Sélectionner une autre question

Allez sur wooclap.com

Entrez le code d'événement dans le bandeau supérieur

EJPKZA

Cliquez sur l'écran projeté pour lancer la question

26

participants

Copier le lien de participation

wooclap

100%

Workshop MDS/MPN Overlap Sd

Fleur Samantha Benghiat

FleurSamantha.Benghiat@umons.ac.be

18/04/2026

BHS

Sélectionner une autre question

Modifier la question

Which pattern suggests MDS/MPN with neutrophilia (former aCML)?

1. Neutrophilia with basophilia and BCR-ABL1 positivity — 0% — 0
2. Neutrophilia with immature granulocytes and abnormal neutrophils — 63% — 12
3. Neutrophilia with mature neutrophils only — 0% — 0
4. Neutrophilia with CSF3R mutation — 37% — 7

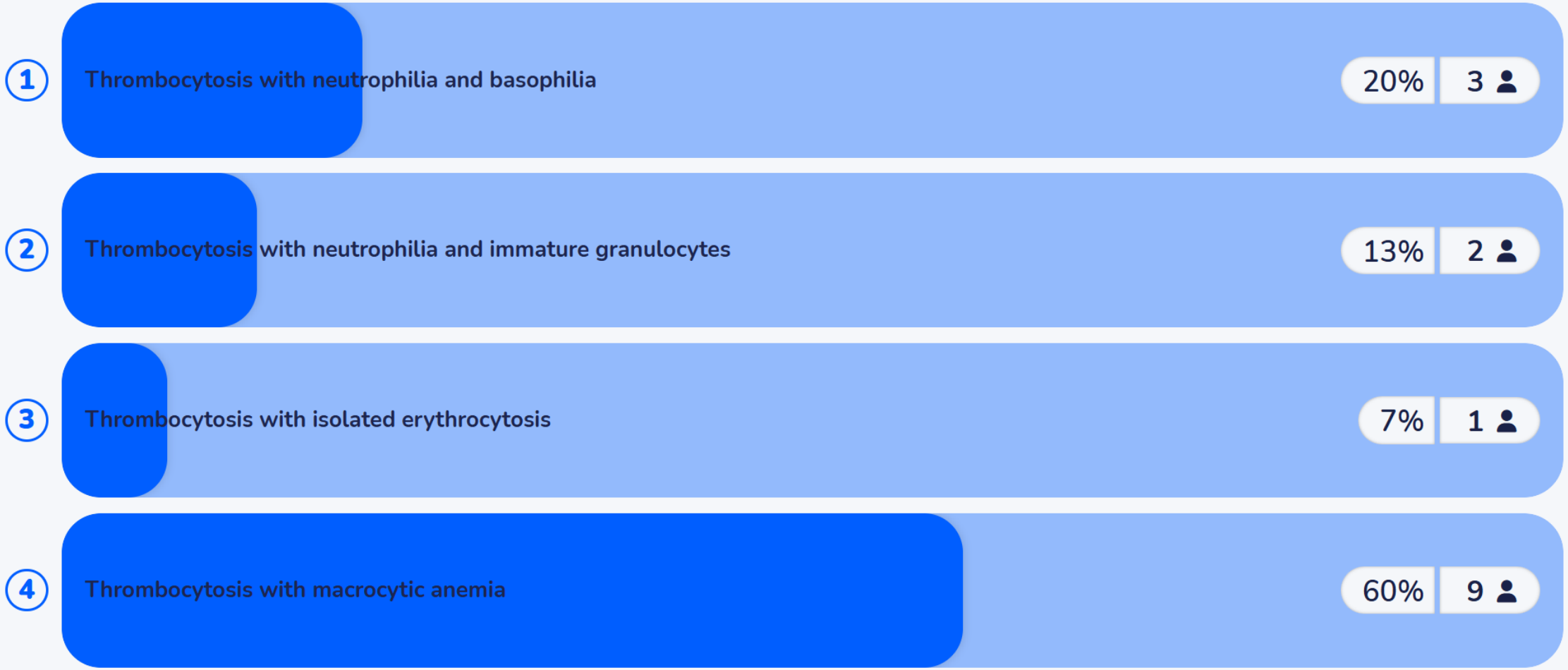
Cliquez sur l'écran projeté pour lancer la question

Which feature is NOT compatible with chronic neutrophilic leukemia?

1. Neutrophilia with mostly mature neutrophils — 11% — 2
2. Neutrophilia with CSF3R mutation — 0% — 0
3. Neutrophilia with immature granulocytes — 78% — 14
4. Neutrophilia without dysplasia — 11% — 2

Cliquez sur l'écran projeté pour lancer la question

Which pattern suggests MDS/MPN with SF3B1 mutation and thrombocytosis?



70-year-old man - abnormal blood counts

Parameter	Result	Ref range
WBC	24.8 × 10^9/L	4.0 – 10.0
Hb	11.5 g/dL	13.0 – 17.0
MCV	102 fL	80 – 100
Platelets	420 × 10^9/L	150 – 400
CRP	2 mg/L	< 5

Cell type	×10^9/L	%	Ref range
Neutrophils	18,5	(75%)	1.5 – 7.5
Bands	2	(8%)	0
Metamyelocytes	1	(4%)	0
Myelocytes	1.2	(5%)	0
Lymphocytes	1.5	(12%)	1.0 – 4.0
Monocytes	0.5	(2%)	0.2 – 1.0
Eosinophils	0.4	(2%)	0 – 0.5
Basophils	0.1	(0.4%)	0 – 0.1

What do you see?

What did you see?

Cliquez sur l'écran projeté pour lancer la question

70-year-old man - abnormal blood counts

Parameter	Result	Ref range
WBC	24.8 × 10^9/L	4.0 – 10.0
Hb	11.5 g/dL	13.0 – 17.0
MCV	102 fL	80 – 100
Platelets	420 × 10^9/L	150 – 400
CRP	2 mg/L	< 5

Cell type	×10^9/L	%	Ref range
Neutrophils	18,5	(75%)	1.5 – 7.5
Bands	2	(8%)	0
Metamyelocytes	1	(4%)	0
Myelocytes	1.2	(5%)	0
Lymphocytes	1.5	(12%)	1.0 – 4.0
Monocytes	0.5	(2%)	0.2 – 1.0
Eosinophils	0.4	(2%)	0 – 0.5
Basophils	0.1	(0.4%)	0 – 0.1

What do you see?

What do you rule out first?

What do you rule out first?

