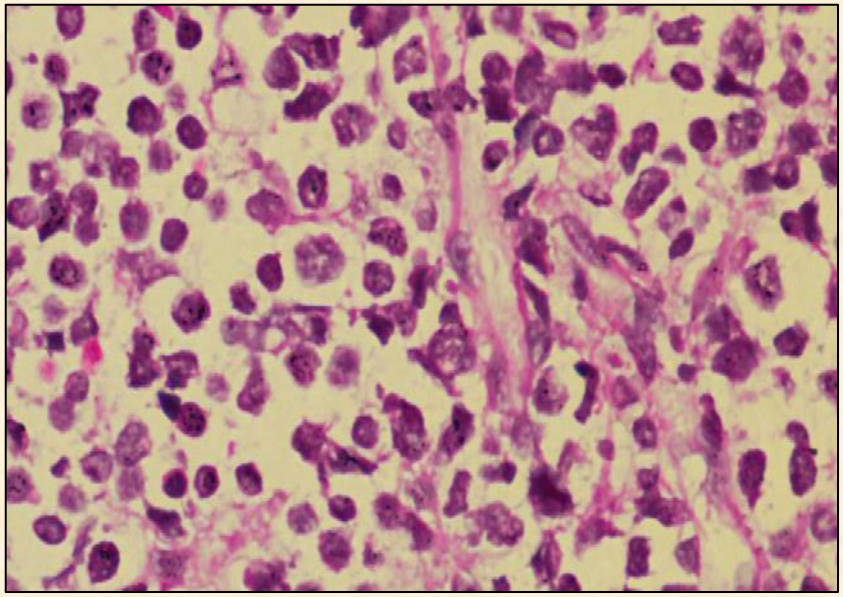
Flow cytometry

- The cells express bright CD45 and low SSc
- Positive for CD19,CD10, CD20 with kappa light chain restriction
- Negative for CD5, CD34 and Tdt
- Overall features are of Burkitt lymphoma

HPE of biopsy



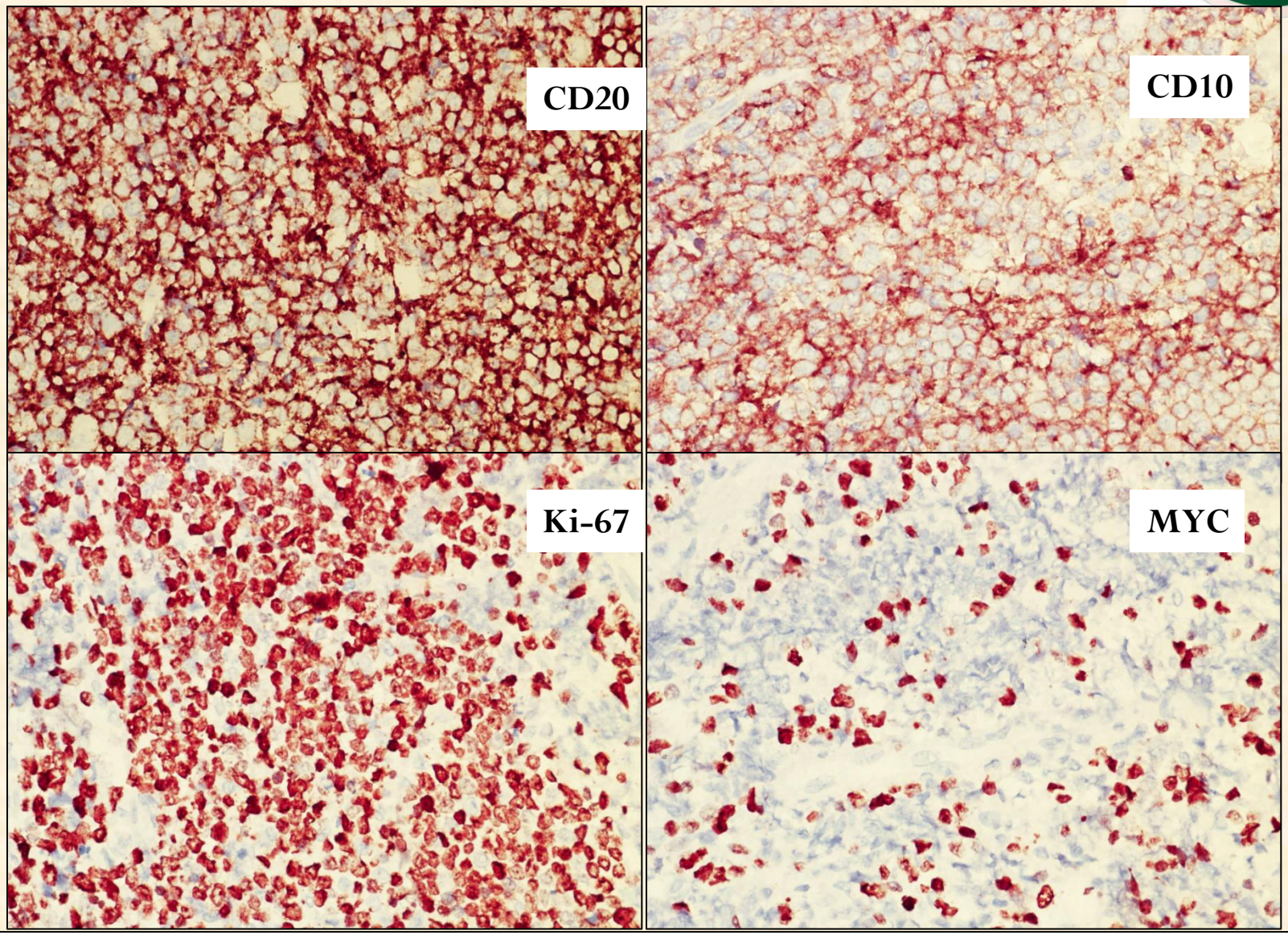


Left panel: HPE reveal a poorly differentiated tumor aranged in nest, seperated by thin fibrovascular septae (H&E stain x 400)

Right panel:The cells show minimal cytoplasm, vesicular nuclei and occasiona cell with single nucleoli (H&E stain x 1000)

S/o small round blue cell tumor

Immunohistochemistry
CD20, CD10, MYC positive ,nearly 100% Ki-67



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Final diagnosis

- Burkitt Lymphoma

- Unusual findings
  - BL, presenting as pleural effusion

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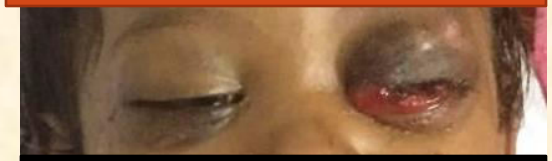
Role of morphology

- The identification of the neoplastic cells as cells of hematopoeitic origin
- Based on the morphological impression, subsequent use of ancillary technique namely flow cytometry of pleural fluid
- Prompt diagnosis and treatment well before the availability of tissue diagnosis

Armed Forces Medical College, Pune

Case 5

PRE CHEMOTHERAPY



CASE 5…

POST INDUCTION CHEMOTHERAPY

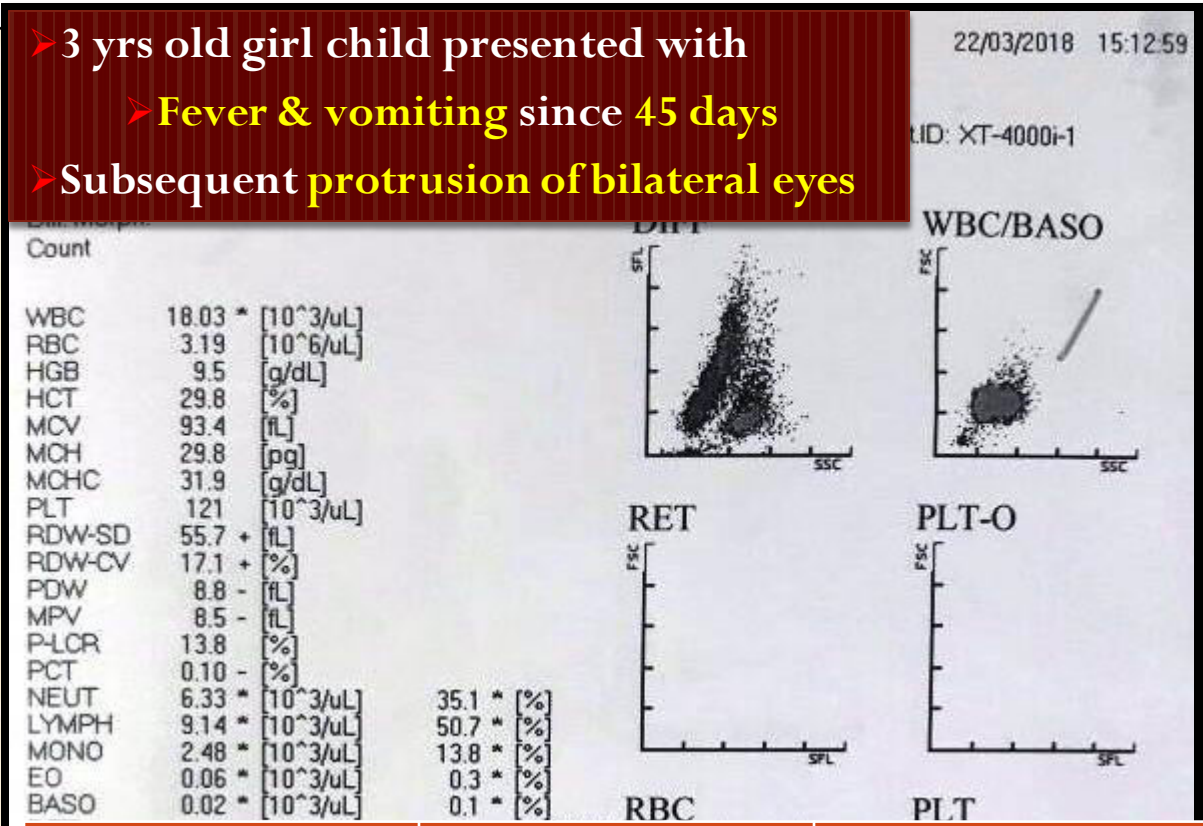
Hb : 9.9 gm/dl;TLC : 3770/cumm; DLC : P-06%, L-94%; Platelets : 3,50,000/cumm

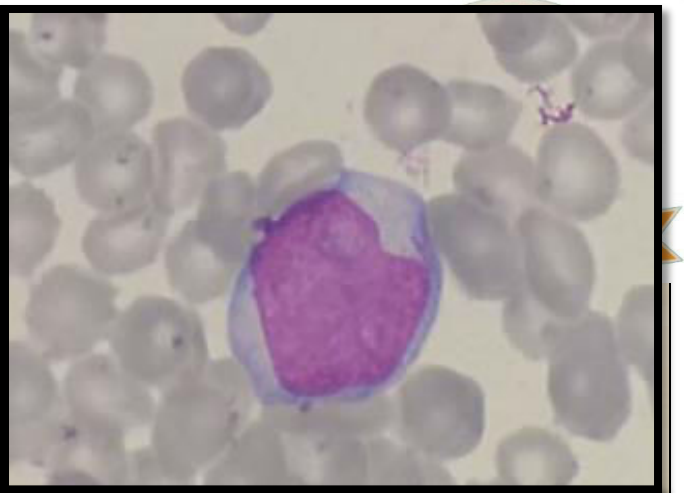
Antibody	Result	Intensity
CD45	Positive	Dim
CD 34	Positive	Moderate
CD 117	Positive	Moderate
MPO	Negative	-
CD13, 33	Positive	Moderate
CD 11c	Positive	Moderate
HLA-DR	Positive	Moderate

