



FOR
Health Professionals

Things to never miss in the office

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UNIVERSITY
OF MANITOBA



CancerCare Manitoba
COMMUNITY ONCOLOGY PROGRAM

Presenter Disclosure

- **Faculty / Speaker's name:** Brett Houston / Leonard Minuk
- **Relationships with commercial interests:**
 - **Grants/Research Support:** None
 - **Speakers Bureau/Honoraria:** None
 - **Consulting Fees:** None
 - **Other:** None

Learning Objectives

1. To review the red flags, diagnosis and approach to thrombotic thrombocytopenic purpura (TTP)
2. To review the common presentations of acute leukemia, and the immediate action plan

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- 1. To review the red flags, diagnosis and approach to thrombotic thrombocytopenic purpura (TTP)**
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Case #1

- 44F with newly identified bruising / petechiae
- Vaginal bleeding since insertion of IUD one month prior; otherwise no bleeding
- Medical history: PCOS
- Medications: none

Case #1

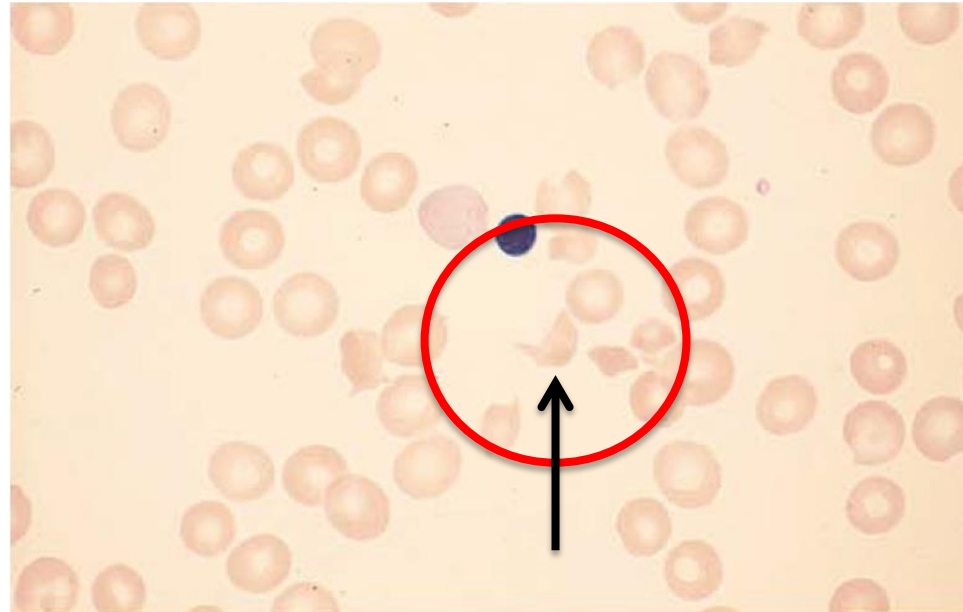
WBC ($\times 10^9/L$)	15
Differential ($\times 10^9$)	Neutrophils 11.9 Lymphocytes 2.73
Hemoglobin (g/L)	68
MCV (fL)	98
Reticulocyte count	330
Platelets ($\times 10^9/L$)	11

