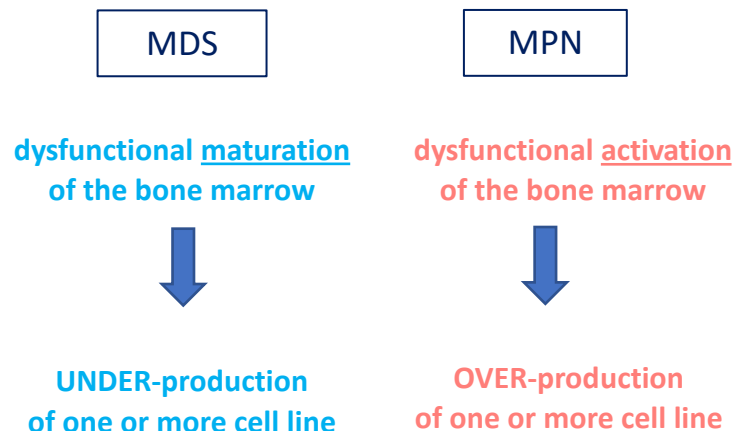


MDS & MPN Review Handout

MDS Diagnosis



RISK FACTORS

Age (Avg 60s)

Gender (Male)

Chemotherapy exposure
Radiation therapy exposure

TYPES

- MDS with single lineage dysplasia
- MDS with multi lineage dysplasia
- MDS with ring sideroblasts
- MDS with excess blasts
- MDS with del(5q)
- Unclassifiable MDS

MDS Risk

Risk Group	R-IPSS Score	OS (years)
Very Low	< 1.5	8.9
Low	1.5 - 3	5.3
Intermediate	3 - 4.5	3.0
High	4.5 - 6	1.6
Very High	> 6	0.8

5q Disease

Lenalidomide

* Low/Intermediate IPSS

Low IPSS (non 5q)

EPO (if EPO < 500) +/- GCSF

Hypomethylating Agent (HMA)

ATG + Cyclosporine

Luspatercept (SF3B1+)

Lenalidomide

Clinical Trial

Intermediate/High IPSS (non 5q)

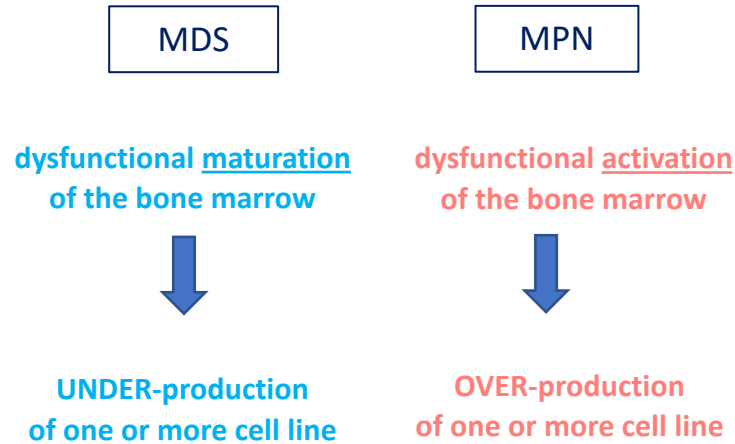
Transplant Candidate = HMA or ASCT

Not Transplant Candidate = HMA

Revised IPSS (International Prognostic Scoring System)

BMB Blasts	0	< 2%
	1	2-5%
	2	5-10%
	3	> 10%
Cytogenetics	0	very good (del11q)
	1	good (del5q, del12p, del20q)
	2	intermediate (del7q, trisomy 8, inv17q, +19)
	3	poor (inv3, del3q, -7)
	4	very poor (complex)
Hemoglobin	0	> 10
	1	8-10
	2	< 8
Platelets	0	> 100
	0.5	50-100
	1	< 50
ANC	0	> 800
	1	< 800