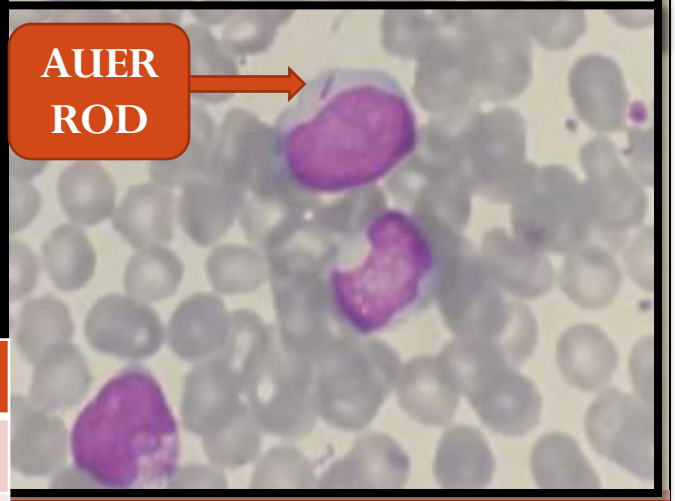
Bone marrow biopsy showed increase in immature cells positive for CD117 and negative for MPO

- 2.5 yrs old girl child presented with vomiting and headache since 2 weeks
- Subsequent redness and protrusion of bilateral eyes (L > R) along with facial deviation to right side
- CNS : 6th nerve and LMN type 7th nerve palsy of left side
- MRI done at CH (CC) Possibility of chronic infection/ inflammatory disorder

- 3 yrs old girl child presented with
  - Fever & vomiting since 45 days
- Subsequent protrusion of bilateral eyes







Antibody	Result	Intensity
CD45	Positive	Dim
CD 34, TdT	Positive	Moderate
CD 117	Positive	Moderate
MPO	Positive	-
CD13, 33	Positive	Moderate
CD 19	Positive	Dim
HLA-DR	Positive	Moderate

CASE 6…

Age/ Sex	Presenting Signs &Symptoms	Radiological Impression	Provisional Diagnosis
45/F	Pain abdomen and weight loss	Intestinal obstruction with stricture ileocaecal junction	Tuberculosis
27/M	Pain abdomen weight loss	Mesenteric lymphadenopathy	Tuberculosis

Positive Lab Findings	Sample	Positive markers FCM	Positive IHC	Final Diagnosis
Raised TLC	Blood, Lymph node	Dim CD 45 with CD34, MPO, CD117, CD13, CD 33	CD45, CD34, MPO, CD117, Ki67; 95%	AML M4
High TLC with Blasts	Peripheral blood and lymph node	CD11c CD 34, MPO	CD 34, TdT	AML M4

MYELOID SARCOMA (2017-2018)

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Myeloid Sarcoma (MS)…

- WHO updated version 2016 defines MS as
  - ‘tumor mass comprising of myeloid blasts with without maturation occurring at an anatomic site other than the bone marrow’
- AML M2, M4 and M5 associated AML
- 5-year survival rate poor with MS- 21%

•Journal of Cancer Metastasis and Treatment ;Volume 2; Issue 2;February 29, 2016

•Ganzel C, Douer D. Extramedullary disease in APL: a real phenomenon to contend with or not? Best Pract Res Clin Haematol 2014;27:63-8.

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Myeloid Sarcoma (MS)…

- Common sites include
  - Skin, subperiosteal bone and lymph nodes
  - Unusual sites-peritoneum, central nervous system, oral-nasal mucosa, breast, genitourinary tract, chest wall, pleura, retroperitoneum and gastrointestinal system

Yu T, Xu G, Xu X, et al. Myeloid sarcoma derived from the gastrointestinal tract: a case report and review of the literature. OncolLett2016;11:4155-9.

Pileri, S.A., Ascani, S., Cox, M., Campidelli, C., Bacci, F., Piccioli, M. et al. (2007) Myeloid sarcoma: clinicopathologic, phenotypic and cytogenetic analysis of 92 adult patients. Leukemia 2007;21:340-50.

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Myeloid Sarcoma (MS)…

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- Cytogenetic abnormality
  - In 50% of cases
  - Prevalence of translocation t(8;21) in 8-35%

- Conventional AML type chemotherapy Cytarabine containing regime protocols are being followed in isolated MS cases

SWITCH OVER ©

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Layout of presentation

- Myelodysplastic syndrome, MDS/MPN
- Chronic lymphoproliferative disorders
- Morphological mimics
- Conclusion

Case 1

- 56 year old female presented with weakness and anemia requiring transfusion
- Received 10 transfusions in last 01 year
- CBC revealed pancyotpenia
- On examination no lymphadenopathy or organomegaly

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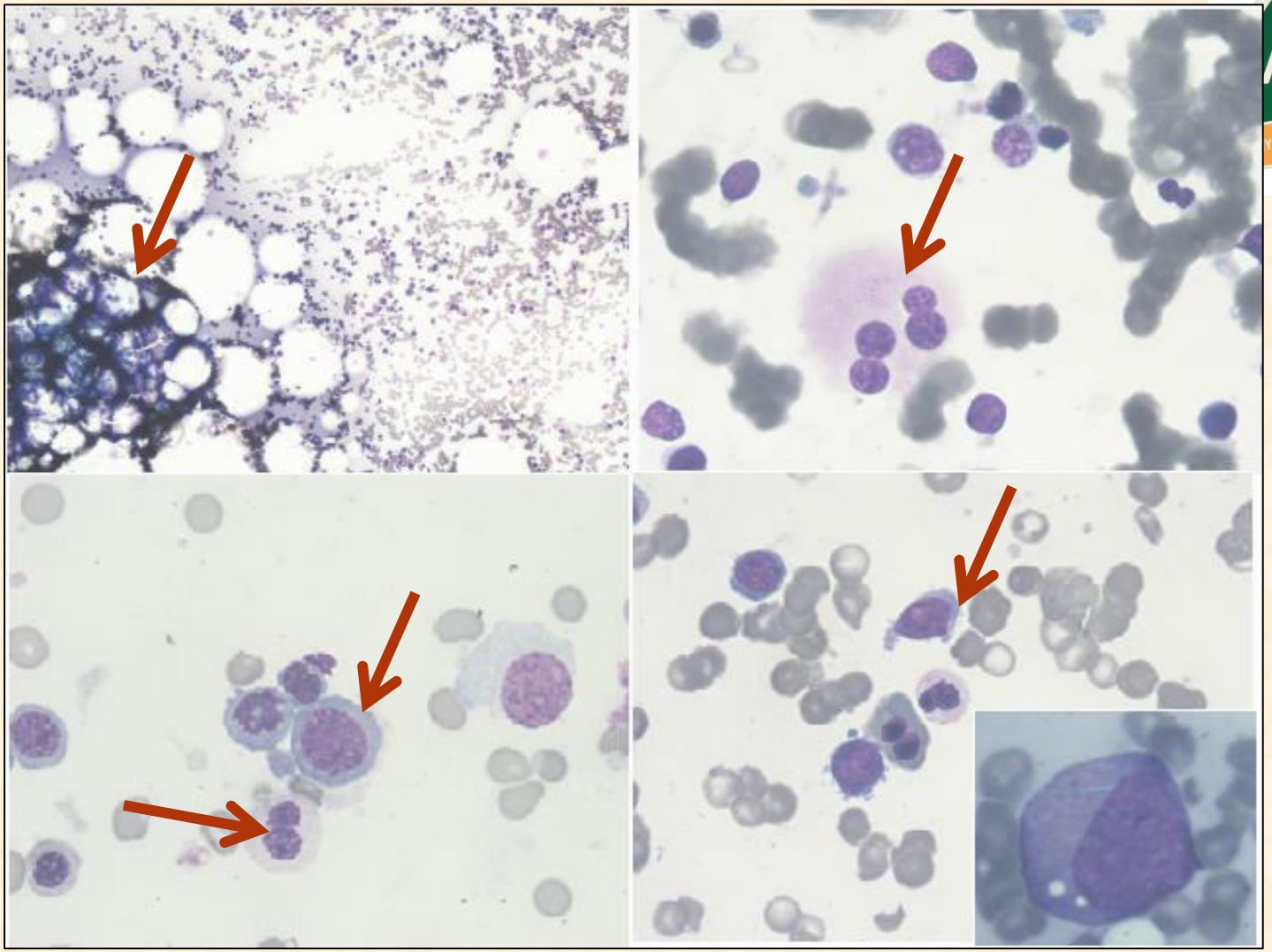
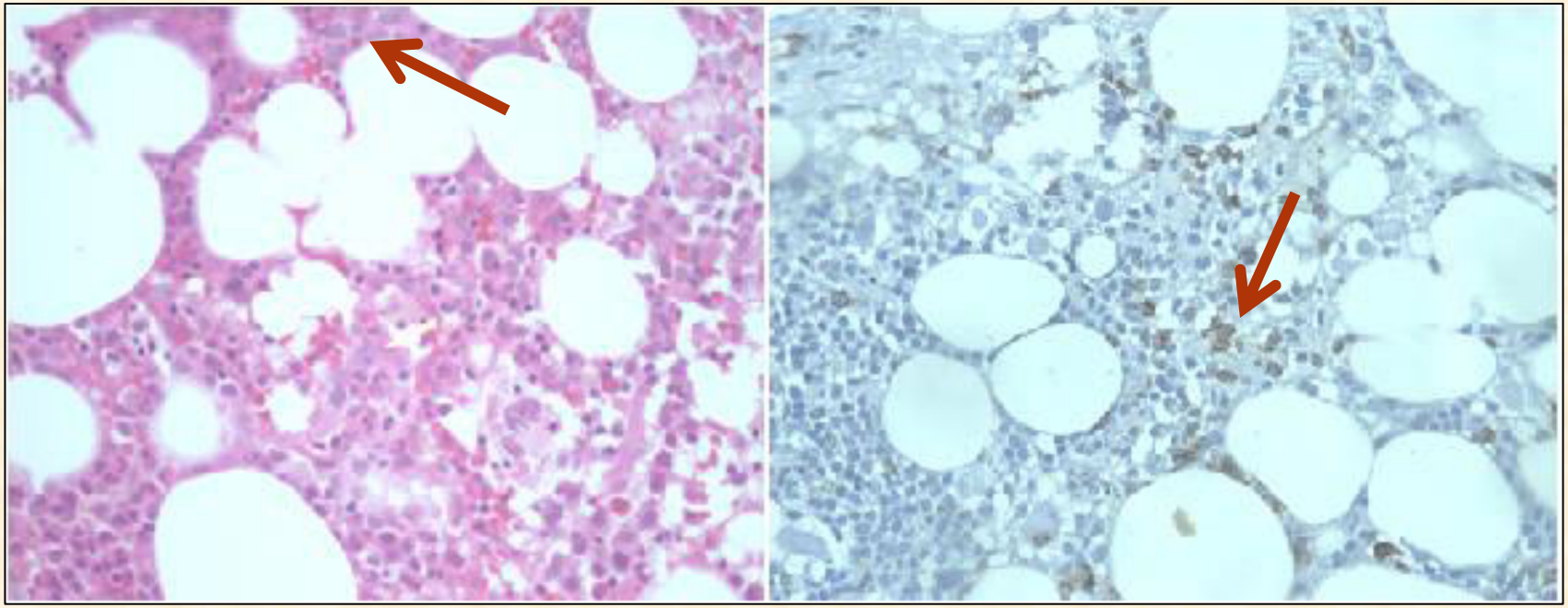