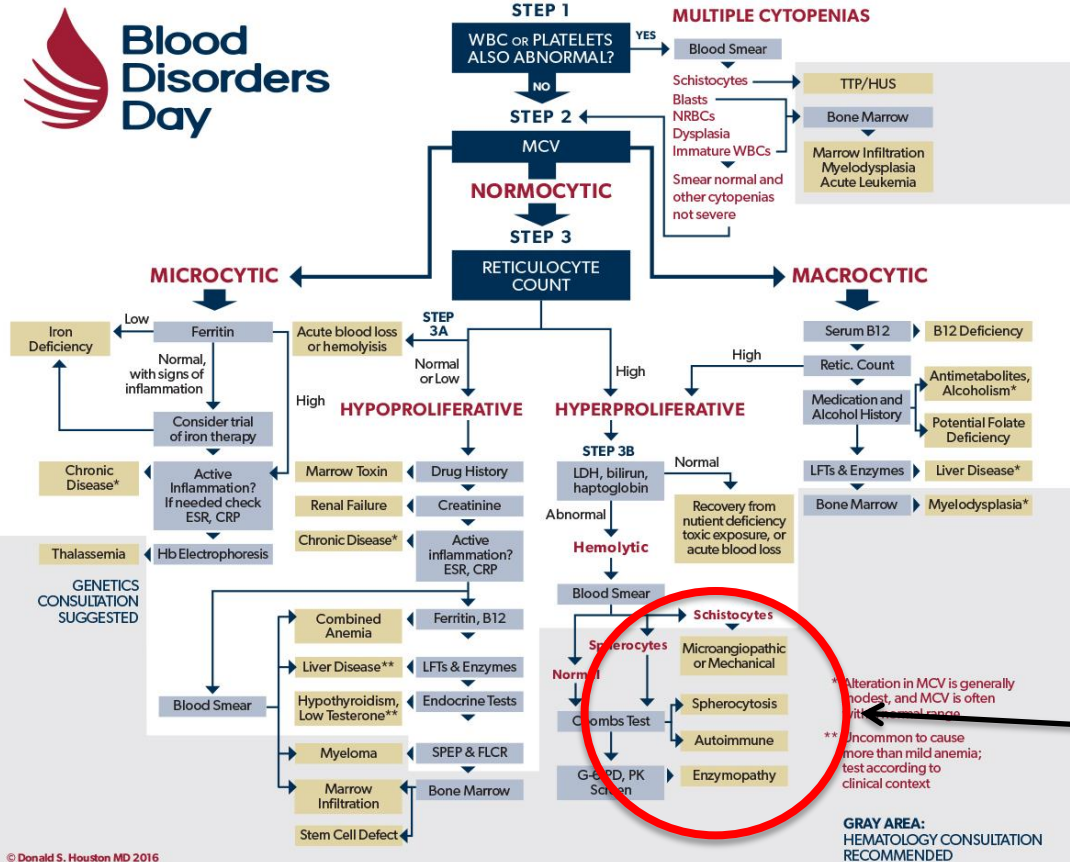
- Creatinine 93
- ALT 10
- Total bilirubin 42
- Indirect bilirubin 33
- LDH 975
- Haptoglobin <0.01

Case #1

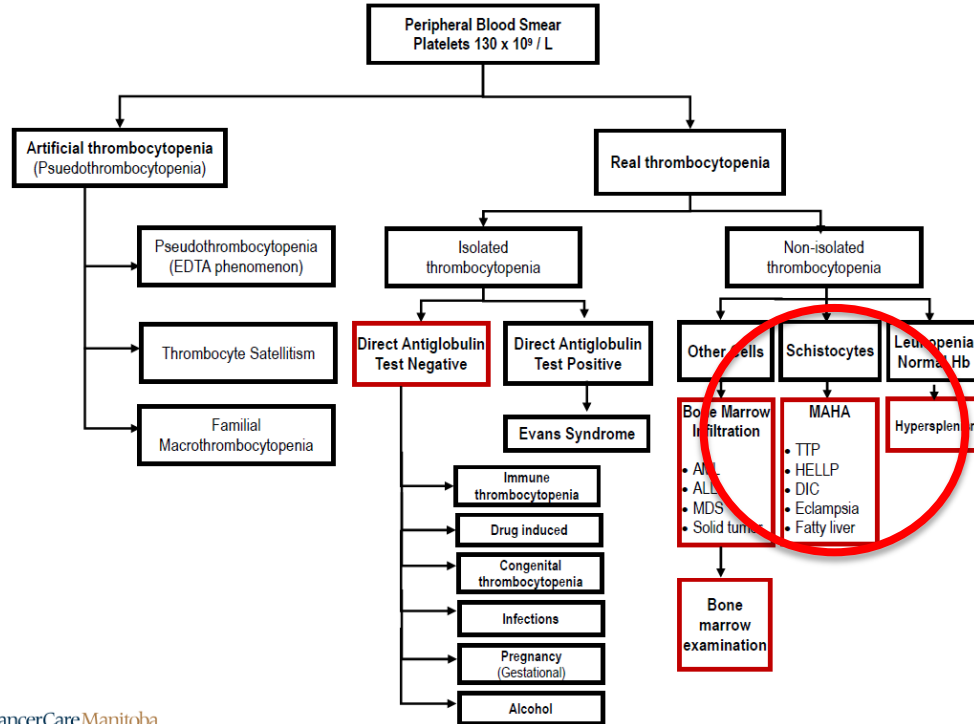
Peripheral film:
increased
polychromasia;
4-10 schistocytes / hpf

