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 2 hours...

In 21 cases, Take-home messages and a framework to hang your cramming on...

Haematology is 5 things:

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

SIMPLY FINALS

CLOTTING IS 5 THINGS

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 IS 5 THINGS

1. Red cells: ABO, Rh and K
2. Plasma
3. Platelets (and thrombocytopenia)
4. Tranexamic Acid
5. Cryo, Fibrinogen, The stuff in a locked cupboard
    - ➢ octaplex, novoseven, factor concentrates

CANCER (Leukaemia, Lymphoma, Myeloma, MPD) is 5 things

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

RED CELL IS 5 THINGS

1. Haematinics
2. Haemoglobin/opathy
3. Haemolysis
4. Haemochromatosis
5.

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

Never Miss

Tumour lysis syndrome: Hyperphos, hypocalc, Oliguria

Prevent with allopurinol, rasburicase and generous IV fluids

Cord Compression: Back pain, known malignancy (or suspected), neurology

Suspect with low index of suspicion

Steroids (unless a new diagnosis), image, radiotherapy, neurosurgery

Thrombotic Thrombocytopenic Purpura

Anaemia, jaundice, thrombocytopenia, fever, renal fx, Neurological

IV lines and straight to pheresis centre for PLEX +/- chemotherapy

Acute transfusion reaction

Unwell on a transfusion -> STOP it, ?adrenaline needed

check BAG, BAND, BLOOD; involve HDU, Hydrate, inform lab, send samples,

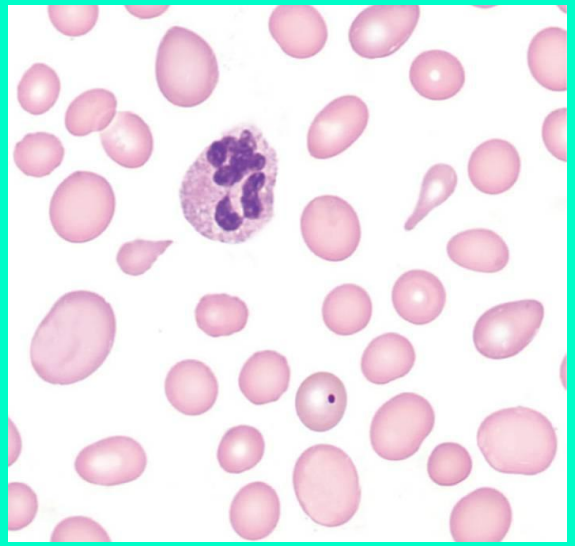
Never Miss: the dangerous thrombocytopenias

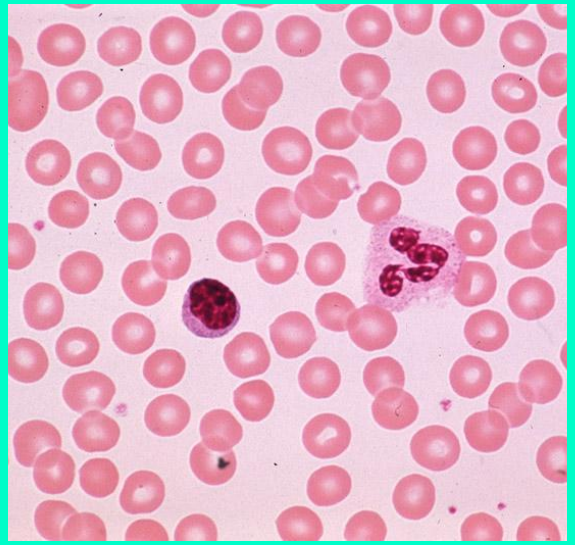
Always ask for a blood film and check medication history

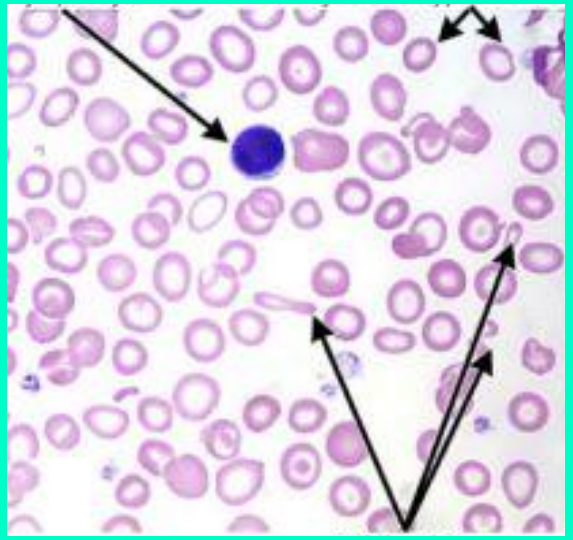
Are they bleeding? Or may they have a clot?

Could they have a bone marrow failure or immunological syndrome?

- ☐ Pregnancy-Associated
  - Liver function? Proteinuria? Hypertension?
  - Think HELLP / Eclampsia spectrum
- ☐ Heparin Induced Thrombocytopenia & Thrombosis (HITT)
- ☐ Thrombotic Thrombocytopenic Purpura (TTP)
  - Anaemia, jaundice, thrombocytopenia, fever, renal fx, Neurological
  - IV lines and straight to pheresis centre for PLEX +/- chemotherapy







28, Bangladeshi, female, TATT

What do you look for?

What do you ask?

Further tests?

Treatment?

		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

88, WHITE BRITISH, FEMALE, TATT

What do you look for?

What do you ask?

Further tests?

Treatment?

		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, BLACK BRITISH (GHANAIAN PARENTS), FEMALE, TATT

What do you look for?

What do you ask?

Further tests?

Treatment?

		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

58, White British, MALE, TATT

What do you look for?

What do you ask?

Further tests?

Treatment?

		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

Take Home: Microcytic Anaemia

Microcytic is IDA or thal trait

IDA is Diet or bleeding - Gynae or Gut?

Investigate the cause

Don't Transfuse if you don't have to

Ferritin is a guide not an absolute: CONTEXT!

SO WHAT IS THALASSEMIA?

