Blood Test Interpretation for Non-Medics

Mark Holland
Topics

• Full Blood Count
• Clotting
• U&E
• Blood Gases
FBC

• Haematology

• Red blood cells / Haemoglobin
  • Anaemia
  • Polycythaemia

• White blood cells

• Platelets
FBC

- Hb
- WCC or WBC
- Platelets
- MCV
FBC

• Haemoglobin
  • Normal range
  • Low = anaemia

• Anaemia
  • Normocytic
  • Microcytic
  • Macrocytic
FBC  Anaemia

• Normocytic
  • Chronic disease
  • Acute bleed
  • Mixed picture

• Microcytic
  • Iron deficiency
  • Sideroblastic
  • Thalassaemia

• Macrocytic
  • B12 deficiency
  • Folate Deficiency
  • Hypothyroid
  • Drugs
  • Alcohol
Question 1

• Susan is a 67 year old woman who presents with tiredness.
• She is usually very well and does not drink
• Her Hb is low at 67g/L
• MCV 74 fl
• Which is the most likely cause of her symptoms?

a Bowel cancer
b B12 deficiency
c Heart failure
d Drug related
e Thalassaemia
Question 2

- Susan is a 32 year old woman who presents with tiredness.
- She is usually very well and does not drink
- Her Hb is low at 67g/L
- MCV 74 fl
- Which is the most likely cause of her symptoms?

a Bowel cancer
b B12 deficiency
c Heart failure
d Heavy periods
e Thalassaemia
Question 3

- Susan is a 32 year old woman who presents with tiredness.
- She has a 3 month history of diarrhoea
- Her Hb is low at 67g/L
- MCV 108 fl
- Which is the most likely cause of her symptoms?

a Bowel cancer
b B12 deficiency
c Crohn’s disease
d Heavy periods
e Thalassaemia
Question 4

- Susan is a 32 year old woman who presents with tiredness.
- She has rheumatoid arthritis
- Her Hb is low at 67g/L
- MCV 90 fl
- Which is the most likely cause of her symptoms?

  a Bowel cancer
  b Folate eficiency
  c Crohn’s disease
  d Chronic disease
  e Thalassaemia
FBC White Cells

- Neutrophils
- Lymphocytes
- Eosinophils
- Monocytes
- Basophils
FBC White Cells

• Neutrophils
  • Infections and sepsis
• Lymphocytes
  • Viruses
• Eosinophils
  • Paracytes
  • Vasculitis
• Monocytes
  • Glandular fever
• Basophils
FBC    White Cells

• Remember leukaemia
FBC  White Cells

• Susan is a 32 year old lady who presents with a cough, green sputum and pneumonia on her CXR.
• Her neutrophils are $20.6 \times 10^5$ and her lymphocytes are $0.7 \times 10^5$

• Why are neutrophils low?
• Might her neutrophils be low and why?
• Would you act on the low lymphocytes?
FBC Platelets and Clotting

• How does blood clot?
FBC Platelets and Clotting

• Platelets 150-400 x10^5

• Low platelets:
  • Thrombocytopenia
    • ITP
    • Viruses
    • Alcohol
    • LMWH
    • HIV

• Raised platelets
  • Thrombocythaemia
    • Inflammation
    • ‘Malignancy’.
FBC Platelets and Clotting

- Platelets 150-400 \times 10^5
- Even if normal number they might not work!
- Why?
FBC Platelets and Clotting

• Clotting
  • PT prothrombin time
  • APTT activated thromboplastin time
  • INR international normalisation ratio
  • TT thrombin time
FBC Platelets and Clotting

• Susan is a 32 year old lady with a recent history of pneumonia.
• She represents with a platelet count of $8 \times 10^5$
• She has a widespread rash?

• Why might she have low platelets?
• Does she require LMWH?
FBC Platelets and Clotting

• Rita is a 32 year old lady with a recent history of pneumonia.
• She represents with a platelet count of $188 \times 10^5$
• She has right side pleuritic chest pain and hypoxia?

• What is the diagnosis?
• Why would you check her clotting?
FBC Platelets and Clotting

- Rita is a 32 year old lady with a recent history of pulmonary embolism.
- She is taking warfarin and has antibiotics for a UTI.
- She presents with epistaxis.
- Her INR is 10.

- What would you do?
U&E

• Sodium
• Potassium
• Urea
• Creatinine
• eGFR
U&E

• Sodium 133-145 mmol/L
  • Hyponatraemia
  • Hypernatraemia
• Potassium 3.5-5.0 mmol/L
  • Hypokalaemia
  • Hyperkalaemia
• Urea
  • Low or high
• Creatinine
  • Low or high
• eGFR
U&E

• Sodium 133-145 mmol/L
  • Hyponatraemia
  • Hypernatraemia

• Potassium 3.5-5.0 mmol/L
  • Hypokalaemia
  • Hyperkalaemia

• Urea 4.5-7.5 mmol/L
  • Low or high

• Creatinine 60-90 umol/L
  • Low or high

• eGFR
U&E  Sodium

• Sodium  133-145 mmol/L
  • Hyponatraemia
    • Too much water
      • SIADH  syndrome of inappropriate antidiuretic hormone
    • Too much water and salt
    • Too little salt
  • Hypernatraemia
    • Too little water
      • Dry
      • Hyperglycaemia
      • Diabetes insipidus
U&E     Sodium

• Hyponatraemia
• Is it common?
• What is the common presentation?
• How do you cure 90%?
U&E Potassium

• Potassium 3.5-5.0mmol/L
  • Hypokalaemia
    • Drugs
    • Diarrhoea
  • Hyperkalaemia
    • AKI or CKD
    • DKA
    • Drugs
U&E  Potassium

• Hypokalaemia / Hyperkalaemia
• Why the fuss
• How would you assess severity?
U&E Kidneys

• Urea
  • Dry
  • GI bleed
  • Alcohol
  • Diet
  • Addison’s disease

• Creatinine
  • Weight

• eGFR
Blood Gases

- pH
- O₂
- CO₂
- HCO₃⁻
- Base excess
- Lactate
Blood Gases

• Venous
• Arterial

• Pros and cons
Blood Gases

- pH 7.35 to 7.45
- O$_2$ 13 KPa or above
- CO$_2$ 3.5 to 6 KPa
- HCO$_3^-$ 21 to 32 mmol/L
- Base excess -2 to +2
- Lactate less than 2
Blood Gases

- Metabolic v Respiratory
- Acidosis v Alkalosis
- Respiratory failure
Blood Gases

- pH 7.35 to 7.45
- O₂ 13 KPa or above
- CO₂ 3.5 to 6 KPa
- HCO₃⁻ 21 to 32 mmol/L
- Base excess -2 to +2
- Lactate less than 2
Blood Gases

• What would the following look like:
  • Metabolic acidosis
  • Metabolic alkalosis
  • Respiratory acidosis
  • Respiratory alkalosis