Schistocytes
= Fragments
= Microangiopathy



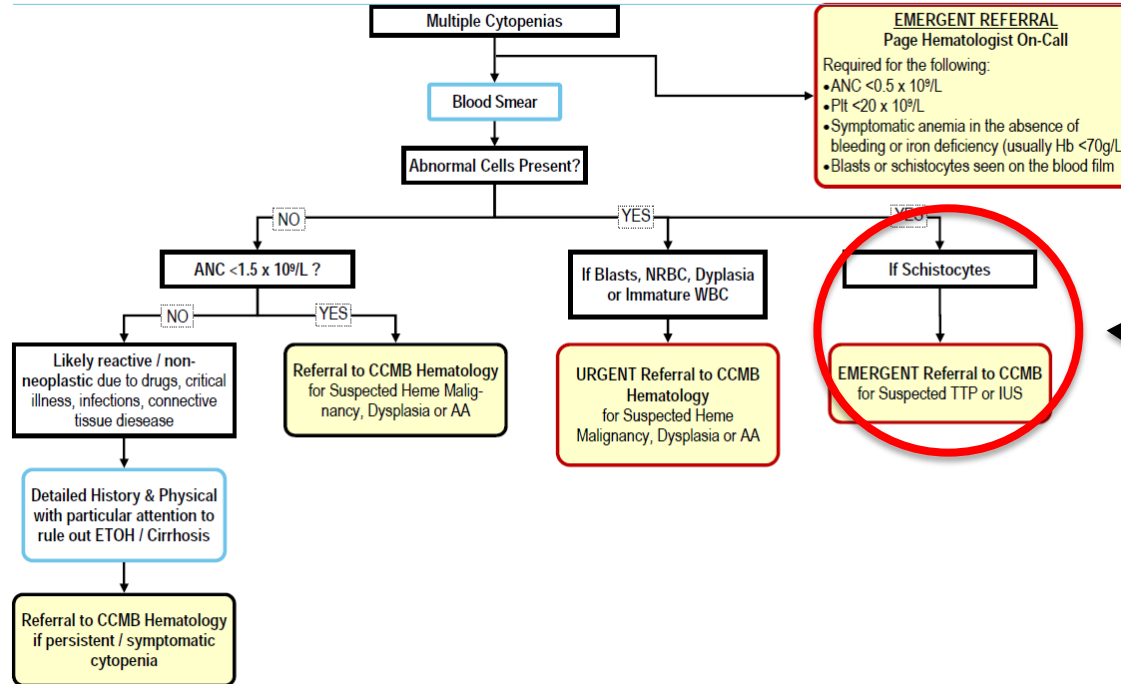


Work-Up of THROMBOCYTOPENIA



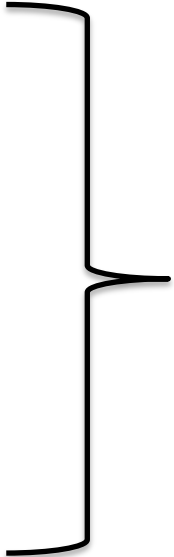
Work-up of PANCYTOPENIA

RISK FACTORS / PRACTICE POINTS:



TTP – Clinical manifestations

- Classic pentad:
 - Fever
 - Thrombocytopenia
 - Microangiopathic hemolytic anemia
 - Neurologic symptoms
 - Renal insufficiency