Cliquez sur l'écran projeté pour lancer la question

70-year-old man - abnormal blood counts

Parameter	Result	Ref range
WBC	24.8 × 10^9/L	4.0 – 10.0
Hb	11.5 g/dL	13.0 – 17.0
MCV	102 fL	80 – 100
Platelets	420 × 10^9/L	150 – 400
CRP	2 mg/L	< 5

FISH BCR-ABL: negative

Cell type	×10^9/L	%	Ref range
Neutrophils	18,5	(75%)	1.5 – 7.5
Bands	2	(8%)	0
Metamyelocytes	1	(4%)	0
Myelocytes	1.2	(5%)	0
Lymphocytes	1.5	(12%)	1.0 – 4.0
Monocytes	0.5	(2%)	0.2 – 1.0
Eosinophils	0.4	(2%)	0 – 0.5
Basophils	0.1	(0.4%)	0 – 0.1

Arguments against CML?

What are the biological arguments against CML?

Cliquez sur l'écran projeté pour lancer la question

Which pattern fits best?

Feature	CML
Anemia	±
Thrombocytosis	✓
Neutrophilia	✓✓
Monocytosis	±
Basophilia	✓✓
Myelocytes / Metamyelocytes	✓✓

Are they other hematologic malignancies that could fit?

Cliquez sur l'écran projeté pour lancer la question

Which pattern fits best?

Feature	CML	pre-MF
Anemia	±	✓
Thrombocytosis	✓	✓✓
Neutrophilia	✓✓	±
Monocytosis	±	✗
Basophilia	✓✓	✗
Myelocytes / Metamyelocytes	✓✓	±

Which pattern fits best?

Feature	CML	pre-MF	CNL
Anemia	±	✓	±
Thrombocytosis	✓	✓✓	±
Neutrophilia	✓✓	±	✓✓
Monocytosis	±	✗	✗
Basophilia	✓✓	✗	✗
Myelocytes / Metamyelocytes	✓✓	±	± (minimal)

Which pattern fits best?

Feature	CML	pre-MF	CNL	SF3B1 + T
Anemia	±	✓	±	✓✓
Thrombocytosis	✓	✓✓	±	✓✓
Neutrophilia	✓✓	±	✓✓	✗
Monocytosis	±	✗	✗	✗
Basophilia	✓✓	✗	✗	✗
Myelocytes / Metamyelocytes	✓✓	±	± (minimal)	✗

Which pattern fits best?

Feature	CML	pre-MF	CNL	SF3B1 + T	MDS/MPN Neutrophilia (aCML)
Anemia	±	✓	±	✓✓	✓
Thrombocytosis	✓	✓✓	±	✓✓	±
Neutrophilia	✓✓	±	✓✓	✗	✓✓
Monocytosis	±	✗	✗	✗	±
Basophilia	✓✓	✗	✗	✗	✗
Myelocytes / Metamyelocytes	✓✓	±	± (minimal)	✗	✓✓

Sélectionner une autre question

Modifier la question

What is your next step?

Cliquez sur l'écran projeté pour lancer la question

wooclap

100%

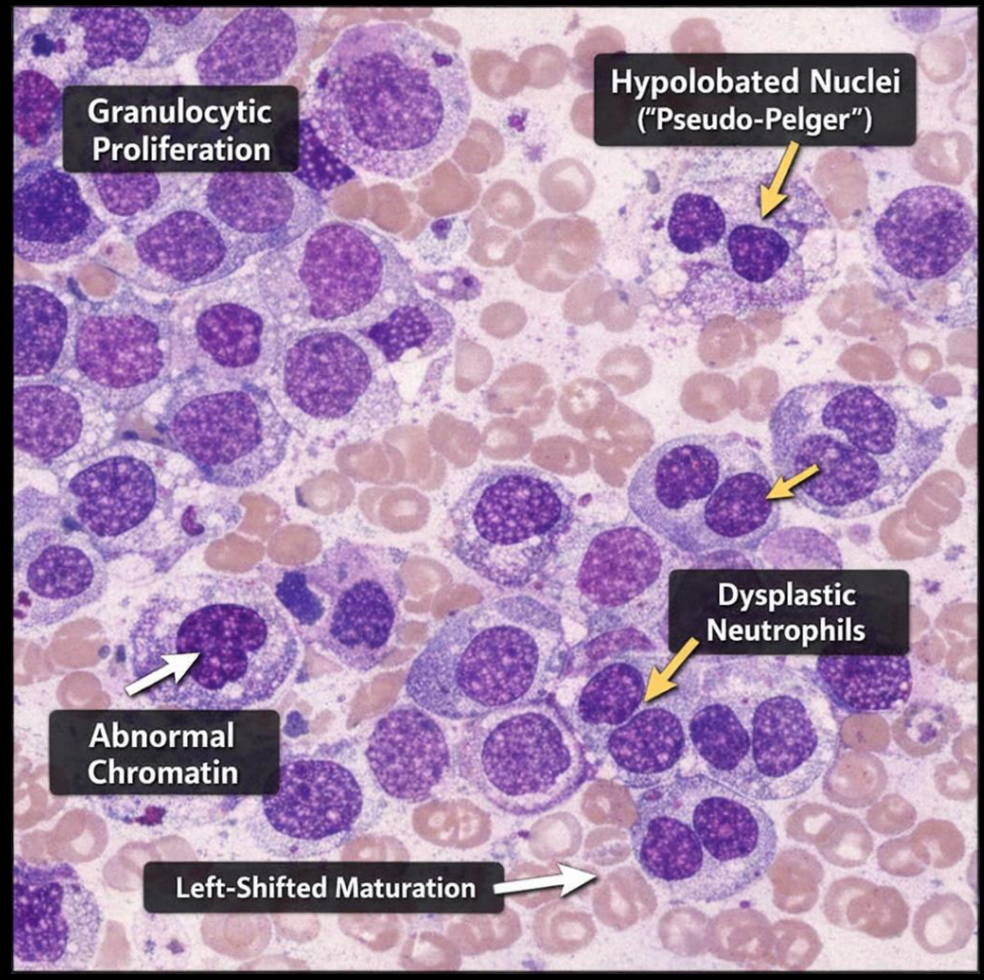
What is the key abnormality here?

- Hypercellular marrow
- Granulocytic proliferation +++
- Dysgranulopoiesis
- Blasts: 3%

Caryotype : Normal

NGS :

- ASXL1 mutation
- SETBP1 mutation
- CSF3R negative
- BCR-ABL1 negative



Which pattern fits best?

Feature	CML	pre-MF	CNL	SF3B1 + T	MDS/MPN Neutrophilia (aCML)
Anemia	±	✓	±	✓✓	✓
Thrombocytosis	✓	✓✓	±	✓✓	±
Neutrophilia	✓✓	±	✓✓	✗	✓✓
Monocytosis	±	✗	✗	✗	±
Basophilia	✓✓	✗	✗	✗	✗
Myelocytes / Metamyelocytes	✓✓	±	± (minimal)	✗	✓✓

Sélectionner une autre question

Modifier la question

Which myeloid neoplasm fits best?

