



MPN

Myeloproliferative neoplasms

vs

MDS

Myelodysplastic neoplasms

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@VijayPatho

Feature

MPN (Myeloproliferative Neoplasms)

MDS/MDN (Myelodysplastic Neoplasms)

Pathophysiology

Excessive proliferation of **MATURE** white bloodcells, erythrocytes and or platelets

Ineffective hematopoiesis with **dysplasia** and apoptosis

Criteria for
Dysplasia: in **more than 10%** of a single-cell lineage

Feature

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Neoplasms)**

**MDS/MDN
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**Disease
entities/types**

Chronic myeloid leukemia
Polycythemia vera
Essential thrombocythemia
Juvenile myelomonocytic
leukemia

And few more!

With defining genetic
abnormalities

Which are
morphologically defined
MDS with low blasts
MDS with excess blasts
MDS with ring sideroblasts
and few more!..

Myelodysplastic/myeloproliferative neoplasms

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Environmental Risk Factors

- Radiation exposure-
- Genetic predisposition
(rare)

- Prior
chemotherapy/radiation
- Benzene exposure

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Common Genetic Mutations

BCR-ABL in CML
RAS in JMML
JAK2,
CALR & or MPL

MDS-5q,
SF3B1,
TP53 inactivation
Etc..

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Lineage
Involvement

Usually **single dominant lineage** affected, but others can show mild increase

Usually **multiple lineages** involved simultaneously

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Typical Affected Lineages

PV: Erythroid (RBCs)
CML: Myeloid (WBCs)
ET: Megakaryocytes
(platelets)

Erythroid (anemia)-
Myeloid (neutropenia)-
Megakaryocytic
(thrombocytopenia)

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**Peripheral Blood
Findings**

Cytoses (high counts),
mature cells

Cytopenias (low counts),
dysplastic cells

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**Bone Marrow
Findings**

Hypercellular, effective,
increased production

Hypercellular,
dysplastic, ineffective

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Cell Maturity

Mature, functional cells

Often immature,
dysplastic cells

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Cell Maturity

Mature, functional cells

Often immature,
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Erythroid series

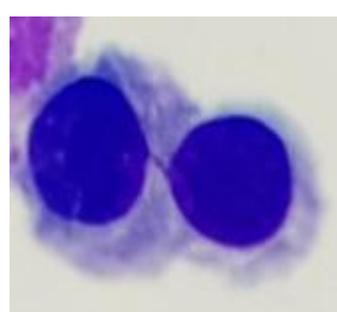
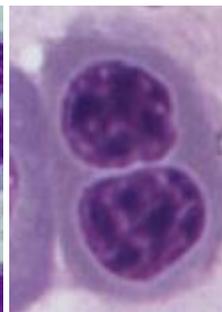
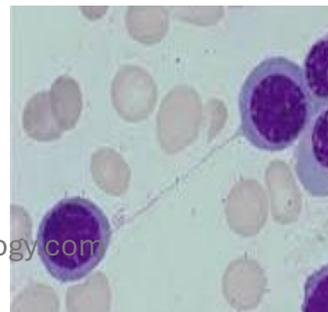
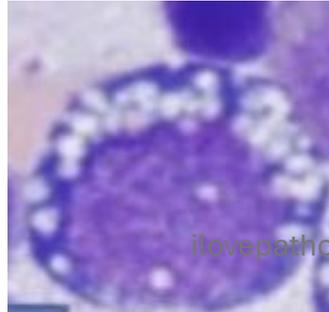
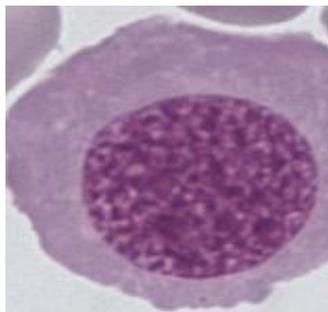
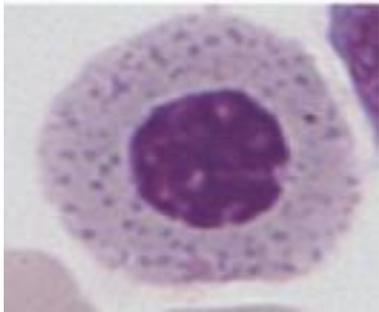
Ring sideroblasts