Present in <10% of patients at diagnosis

TTP – Clinical manifestations

- ***Thrombocytopenia (usually <30)**
- ***Thrombotic microangiopathy**
- Neurologic symptoms (60%)
- Abdominal pain (mesenteric ischemia) (35%)
- Cardiac ischemia (25%)
- Renal failure (10-25%)

TTP - Investigations

- CBC
- Reticulocyte count
- Peripheral blood film
- Creatinine
- Bilirubin, LDH, haptoglobin

TTP – Differential diagnosis

- Malignant hypertension → Blood pressure
- Pre-eclampsia / HELLP → β -hcg
- Hemolytic uremic syndrome → Complement testing
- Disseminated intravascular coagulation → INR, aPTT, fibrinogen, d-dimer

TTP - Management

- **Hematology referral (STAT → call)**
- Plasma exchange
- Prior to plasma exchange, mortality in TTP was 90%
- With plasma exchange, survival in TTP is now 90%

Case #1 Revisited

- Despite feeling entirely well, 1 L of FFP was transfused and she sent to Winnipeg by ambulance
- Central line inserted in ER upon arrival
- Plasma exchange initiated within 4 hours
 - Hemoglobin, reticulocyte count, platelets and LDH normalized over the next few days
 - Currently under observation

Learning Objectives

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2. **To review the common presentations of acute leukemia, and the immediate action plan**

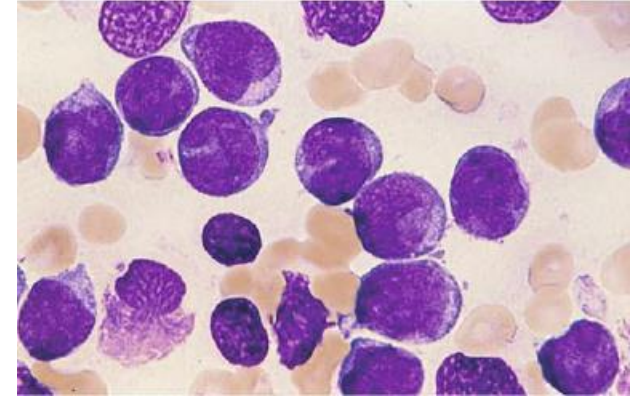
Case #2

- 59F seen in clinic with increased bruising
- Otherwise well

- Past medical history: none
- Medications: none

Case #2

WBC (x10e9)	69
Differential (x10e9)	Neutrophils 0.7 Lymphocytes 17.9 Monocytes 1.4 Myelocytes 0.69 Blasts 48.3
Hemoglobin (g/L)	109
MCV (fL)	84
Platelets (x10e9)	27