Bone marrow aspirate showing moderately cellular fragments with dysmegakaryopoeisis, dyerythropoeisis and dysmyelopoeisis with increase in blasts. (Jenner Giemsa stain)



Left panel: Bone marrow biopsy showing foci of immature cells (H&E stain x 400)

Right panel: These cells are immunopositive for CD 34 (IHC x 400)

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Myelogram

- Blasts 10%, Erythroid cells 47%, myelocytes 08%, metamyelocytes 05%, neutrophils 10%, lymphocytes 17%, plasma cells 03%

- Diagnosis – Myelodysplastic syndrome with Excess blasts-2 (MDS- EB-2)

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Prognostic relevance of EB

- Subtype of MDS affects survival and incidence of evolution to acute myeloid leukaemia (AML)
- 25% of cases MDS-EB-I and 33% of patients with MDS-EB-2 progress to AML
- The median survival is approximately 16 months for MDS-EB-1 and 9 months for MDS-EB-2

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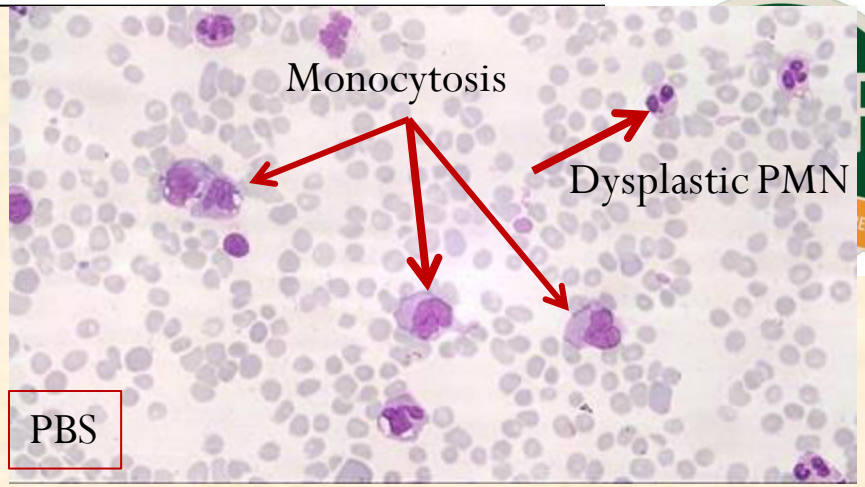
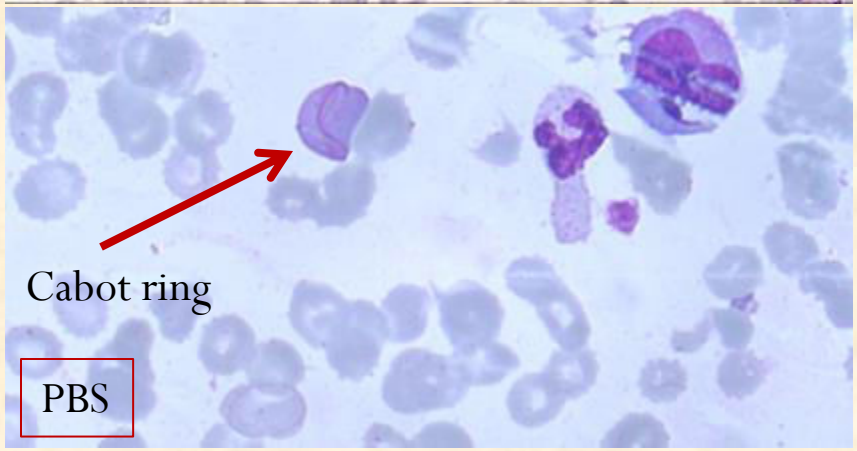
Importance of cytomorphology

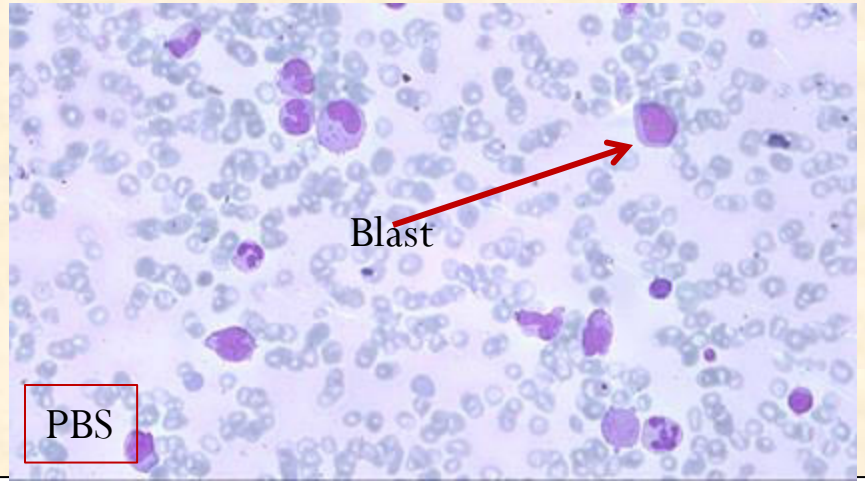
- Identification of multilineage dysplasia
- Diligent counting of blasts

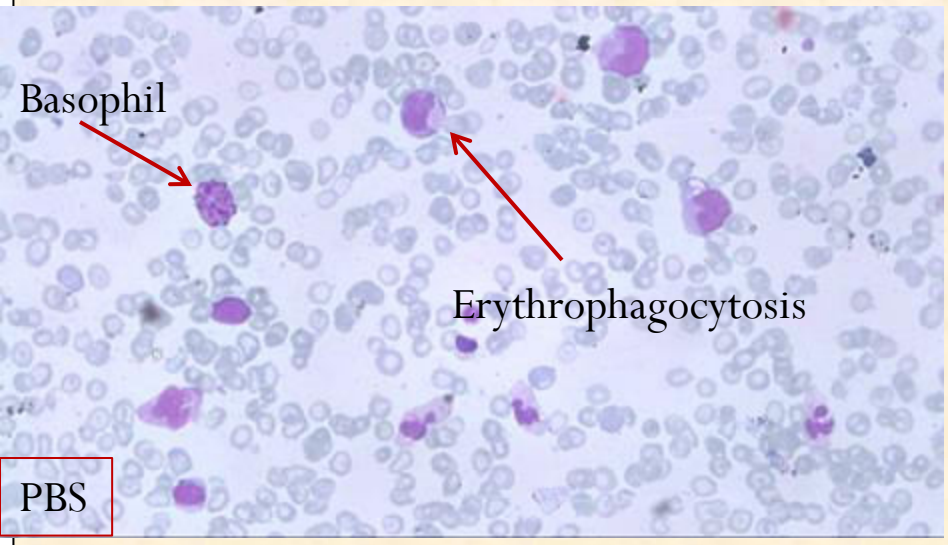
Case -2

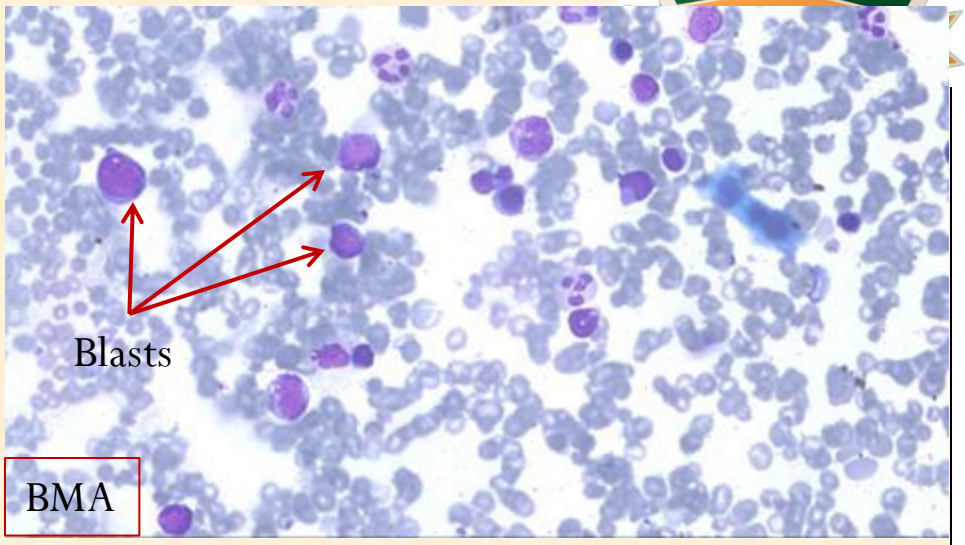
- 52 yr old male
- Presented with massive splenomegaly
- Investigations
  - Hb 8.0 gm/dl
  - TLC- 32,000/ cumm
  - Plt – 12,000/ cumm