1	CML	0%	0
2	Pre-MF	0%	0
3	CNL	0%	0
4	SF3B1 with thrombocytosis	0%	0
5	MDS/MPN with neutrophilia	0%	0
6	I have no clue	0%	0

Cliquez sur l'écran projeté pour lancer la question

Which pattern fits best?

Feature	CML	pre-MF	CNL	SF3B1 + T	MDS/MPN Neutrophilia (aCML)
Anemia	±	✓	±	✓✓	✓
Thrombocytosis	✓	✓✓	±	✓✓	±
Neutrophilia	✓✓	±	✓✓	✗	✓✓
Monocytosis	±	✗	✗	✗	±
Basophilia	✓✓	✗	✗	✗	✗
Myelocytes / Metamyelocytes	✓✓	±	± (minimal)	✗	✓✓

MDS/MPN with neutrophilia (aCML)

Key features

- MPN: Neutrophilia + immatures myeloid cells
- MDS: Prominent dysgranulopoiesis
- No BCR-ABL1
- Often anemia

Think of it when:

- Looks like CML but no basophilia + BCR-ABL negative

Biology: ASXL1 (20-40%), SETBP1 (25%)

Poor Prognosis : mOS ~1-2 years

Chronic Neutrophilic Leukemia (CNL)

Key features

- Marked MATURE neutrophilia (often >25 × 10^9/L)
- No dysplasia
- No monocytosis, no basophilia

Think of it when:

- infection but CRP normal + persistent

Molecular hallmark

- CSF3R mutation (80-90%)

Intermediate prognosis: mOS ~2-3 years

MDS/MPN with SF3B1 and thrombocytosis

Key features

- Macrocytic anemia
- Thrombocytosis
- Ring sideroblasts
- Not neutrophils

Molecular hallmark

- SF3B1 mutation (100%), JAK2V617F (40 - 60%)

Think of it when: Looks like ET but anemia + sideroblasts

Good prognosis: mOS ~6 years

Take home message

Disease	CML	pre-MF	CNL	SF3B1 + T	MDS/MPN Neutrophilia
KEY IDEA	**BCR-ABL driven**	**Platelets - Fibrosis**	**Mature neutrophils**	**Anemia + platelets**	**Dysplastic neutrophils**
Key mutation	BCR-ABL1	JAK2 / CALR / MPL	CSF3R	SF3B1	ASXL1 / SETBP1
Prognosis	Indolent (with TKI)	Indolent	Intermediate	Indolent	Poor
1st line ttt	TKI	Risk adapted (R-IPSET)	Cytoreduction AlloHSCT	Symptomatic	HU +/- HMA AlloHSCT

Which pattern suggests MDS/MPN with neutrophilia (former aCML)?

1. Neutrophilia with basophilia and BCR-ABL1 positivity — 0% — 0
2. Neutrophilia with immature granulocytes and abnormal neutrophils — 0% — 0
3. Neutrophilia with mature neutrophils only — 0% — 0
4. Neutrophilia with CSF3R mutation — 0% — 0

Cliquez sur l'écran projeté pour lancer la question

Which pattern suggests MDS/MPN with neutrophilia (former aCML)?

- A. Neutrophilia with basophilia and BCR-ABL1 positivity
- B. Neutrophilia with immature granulocytes and abnormal neutrophils
- C. Neutrophilia with mature neutrophils only
- D. Neutrophilia with CSF3R mutation

Which pattern suggests MDS/MPN with neutrophilia (former aCML)?

- A. Neutrophilia with basophilia and BCR-ABL1 positivity
- B. Neutrophilia with immature granulocytes and abnormal neutrophils
- C. Neutrophilia with mature neutrophils only
- D. Neutrophilia with CSF3R mutation

Which feature is NOT compatible with chronic neutrophilic leukemia?

1. Neutrophilia with mostly mature neutrophils — 0% — 0
2. Neutrophilia with CSF3R mutation — 0% — 0
3. Neutrophilia with immature granulocytes — 0% — 0
4. Neutrophilia without dysplasia — 0% — 0

Cliquez sur l'écran projeté pour lancer la question

Which feature is **NOT** compatible with chronic neutrophilic leukemia?

- A. Neutrophilia with mostly mature neutrophils
- B. Neutrophilia with CSF3R mutation
- C. Neutrophilia with immature granulocytes
- D. Neutrophilia without dysplasia

Which feature is **NOT** compatible with chronic neutrophilic leukemia?

- A. Neutrophilia with mostly mature neutrophils
- B. Neutrophilia with CSF3R mutation
- C. Neutrophilia with immature granulocytes
- D. Neutrophilia without dysplasia

Which pattern suggests MDS/MPN with SF3B1 mutation and thrombocytosis?

1. Thrombocytosis with neutrophilia and basophilia — 0% — 0
2. Thrombocytosis with neutrophilia and immature granulocytes — 0% — 0
3. Thrombocytosis with isolated erythrocytosis — 0% — 0
4. Thrombocytosis with macrocytic anemia — 0% — 0

Cliquez sur l'écran projeté pour lancer la question

Which pattern suggests MDS/MPN with SF3B1 mutation and thrombocytosis?

- A. Thrombocytosis with neutrophilia and basophilia
- B. Thrombocytosis with neutrophilia and immature granulocytes
- C. Thrombocytosis with isolated erythrocytosis
- D. Thrombocytosis with macrocytic anemia

Which pattern suggests MDS/MPN with SF3B1 mutation and thrombocytosis?

