Haematology for Clinical Finals

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21 Cases, Take Home Messages & A framework for cramming

@bloodworkapp

SIMPLY FINALS

The whole of haematology in 90 minutes...

In 21 cases, Take-home messages and a revision framework

Haematology: Organising your cramming...

1. Clotting
2. Transfusion
3. Cancer
4. Red cell
5. Dire emergencies you must never mess up

SIMPLY FINALS

CLOTTING: 5 key topics

1. PT, APTT and two ways to make a clot
2. How to use heparin, warfarin and NOACs
3. What to do with a bleeding patient taking anticoags
4. Bleeding tendency
5. Clotting tendency

SIMPLY FINALS

TRANSFUSION: 5 key topics

1. Red cells: ABO, Rh and K
2. Plasma
3. Platelets (and thrombocytopenia)
4. Tranexamic Acid
5. Cryo, Fibrinogen, Expensive extras
    - ➢ octaplex, novoseven, factor concentrates

SIMPLY FINALS

CANCER: 5 key topics

1. Presentation
   - ➢ lumps, organomegaly, bone marrow failure, infection
2. Diagnostics
   - ➢ scans, bone marrow, biopsy, blood film, flow, cytogenetics
3. Treatment
   - ➢ chemo, radio, targeted antibodies, targeted molecules
4. Supportive care
   - ➢ antiemetics, mouth-care, antimicrobials, bisphosphonates, psychosocial
5. Emergencies
   - ➢ sepsis, tumour lysis, leukostasis, cord compression

SIMPLY FINALS

CANCER: 4 key diagnoses

1. Leukaemia
2. Lymphoma
3. Myeloma
4. Myeloproliferative Disease

SIMPLY FINALS

RED CELL: 4 key topics

1. Haematinics
2. Haemoglobin/opathy
3. Haemolysis
4. Haemochromatosis

SIMPLY FINALS

5 things to NEVER MESS UP

1. Massive Transfusion and transfusion reactions
2. Sepsis, Tumour Lysis & Hypercalcemia
3. Cord Compression
4. Sickle Chest crisis
5. Dangerous thrombocytopenias

SIMPLY FINALS

Pearls: dangerous thrombocytopenias

- Patient well or unwell?
- Check out the blood film!

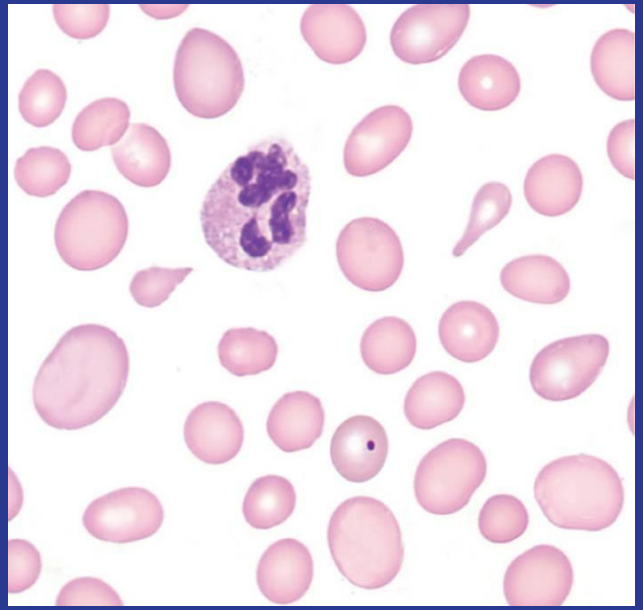
- Neurology, renal, fevers, haemolysis, RC framents -> TTP
- Pregnant, LFTs deranged, Proteinuria -> HELLP
- Heparin, Rash, Thrombosis -> HITT
- Pancytopenia, abnormal WC on film -> Acute leukaemia

Anaemia 101

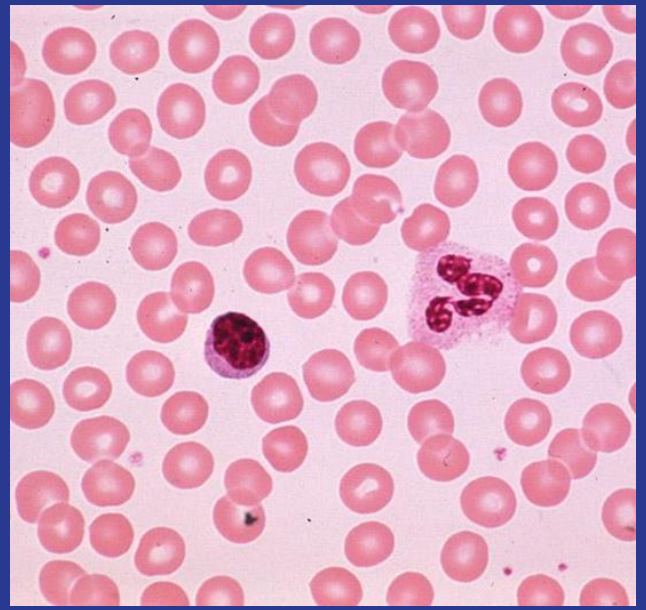
- Check MCV
- Check other blood counts
- Check haematinics
- Look at blood film

You'll usually have the answer then...

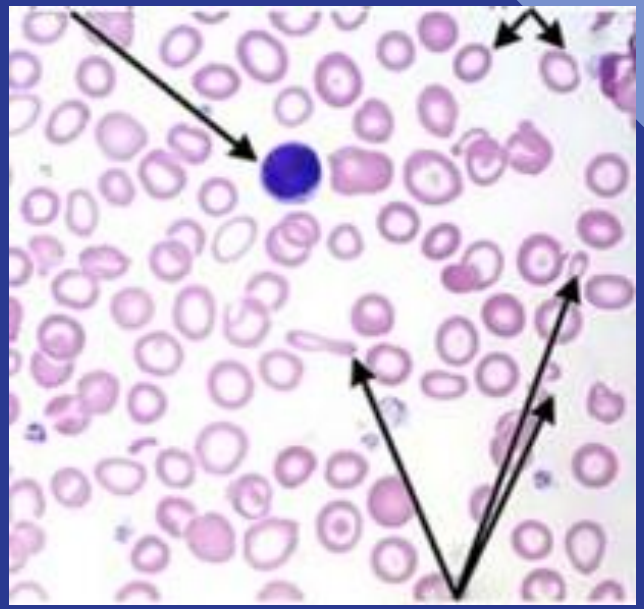
There are 3 kinds of anaemia



Macrocytic



Normocytic



Microcytic

(usually also hypochromic)

88, WHITE BRITISH, FEMALE

		NR
Hb	62	120 - 160 g/l
MCV	65	80 - 100 fl
MCH	17	26 - 33 pg/c
RDW	20	12 - 15%
WCC	11	4 - 10 $x10^{9/l}$
Nph	8	2 - 8 $x10^{9}/l$
LC	3	1 - 4 x $10^{9}/l$
Plt	550	150 - 450 x $10^{9}/l$