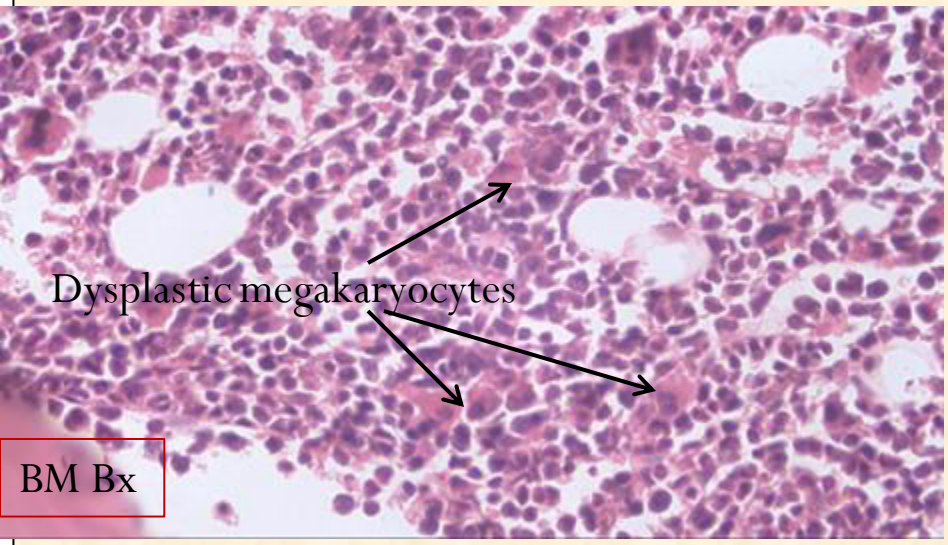


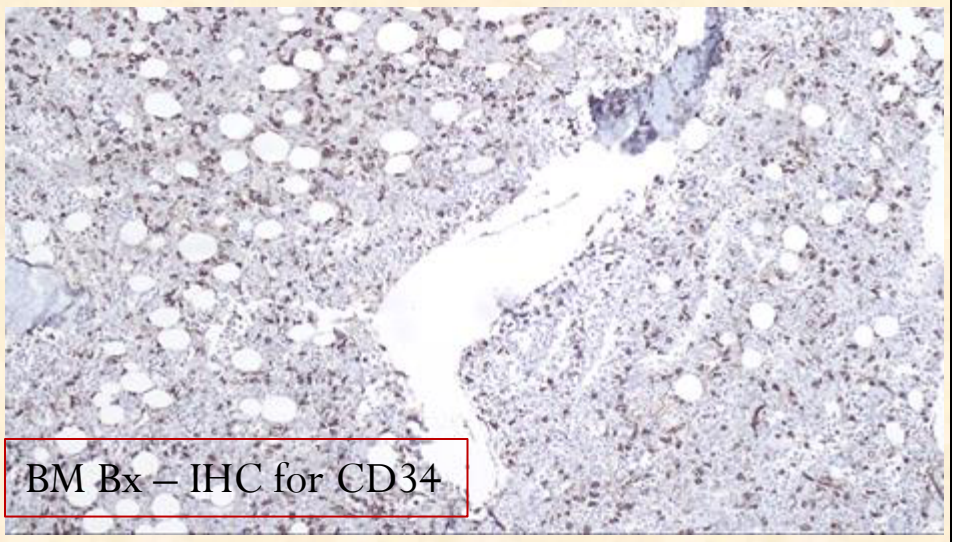





Basophil
Erythrophagocytosis
PBS


Blasts
BMA


Dysplastic megakaryocytes
BM Bx


BM Bx – IHC for CD34

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Salient findings

- Peripheral blood smear
  - Monocytosis (12600/cumm) with 05% blasts
- Bone marrow
  - 16% blasts
  - Dyspoietic megakaryocytes
- Cytogenetics
  - Monosomy 7
- Molecular genetics
  - Negative for BCR-ABL1

Final Impression

Chronic myelomonocytic leukemia – II

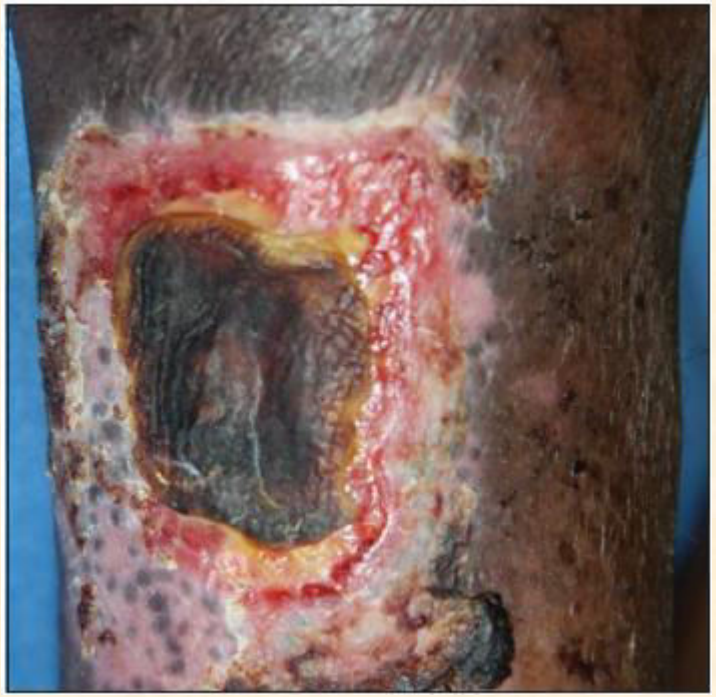
(CMML-II)

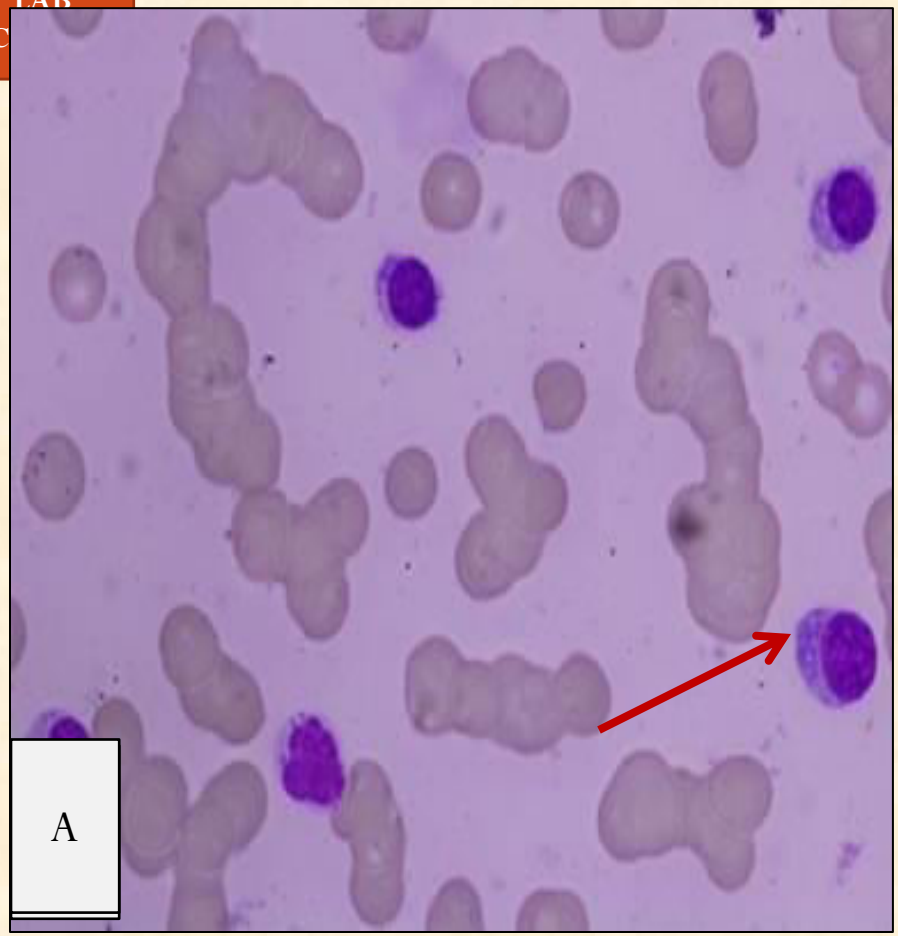
Important aspects of morphology

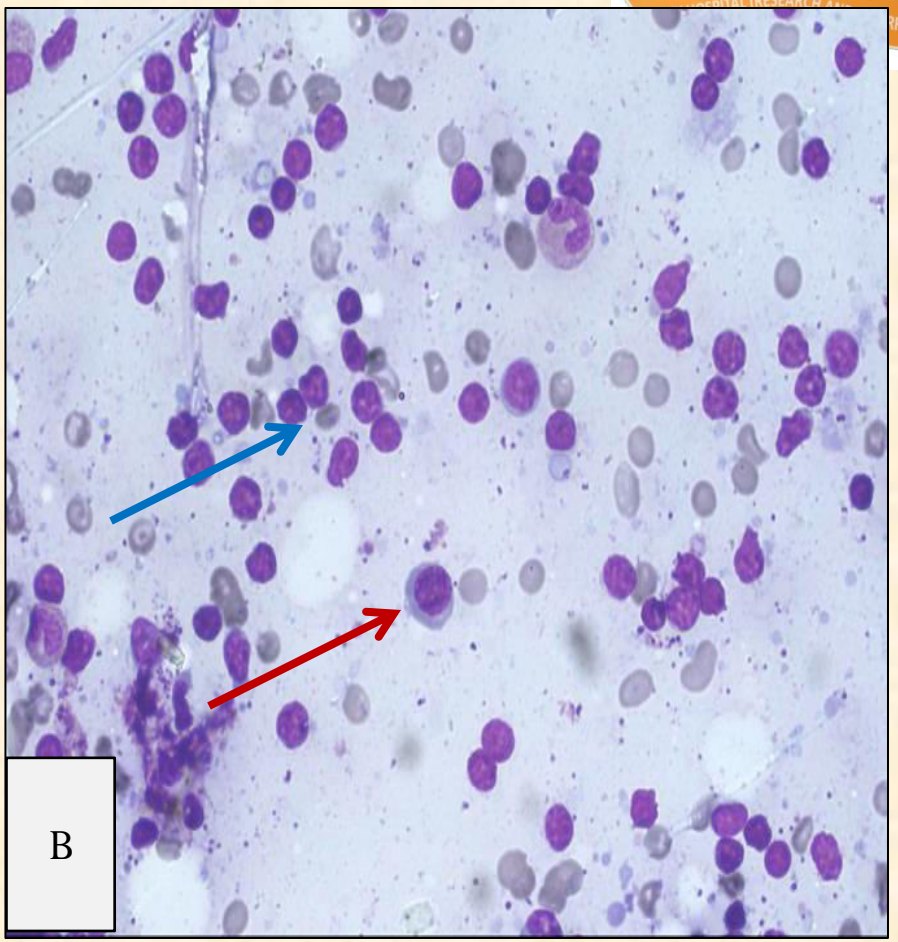
- Identification of dyspoiesis
- Monocyte count
- Blast enumeration
- Essential aspects of diagnosis and subclassification of the disease
- Blast percentage in PB and BM is the most important factor in determining the survival

Case 3

- 70 yr male
- Presented with non healing leg ulcers, fatigability
- Blood sample clotted in EDTA/ Citrate during repeated attempts
- At 37 deg, sample returned to fluid state (Hb: 4.6 gm/dl)
  - S/o cryoglobulinemia







A: Peripheral smear showing background staining, rouleaux formation and plasmacytoid cells B: BMA showing predominance of lymphocytes along with lymphoplasmacytic cells