Alpha or Beta? : Excess of the 'other' globulin is pathogenic

Trait/Minor, Intermedia or Major: number of copies lost

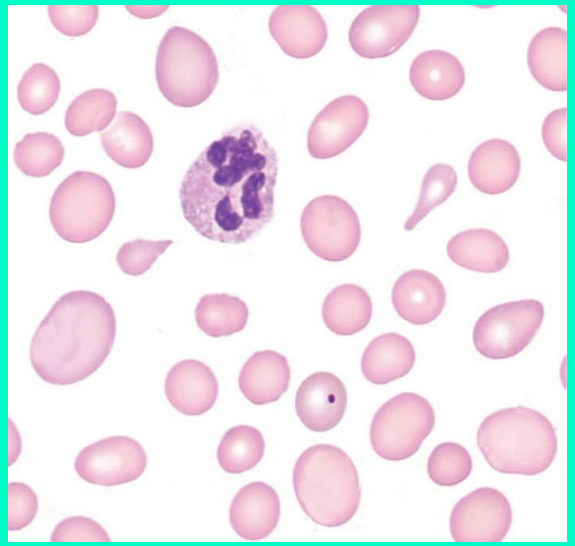
Haemolysis & Ineffective & Extramedullary Haematopoiesis

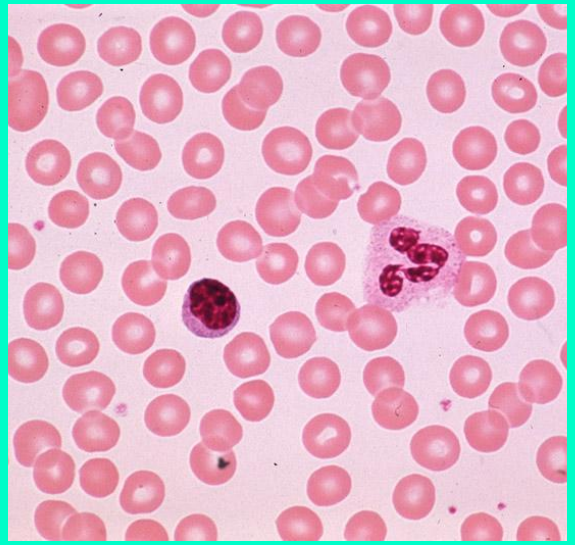
Skeletal Deformity & Endocrinopathy

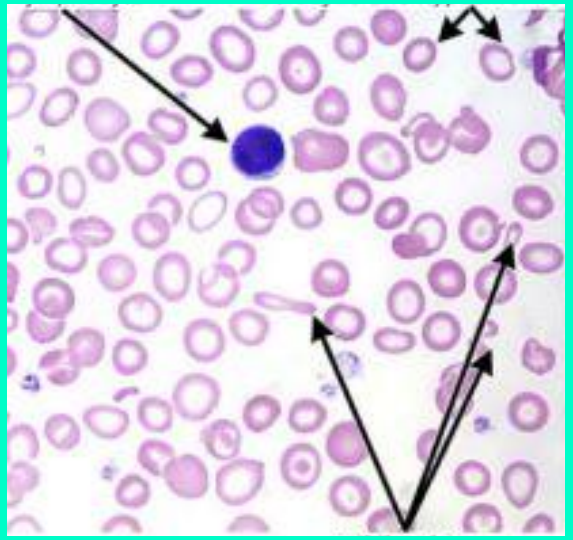
Iron Overload Syndrome & Viral transmission risk

TRANSFUSION with AGGRESSIVE CHELATION is MAINSTAY of therapy

Bone marrow Transplanation is curative







88, WHITE BRITISH, FEMALE, COLLAPSE, JAUNDICED, CONFUSED

Key tests in macrocytic anaemia?

How to treat without causing harm?

Secondary tests

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

B12/folate deficiency…?

48, Jamaican, Female, Collapse, Jaundiced, Confused

Splenomegaly

Reticulocytosis

Confirmatory tests?

How to treat?

Secondary tests

Hb	42	120 - 160 g/l
MCV	110	80 - 100 fl
MCH	33	26 - 33 pg/c
RDW	16	12 - 15%
WCC	16	4 - 10 $x10^{9}$/l
Nph	11	2 - 8 $x10^{9}$/l
LC	3	1 - 4 x 10^{9}/l
Plt	450	150 - 450 x 10^{9}/l

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

DAT… and haemolysis differential?

23, White British, Male, Abdo discomfort, Jaundice

Mild splenomegaly

Reticulocytosis

Confirmatory tests?

How to treat?

Secondary tests

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

DAT negative haemolysis differential?

68 Female, Abdo discomfort, Jaundice

Mild splenomegaly

Reticulocytosis

Confirmatory tests?

How to treat?