28, Bangladeshi, FEMALE

		NR
Hb	62	120 - 160 g/l
MCV	65	80 - 100 fl
MCH	17	26 - 33 pg/c
RDW	20	12 - 15%
WCC	11	4 - 10 $x10^{9/l}$
Nph	8	2 - 8 $x10^{9}/l$
LC	3	1 - 4 x $10^{9}/l$
Plt	550	150 - 450 x $10^{9}/l$

SIMPLY FINALS

58, White British, MALE

		NR
Hb	102	120 - 160 g/l
MCV	70	80 - 100 fl
MCH	23	26 - 33 pg/c
RDW	19	12 - 15%
WCC	11	4 - 10 $x10^{9}$/l
Nph	8	2 - 8 $x10^{9}$/l
LC	3	1 - 4 x 10^{9}/l
Plt	400	150 - 450 x 10^{9}/l

28, BLACK BRITISH (Ghanaian parents), MALE

		NR
Hb	102	120 - 160 g/l
MCV	55	80 - 100 fl
MCH	23	26 - 33 pg/c
RDW	14	12 - 15%
WCC	11	4 - 10 $x10^{9}$/l
Nph	8	2 - 8 $x10^{9}$/l
LC	3	1 - 4 x 10^{9}/l
Plt	400	150 - 450 x 10^{9}/l

SIMPLY FINALS

Pearls: Microcytic Anaemia

IRON DEFIENCY or THALASSEMIA: nothing else!
Check FERRITIN - if it's low they're definitely deficient
Don't give iron if ferritin is normal

IDA is not a diagnosis but a symptom

- DIET, MALABSORPTION or BLEEDING?
- Bleeding is GYNAE or GUT: The history will tell you
- No clear blood loss: Check for Ca Bowel or Bladder

Don't Transfuse unless active bleed:

- Fe replacement will do it

Pearls: Thalassemia

HbA = 2 alpha chains (4 genes) & 2 beta chains (2 genes)
Alpha thal = alpha gene problems; Beta thal = vice versa!

Trait: some genes still working

- Not pathological but need antenatal testing and counselling

Major: no genes working -> PROBLEMS

- Ineffective erythropoiesis -> anaemia & developmental issues
- Extramedullary erythropoiesis -> skeletal deformity
- Rx: Chronic Transfusion & Chelation
- Iron overload and chronic anaemia -> endocrinopathy, cardiopathy
- Cure with bone marrow transplant
- Future cure with gene therapy

88, FEMALE, Collapse, Jaundiced, Confused

Hb	42	120 - 160 g/l
MCV	130	80 - 100 fl
MCH	28	26 - 33 pg/c
RDW	25	12 - 15%
WCC	3	4 - 10 x10^{9}/l
Nph	1.8	2 - 8 x10^{9}/l
LC	1.2	1 - 4 x 10^{9}/l
Plt	55	150 - 450 x 10^{9}/l

ALP	100	40 - 120 IU/L
ALT	35	5-50 IU/L
BR	25	5 - 16 mcmol/L
LDH	2000	>450 IU/L

35, MALE, Jaundiced

Hb	95	120 - 160 g/l
MCV	82	80 - 100 fl
MCH	33	26 - 33 pg/c
RDW	16	12 - 15%
WCC	8	4 - 10 x10^{9}/l
Nph	6	2 - 8 x10^{9}/l
LC	3	1 - 4 x 10^{9}/l
Plt	400	150 - 450 x 10^{9}/l

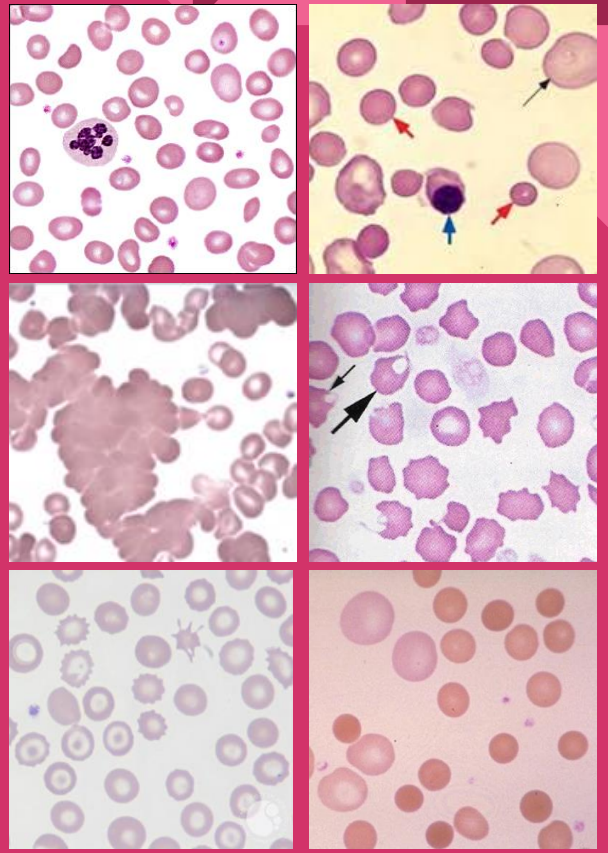
ALP	200	40 - 120 IU/L
ALT	52	5-50 IU/L
BR	30	5 - 16 mcmol/L
LDH	500	>450 IU/L

SIMPLY FINALS

Pearls: Macrocytic Anaemia

Acute: HAEMOLYSIS / AIHA / Acute leuk
Subacute: FOLATE (esp pregnancy)
Chronic: B12, thyroid, alcohol, MDS
Tests:

- Reticulocytes (up in AIHA, down in others)
- B12 & Folate = Dietary or Pernicious
  - Don’t transfuse without haematinics
  - Overtransfusion of chronic anaemia kills
- DAT
- Liver Function and Thyroid Function
- Blood Film



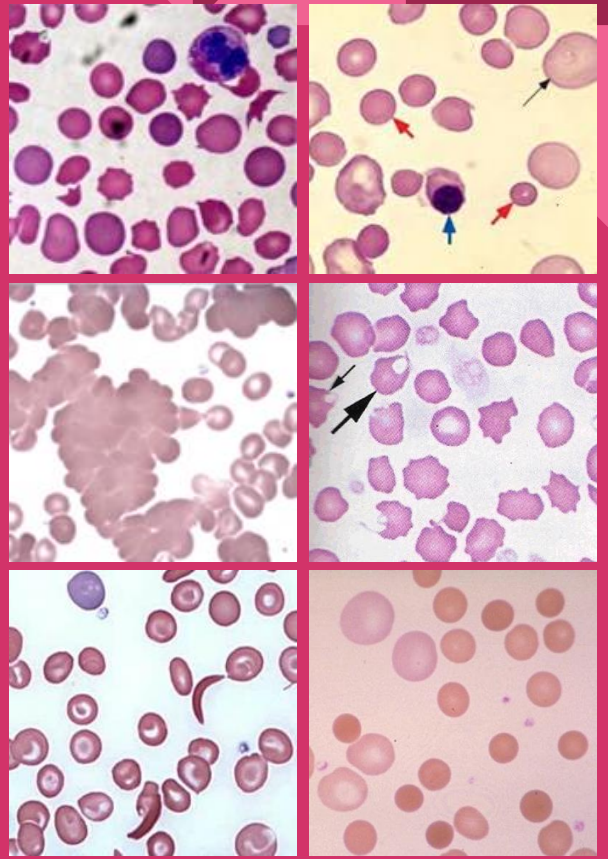
Pearls: Haemolytic Anaemia

If LDH & BR hi & Haptoglobins absent there IS haemolysis!

