

Sample Applied Exam – General Pathology

Case 1

A 56-year-old man, with no significant previous medical history, presented with a 2-month history of fatigue and pallor. The family physician ordered a complete blood count (CBC) with peripheral blood smear (PBS).

Question 1

Interpret the CBC report (slide 1). What are the possible causes of these results?

MODEL ANSWER

- Pancytopenia or Cytopenia
- Anemia, leukopenia/ neutropenia, thrombocytopenia
- Possible causes of pancytopenia include, drugs, toxins, infections, malignancies, nutritional deficiencies, autoimmune diseases.

Question 2

What is the next step in the investigation of this patient?

MODEL ANSWER

- Examine the peripheral blood smear (PBS).
- Review other available medical history and bloodwork

Question 3

Interpret this peripheral blood smear (PBS) and describe your findings (slide 2 and 3). What should be the next step in your investigation of this patient?

MODEL ANSWER

- Hypo granular and pelgeroid neutrophils
- Presence of Blast
- Thrombocytopenia
- Next step should be to arrange a bone marrow aspiration and biopsy

Question 4

You have arranged a bone marrow biopsy for this patient. What steps should be taken before starting the procedure?

MODEL ANSWER

- Patient in a stable medical state.
- Review the history to see if the patient is critically thrombocytopenic and/or on blood thinners which may increase risk of bleeding during the procedure.
- Explain the procedure to the patient.
- Explain the rationale for the procedure, risk and benefits.
- Ask if patient have any questions.
- Address all concerns of the patients.
- A written consent is explained and signed.



Question 5

The technologist asks you if any ancillary tests are needed on this bone marrow sample and if so, what tubes should be used for sample collection. How would you reply?

MODEL ANSWER

- Flow cytometry – EDTA (purple top), Heparin (light Green top), ACDA (yellow top), RPMI or Flow Media
- Cytogenetics – sodium Heparin, RPMI
- Molecular – EDTA (purple top), ACDA (yellow top)

Question 6

Describe the findings shown on this bone marrow aspirate smear (slides 4 and 5). Based on the results of CBC and peripheral blood smear, what is the most likely diagnosis?

MODEL ANSWER

- Dysplasia in erythroid lineage
- Hypogranular neutrophils
- Dysplastic Megakaryocytes
- Most likely diagnosis: "Myelodysplastic Syndrome with multilineage dysplasia (MDS-MLD)"

Question 7

What is the significance of cytogenetic studies in the diagnosis and prognosis of myelodysplastic syndrome?

MODEL ANSWER

- Specific cytogenetic finding can be diagnostic if morphology is borderline. However, most value of karyotypic findings are of prognostic value.

Question 8

Review the cytogenetic data provided (slide 6) and select TWO Myelodysplastic Syndrome (MDS) patients projected to have poor prognosis based on cytogenetic data.

MODEL ANSWER

- Patient C & D

Question 9

What is IPSS system in the management of Myelodysplastic Syndrome (MDS)?

MODEL ANSWER

- IPSS is an abbreviation for International Prognostic Scoring System (IPSS).
- IPSS is devised to determine treatment and to project prognosis
- This system is developed based on extensive retrospective data related to MDS patients and their clinical outcome

Question 10

Name THREE essential data elements required to calculate the IPSS score for MDS risk stratification.