- A. Thrombocytosis with neutrophilia and basophilia
- B. Thrombocytosis with neutrophilia and immature granulocytes
- C. Thrombocytosis with isolated erythrocytosis
- D. Thrombocytosis with macrocytic anemia

SF3B1 + Thrombocytosis
Differential diagnosis

Feature	SF3B1 + Thrombocytosis	MDS-RS (SF3B1)	ET	Pre-MF
Platelet count	≥450 × 10^9/L	Normal or low	≥450 × 10^9/L	≥450 × 10^9/L (possible)
Dysplasia	Present	Present	Absent	Absent
Ring sideroblasts	≥5% + *SF3B1*	≥15% (or ≥5% + *SF3B1*)	Absent	Absent
SF3B1 mutation	100%	≥80%	Rare	Rare
JAK2 V617F	~50%	5%	~60%	~60%
Megakaryocytes	Large, atypical (MPN-like)	Small, hypolobated	Large, hyperlobated	Atypical, clustered
Leukemic transformation	Low (~5–10%)	Low	Very low	Moderate
Median OS	~6 years	~5–6 years	>15 years	~15 years

Differential diagnosis

Feature	CML	MDS/MPN Neutrophilia	SF3B1 + Thrombocytosis	CNL	CMML
Dominant lineage	All myeloid	Neutrophils	Platelets	Neutrophils	Monocytes
Anemia	No	Yes	Yes	Minimal	Yes
Key mutation	BCR-ABL	SETBP1/ASXL1	SF3B1	CSF3R	TET2/SRSF2
Monocytosis	No	No	No	No	Yes
Basophilia	Yes	No	No	No	No
Ring sideroblasts	No	No	Yes	No	No

Mister M, 72 yo

- No symptoms
- Fit patient
- Normal clinical exam
- Routine blood analysis

Parameter	Apr 2025	Ref Range
WBC × 10^9/L	12.0	4.5–11.0
Absolute Monocytes	1.2	0.2–0.8
Monocyte %	23%	2–8%
Neutrophils	10.8	1.8–7.7
Hb g/dL	11.2	13.5–17.5
MCV fL	101	80–100
Platelets × 10^9/L	142	150–400
Peripheral Blasts	0	0%
LDH U/L	270	140–280

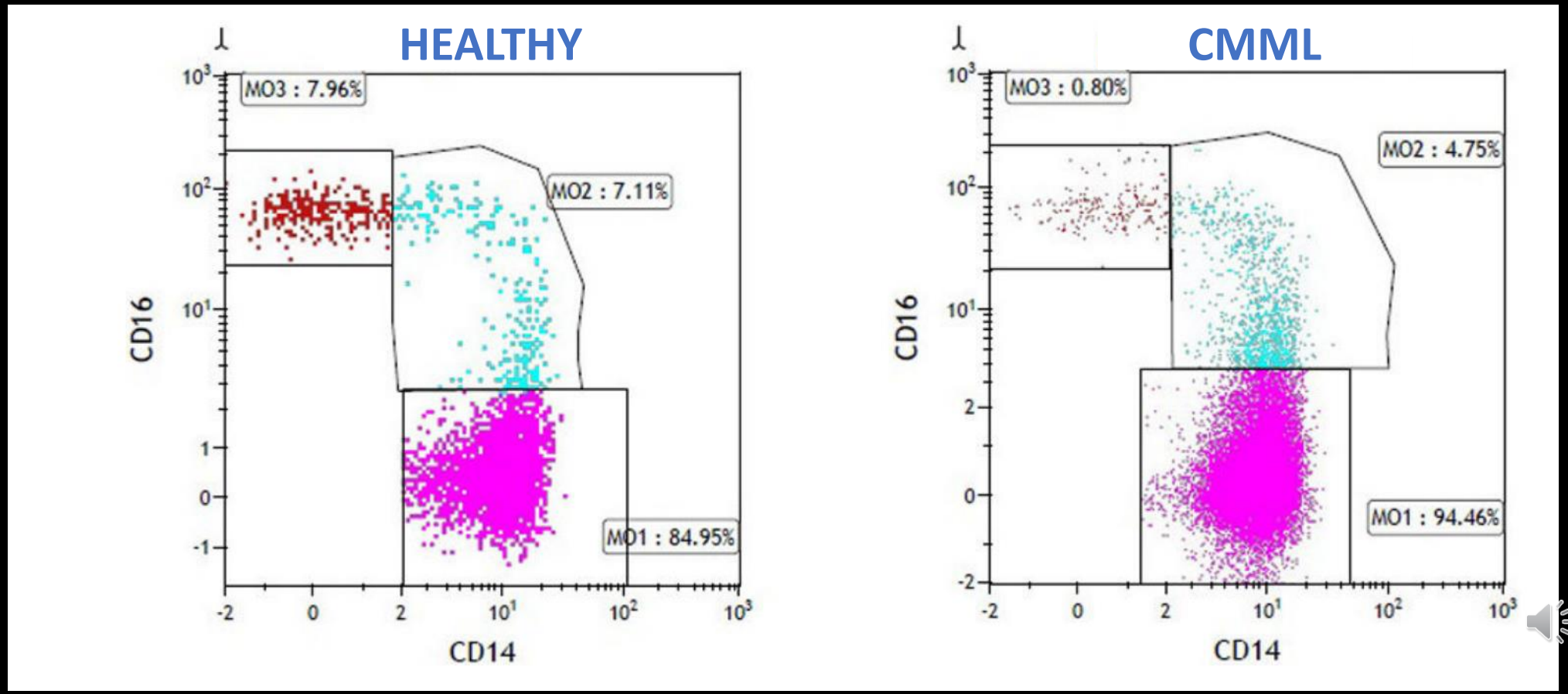
Mister M, 72 yo, 1 year later

- Fatigue
- Weight Los
- Splenomegaly

Parameter	Apr 2025	Apr 2026	Ref Range
WBC × 10^9/L	12.0	**28.5**	4.5–11.0
Absolute Monocytes	1.2	**4.6**	0.2–0.8
Monocyte %	23%	**26%**	2–8%
Neutrophils	10.8	**17.5**	1.8–7.7
Hb g/dL	11.2	**8.4**	13.5–17.5
MCV fL	101	**104**	80–100
Platelets × 10^9/L	142	**68**	150–400
Peripheral Blasts	0	**4%**	0%
LDH U/L	270	**420**	140–280