DAT positive?

- YES… probably immune

- NO… consider
  - Lab issue!
  - Membrane (HS & HE)
  - Enzymes (G6PD & PKD)



36, Nigerian, Male, Leg pain, Chest Pain

Known HbSS sickle cell disease

What are the priorities of management

What are your targets and guidelines?

What are the short-term complications and how to prevent them?

What are the long-term complications?

Hb	72	120 - 160 g/l
MCV	77	80 - 100 fl
MCH	23	26 - 33 pg/c
RDW	18	12 - 15%
WCC	22	4 - 10 $x10^{9}$/l
Nph	15	2 - 8 $x10^{9}$/l
LC	4	1 - 4 x 10^{9}/l
Plt	700	150 - 450 x 10^{9}/l

SIMPLY FINALS

What are the haemoglobinopathies and how to diagnose them?

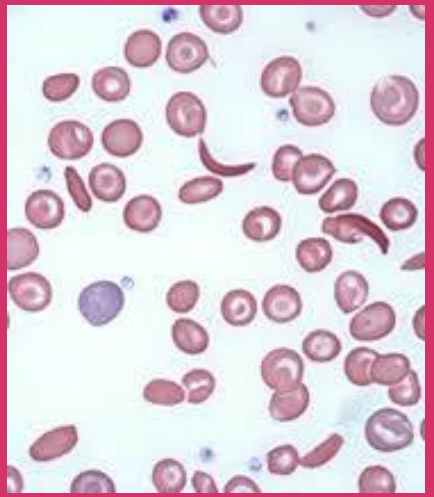
PEARLS: Sickle Cell Disease

- Lifelong, life-limiting, multisystemic disease
- Hb SS, Hb SC and Hb Beta Thal all sickle

- Treat with individualised care plans
- All patients on FOLIC ACID and PENICILLIN-V

- OPIATE ANALGESIA, 20 mins, 1 hr pain targets
- Bloods, Oxygen, Fluids (oral or IV), Spirometry
- Possibly also… CXR, ANTIBIOTICS, TRANSFUSION

- LONG-TERM: Hydroxyurea, Transfuse, Chelation
- CURE: Bone marrow Transplantation & Gene Rx



PEARLS: Sickle Cell Crises

PAIN: Limb or Axial including SKULL or CHEST

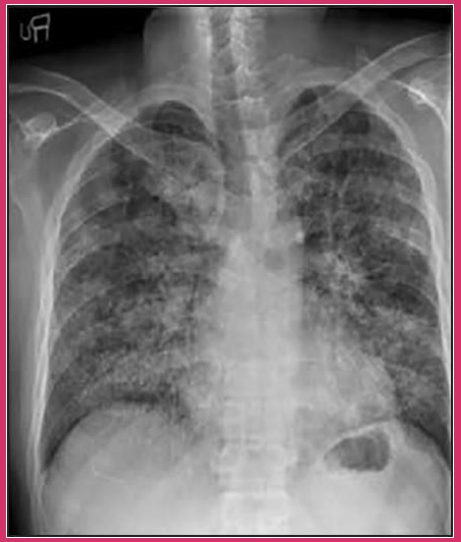
CHEST: Pain, Hypoxia, Pulmonary Infiltrates

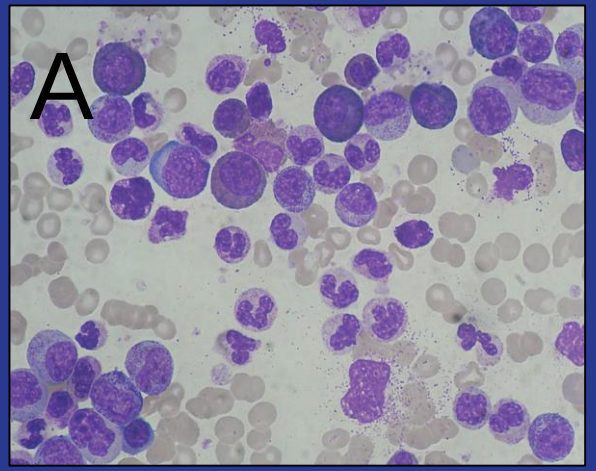
- Oxygen, Analgesia, Antibiotics & Spirometry
- Ventilatory Support, Exchange Transfusion

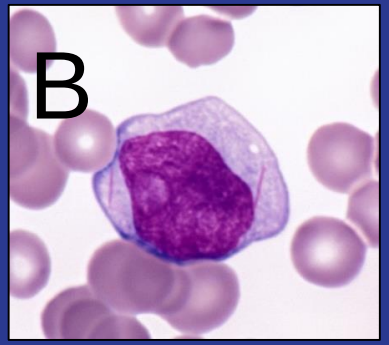
APLASTIC: Parvovirus (or drug); TRANSFUSE

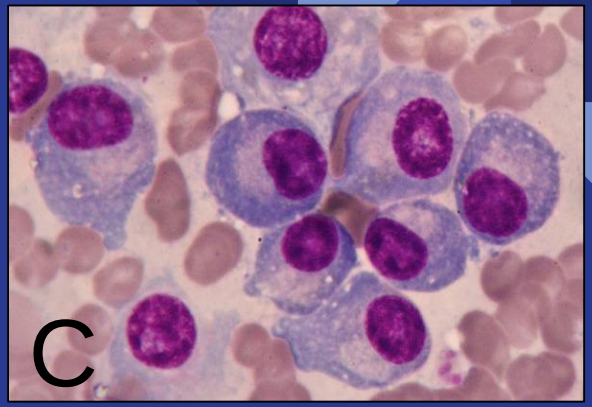
Sequestration: Liver (or spleen); TRANSFUSE

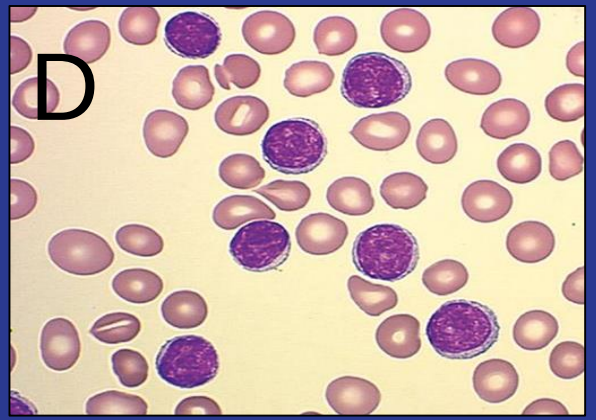
SEPTIC: Recognise Early, Treat, Re-assess