MODEL ANSWER

- Blast count

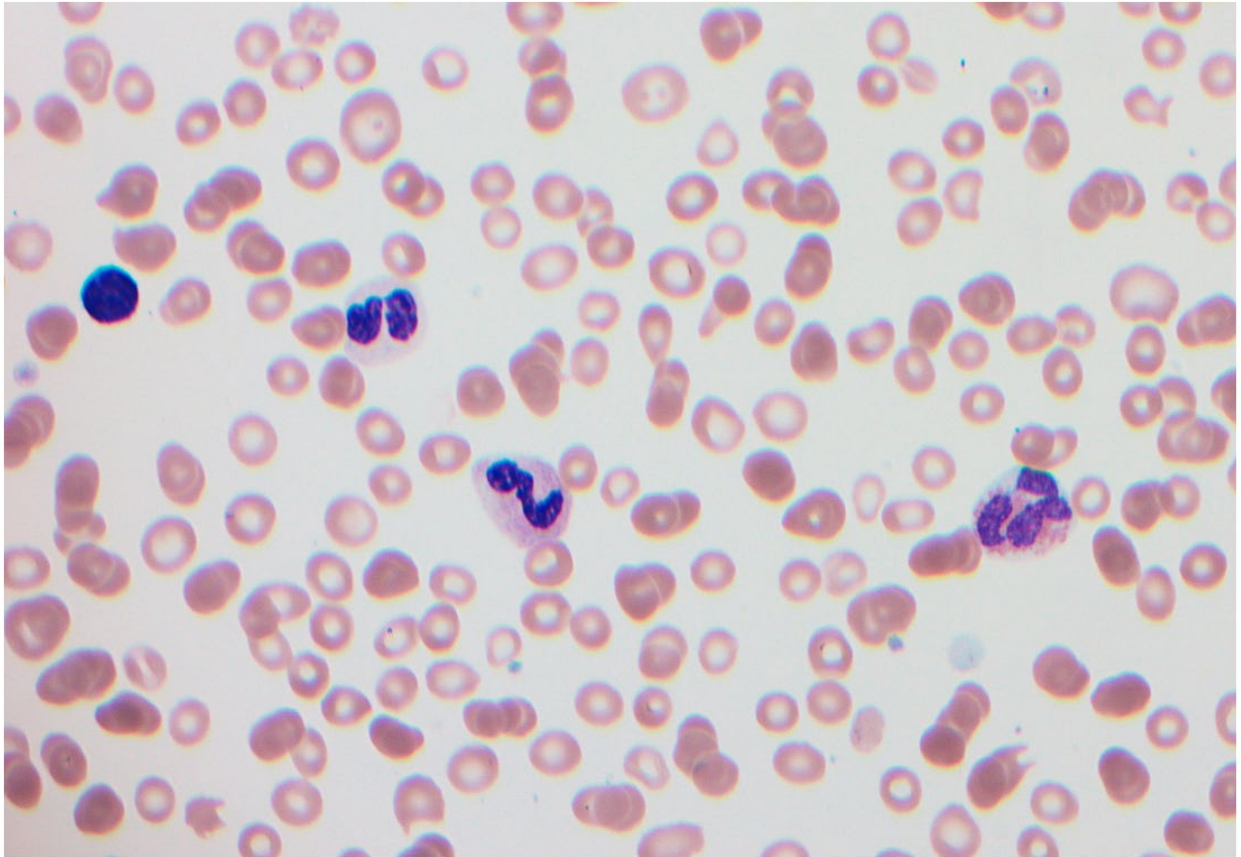
- Cytogenetic data
- Cytopenia



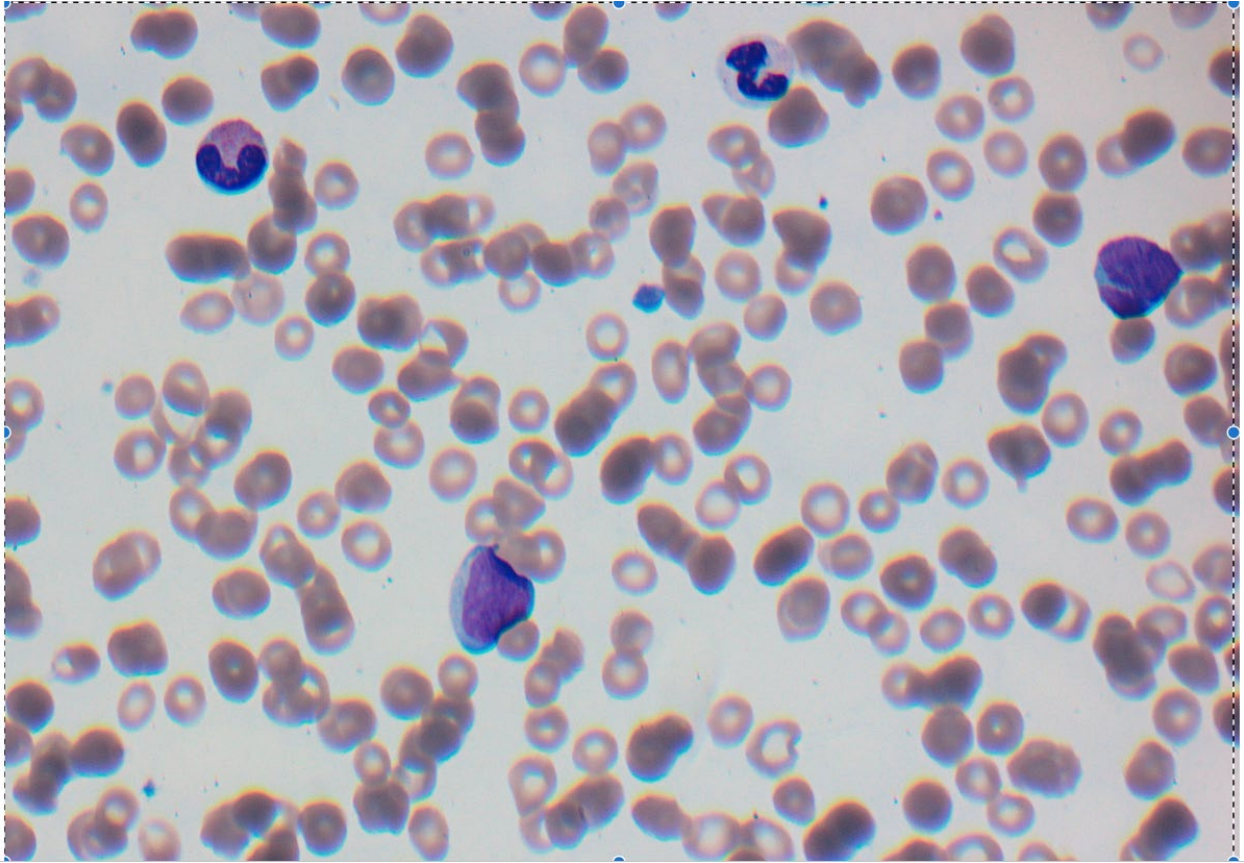
Slide 1

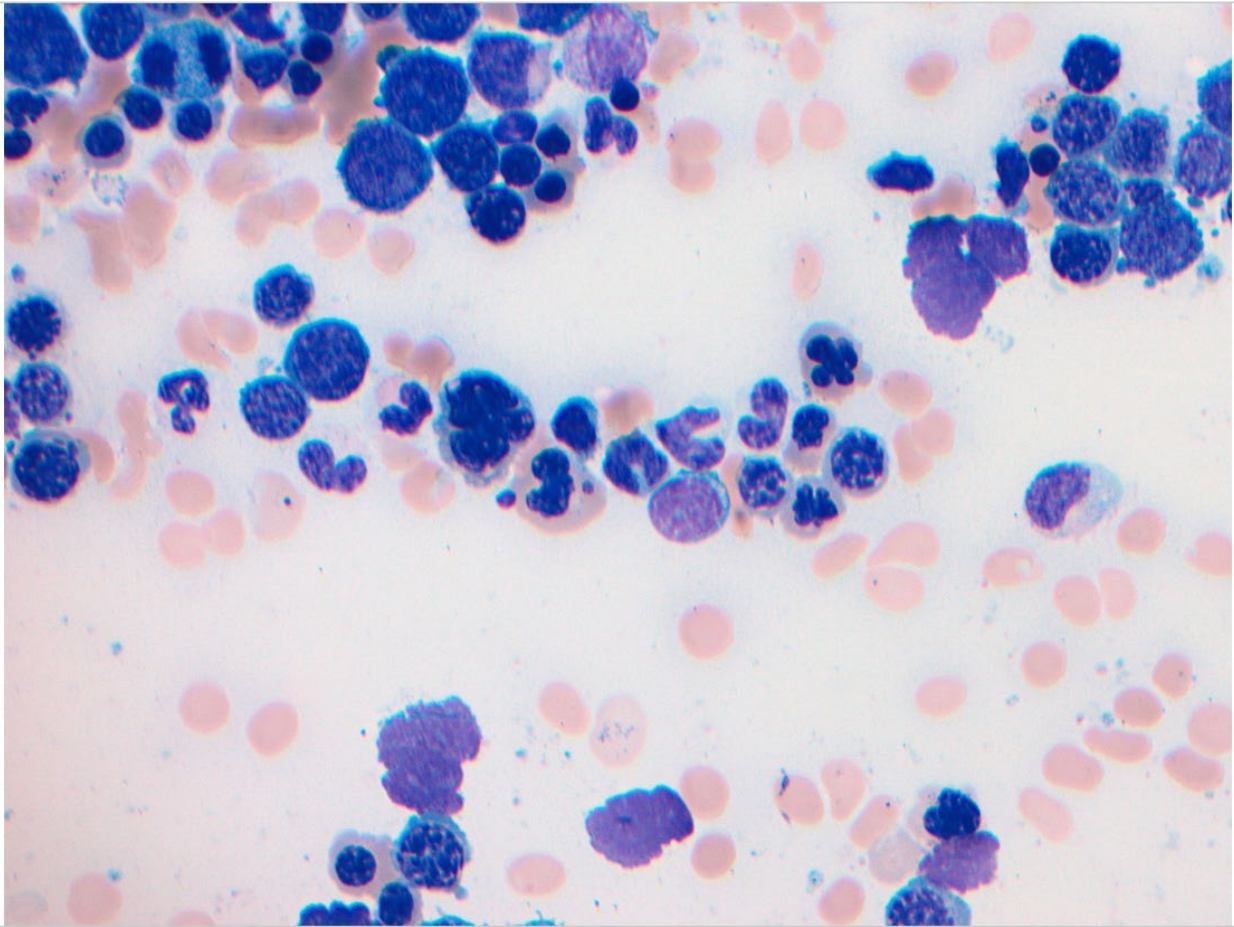
CBC	Patient	Normal range
Hemoglobin	73	137-180
Hematocrit	0.23	0.40-0.54
RBC	2.6	4.5-6.0
MCV	88	82-100
MCHC	321	320-360
RDW	15.0	11.0-16.0
Platelet count	117	150-400
WBC	1.9	4.0-11.0
Neutrophils	0.5	2.0-8.0
Lymphocytes	2.1	0.7-3.5
Monocyte	0.9	0.0-1.0
Blasts	0.1	0.0-0.0
Nucleated red cells	3/100 WBC	