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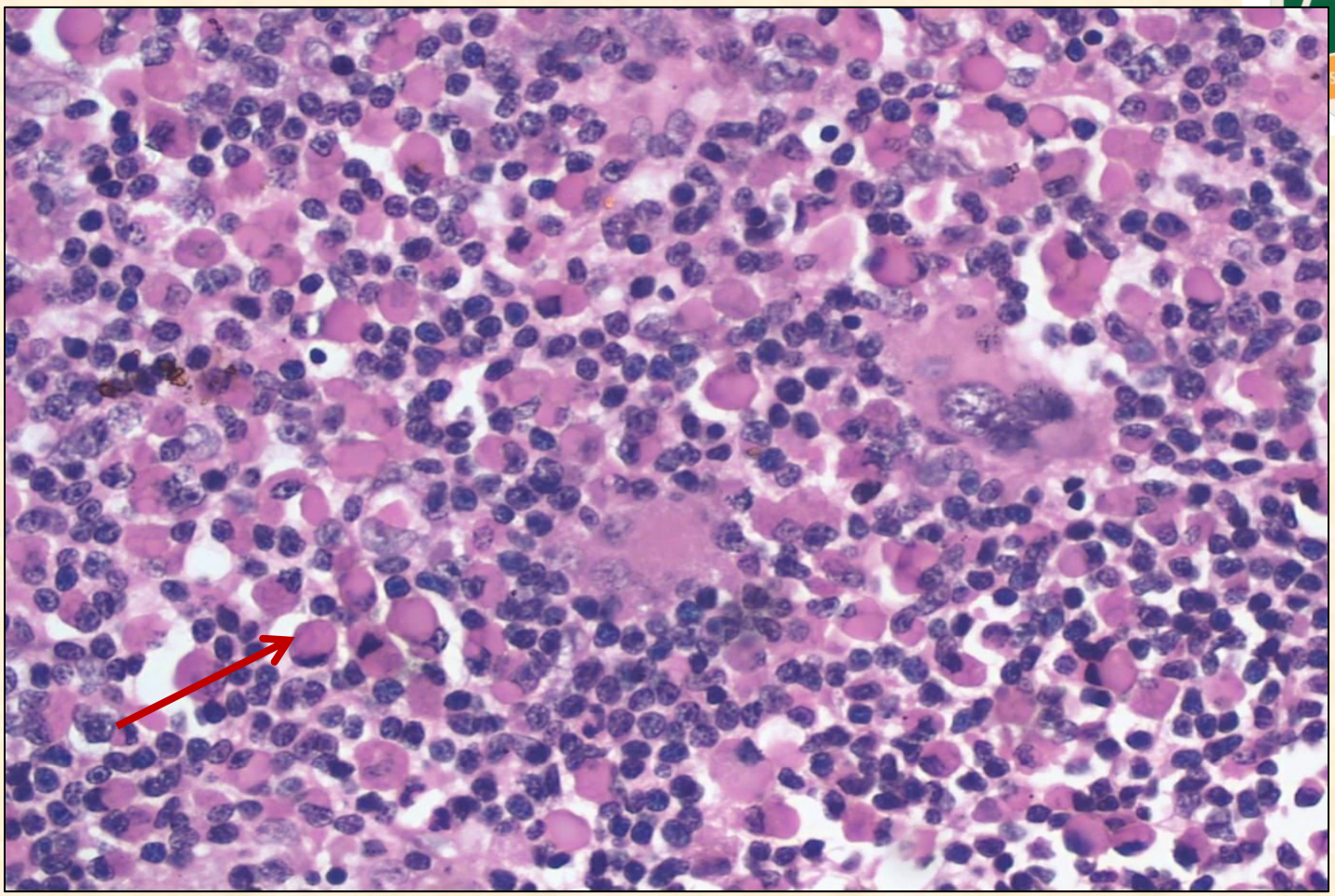
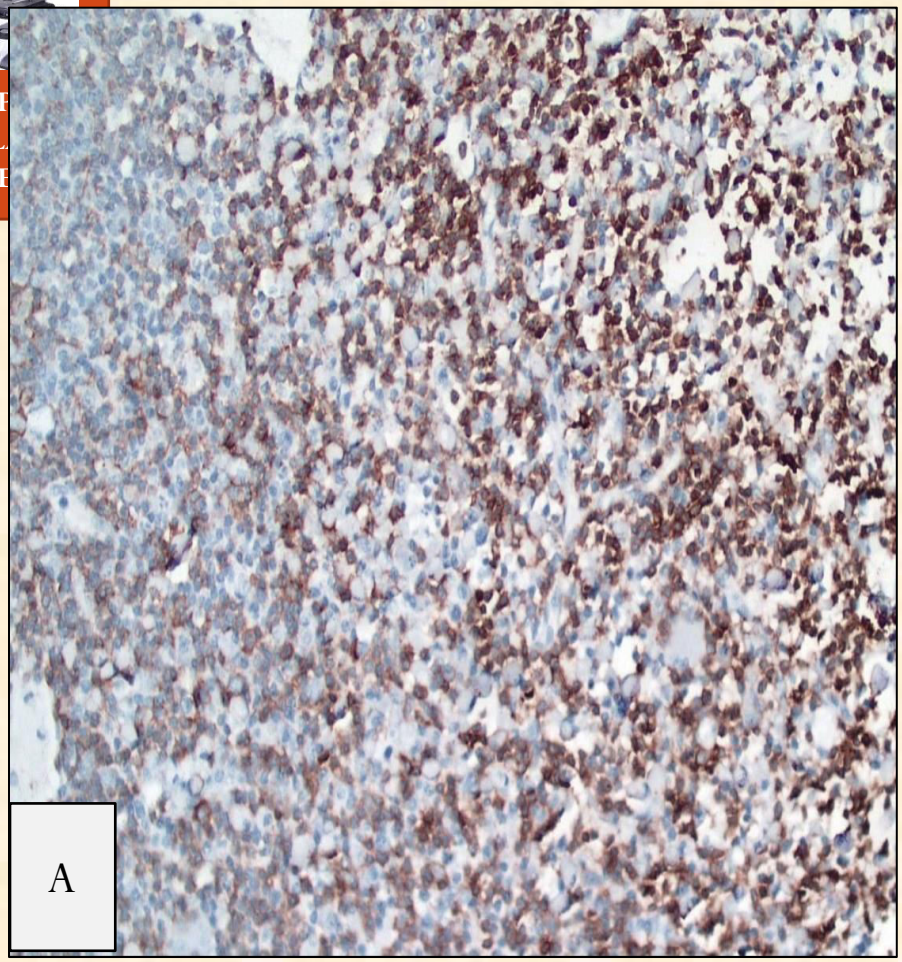
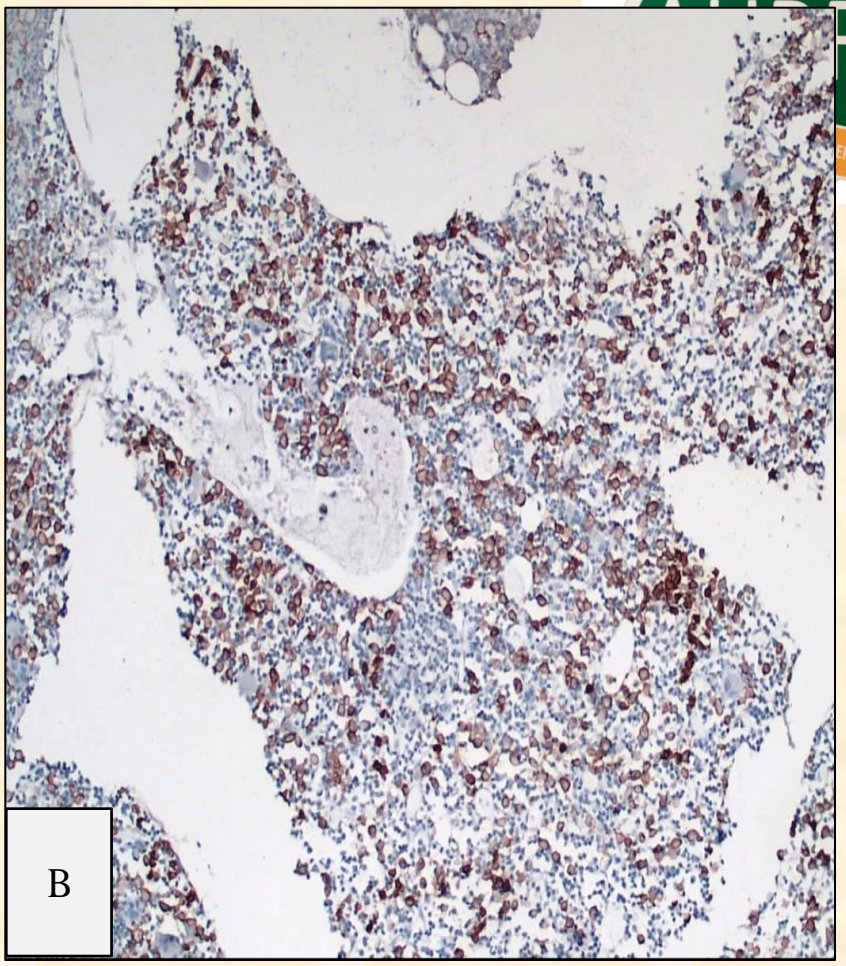


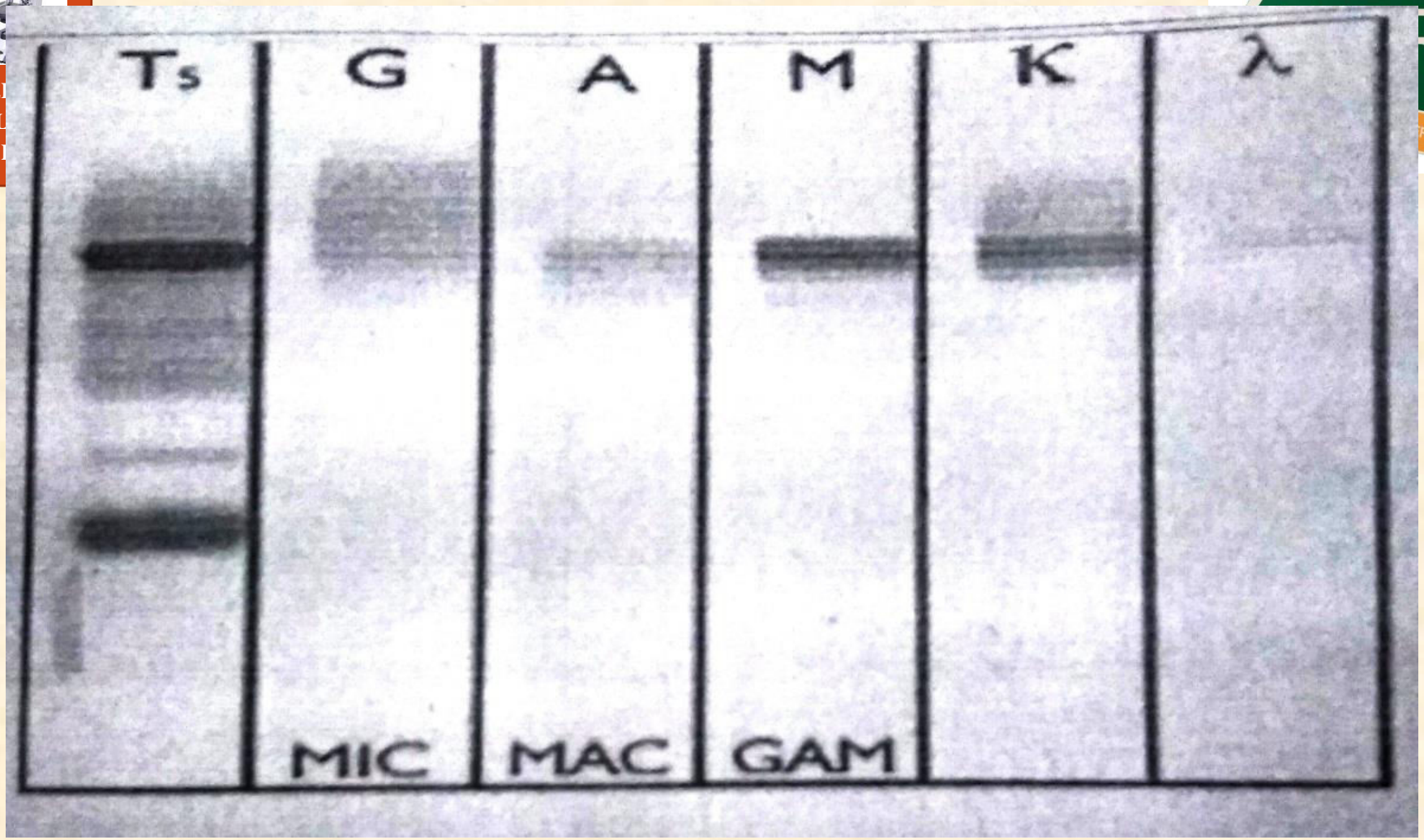
A: Trephine biopsy showing hypercellular marrow with infiltration by lymphocytes and plasma cells





A: Immunostaining with CD 20 highlighting the mature lymphoid cells

B: Immunostaining with CD 138 highlights the plasma cells.