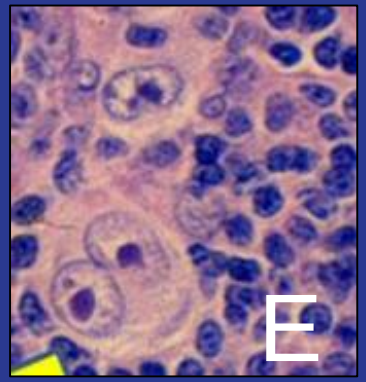












A: CML
B: AML
C: MM
D: CLL
E: CHL

PEARLS: Haem Cancer Workup

DIAGNOSE -> STAGE -> PROGNOSTICATE -> SUPPORT

Baseline tests:

- Biopsy - Lymph node, bone marrow

- FBC: Marrow failure often a complication (+ haematinics)
- Chemistry: Tumor lysis, Calcium, Liver infiltration, Fitness

- HIV and Hepatitis status check
- Autoimmune and thyroid

Supportive Care:

- Antimicrobials, BMFx, Analgesia, Mouthcare, Antiemetics, Anti-TLSx

PEARLS: Haem Cancer Staging

Staging determines TREATMENT and PROGNOSIS

Lymphomas: IMAGING: CT / PET CT

Myeloma: Skeletal survey, MRI spine

Leukaemia: Molecular
Immunophenotyping defines cell type
Cytogenetics determines prognosis

PEARLS: Haem Cancer Treatment

Old Style; Still Work!

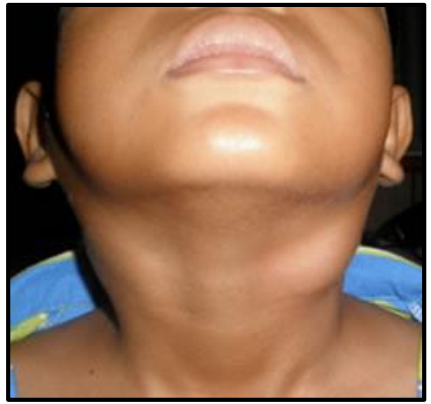
- Cytotoxics: Damage DNA / Cell replication -> Apoptosis
- Radiotherapy: Regionally targeted DNA damage -> Apoptosis

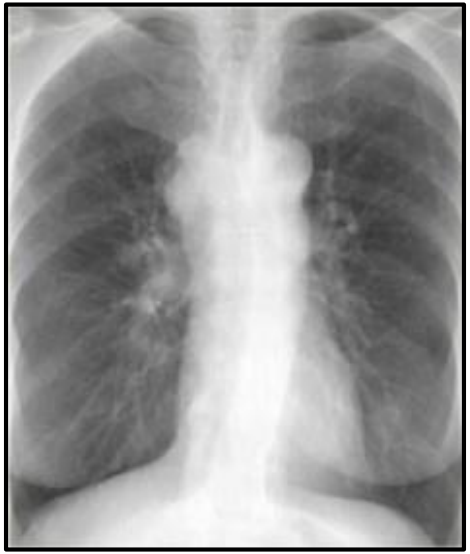
‘Novel’ Agents:

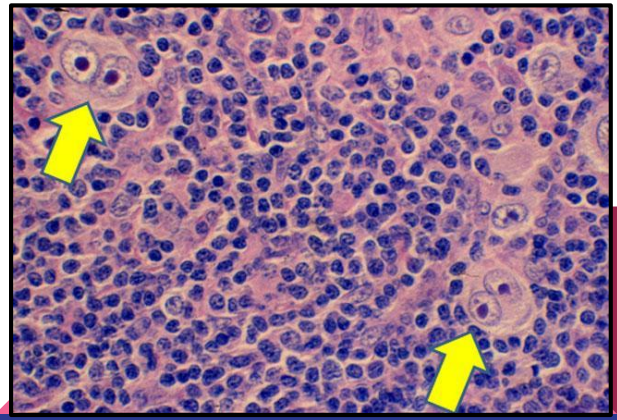
- Monoclonal antibody: target tumour; immune modulate or carry cytotoxic or radioactive substance
  - E.g. Rituximab, Daratumomab
- Oncogenic pathway blocker - ‘small molecule inhibitor’
  - E.g. Imatinib, Ibrutinib
- Esoteric mechanism not fully understood!
  - E.g. Lenalidomide, Bortezomib

24, Female: Cough, swollen glands, Fevers, Fatigue

Hb	110	120 - 160 g/l	**ALP**	165	40 - 120 IU/L
MCV	92	80 - 100 fl	**ALT**	250	5-50 IU/L
MCH	28	26 - 33 pg/c	**BR**	15	5 - 16 mcmol/L
RDW	14	12 - 15%			
WCC	13	4 - 10 $x10^{9/l}$			
Nph	11	2 - 8 $x10^{9}/l$			
LC	2	1 - 4 x $10^{9}/l$			
Plt	500	150 - 450 x $10^{9}/l$			







SIMPLY FINALS

Lymphoma 101

Non-Hodgkin: 5th commonest cancer

USUALLY B CELL, High Grade or Low Grade

High Grade = DLBCL

Low Grade = Follicular lymphoma

T cell rare (10%) = Immune disruption++

Other exam-topic B cell lymphomas

BURKITT: rare super-highgrade

Key facts: EBV, C-MYC, t(8;14)

Key types: SPORADIC, ENDEMIC, IMMUNOSUPP

WALDENSTROM:

Lo grade +IgM paraprotein AKA LPC lymphoma

Targeted Ab: RITUXIMAB (CD20) for B cell

Hodgkin: Rare cancer but...

2nd commonest teens /twenties

Key facts:

Reed Sternberg cells; 30% EBV+

4 Histological subtypes:

NS/MC/LP/LD

Targeted Ab: Brentuximab (CD30)

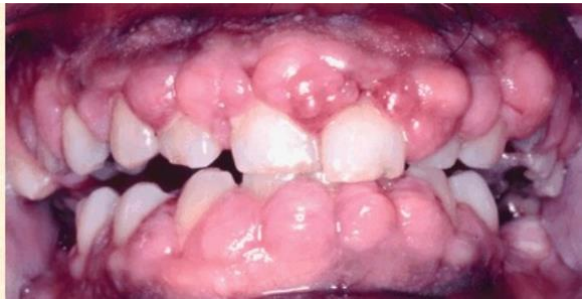
Stage and treated both 'the same'