Step 2: Peripheral blood monocyte cytometry

Classical monocytes CD14+ CD16- ≥ 94%
CMML diagnosis: se 90–92% sp 94-95%



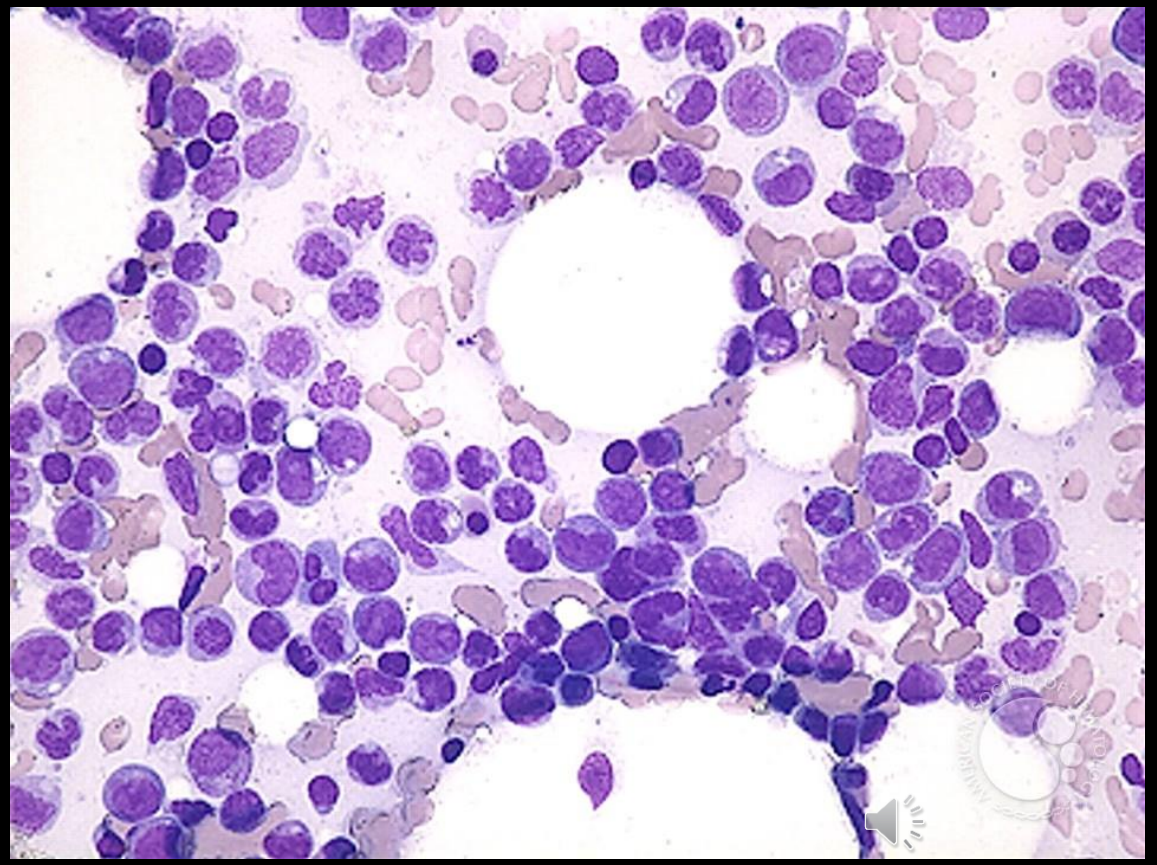
Patnaik M. et al. Am J Hematol. 2024 June ; 99(6): 1142–1165

Step 3: When to perform bone marrow and genetic testing

Indications

- Persistent unexplained monocytosis
- Cytopenias
- Circulating blasts
- Splenomegaly

  or constitutional symptoms
- >94% classical monocytes



Features	WHO 2022	ICC 2022
Monocyte threshold **Duration of monocytosis**	AMC ≥0.5 × 10^9/L *and* monocytes ≥10% of WBC differential Persistent (≥3 months)	
Blast/promonocyte threshold	20% blasts (including promonocytes) in PB and BM	
Clonality requirement	Cytogenetic or molecular evidence of clonality (acquired mutation or cytogenetic)	
Monocyte immunophenotyping	Increase in classical monocytes (≥94%) supportive but not required	
Exclusions	Absence of *BCR::ABL1*, *PDGFRA/PDGFRB/FGFR1* rearrangements, *PCM1::JAK2*; absence of AML-defining genetic abnormalities	
Cytopenia requirement	Not an explicit separate criterion	≥ 1 cytopenia (ineffective hematopoiesis)
Morphologic criteria	BM morphology consistent with CMML; dysplasia in ≥1 lineage	More stringent morphologic criteria (myeloid proliferation and monocytes) → fewer cases qualifying as CMML compared to WHO
Practical impact	**More** oligomonocytosis cases as **CMML** than ICC.	**More** oligomonocytosis cases as **MDS, MDS/MPN-NOS** than WHO.
Prognostic impact	**NO DIFFERENCE**	

Step 5: Classify the CMML subtype
COMPLEMENTARY

WHO 2022° Blast-based		ICC 2022 WBC-based	
CMML-1	**CMML-2***	**CMML-MD**	**CMML-MP***
PB blasts <5%	5-19%	WBC <13 x10^9/L	WBC ≥13 x10^9/L
BM blasts <10%	10-19% Auer rods+		

*higher risk of AML transformation

°Khoury, J.D. *et al. Leukemia* **36**, 1703–1719 (2022)

Mister M, 72 yo, 1 year later

Monocyte cytometry

Classical monocytes CD14+ $CD16^{neg}$: 97% (N 80-90)

Myelogram

- Hypercellular (80% cellularity)
- Monocytic proliferation
- Dysplasia in ≥1 lineages
- Blasts + promocytes : 6%

Diagnosis CMML-1, Proliferative subtype

Cytogenetics Normal karyotype (46, XY)

Molecular Studies TET2, SRSF2, ASXL1

Parameter	Apr 2025	Apr 2026	Ref Range
WBC × 10^9/L	12.0	**28.5**	4.5–11.0
Absolute Monocytes	1.2	**4.6**	0.2–0.8
Monocyte %	23%	**26%**	2–8%
Neutrophils	10.8	**17.5**	1.8–7.7
Hb g/dL	11.2	**8.4**	13.5–17.5
MCV fL	101	**104**	80–100
Platelets × 10^9/L	142	**68**	150–400
Peripheral Blasts	0	**4%**	0%
LDH U/L	270	**420**	140–280

Molecular landscape

Gene	Frequency mutation	Prognostic impact
TET2*	60%	Favorable (if no adverse mutation)
SRSF2**	50%	Neutral
ASXL1*	40%	Adverse
NRAS***	15%	Adverse
RUNX1****	15%	Adverse
DNMT3A*	15%	Adverse
SETBP1	10%	Adverse

Co-mutation TET2+ SRSF2
Highly specific of CMML

* Epigenetic regulators
** Spliceosome genes
*** Signaling pathway
**** Transcription factor

Step 6: Risk stratification

1. Such E. et al. Blood 2013 Apr 11;121(15):3005-15.
2. Elena C. et al. Blood 2016 Sep 8;128(10):1408-17.
3. Tefferi A. et al. Blood 2025 Aug 14;146(7):874-886.
4. Lanino L. et al. JCO 2026 Mar 27:JCO2502116.