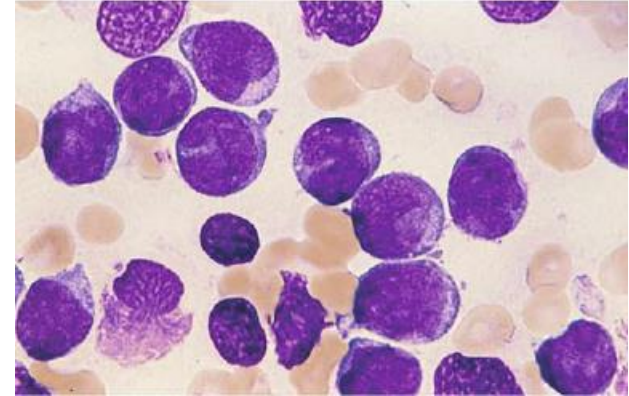


* Prior CBC normal

Case #2

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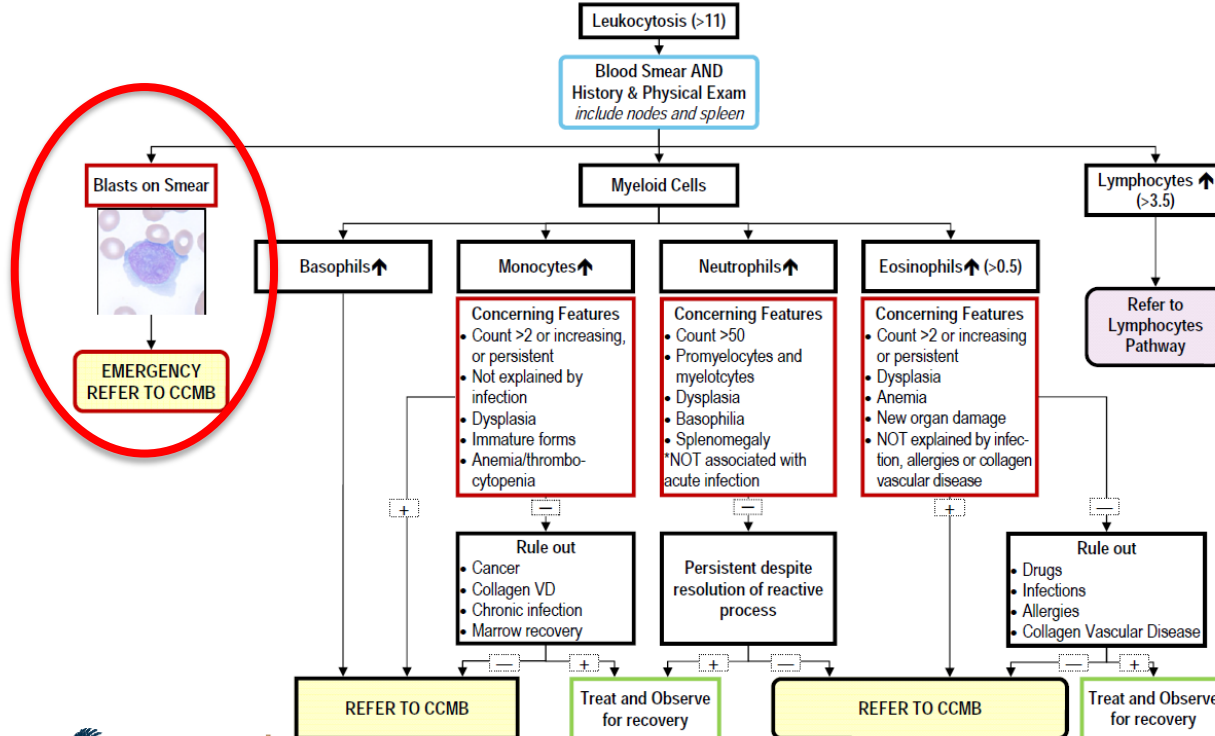
IMPRESSION:

Leukocytosis (with blasts)

Pancytopenia

Work-Up of LEUKOCYTOSIS

RISK FACTORS: add info here PRACTICE POINTS: add info here



Case #3

- 24M seen in clinic with progressive fatigue, night sweats and weight loss
- Recently antibiotics for ?pneumonia
- No infectious source, no bleeding

- Past medical history: none
- Medications: none

Case #3

WBC ($\times 10^9/L$)	1.9
Differential ($\times 10^9/L$)	Neutrophils 1.19 Lymphocytes 0.71 Monocytes 0.02 Blasts 0.02
Hemoglobin (g/L)	97
MCV (fL)	94
Platelets ($\times 10^9/L$)	153

* Prior CBC normal

Case #3

WBC ($\times 10^9/L$)	1.9
Differential ($\times 10^9/L$)	Neutrophils 1.19 Lymphocytes 0.71 Monocytes 0.02 Blasts 0.02
Hemoglobin (g/L)	97
MCV (fL)	94
Platelets ($\times 10^9/L$)	153