Secondary tests

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

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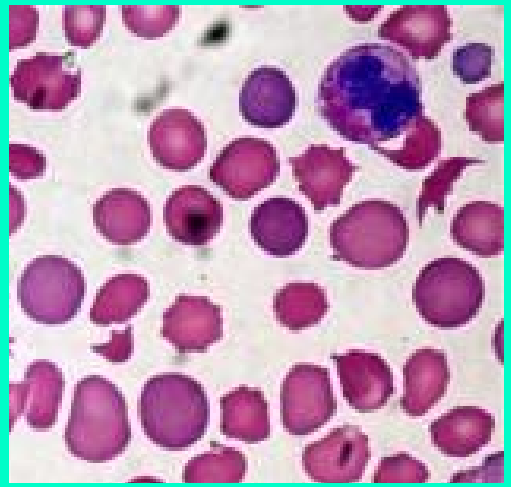
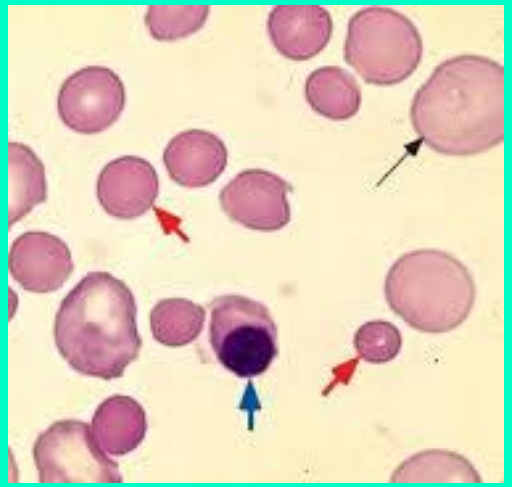
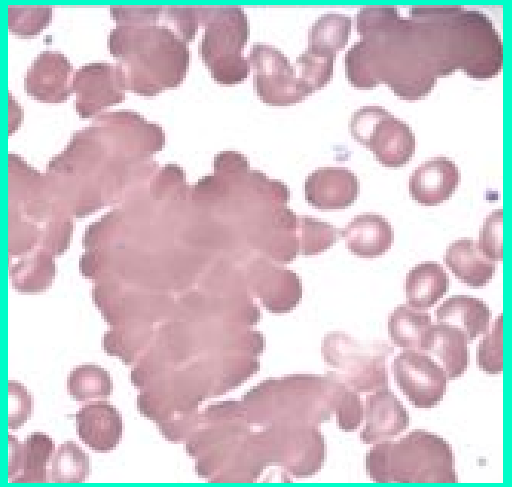
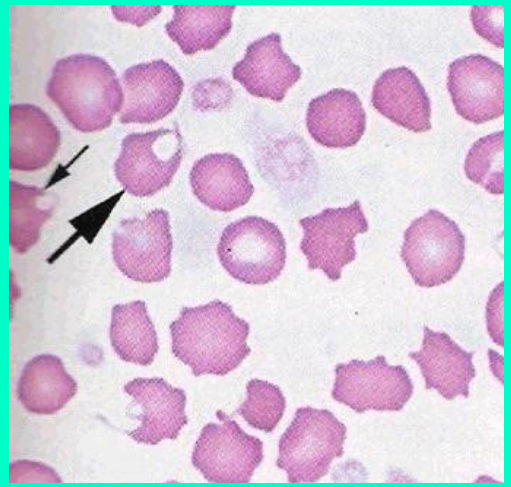
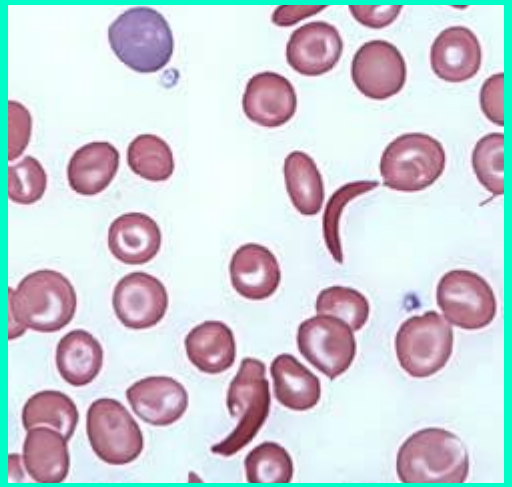
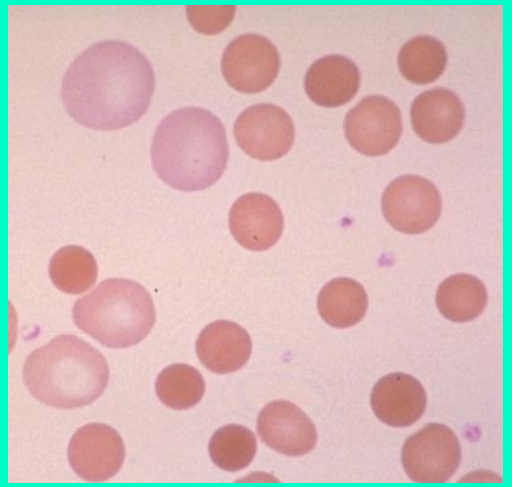
DAT negative haemolysis differential?

TAKE HOME: MACROCYTIC ANAEMIA

HELPFUL TESTS: B12, FOLATE, RETICS, DAT, LDH, HAPTOGLOBS

ACUTE: HAEMOLYSIS: RETICS UP - IS IT IMMUNE? - CHECK DAT & FILM

SUBACUTE: FOLIC ACID ?PREGNANCY & CHRONIC: B12 ? P.A.: RETICS DOWN

ALCOHOL? DRUGS? THYROID? LIVER? MYELODYSPLASTIC SYNDROME?

RAPID TRANSFUSION KILLS IN PERNICIOUS ANAEMIA

REPLACE B12 FIRST THEN FOLIC ACID

WATCH FOR HYPOKALEMIA; RETICS RISE AT DAY 5

36, Black Nigerian, Male, Leg pain, Chest Pain

Known HbSS sickle cell disease

What are the priorities of management

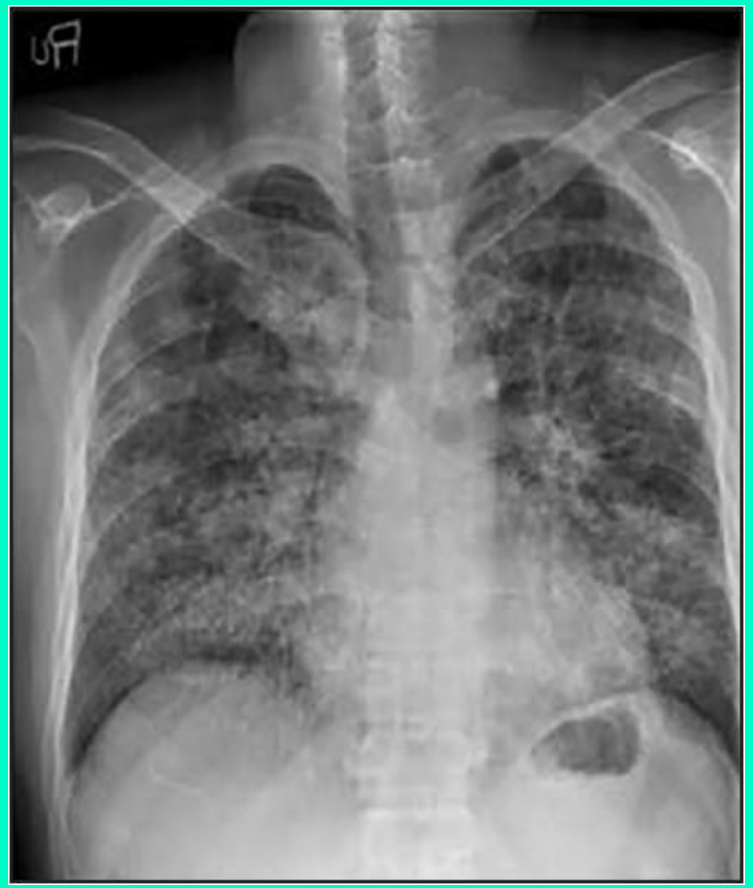
What are your targets and guidelines?

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

What are the haemoglobinopathies and how to diagnose them?