Variable	CPSS[1] (2013)	CPSS-Mol[2] (2016)	BLAST[3] (2025)	BLAST-Mol[3] (2025)	iCPSS[4] (2026)
WBC ≥13	✓	✓	✓	✓	✓
Hb / TD	RBC-TD	RBC-TD	Hb	Hb	Hb
PLT					✓
Blasts	✓ BM	✓ BM	✓ PB ≥2%	✓ PB ≥2%	✓ BM
Cytogenetics	✓	✓		✓	✓
Molecular		✓ ASXL1, RUNX1, NRAS, SETBP1		✓ favorable: TET2, PHF6 Adverse: ASXL1, RUNX1, NRAS, SETBP1, DNMT3A, TP53, U2AF1, BCOR, PTPN11	✓ ASXL1, RUNX1, TET2, SETBP1, DNMT3A, TP53, EZH2, STAG2, U2AF1
Risk groups	4	4	3	3	5
mOS (mo)	72/31/18/12	144/59/31/18	63/28/13	N/A	N/A
1ary purpose 2ary	OS AML transformat°	OS AML transformat°	OS -	OS -	OS HSCT timing
Best value	Baseline, no NGS	HSCT if no BLAST-Mol or iCPSS	Blood → routine monitoring	HSCT	Transplant timing decisions

ONLINE CALCULATORS

CPSS-Mol

- https://qxmd.com/calculate/calculator_609/cmml-cpss-mol

BLAST and BLAST-MOL

- https://sudheshk.com/projects/blast-model

iCPSS

- https://icpss-risk.com/

Mister M, 72 yo, CMML-1, MP

Parameter	Apr 2025	Apr 2026	Ref Range
WBC × 10^9/L	12.0	**28.5**	4.5–11.0
Hb g/dL	11.2	**8.4**	13.5–17.5
Platelets × 10^9/L	142	**68**	150–400
Peripheral Blasts	0	**4%**	0%
BM blasts		**6%**	<2%

CPSS Mol	Blast-Mol	iCPSS
Int-2 mOS 37 mo	High 12 mo	Intermediate ~ 30 mo

Cytogenetics Normal karyotype (46, XY)

Molecular Studies TET2, SRSF2, ASXL1

Step 7: Determine transplant eligibility

- Age and performance status
- Comorbidity index (HCT-CI)
- Donor availability → early HLA typing
- Risk score (CPSS-Mol, BLAST-mol, iCPSS)
- Patient preference and goals of care

Mister M, 72 yo, CMML-1, MP

Parameter	Apr 2025	Apr 2026	Ref Range
WBC × 10^9/L	12.0	**28.5**	4.5–11.0
Hb g/dL	11.2	**8.4**	13.5–17.5
Platelets × 10^9/L	142	**68**	150–400
Peripheral Blasts	0	**4%**	0%
BM blasts		**6%**	<2%

CPSS Mol	Blast-Mol	iCPSS
Int-2	High	Intermediate
mOS 37 mo	12 mo	~ 30 mo

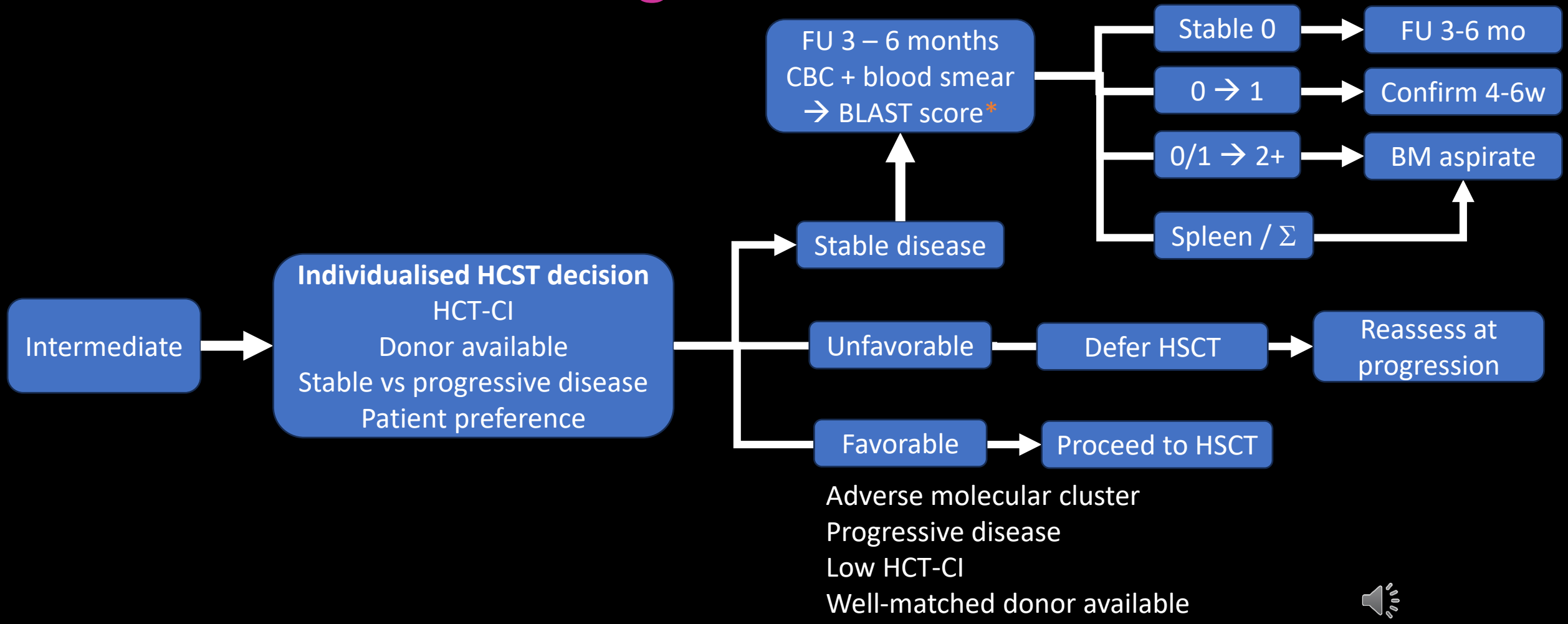
Cytogenetics Normal karyotype (46, XY)

Molecular Studies TET2, SRSF2, ASXL1

→ **Transplant should be discussed early**
but not performed immediately.