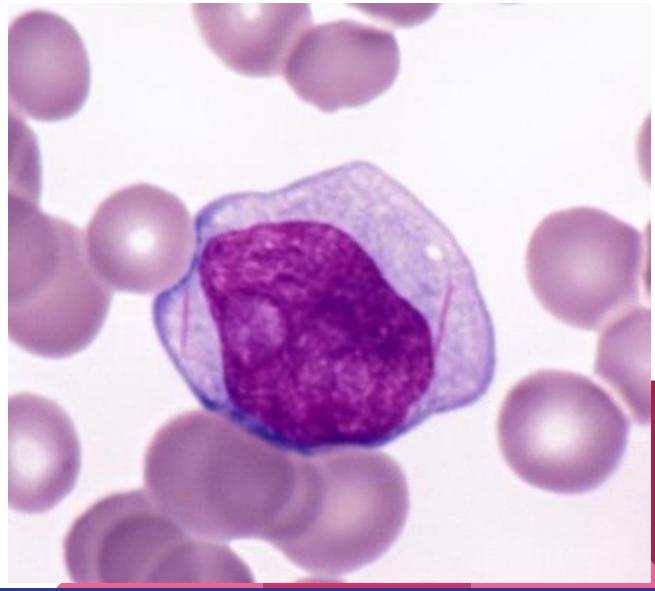
- Biopsy, CT or PET-CT: Anne Arbor stage
- Chemotherapy mainstay
- Radiotherapy for localised
- BM Transplant for relapse

28, MALE: ‘Flu’, Fatigue, Bone pain, and sore gums

Hb	65	120 - 160 g/l
MCV	112	80 - 100 fl
MCH	28	26 - 33 pg/c
RDW	18	12 - 15%
WCC	3	4 - 10 x10^{9}/l
Nph	0.9	2 - 8 x10^{9}/l
LC	1.5	1 - 4 x 10^{9}/l
Plt	40	150 - 450 x 10^{9}/l

ALP	165	40 - 120 IU/L
ALT	250	5-50 IU/L
BR	15	5 - 16 mcmol/L





Acute Leukaemia Pearls

The acute leukaemia are VERY SIMILAR in presentation & treatment
The chronic leukaemias are COMPLETE DIFFERENT from each other!

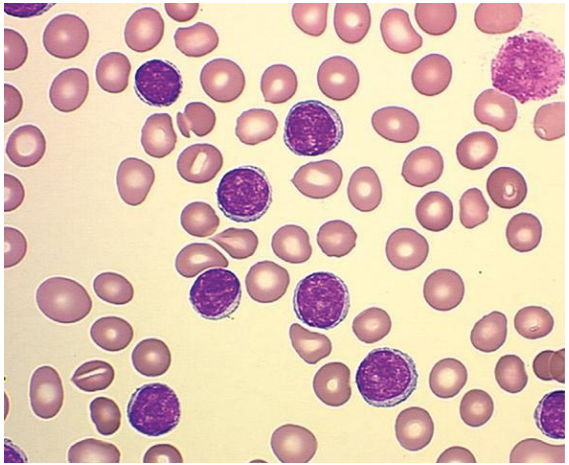
Acute leukaemia: AML and ALL
Presentation: Bone marrow failure, infections/bleeding, leucostasis
Treatment: Chemotherapy +/- transplant; and CNS prophylaxis
Cytogenetics are prognostically essential:
t(15;17) GOOD, monosomy 3,5,7 BAD (AML)

LIFE THREATENING PRESENTATIONS!:
Leucostasis, Tumor Lysis, Coagulopathy, Sepsis

84, Female: Fatigue, Abdominal discomfort

Hb	100	120 - 160 g/l
MCV	92	80 - 100 fl
MCH	28	26 - 33 pg/c
RDW	14	12 - 15%
WCC	48	4 - 10 x10^{9}/l
Nph	5	2 - 8 x10^{9}/l
LC	42	1 - 4 x 10^{9}/l
Plt	110	150 - 450 x 10^{9}/l

Cr	55	40 - 120 IU/L
Ca	2.3	2.2-2.6 mM



18 months ago..?

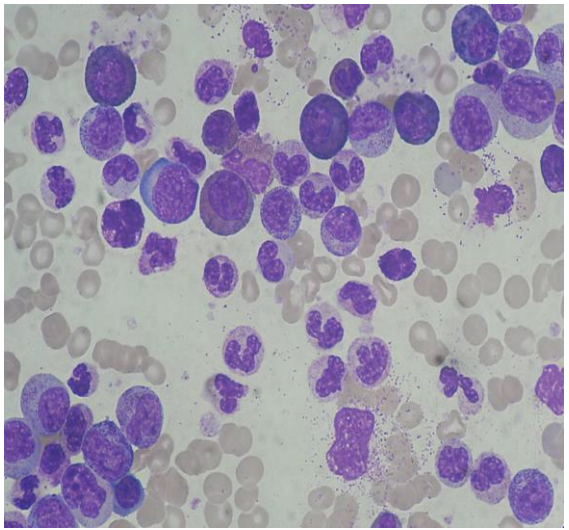
Hb	110	120 - 160 g/l
MCV	92	80 - 100 fl
MCH	28	26 - 33 pg/c
RDW	14	12 - 15%
WCC	16	4 - 10 x10^{9}/l
Nph	5	2 - 8 x10^{9}/l
LC	8	1 - 4 x 10^{9}/l
Plt	140	150 - 450 x 10^{9}/l

SIMPLY FINALS

54, Male: Fatigue, Abdominal discomfort

Hb	100	120 - 160 g/l
MCV	92	80 - 100 fl
MCH	28	26 - 33 pg/c
RDW	14	12 - 15%
WCC	48	4 - 10 x10^{9}/l
Nph	42	2 - 8 x10^{9}/l
LC	2	1 - 4 x 10^{9}/l
Plt	710	150 - 450 x 10^{9}/l

Cr	55	40 - 120 IU/L
Ca	2.3	2.2-2.6 mM



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SIMPLY FINALS

Chronic Leukaemia Pearls

Chronic Myeloid Leukaemia is VERY RARE

Presents with hepatosplenomegaly and very high white cell count

- BCR-ABL is the gene driving it
- t(9;22) is the cytogenetic lesion
- Chemo / bone marrow transplant used to be needed
- Now it's just TARGETED therapy with IMATINIB or similar
- Occasionally transforms into acute leukaemia (AML AND ALL!)

Chronic Lymphocytic leukaemia is COMMONEST LEUKAEMIA

Presents incidentally with inc WCC; usually with palpable nodes

- Behaves just like B cell non-Hodgkin lymphoma
- Treated like B cell non-Hodgkin lymphoma
- Occasionally transforms into high grade lymphoma (Richters)

54, Male: Fatigue, Pruritis, Abdominal discomfort

Hb	190	120 - 160 g/l
MCV	105	80 - 100 fl
MCH	28	26 - 33 pg/c
RDW	14	12 - 15%
WCC	15	4 - 10 $x10^{9}/l$
Nph	13	2 - 8 $x10^{9}/l$
LC	2	1 - 4 $x\ 10^{9}/l$
Plt	710	150 - 450 $x\ 10^{9}/l$

Hct	62	40 - 50%

Diagnostic Test?

Anything else to exclude?

'Adjunct' tests

Treatment?

Complications?