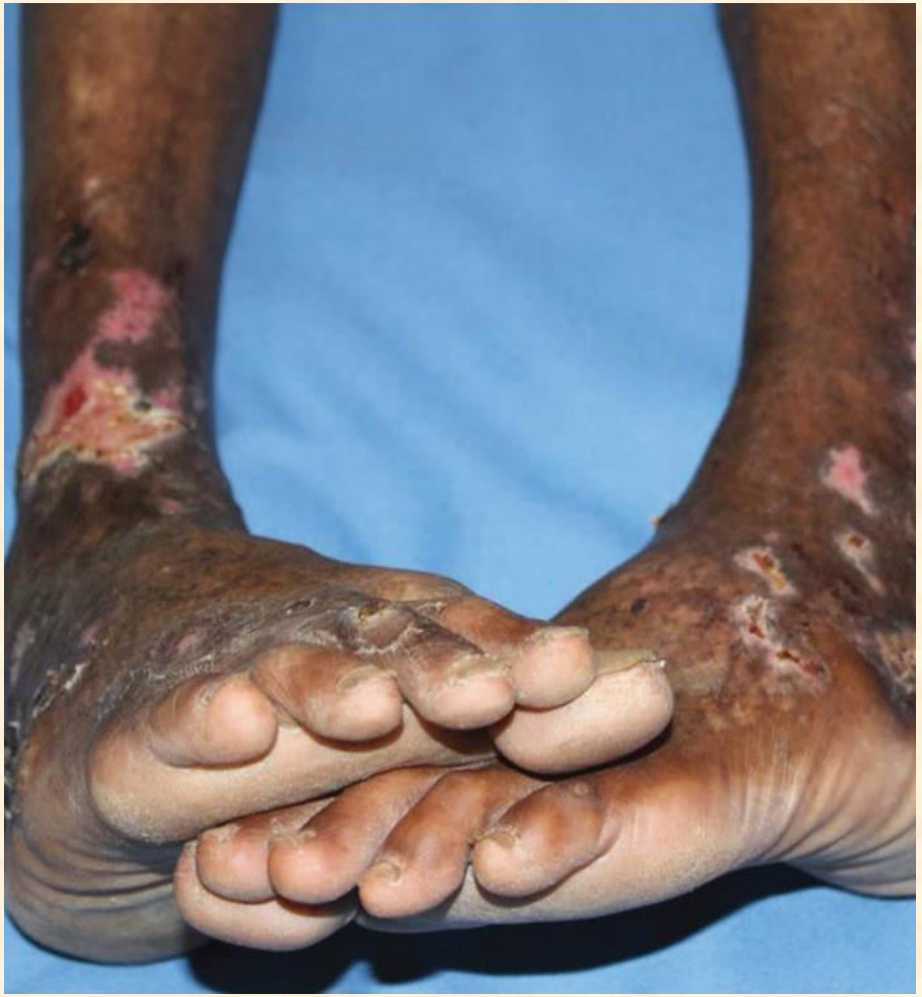


Serum protein 12 gm/dl with 09 gm/dl globulin. Immunofixation electrophoresis showing monoclonal Ig M with kappa light chain restriction

Waldenstrom Macroglobulinemia

Management

- Started with Rituximab based regimen
- Hb and leg ulcers improved



Case Report

Waldenstrom's macroglobulinemia: An unusual cause of nonhealing leg ulcers

Navjyot Kaur, Sanjeevan Sharma[1], Abhish Mohan, Pankaj Puri

Departments of Medicine, AFMC, [1]Command Hospital, Pune, Maharashtra, India

ABSTRACT

Waldenstrom's macroglobulinemia (WM) is one of the rare hematological malignancies and accounts for 1%–2% of all blood cancers. While fatigue is the most common presentation; hyperviscosity syndrome, symptomatic cryoglobulinemia, and cold agglutinin disease (CAD) are the characteristic symptoms. However, they occur only in 5%–15% of all patients of WM. We discuss a 63-year-old patient who presented with

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J Lab Physicians. 2014 Jul-Dec; 6(2): 127–129.
doi: 10.4103/0974-2727.141516
PMCID: PMC4196362

Cryoglobulinemia as an Initial Manifestation of Underlying Hematological Malignancy: A Rare Occurrence in India

Narender Kumar, Reena Das, Dinesh Chandra, and Pankaj Malhotra[1]

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[1]Department of Internal Medicine, Postgraduate Institute of Medical Education and Research, Chandigarh, India
Address for correspondence: Dr. Narender Kumar, E-mail: kumar.narender@pgimer.edu.in

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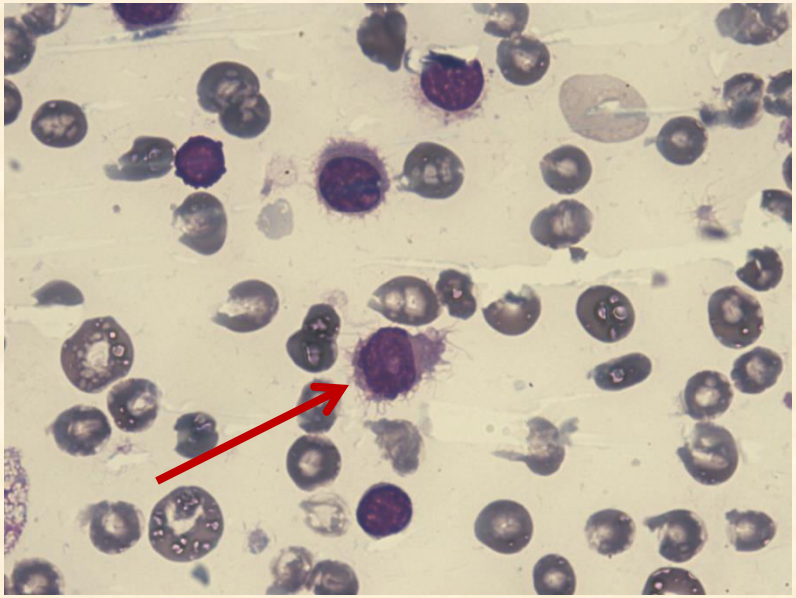
Lessons learnt

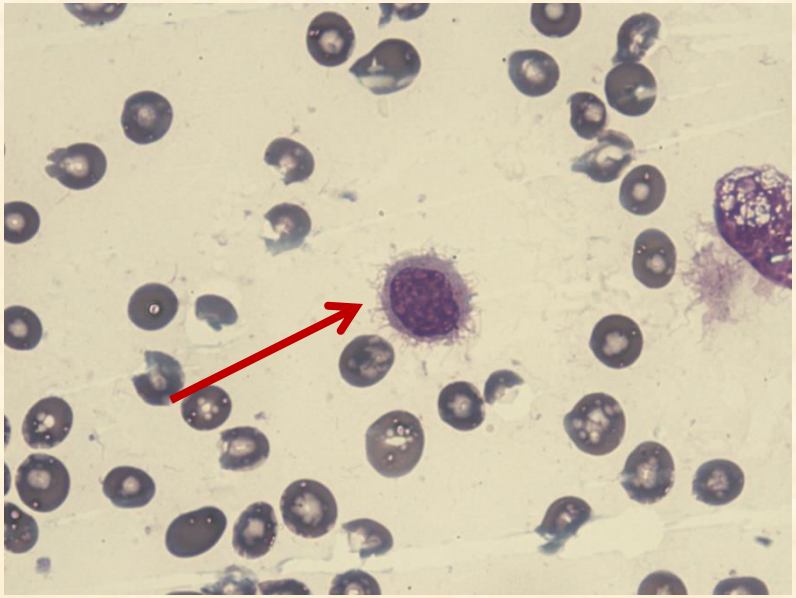
- Cryoglobulins – cause of sample clotting and leg ulcers
- High degree of suspicion and timely intervention led to fruitful outcome in this case


Copycats
always lurking

Case 4

Are all hairy cells lead to a diagnosis of HCL?





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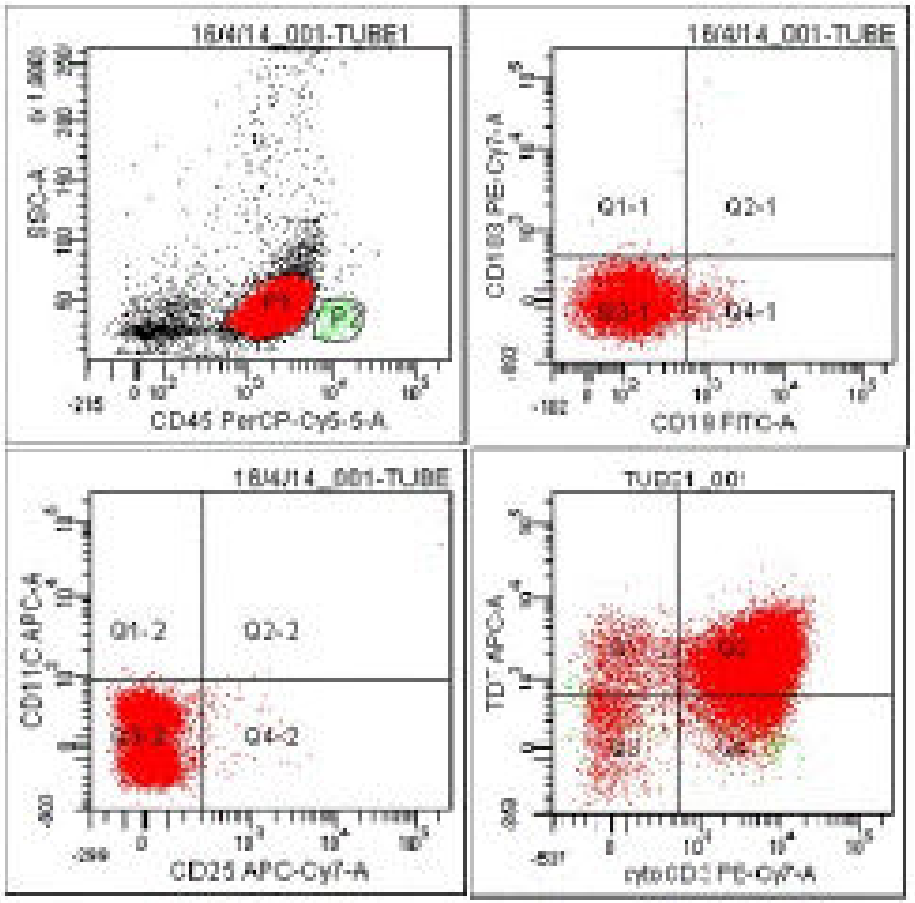

Figure 2: Flow cytometry dot plots showing that the neoplastic cells expressing cytoplasmic CD3, TdT diagnostic of T-ALL and are negative for CD19, CD11c, CD25 and CD103 ruling out HCL.