Slide 2

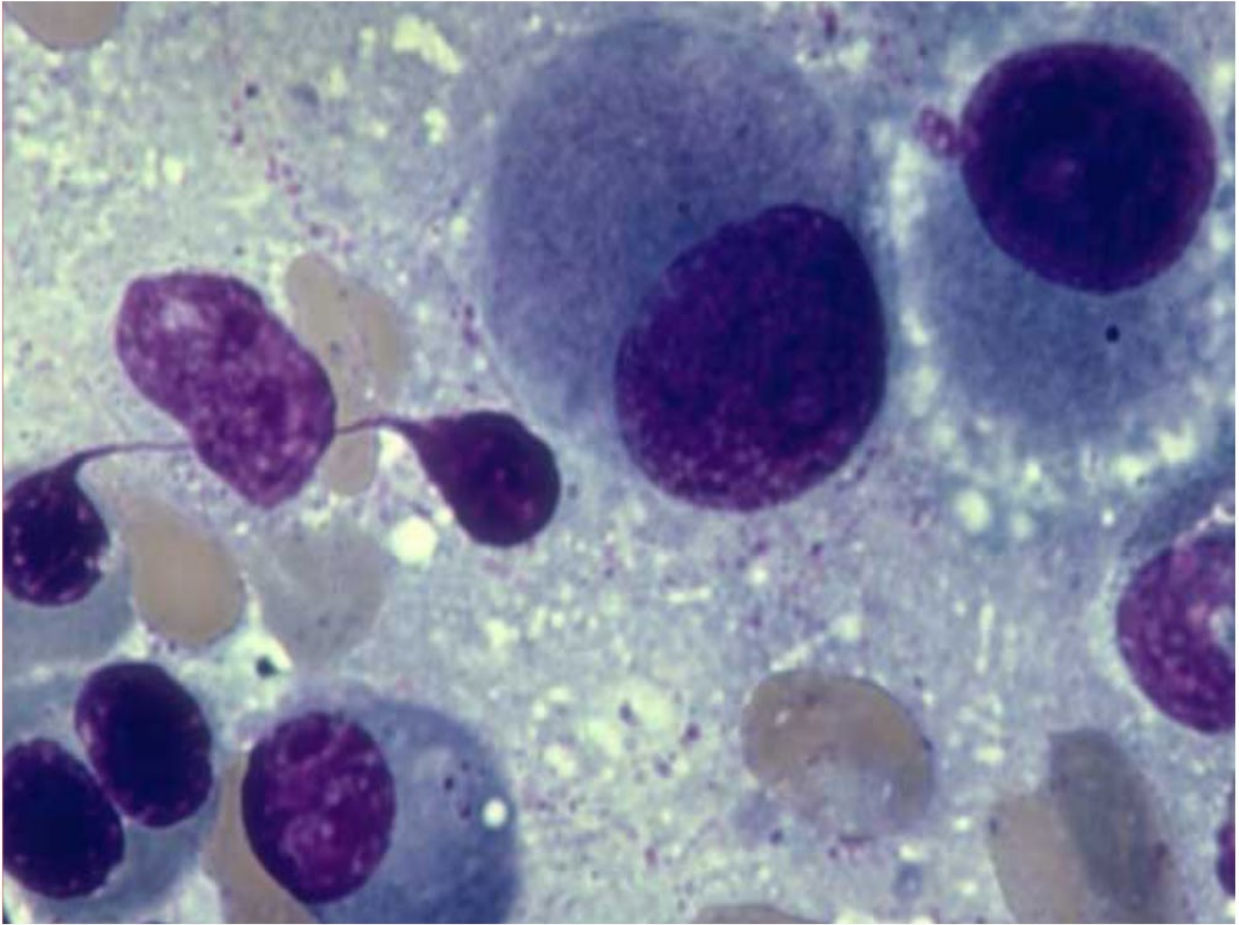


Slide 3





Slide 5





Patient	Cytogenetics Findings
A	del(5q), del(12p), del(20q),
B	XY [8] +8, +19, i(17q) [12]
C	-7, inv. (3)/ t(3q)/del(3q)
D	Complex Karyotype (>5 abnormalities)
E	XY [20]