SIMPLY FINALS

Myeloproliferative Disease 101

Three related disorders: PCV, ET & MF

- ALL of PCV and ⅓ of others = mutated JAK2
- Most of ET/MF are JAK2 or CALR/MPL mutated
- MF = characterised by B symptoms & big spleen

Always excluded ‘secondary’ causes

- Erythrocytosis = HYPOXIA, EPO secretion or rare OXYGEN AFFINITY / HYPOSENSITIVITY disorders
- Thrombocytosis = ACUTE PHASE or IDA

Complications: Thrombosis and transformation to AML/MF

- Treat with ASPIRIN and CYTOREDUCTION (HU)

PEARLS: Bone Marrow Failure Syndromes

EXCLUDE CONGENITAL and secondary causes:
Nutritional/Viral/Toxin/Radiation

Aplastic Anaemia:

- Disease of mid-age
- Sometimes curable
- Autoimmune mechanism
- Does not evolve to AML

Treatment:

- Immunosuppression (ATG/CSA) + BMT

Myelodysplastic syndrome:

- Generally incurable
- Disease of elderly
- Neoplastic mechanism
- Frequently evolves to AML

Treatment:

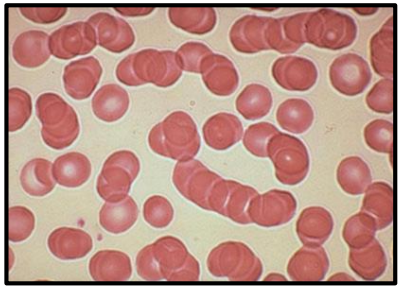
- Growth factors
- Hypomethylators & Lenalidomide
- Chemo / BMT
- Immunosuppression

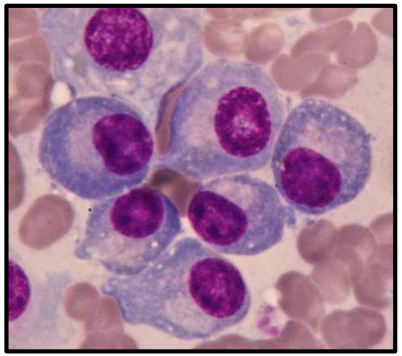
Support with blood products and antimicrobial prophylaxis

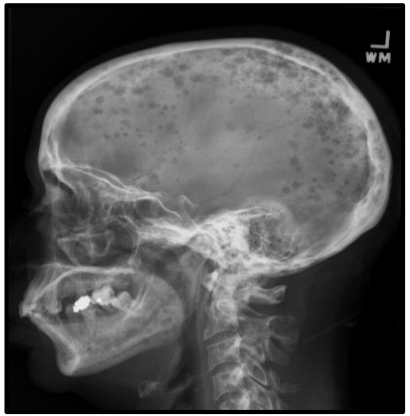
64, Male: Back pain, Fatigue, Polydipsia

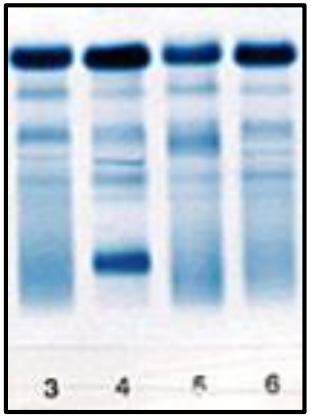
Hb	100	120 - 160 g/l
MCV	92	80 - 100 fl
MCH	28	26 - 33 pg/c
RDW	14	12 - 15%
WCC	6	4 - 10 $x10^{9}$/l
Nph	5	2 - 8 $x10^{9}$/l
LC	1.5	1 - 4 x 10^{9}/l
Plt	140	150 - 450 x 10^{9}/l

Cr	200	40 - 120 IU/L
Ca	3.1	2.2-2.6 mM









SIMPLY FINALS

PEARLS: MYELOMA

MULTISYSTEMIC MALIGNANCY: CRAB criteria

- Calcium, Renal, Anaemia, Bone
- Infection, Thrombus, Amyloid

SUSPECT: Anaemia, bone pain, globulins, Hypercalcemia

TREAT DISEASE:

- Chemo/RT
- Novel agents: velcade & imids, targeted antibodies
- Auto BMT

TREAT COMPLICATIONS:

- Analgesia, Bisphosphonates, Anticoags, Antibios

BEWARE!:

- Cord Compression, Pathological #, Renal Failure, Infection

58, White British, MALE, TATT

PMHx

Diabetes

Osteoarthritis

Hypothyroidism

20-30u beer/week

O/E

Tanned

Hb	122	120 - 160 g/l
MCV	102	80 - 100 fl
MCH	28	26 - 33 pg/c
RDW	14	12 - 15%
WCC	9	4 - 10 x10^9/l
Nph	6	2 - 8 x10^9/l
LC	3	1 - 4 x 10^9/l
Plt	400	150 - 450 x 10^9/l

ALP	165	40 - 120 IU/L
ALT	250	5-50 IU/L
BR	15	5 - 16 mcmol/L

Ferritin	6250	20 - 300 mcg/L
Transferrin Sat	58	<55%

HFE

C282Y

H63D

SIMPLY FINALS

PEARLS: Iron Overload

Hyperferritinemia =

- ACUTE PHASE, LIVER … or iron overload

Iron Overload =

- Transfusional, Ineffective Erythropoiesis or H.H.

Complications:

- Liver, Endocrine, Cardiac, Joint, Skin
- Hereditary (HH): Usually HFE gene C282Y or H63D

Treatment:

- VENESECT if H.H.
- Iron Chelation if Ineffective Epoiesis/Transfusion

Splenomegaly : Causes

Storage Disease

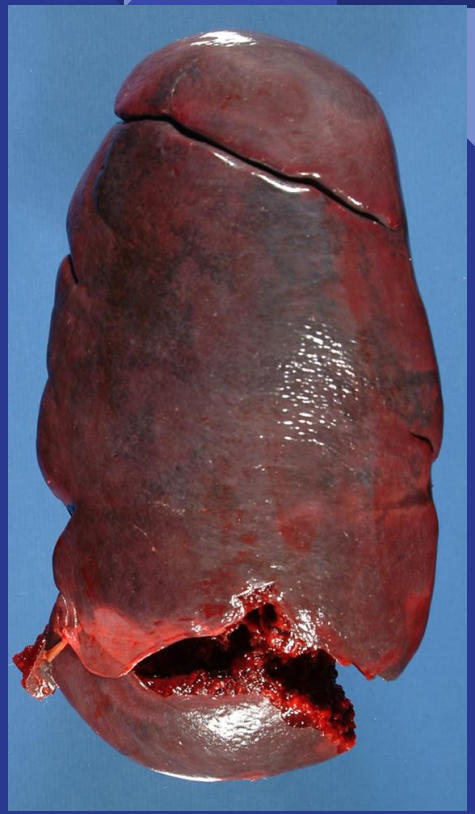
Portal hypertension

Lysis (haemolysis)

ESR (connective tissue)

Exotic (malaria/leishman/schisto)

Neoplastic (Lymphoma, MPD)



PEARLS: Thromobosis

- CONGENITAL: FVL, PTM, ATD, PCD, PSD
- ACQUIRED: Malignancy, TRAUMA, APLS, MPD
- Major: HOSPITALISATION, HORMONE (pregnancy)
- Secondary: Immobility, Smoking, Obesity