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Journal of Hematology & Thromboembolic Diseases

Somasundaram, et al., J Hematol Thrombo Dis 2015, 3:5
DOI: 10.4172/2329-8790.1000223

Case Report Open Access

Unusual Hairy Projections in a Case of T-acute Lymphoblastic Leukemia, a Cause for Diagnostic Dilemma: A Case Report

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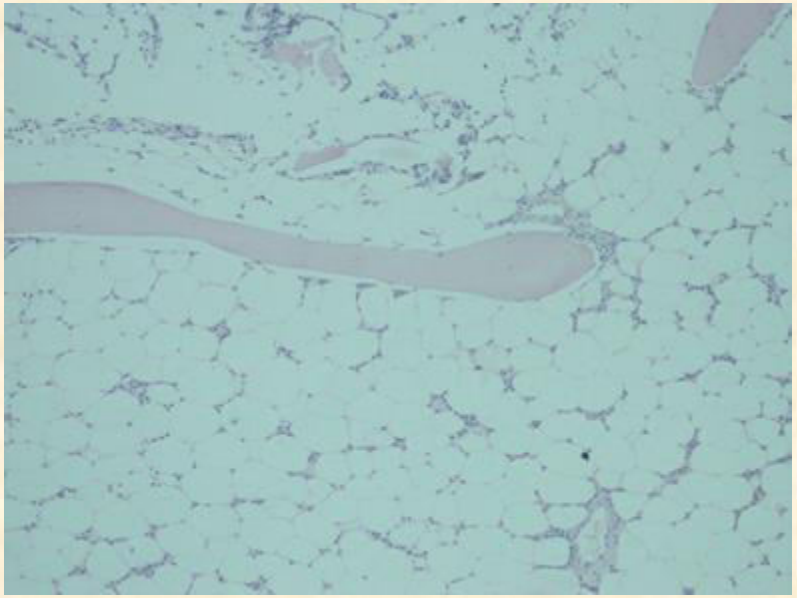
- Morphology forms the basis for effective utilization of expensive techniques such as FCM or IHC
- However morphology can be deceptive at times as brought out in this case
- Presence of hairy cells is a characteristic feature of HCL, cells with similar morphology are rarely reported in cases other than HCL such as plasma cell leukemia and hepatosplenic gamma delta lymphoma

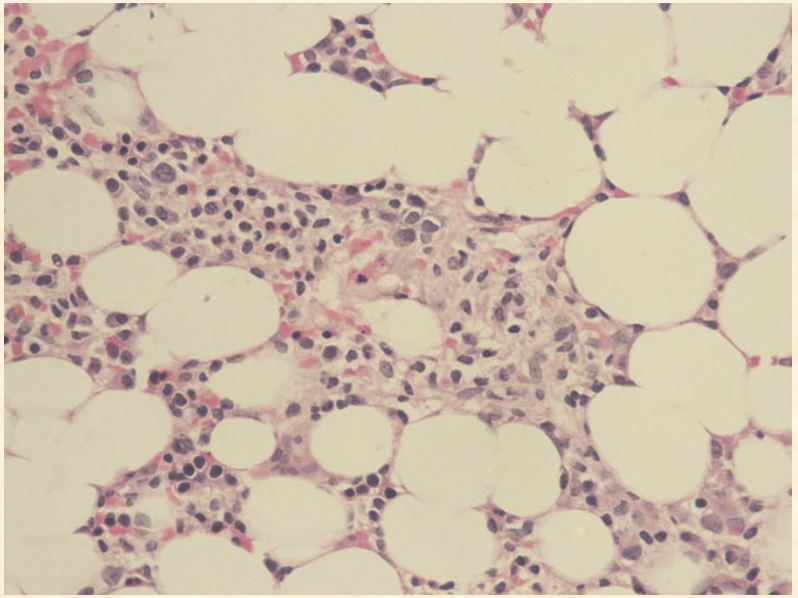
Case 5

- 67 yrs old retired doctor underwent coronary angioplasty five months ago
- Later developed weakness and easy fatigability
- Routine hemogram revealed pancytopenia

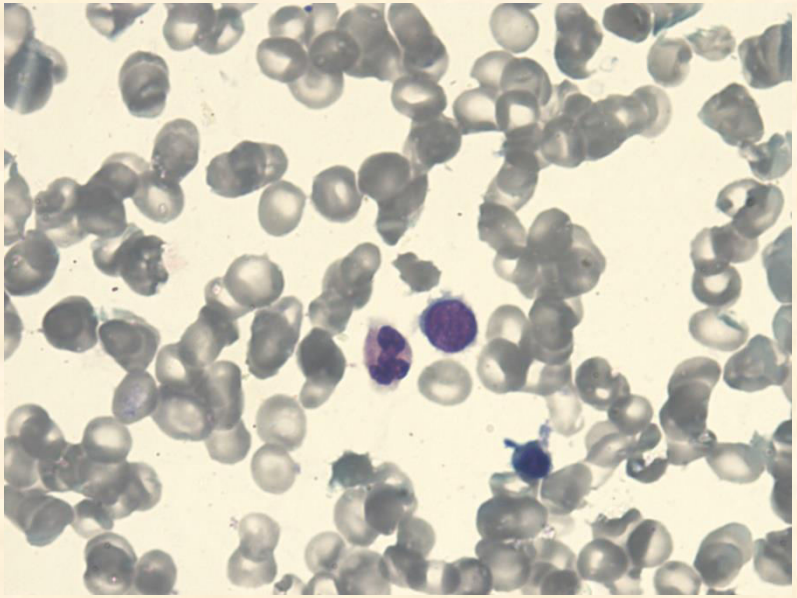
- **No organomegaly**
- Aplastic anemia in view of a hypocellular bone marrow biopsy
- Patient has received multiple PRBC and platelet transfusions

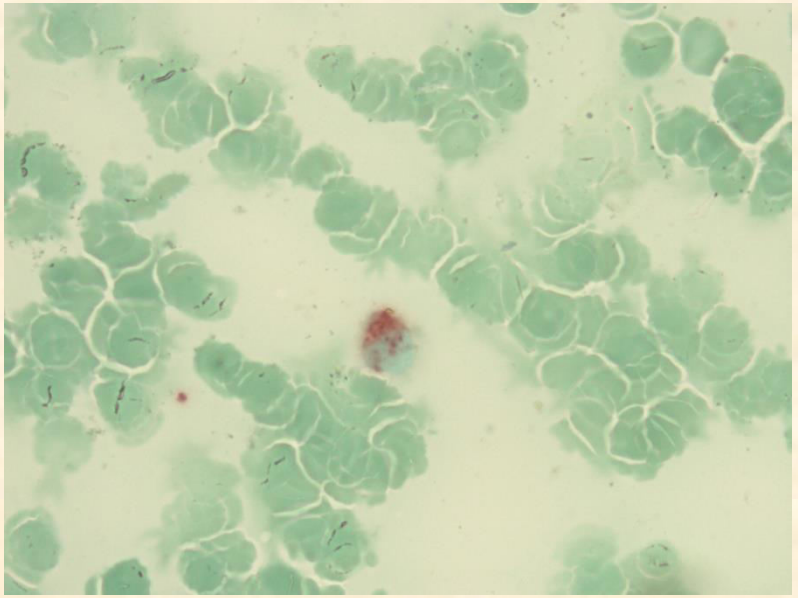
Rpt Bone marrow biopsy





Bone marrow aspirate





- In subsequent visit to OPD after a month, the follow up peripheral smear examination revealed 9-10% hairy cells

- Immunophenotyped and confirmed as **HCL** with expression of CD 19, CD 11c, CD 25 and CD 103

- Treated with cladribine
- Latest hemogram showed hemoglobin of 11.6 gm/dl, TLC 8050/cumm and platelets 1,50,000/cumm
- Transfusion independant

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CASE REPORT

Unusual Presentation of Hairy Cell Leukemia: A Case Series of Four Clinically Unsuspected Cases

S. Venkatesan · Abhishek Purohit · Mukul Aggarwal · Prabhu Manivannan · Seema Tyagi · Manoranjan Mahapatra · Hara P. Pati · Renu Saxena

Case 4

A 67 years old retired doctor underwent coronary angioplasty five months ago and later developed weakness and easy fatigability. Routine hemogram revealed pancytopenia and the patient underwent bone marrow examination at an outside hospital and was suspected to have aplastic anemia in view of a hypocellular bone marrow biopsy. Patient has received multiple packed red cells and platelet transfusions for the past three months. Patient reported to our hematology OPD for second opinion; however he could not produce the previous bone marrow slides for review. With the clinical suspicion of MDS/Aplastic anemia, bone marrow examination was repeated. His hemogram showed Hb of 7.6 gm/dl, TLC 2000/cumm and platelet count of 70,000/cumm. Bone marrow aspirate was diluted and biopsy

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Lessons learnt

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- Careful observation of the cells even in a hypocellular bone marrow

- Hypocelluar marrow
  - Aplastic anemia
  - Hypoplastic MDS
  - Hypoplastic Acute Leukemia
  - Rarely HCL

Case 6

Case history

- 18y/m
- Resident of Bihar
  - Fever
  - Weakness
  - Pallor
  - left sided abd pain

3 months duration

History

- Received six units of PRBCs in three months
- Dull aching, continuous pain in left hypochondrium
- No significant past illness

Examination

- Febrile
- No lymphadenopathy
- System exam
  - Liver – 6 cm
  - Spleen – 8 cm
  - Other systems - NAD