TAKE HOME: The Sickle Cell Syndrome

A lifelong, life-limiting, multisystemic disease

Treat without prejudice but **WITH** individual care plans

adequate **ANALGESIA**, 20 mins, 1 hr targets

YES! Bloods, Oxygen, Fluids (oral or IV), Spirometry

MAYBE! CXR, ANTIBIOTICS, TRANSFUSION

LONG-TERM:Hydroxyurea, Transfusion, Chelation &

Screening; ?Bone marrow Transplantation?

Take Home: The 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 & Support!

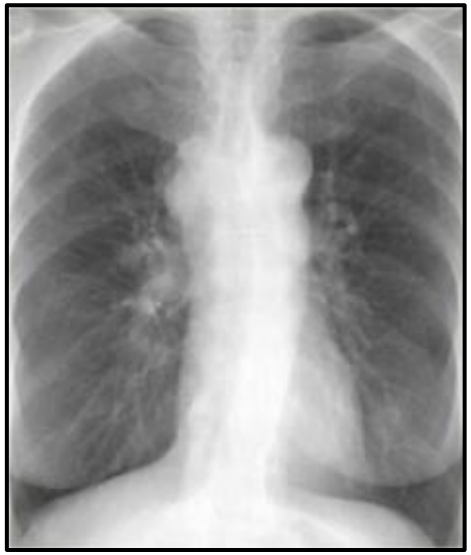
Sequestration: Liver (or spleen); Transfuse & Support!

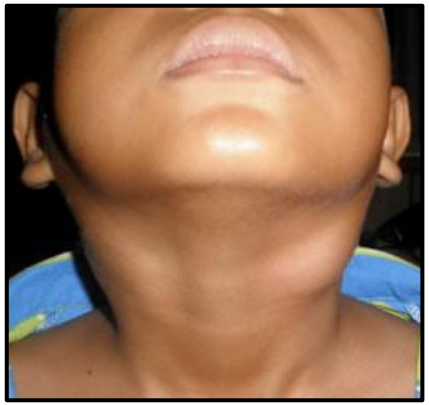
Septic: Recognise Early, Treat, Re-assess

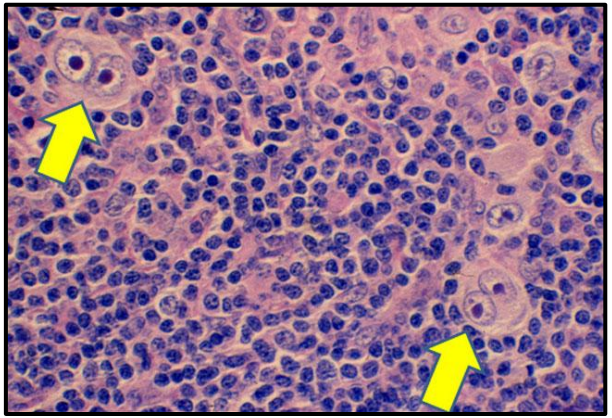
24, Female: Cough, swollen glands, Feverish, Fatigue

Hb	110	120 - 160 g/l
MCV	92	80 - 100 fl
MCH	28	26 - 33 pg/c
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

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







Haematological Malignancy

EVERYONE needs:

A biopsy - Lymph node, bone marrow

FBC: Marrow failure often a complication

Chemistry: Tumor lysis, Calcium, Liver infiltration, Fitness for treatment

HIV and Hepatitis status check

Autoimmune and thyroid

Staging / Prognostication:

Imaging:

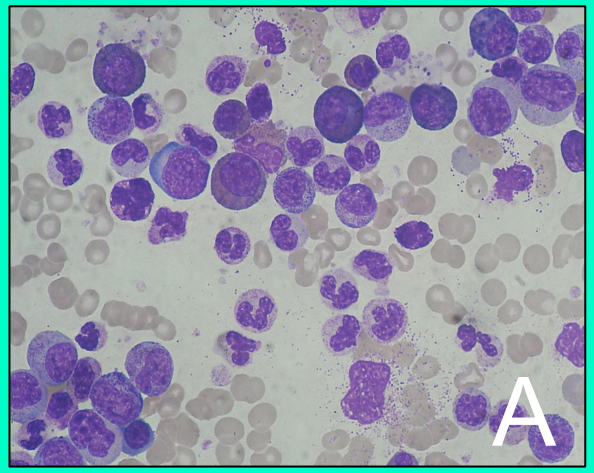
Lymphoma: CT and 'functional' PET-CT

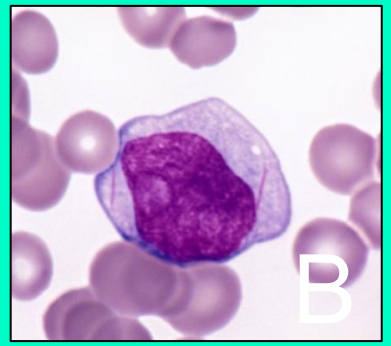
Myeloma: Skeletal survey, MRI spine

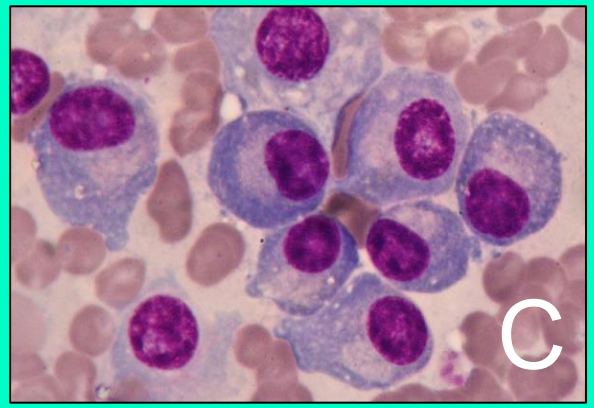
Molecular:

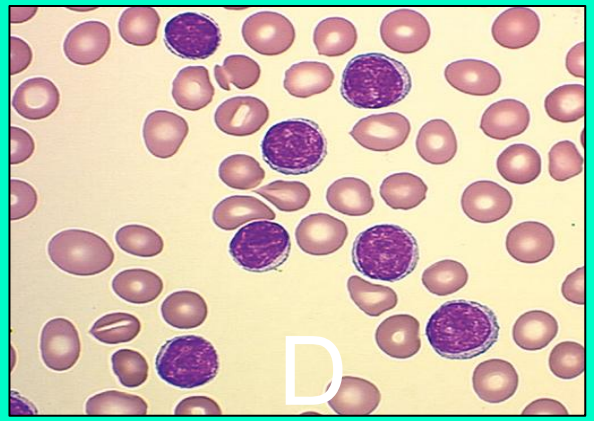
Immunophenotyping defines cell type

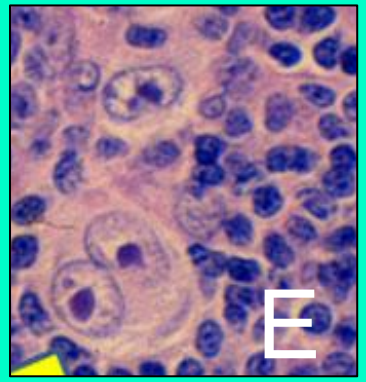
Cytogenetics determines prognosis











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

TAKE HOME: LYMPHOMAS

NON-HODGKIN: COMMON

USUALLY **B CELL**, HIGH GRADE OR LOW GRADE

- HIGH GRADE = **DLBCL**
- LOW GRADE = **FOLLICULAR LYMPHOMA**
- LOW GRADE + IgM PARAPROTEIN = **LPCLYMPHOMA**

SOMETIMES **T CELL** (10%) = **RASHES** AND **BAD NEWS**

BURKITT'S - RARE SUPER-HIGHGRADE, EBV

3 TYPES: **SPORADIC** (ELDERLY); **ENDEMIC** (AFRICA, JAW, KIDS); **HIV / IMMUNOSUPPRESSION ASSOCIATED**

TARGETED ANTIBODY: **RITUXIMAB** (CD20) FOR B CELL

HODGKIN: RARE (NLPHL RARER)

TEENS AND TWENTIES PLUS ELDERLY

REED STERNBERG CELLS; 30% EBV+

HISTOLOGICAL SUBTYPES x4 (USU NS OR MC)

TARGETED ANTIBODY: **BRENTUXIMAB** (CD30)

STAGED AND TREATED THE SAME!

BIOPSY, CT OR PET-CT: ANNE ARBOR STAGE

CHEMOTHERAPY MAINSTAY

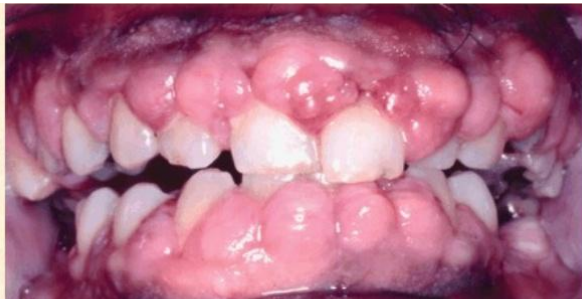
RADIOTHERAPY FOR LOCALISED

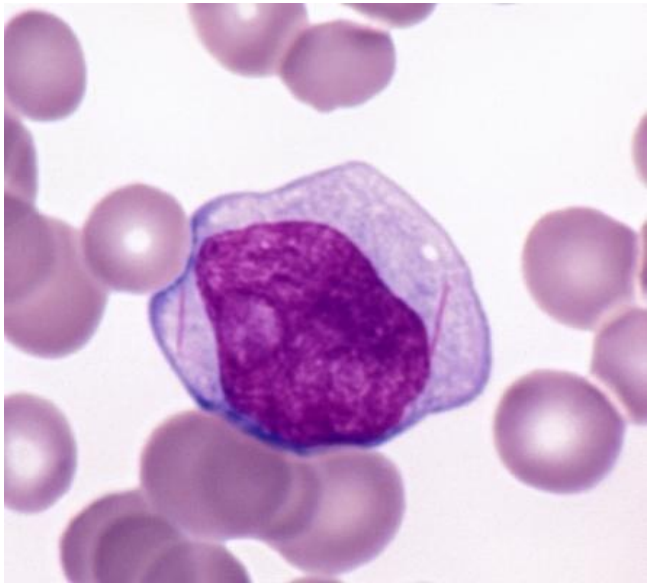
BM TRANSPLANT FOR RELAPSE

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





TAKE HOME: Acute Leukaemias (AML/ALL)

Behave VERY like each other (contrast CHRONIC)

Present similarly: Bone marrow failure, infections/bleeding, leucostasis

Treated similarly: Chemotherapy +/- transplant; don't forget the CNS

Cytogenetics are all important prognostically:

t(15;17) GOOD, monosomy 3,5,7 BAD

SUSPECT: Bone marrow failure with 'Systemic Symptoms', +/- leucocytosis

TREAT: DISEASE Rx: CHEMOTHERAPY, Allogeneic Transplant

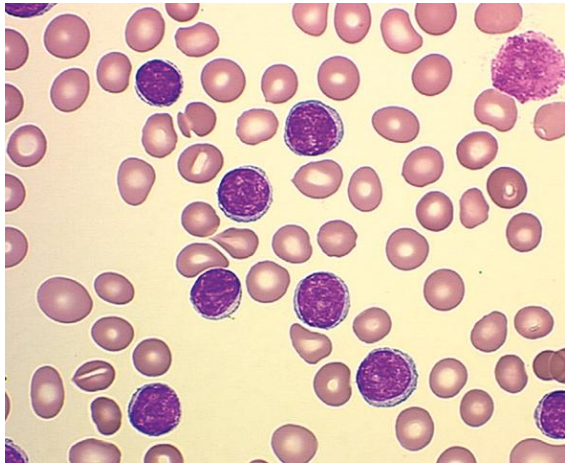
ADJUVENT Rx: Analgesia, Bisphosphonates, Anticoags, Antibios, RT

BEWARE!: 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



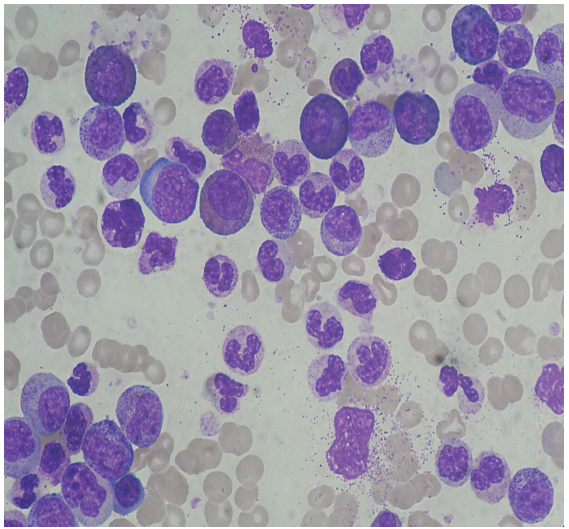
18 months ago..?