Indications for anticoagulation:

- Prophylaxis of above
- Prophylaxis in AF and Valvular disease
    - CHADS2Vasc and HASBLED srisk stratify AF
- Treatment of VTE
    - Diagnose with IMAGING after WELLS SCORE
    - Lifelong or 12/52 anticoagulation
    - Depends on PROVOKED or UNPROVOKED

Pearls: Oral Anticoagulation

Warfarin still has its place:

- Reversible, well tolerated, useful with renal impairment
- ALWAYS for valvular heart disease (especially prosthetics)
- Takes 3+ days to work
- REVERSIBLE (Vitamin K and PCC)

Novel agents preferable for compliance & risk:

- Rivaroxaban (+apixiban if frail)
- Dabigatran sometimes (but GI bleeds and MIs?)
- Act immediately but IRREVERSIBLE (for now…)

Take Home: Parenteral Anticoagulation

Unfractionated heparin rarely used

- Except CARDIOLOGY and RENAL IMPAIRMENT
- APTT monitoring required: unpredictable pharmacokinetics
- Risk of Heparin-induced Thrombocytopenia
- Reversed with PROTAMINE (but has short half-life anyway)

LMWH (‘ultra-low’ Fondaparinux for ACS)

- Many brands, pretty much the same
  - (dalte/enoxa/tinzaparin)
- Predictable RENAL excretion: easy weight-based dosing
- Unlike UFH - IRREVERSIBLE (mainly)
  - 10-20 hour half-life

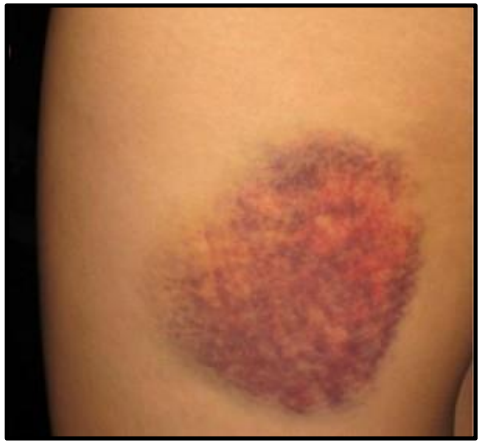
38 Female, Fatigue, Easy bruising limbs, ankle rash

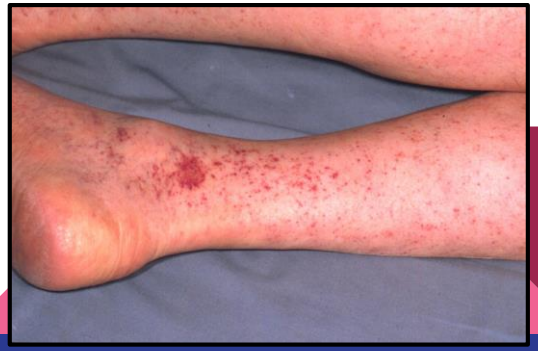
Hb	122	120 - 160 g/l	**APTT**	26	20 - 30 sec
MCV	92	80 - 100 fl	**PT**	11	9 - 12 sec
MCH	28	26 - 33 pg/c	**Fib**	2.3	1.5 - 4g/l
RDW	14	12 - 15%			
WCC	9	4 - 10 $x10^{9}/l$			
Nph	6	2 - 8 $x10^{9}/l$			
LC	3	1 - 4 x $10^{9}/l$			
Plt	26	150 - 450 x $10^{9}/l$			

What could be causing this?

Which investigations?

Confirmatory tests?





SIMPLY FINALS

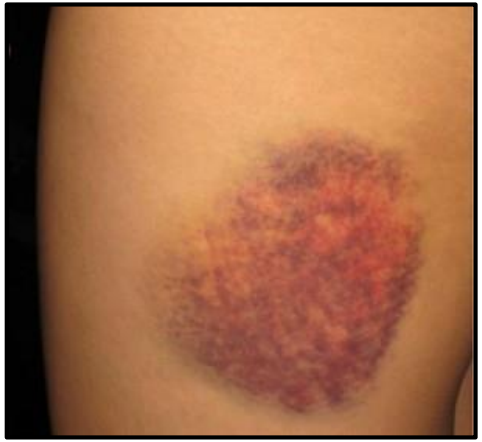
38 Female, Fatigue, Easy bruising limbs, ankle rash

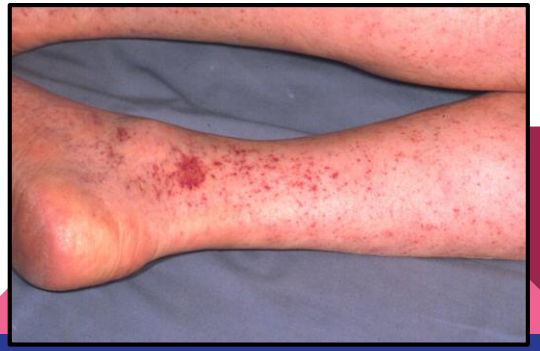
Hb	122	120 - 160 g/l	**APTT**	60	20 - 30 sec
MCV	92	80 - 100 fl	**PT**	11	9 - 12 sec
MCH	28	26 - 33 pg/c	**Fib**	2.3	1.5 - 4g/l
RDW	14	12 - 15%			
WCC	9	4 - 10 $x10^{9}/l$			
Nph	6	2 - 8 $x10^{9}/l$			
LC	3	1 - 4 x $10^{9}/l$			
Plt	120	150 - 450 x $10^{9}/l$			

What could be causing this?

Which investigations?

Confirmatory tests?





SIMPLY FINALS

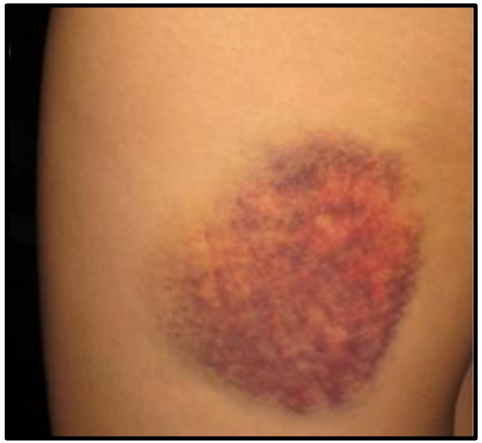
38 Female, Fatigue, Easy bruising limbs, ankle rash, headache, fever

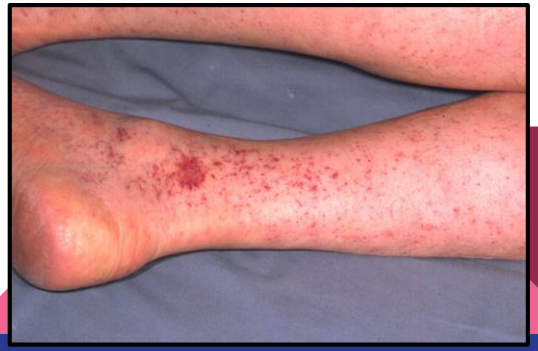
Hb	80	120 - 160 g/l
MCV	101	80 - 100 fl
MCH	28	26 - 33 pg/c
RDW	17	12 - 15%
WCC	9	4 - 10 $x10^{9}$/l
Nph	6	2 - 8 $x10^{9}$/l
LC	3	1 - 4 x 10^{9}/l
Plt	36	150 - 450 x 10^{9}/l