- Bone marrow done outside – s/o acute leukemia

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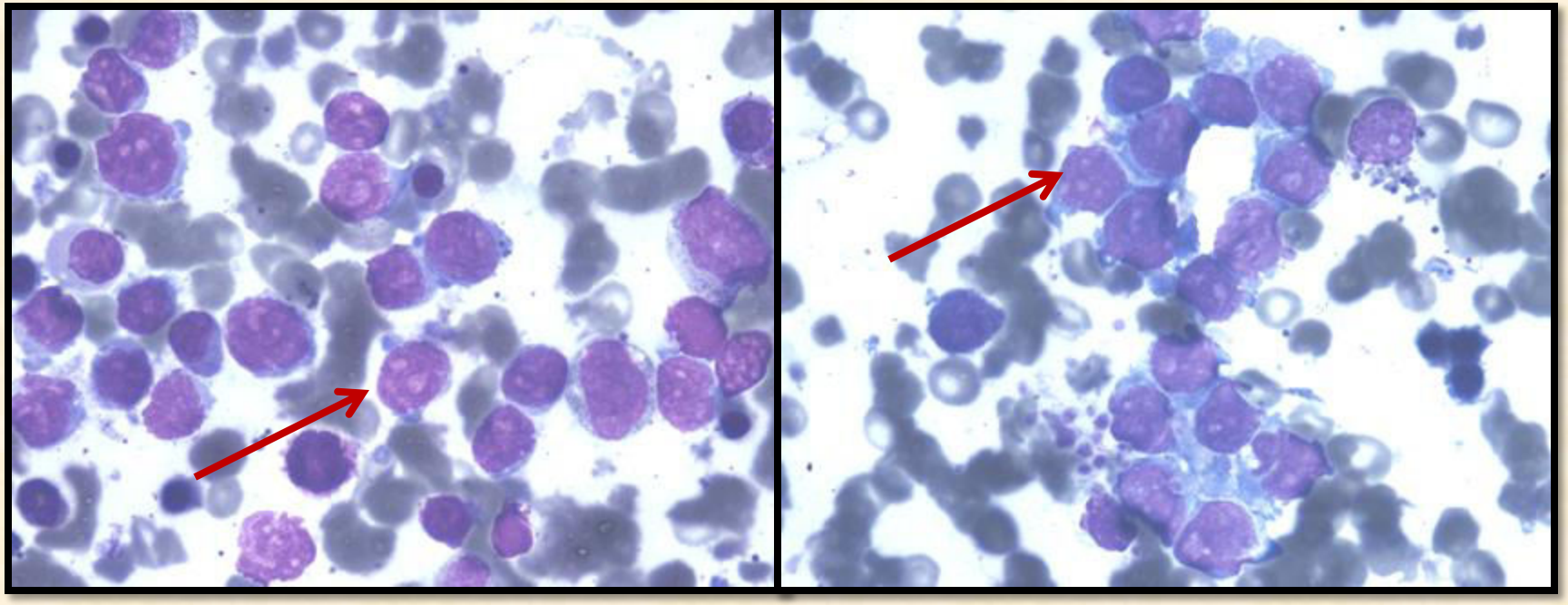
Lab Investigations…

Inv	
Hb (g/dl)	7.0
TLC	2660/cumm
DLC	N 39 L 50 M 08 E 03, no abnormal cells
Plt	46000/cumm

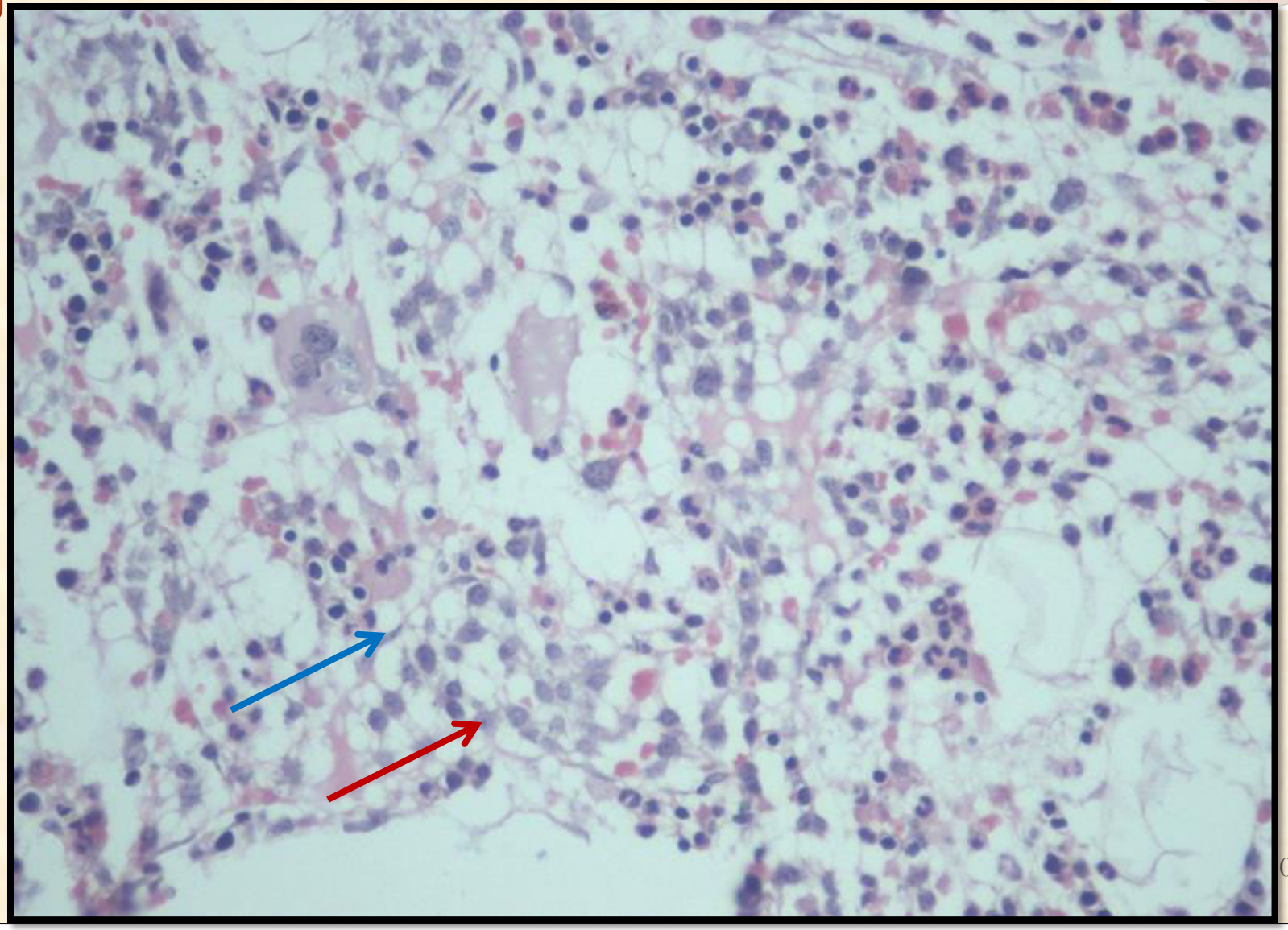
BM aspirate smears (review)



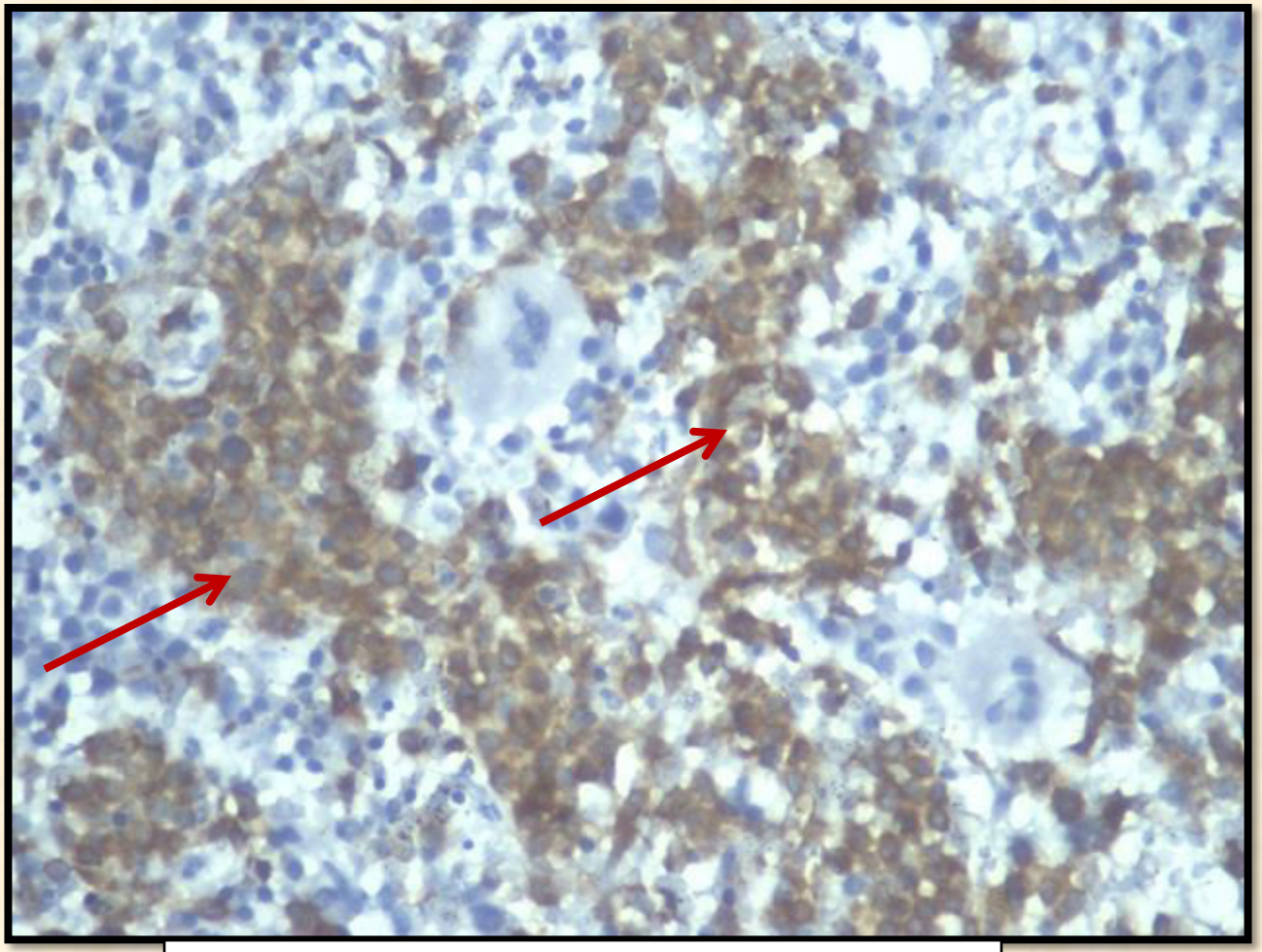
60% cells with blast morphology

No unstained slides available for cytochemistry

Bone marrow biopsy (review)



IHC – CD 3



Immunohistochemical staining for CD3 highlights lymphoid cells within sinusoids

Diagnosis

- Considering the clinical findings, morphology on BM Bx, IHC diagnosis of Hepatosplenic T-cell Lymphoma was offered

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Important points

- Large cells with blastic morphology mimicking acute leukemia

- Identification of **malignant cells within the sinusoids in bone marrow aided in making the diagnsois**

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Conclusion

- Evaluation of hematolymphoid malignancies doesn't stop until molecular studies in today's era

- However, with the illustrations we had given, morphology still holds its ground as it is often the guiding force for the sophisticated investigations to follow

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Conclusion

- In a resource limited setting, morphology guides in setting up of panel of antibodies for diagnosis of acute leukemia/chronic lymphoproliferative disorders, either by FCM or IHC
- It is even important in those cases where immunophenotyping may not yield a definite answer

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