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

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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LC	3	1 - 4 x 10^{9}/l
Plt	140	150 - 450 x 10^{9}/l

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?

TAKE HOME: Chronic Leukaemias

Behave NOTHING like each other (contrast ACUTE)

CLL: The commonest leukaemia!

All about too many mature **lymphocytes**

Often requires **NO treatment**

TREAT when the **symptoms** get bad:

Lumps, Cytopenias, 'B symptoms'

No magic treatment

Chemo + anti B cell (CD20) **Rituximab**

Novel agents: Ibrutinib, Idelalisib

CML: extremely rare!

All about too many mature **granulocytes**

Remember: **t(9;22) and BCR-ABL**

ALWAYS requires treatment

Has a **magic treatment** (**Imatinib** & sons)

Can TURN to **acute leuk** (beware new cytopenias)

And don't forget the MPDs: PCV, ET, MF

JAK2 (etc): Thrombosis & AML risk

Cytoreduce (venesect or HU) & an ASPIRIN!

TAKE HOME: Bone Marrow Failure Syndromes

EXCLUDE **CONGENITAL** AND SECONDARY CAUSES: **NUTRITIONAL/VIRAL/TOXIN/RADIATION**

SUPPORT WITH **BLOOD** PRODUCTS AND **ANTIMICROBIAL** PROPHYLAXIS

Aplastic Anaemia:

SOMETIMES **CURABLE** DISEASE OF MID-AGE

AUTOIMMUNE MECHANISM

DOES NOT EVOLVE TO AML

TREATMENT:

IMMUNOSUPPRESSION (ATG/CSA) + BMT

Myelodysplastic syndrome:

GENERALLY **INCURABLE** DISEASE OF THE ELDERLY

NEOPLASTIC MECHANISM

FREQUENTLY EVOLVES TO **AML**

TREATMENT:

HYPOMETHYLATORS,

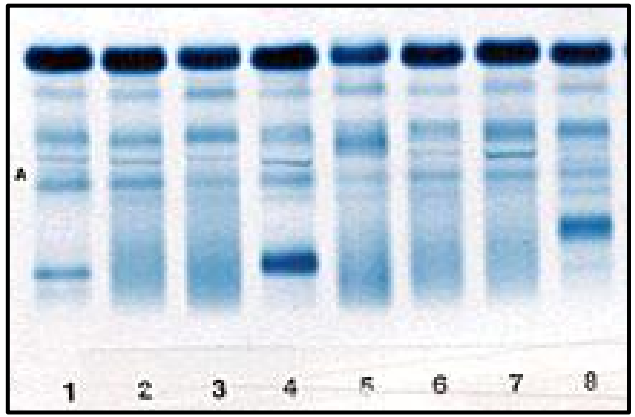
GROWTH FACTORS, CHEMO + **BMT**

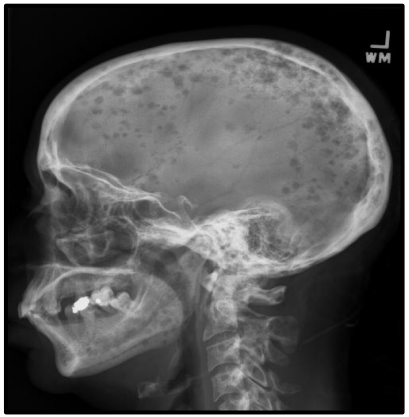
SOMETIMES IMMUNOSUPPRESSION OR LENALIDOMIDE

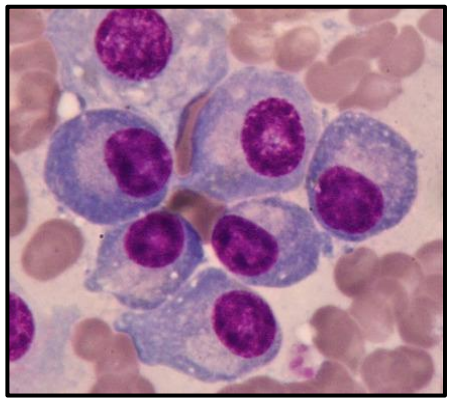
64, Male, Black Nigerian: Back pain, Fatigue, Polydipsia

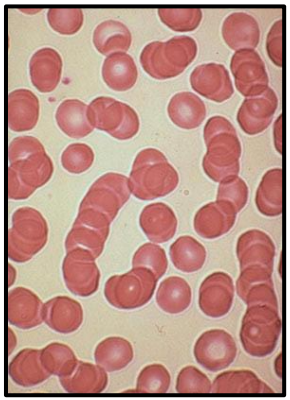
Hb	100	120 - 160 g/l
MCV	92	80 - 100 fl
MCH	28	26 - 33 pg/c
RDW	14	12 - 15%
WCC	6	4 - 10 x10^{9}/l
Nph	5	2 - 8 x10^{9}/l
LC	1.5	1 - 4 x 10^{9}/l
Plt	140	150 - 450 x 10^{9}/l

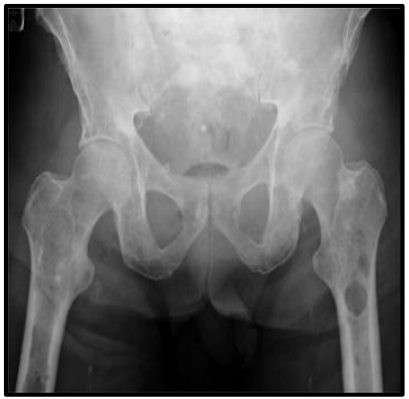
Cr	200	40 - 120 IU/L
Ca	3.1	2.2-2.6 mM











TAKE HOME: MYELOMA

MULTISYSTEMIC MALIGNANCY: **CRAB** CRITERIA (+ INFECTIONS)

CALCIUM, RENAL, ANAEMIA, BONE (+INFECTION, THROMBUS, AMYLOID)

SUSPECT: ANAEMIA, BONE PAIN, FATIGUE, HIGH GLOBULINS, HYPERCALCEMIA

TREAT:

DISEASE Rx: CHEMO/RT, **NOVEL AGENTS**: VELCADE & IMIDS, AUTO BMT

ADJUVENT Rx: 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%

58, White British, MALE, TATT

How to confirm the diagnosis?