APTT	26	20 - 30 sec
PT	11	9 - 12 sec
Fib	2.3	1.5 - 4g/l

Cr	700	40 - 120 IU/L
Ur	36.3	2.5 - 8 mM

ALP	100	40 - 120 IU/L
ALT	35	5-50 IU/L
BR	70	5 - 16 mcmol/L
LDH	2000	>450 IU/L





SIMPLY FINALS

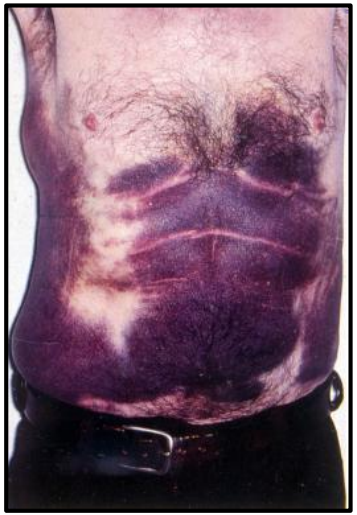
88, Male, Nursing home resident, Purpura, Abdo pain

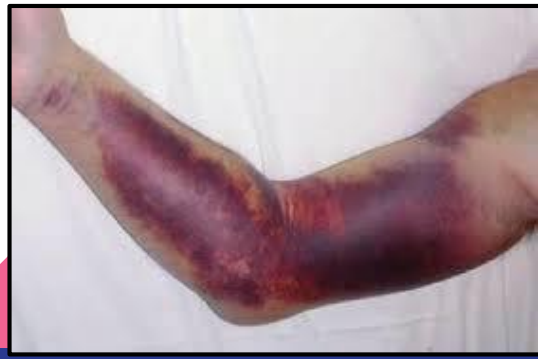
Hb	80	120 - 160 g/l
MCV	65	80 - 100 fl
MCH	28	26 - 33 pg/c
RDW	17	12 - 15%
WCC	9	4 - 10 $x10^{9}$/l
Nph	6	2 - 8 $x10^{9}$/l
LC	3	1 - 4 x 10^{9}/l
Plt	480	150 - 450 x 10^{9}/l

APTT	>120	20 - 30 sec
PT	11	9 - 12 sec
Fib	2.3	1.5 - 4g/l

Cr	150	40 - 120 IU/L
Ur	13.2	2.5 - 8 mM

ALP	100	40 - 120 IU/L
ALT	35	5-50 IU/L
BR	20	5 - 16 mcmol/L





SIMPLY FINALS

Neonate, Male, Post ventouse delivery, Unresponsive, Cefalhaematoma

Hb	120	160 - 180 g/l
MCV	105	100 - 110 fl
MCH	28	26 - 33 pg/c
RDW	17	15 - 20%
WCC	23	10 - 35 x10^{9}/l
Nph	18	5 - 21 x10^{9}/l
LC	8	2 - 10 x 10^{9}/l
Plt	380	150 - 350 x 10^{9}/l

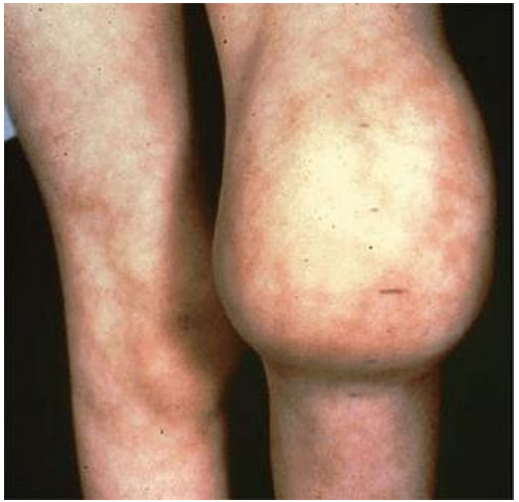
APTT	>120	20 - 30 sec
PT	11	9 - 12 sec
Fib	2.3	1.5 - 4g/l

What could be causing this?

Which investigations?

Confirmatory tests?

‘Late’ Complications?



SIMPLY FINALS

Pearls: Bleeding and Bruising

Platelets abnormal:

- Mucocutaneous bleeds: Bruises and purpura

Clotting proteins abnormal:

- Congenital haemophilia:
  - Joint bleeds
- Acquired haemophilia:
  - EVERYWHERE bleeds
  - muscle, retroperitoneal, GI, mucosal, cranial

APTT abnormal?

- It's heparin, Lupus or HAEMOPHILIA

PT abnormal?

- It's warfarin, Nutrition, liver or a RARE haemophilia

BOTH abnormal?

- It's DIC, Liver… check fibrinogen / FDPs - how's the patient?

BLEEDING HISTORY better than labs

Take Home: Proper Transfusion

Red Blood Cells:

For emergencies & congenital anaemias: Avoid if you can

Tranexamic acid in major bleeds

Patient Blood management:

- Conservative vs Liberal Hb
- Why use 2 when 1 will do?
- Optimise iron (IV) +/- Epo
- Fewer blood tests for patients
- Salvage blood intraop
- Treat anaemia cause before Hb too low

Platelets:

A scarce resource: emergencies only

- Seek cause of new thrombocytopenia
- patient, drug chart & blood film

Excess use -> refractoriness

- 1 unit usually adequate
- Most invasive procedures require platelets >30-50; only neurosurgery >100
- Remember to replace during massive transfusion

Take Home: Blood Products

Plasma (FFP):

Corrects deficiencies of all clotting factors (inefficiently)

No good for warfarin reversal

Use in massive transfusion (>6 units)
NOT for DIC!

Cryoprecipitate:

Fibrinogen concentrate
Good for dys/hypofibrinogenemia
Occasionally DIC and obstetric bleeds

Prothrombin Complex Concentrates:

LIFE THREATENING warfarin bleeds

Clotting factors

Once were ‘super-concentrates’
Now RECOMBINANTS (viral risk)

- Factors VIIa, VIII, IX and VWF
- Generally for HAEMOPHILIA

FEIBA = Activated PCC

- For haemophilia with inhibitors

Novo7 = occasionally in trauma

That was…
Haematology for Clinical Finals

Paul Greaves: Consultant Haematologist, BHRUT, Romford

...any questions?
(now or later: haematologypaul@gmail.com)

SIMPLY FINALS

Good ‘last minute’ runthrough of clinical cases: Haematology: Clinical Cases Uncovered https://appsto.re/gb/4LUvz.

Want to be a haematologist? Follow these…

@bloodworkapp

@teamhaem

haematologypaul@gmail.com