MPN Diagnosis



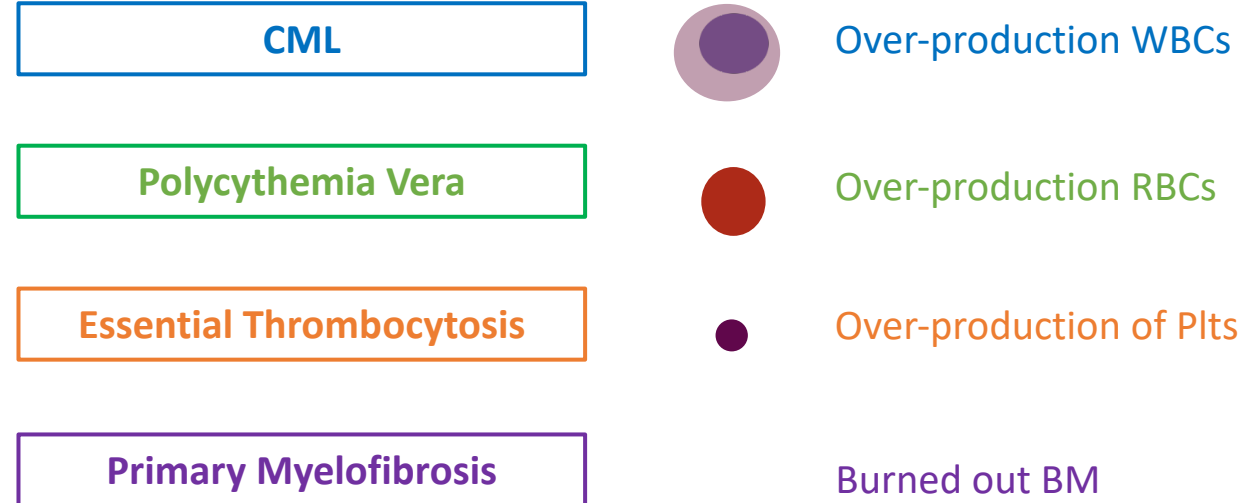
Common

- CML
- Polycythemia Vera
- Essential Thrombocytosis
- Primary Myelofibrosis

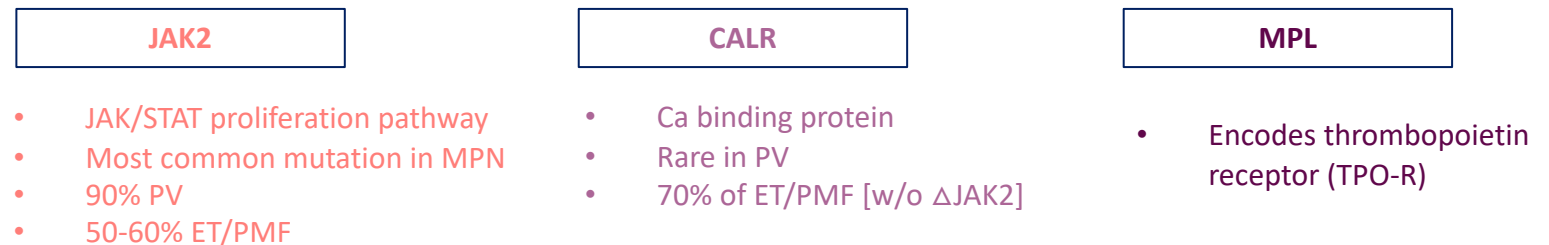
Rare

- Chronic Neutrophilic Leukemia
- Chronic Eosinophilic Leukemia
- Mast Cell Disease
- Unclassifiable MPN

MPN Types



Three major mutations in MPN: **JAK2**, **CALR**, **MPL**



CML Diagnosis



CML = Overproduction of WBCs	
LAB HYPERPLASIA	Leukocytosis : often 20-700K Left shift to immature cells * Sometimes thrombocytosis
GENETIC MUTATION	BCR-ABL t(9;22)
BONE MARROW BIOPSY	Hypercellular