How to treat now?

How to manage long-term?

Further work to be done?

Iron metabolism…?

HFE

C282Y

H63D

Take Home: Iron Overload

Hyperferritinemia = acute phase, liver ... or iron overload

Gut is the main regulator through hepcidin and HFE

Causes: Transfusional, Ineffective Erythropoiesis or H.H.

Complications: Liver, Endocrine, Cardiac, Joint, Skin

Hereditary (HH): C282Y or H63D mutated HFE gene (& rarer others)

Treatment: venesect if H.H.

Iron Chelation if Ineffective Epoiesis/Transfusion

Splenomegaly : 5 causes

Storage Disease

Portal hypertension

Lysis (haemolysis)

ESR (connective tissue)

Exotic (malaria/leishman/schisto)

Neoplastic (lymphoma, MPD)

THROMBOPHILIAS

CONGENITAL: FVL, PTM, ATD, PCD, PSD

ACQUIRED: APLS, MPD

MALIGNANCY, TRAUMA, HOSPITALISATION, HORMONE

SECONDARY: IMMOBILISATION, SMOKING, OBESITY

38, White Female, Fatigue, Easy bruising limbs, ankle rash

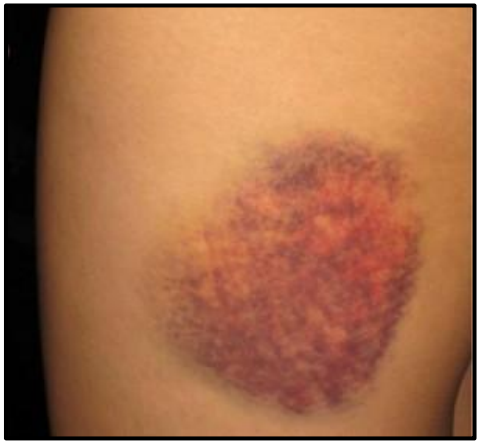
Hb	122	120 - 160 g/l
MCV	92	80 - 100 fl
MCH	28	26 - 33 pg/c
RDW	14	12 - 15%
WCC	9	4 - 10 $x10^{9}$/l
Nph	6	2 - 8 $x10^{9}$/l
LC	3	1 - 4 x 10^{9}/l
Plt	26	150 - 450 x 10^{9}/l

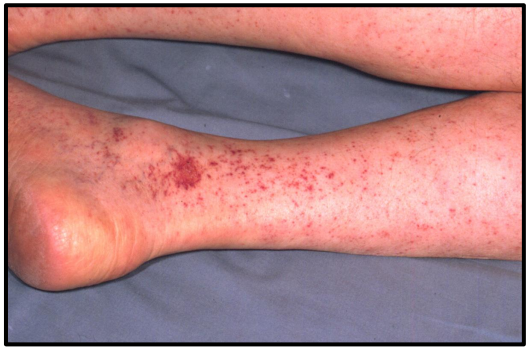
APTT	26	20 - 30 sec
PT	11	9 - 12 sec
Fib	2.3	1.5 - 4g/l

What could be causing this?

Which investigations?

Confirmatory tests?





38, White Female, Fatigue, Easy bruising limbs, ankle rash

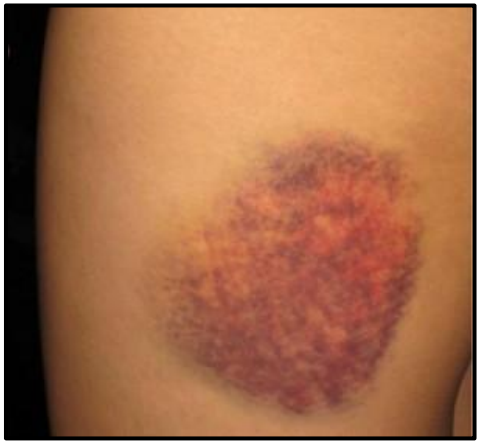
Hb	122	120 - 160 g/l
MCV	92	80 - 100 fl
MCH	28	26 - 33 pg/c
RDW	14	12 - 15%
WCC	9	4 - 10 $x10^{9}$/l
Nph	6	2 - 8 $x10^{9}$/l
LC	3	1 - 4 x 10^{9}/l
Plt	120	150 - 450 x 10^{9}/l

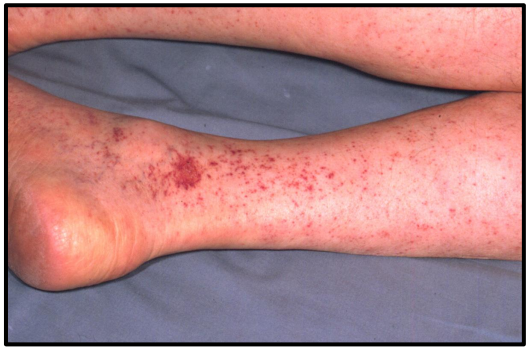
APTT	60	20 - 30 sec
PT	11	9 - 12 sec
Fib	2.3	1.5 - 4g/l

What could be causing this?

Which investigations?

Confirmatory tests?





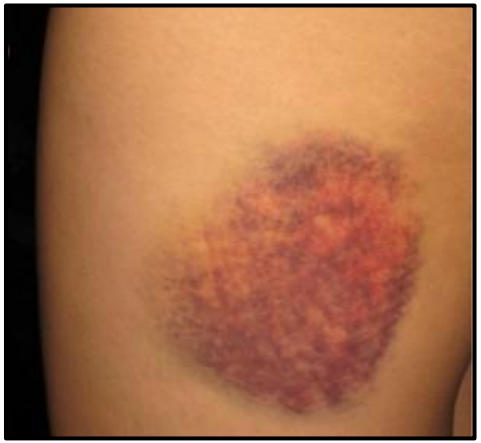
38, White Female, Easy bruising, Headache, Feverish