**Megaloblastoid
maturation**

**Cytoplasmic
bridging and
vacuolation**

**Bi or
multinucleation**

**Nuclear
budding/
bridging**



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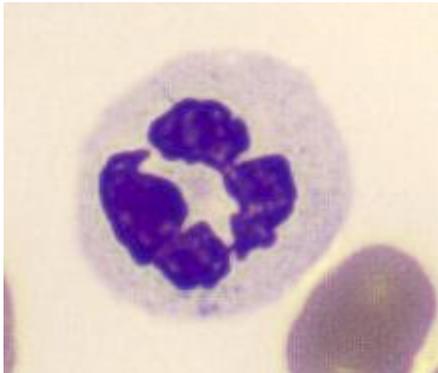
Cell Maturity

Mature, functional cells

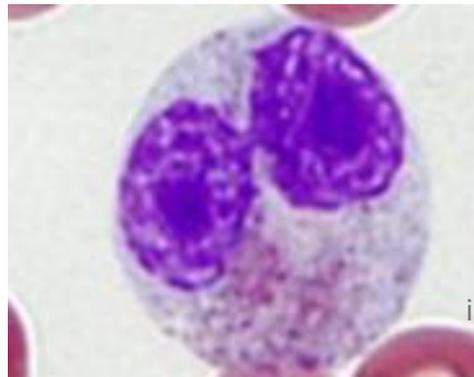
Often immature,
dysplastic cells

Myeloid series

Hypogranulation



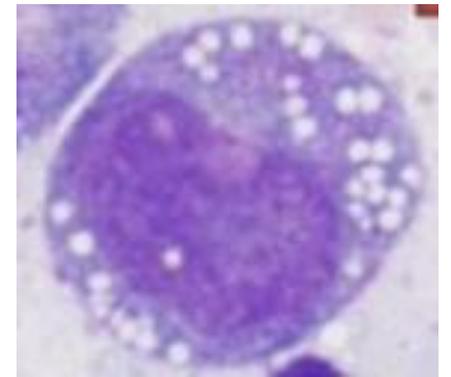
Bilobed Pseudo-Pelger-Huet



Nuclear hypersegmentation or abnormal shape



Cytoplasmic vacuolation



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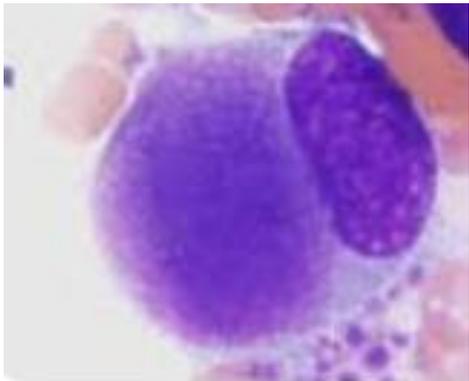
Cell Maturity

Mature, functional cells

Often immature,
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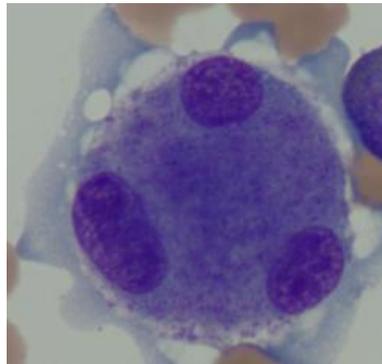
Megakaryocyte series

**single nuclear
lobe**

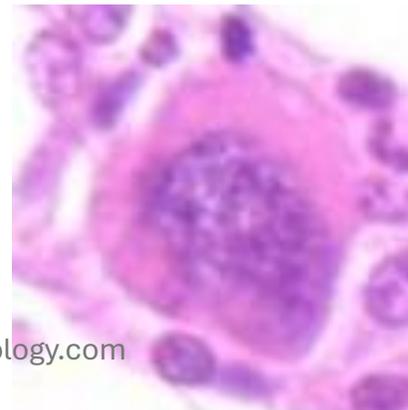


**Multiple separate
nuclei**

Pawn ball megakaryocyte



Cloud like nuclei



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**Clinical
Presentation**

Thrombosis, splenomegaly,
hyperviscosity

Fatigue, infections,
bleeding

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Progression Risk

Can progress to
myelofibrosis or rarely AML

High risk of AML
transformation

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**Treatment
Approach**

Cytoreductive therapy, JAK
inhibitors, phlebotomy

Supportive care,
hypomethylating agents,
stem cell transplant

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Prognosis

Generally better initially,
but long-term risks exist

Generally poorer
(especially with excess
blasts)

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THANKS FOR WATCHING