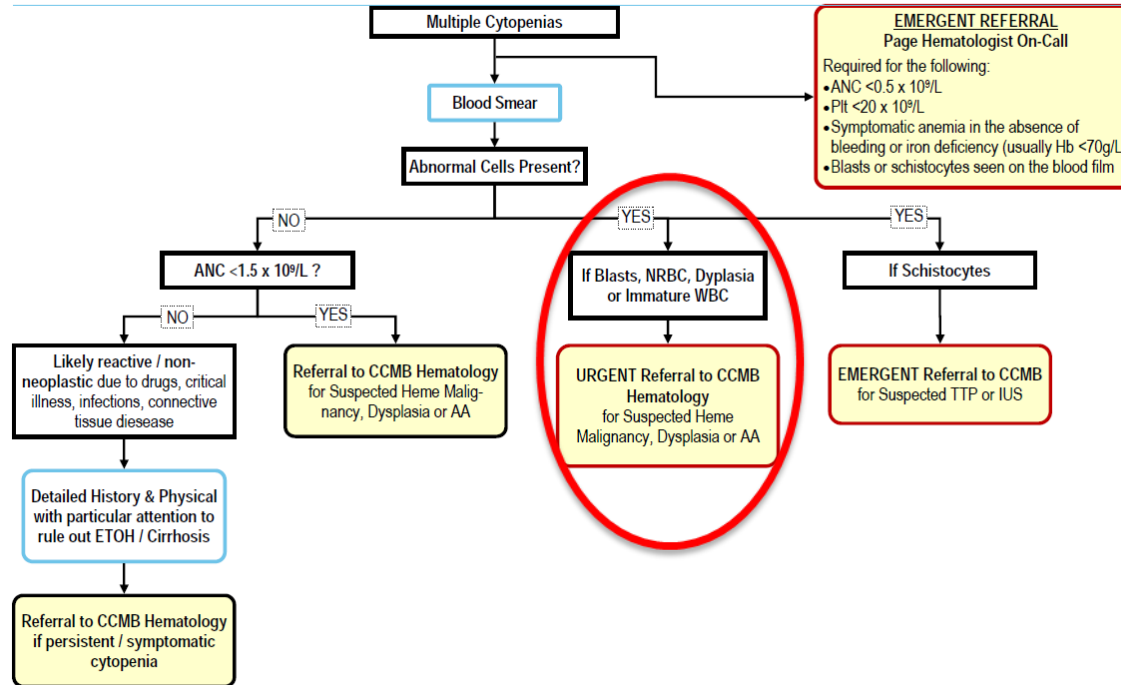
IMPRESSION:

Pancytopenia

* Prior CBC normal

Work-up of PANCYTOPENIA

RISK FACTORS / PRACTICE POINTS:



Acute leukemia – Clinical manifestations

- Constitutional symptoms
- Fatigue, malaise
- Anemia (pallor, heart failure)
- Thrombocytopenia (bleeding)
- Leukopenia / leukocytosis (infection)

Acute leukemia - Diagnosis

- Leukocytosis (blasts) OR pancytopenia
 - Peripheral blood OR bone marrow blasts >20%
- Delayed treatment is associated with reduced survival
- Early mortality related to bleeding and infection

Diagnosis – Take home points

- Present with constitutional symptoms, infections, bleeding
- CBC can show leukocytosis OR pancytopenia
- Differential and peripheral film are very informative
- New blasts are always bad; **call HEMATOLOGY ON CALL**

Acute leukemia - Complications

- White blood cells (infection, leukostasis)
- Hemoglobin (symptomatic anemia, CHF)
- Platelets (bleeding)

- DIC (bleeding, thrombosis)
- Tumor lysis syndrome

Acute leukemia - Assessment

- History & physical
 - Focal infection
 - Bleeding (intracranial, GI, mucocutaneous)
 - Thrombosis (DVT, PE)
 - Organ dysfunction (head to toe)
 - Leukostasis

Acute leukemia - Assessment

- Laboratory tests
 - CBC, differential, blood film
 - Electrolytes, Ca/Mg/PO₄, albumin
 - Creatinine
 - Liver enzymes
 - LDH, uric acid
 - DIC screen (INR, aPTT, fibrinogen, d-dimer)

Case #2 / #3 Revisited

- Both patients were transferred to HSC leukemia service within 24 hours
- Baseline investigations (bone marrow, MUGA)
- Started induction chemotherapy

Take home messages

- TTP and acute leukemia are medical emergencies with acute life-threatening complications
- Maintain a high index of suspicion
 - TTP – anemia / thrombocytopenia
 - Acute leukemia – leukocytosis / pancytopenia
- If you suspect these, please call hematology on-call (at any hour!)

Thank you

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