TRANSPLANT ELIGIBLE PATIENTS

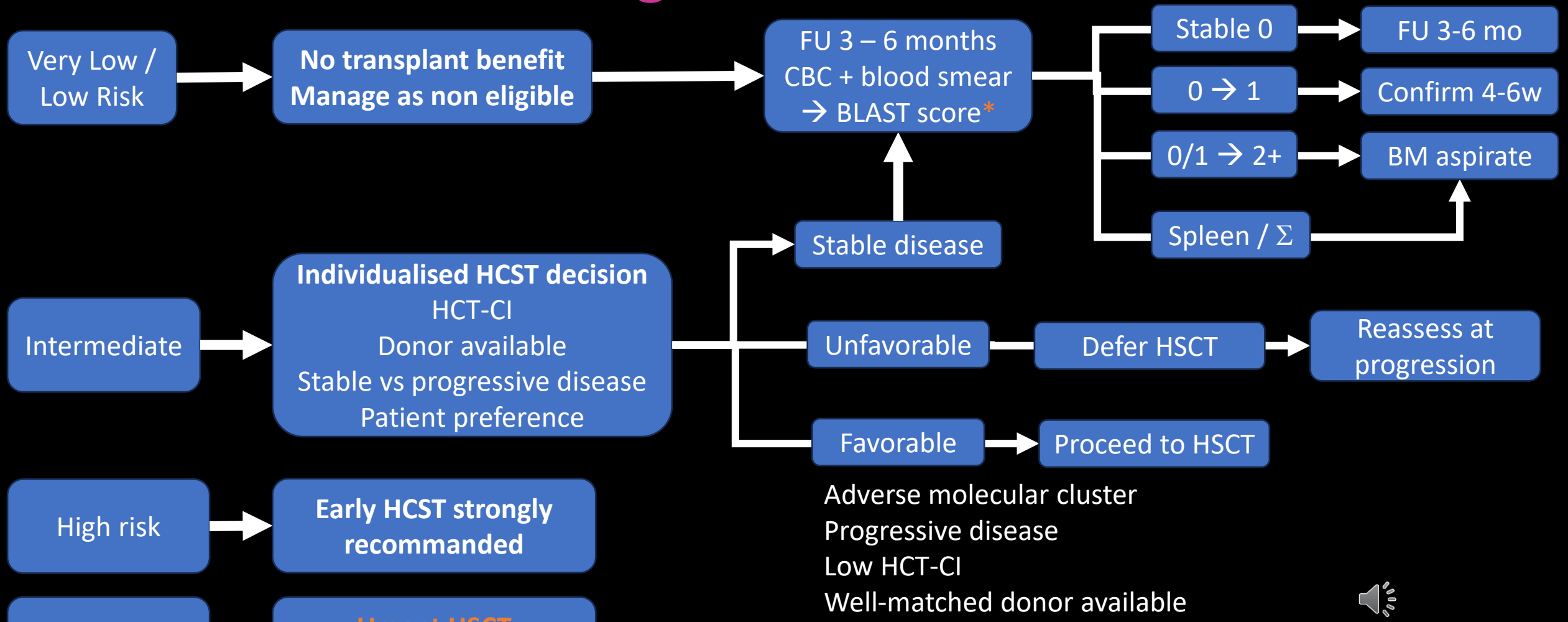
Treatment according to iCPSS risk assessment



*Tefferi A. et al. Blood 2025 Aug 14;146(7):874-886

TRANSPLANT ELIGIBLE PATIENTS

Treatment according to iCPSS risk assessment



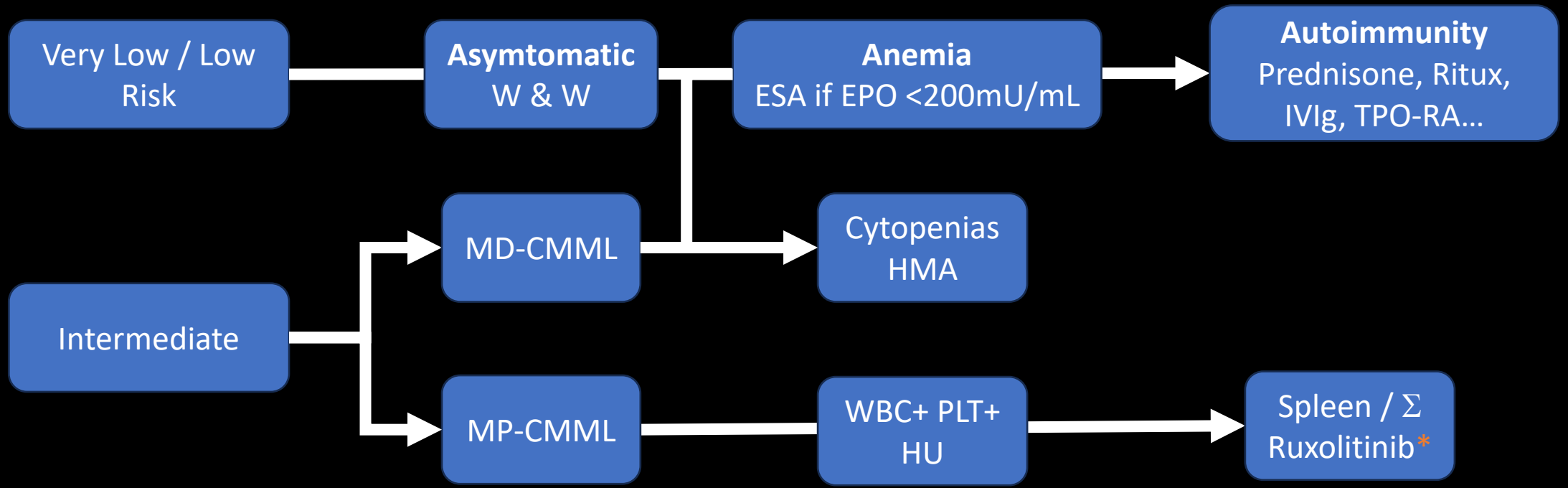
*Tefferi A. et al. Blood 2025 Aug 14;146(7):874-886

Step 8: Treatment of non transplant eligible patients according to iCPSS risk assessment

… in an ideal setting …

Step 8: Treatment of non transplant eligible patients according to iCPSS risk assessment