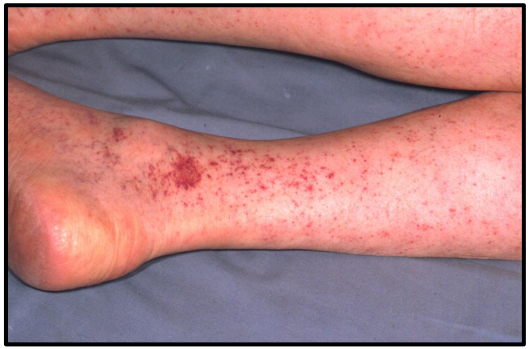
Hb	80	120 - 160 g/l
MCV	101	80 - 100 fl
MCH	28	26 - 33 pg/c
RDW	17	12 - 15%
WCC	9	4 - 10 $x10^{9}$/l
Nph	6	2 - 8 $x10^{9}$/l
LC	3	1 - 4 x 10^{9}/l
Plt	2	150 - 450 x 10^{9}/l

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





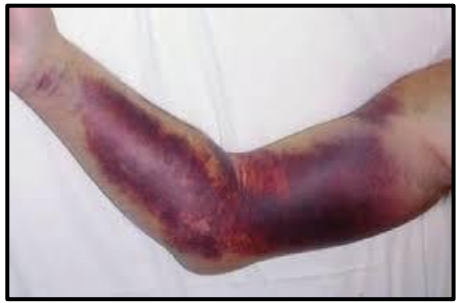
88, Male, Nursing home resident, Purpura, Abdo pain

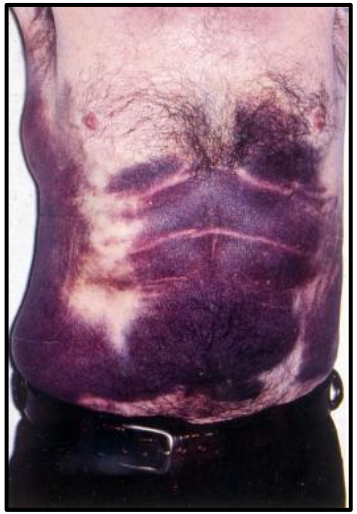
Hb	80	120 - 160 g/l
MCV	65	80 - 100 fl
MCH	28	26 - 33 pg/c
RDW	17	12 - 15%
WCC	9	4 - 10 $x10^{9}$/l
Nph	6	2 - 8 $x10^{9}$/l
LC	3	1 - 4 x 10^{9}/l
Plt	480	150 - 450 x 10^{9}/l

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





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

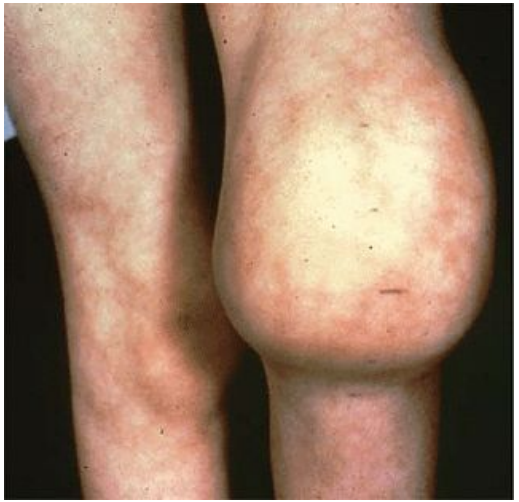
APTT	>120	20 - 30 sec
PT	11	9 - 12 sec
Fib	2.3	1.5 - 4g/l

What could be causing this?

Which investigations?

Confirmatory tests?

'Late' Complications?



Take Home: Bleeding and Bruising

Platelets abnormal: Mucocutaneous bleeds: Bruises and purpura
Clotting proteins abnormal: Joint bleeds if congenital, everywhere if acquired (muscle, retroperitoneal, GI, Mucosal, cranial)

APTT abnormal?: It's heparin, Lupus or haemophilia (acquired/congenital)
PT abnormal?: It's warfarin, Nutrition, liver or a RARE haemophilia
BOTH abnormal?: It's DIC, Liver... check fibrinogen / FDPs

Bleeding history: structured bleeding assessment tool is better than labs
Significant Haemorrhage?: Consider **tranexamic acid**

Take Home: Oral Anticoagulation

Warfarin still has its place:

- **Reversible**, Well tolerated, useful with **renal** impairment
- Always use for **valvular heart disease** (especially prosthetics)
- **Takes 3 days to work** (at least), but **reversible** (Vitamin K and PCC)

Novel agents are preferable for new patients or clinic non-attenders:

- **Rivaroxaban** most commonly (+**apixiban** if frail), also edoxaban
- **Dabigatran** sometimes used (but GI bleeds and MIs?)
- Act immediately but **irreversible** (for now... watch this space)

CHADS2Vasc and HASBLED scores help risk stratify atrial fibrillation

Take Home: Parenteral Anticoagulation

Unfractionated heparin rarely used

- except for **cardiology** and **renal impairment**
- **APTT monitoring** required because of **unpredictable pharmacokinetics**
- Risk of **Heparin-induced Thrombocytopenia**
- Can be reversed with **protamine** (or just switched off - short half-life)

Low molecular weight heparin (and 'ultra-low' Fondaparinux for ACS)

- Many brands, pretty much the same (dalte/enoxa/tinza-**parin**)
- Predictably RENALLY excreted hence easy dosing (weight-based)
- But **unlike UFH** - it's **irreversible** (mainly) and has a 10-20 hour half-life

Take Home: Blood Products

Plasma (FFP):

Corrects deficiencies of all clotting factors
No good for warfarin-induced deficiencies
Used in massive transfusion (>6 units)
Generally NOT for DIC!

Cryoprecipitate:

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

Prothrombin Complex Concentrates:

LIFE THREATENING warfarin bleeds

Clotting factors

Once were 'super-concentrates'
Now **recombinants** (less viral risk)
Factors VIIa, VIII, IX and VWF
Generally for haemophilia
Activated version: **FEIBA**
For haemophilia with inhibitors

Take Home: Proper Transfusion

Red Blood Cells:

Only for emergencies and congenital anaemias: Avoid if you can

Patient Blood management

Conservative vs Liberal Hb thresholds

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 and precious resource: for emergencies only

Seek the cause of a new thrombocytopenia: look at patient, drug chart & blood film.

Excess use leads to refractoriness

1 unit usually adequate

Most invasive procedures require platelets >30-50; only neurosurgery >100

Remember to replace during massive transfusion

That was...

Haematology for Clinical Finals

Paul Greaves: Consultant Haematologist, BHRUT, Romford

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

Good 'last minute' runthrough of clinical cases: Haematology: Clinical Cases Uncovered https://appsto.re/gb/4lUvz.

Want to be a haematologist? Follow these...

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