CML Phases

CML Phases	
Chronic	
Accelerated	Increasing WBC Basophils > 20% Myeloblasts/promyelocytes > 30% Peripheral/BMB blasts 10-19% Plts > 1 million or < 100K Splenomegaly
Blast	> 20 % BMB blasts

CML Treatment

First Generation TKI

Imatinib	QTC Rash Diarrhea Muscle cramps Fluid Retention
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* Usually only used in chronic phase

Second Generation TKI

Dasatinib * Penetrates CNS	QTC Pleural Effusion Pericardial Effusion Pulmonary HTN Thrombocytopenia	Bosutinib	Rash Diarrhea GI/Liver toxicity
Nilotinib	QTC Pancreatitis Hyperglycemia Hyperlipidemia GI/Liver toxicity		

Third Generation TKI

Ponatinib	QTC Thrombosis CHF Liver toxicity Pancreatitis Fluid retention
Asciminib	URIs Rash GI Toxicity

* Used for T315I mutation

MPN Diagnosis

PV = Overproduction of RBCS	
LAB HYPERPLASIA	Hb > 16 * Sometimes Thrombocytosis
GENETIC MUTATION	JAK2 (90%) V617F or exon 12
BONE MARROW BIOPSY	Hypercellular
Minor Criteria	Low EPO
Symptoms/Complications	Splenomegaly Thrombosis Acquired VWD

ET = Overproduction of Plts	
LAB HYPERPLASIA	Plts > 450
GENETIC MUTATION	JAK2 (60%) CALR (20%) MPL (3%)
BONE MARROW BIOPSY	Megakaryocytes
Minor Criteria	Rule out reactive thrombocytosis
Symptoms/Complications	Vasomotor: HA, palpitations, livedo reticularis, erythromelalgia Splenomegaly Thrombosis Acquired VWD

MF = Bone Marrow Fibrosis	
LAB HYPOPLASIA	Pancytopenia Tear drops
GENETIC MUTATION	JAK2, CALR, MPL
BONE MARROW BIOPSY	BM Fibrosis Megakaryocyte proliferation, atypia
Extramedullary Hematopoiesis (Liver and Spleen)	HSM Tear drops

MPN Treatment

MPN RISK FACTORS

- Age > 60
- Thromboembolism

PV LOW/HIGH RISK TREATMENT

Aspirin 81 mg

Phlebotomy
goal Hct < 45

PV HIGH RISK TREATMENT

Front Line

Hydroxyurea

IFN alpha

Second Line

Ruxolitinib (Jakafi)

ET LOW/HIGH RISK TREATMENT

Aspirin 81 mg

ET HIGH RISK TREATMENT

Front Line

Hydroxyurea

IFN alpha

Second Line

Anagrelide

PMF TREATMENT PARADIGM

Low Risk + Asymptomatic → Observe

Low Risk + Symptomatic → Treat

Intermediate/High Risk → HSCT

MF + Anemia

EPO

Danazol

Lenalidomide +/- Steroids

MF + Thrombocytopenia

Pacritinib

MF + Splenomegaly

Splenectomy

Fedratinib

Ruxolitinib (Jakafi)

Hydroxyurea

CMML Diagnosis

CMML is an overlap syndrome between **MDS** and **MPN**

MDS Features

Cell-line dysplasia

Anemia
Thrombocytopenia

MPN features

Cell-line hyperplasia

Leukocytosis
Monocytosis
Splenomegaly

Diagnosis:

Monocytosis: >1K

Associated Genes: PDGFRA, PDGFRB, FGFR

Rule Out Related Conditions: CML, secondary monocytosis

CMML Treatment

CMML Types	Peripheral Blasts	BMB Blasts
Type 1	< 5%	< 10%
Type 2	5-20%	10-20%

CMML

Transplant Candidate = AlloSCT

Not Transplant Candidate = HMA