… in an ideal setting …

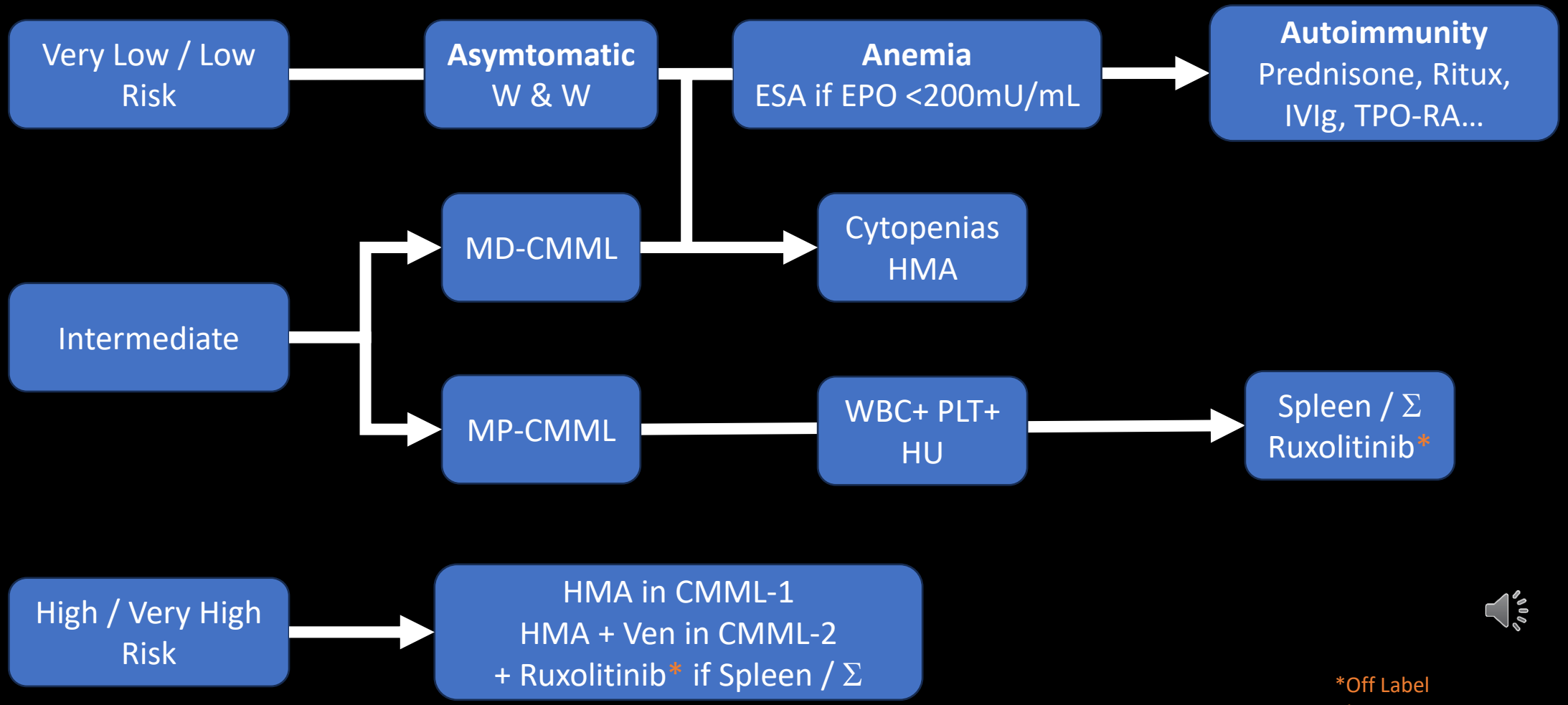


*Off Label

Clin Cancer Res 2021 Nov 15;27(22):6095

Step 8: Treatment of non transplant eligible patients according to iCPSS risk assessment

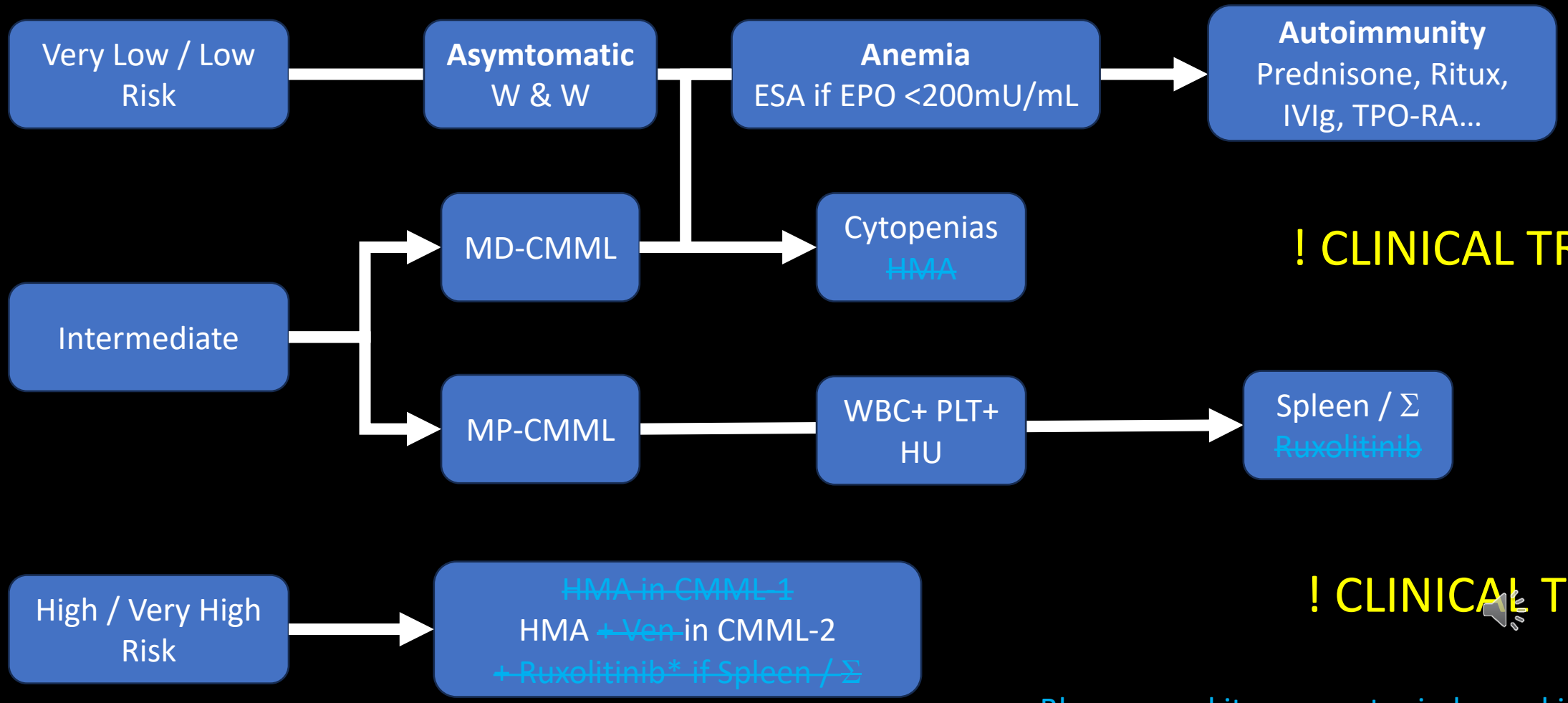
… in an ideal setting …



*Off Label

Clin Cancer Res 2021 Nov 15;27(22):6095

Treatment of non transplant eligible patients according to iCPSS risk assessment … in the Belgium setting …



Blue crossed items = not reimbursed in Belgium

Thank you

Good judgment comes from experience.
Experience comes from bad judgment.

Rita Mae Brown