



Interpretation of Data



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2024

Learning Objectives

- **Interpreting ABGs**
 - Understanding the sections of the ABG
 - Differentiating acidotic and alkalotic presentations
 - Understanding the causes of pH discrepancies
- **Interpreting bloods**
 - Understanding different blood tests
 - Understanding the causes of derangements in blood tests
 - Applying blood test knowledge to OSCE situations
- **Interpreting chest x-rays**
 - Understanding the structure of interpreting a CXR
 - Recognise common chest pathologies

Ask questions in the chat or use the hands up function!

ABGs

Blood gas values

↑ pH	7.499		[7.350 - 7.450]
pCO ₂	5.54	kPa	[4.50 - 6.00]
pO ₂	12.2	kPa	[10.0 - 13.0]
↑ cHCO ₃ ⁻ (P) _c	32.3	mmol/L	[22.0 - 26.0]
↑ cBase(B) _c	8.4	mmol/L	[-2.0 - 2.0]

Temperature-corrected values

pH(T) _c	7.510		
pCO ₂ (T) _c	5.38	kPa	
pO ₂ (T) _c	11.7	kPa	

Oximetry values

↓ ctHb	73	g/L	[115 - 174]
sO ₂	98.6	%	
FO ₂ Hb	96.2	%	
FCOHb	1.7	%	
FMetHb	0.7	%	
FHHb	1.4	%	

Electrolyte values

cNa ⁺	138	mmol/L	[135 - 145]
cK ⁺	3.8	mmol/L	[3.5 - 4.5]
cCl ⁻	99	mmol/L	[98 - 107]
cCa ²⁺	1.13	mmol/L	[1.12 - 1.32]

Metabolite values

↑ cGlu	11.2	mmol/L	[3.9 - 8.0]
cLac	1.3	mmol/L	[0.4 - 2.2]

pH

	ACIDOSIS	ALKALOSIS
RESPIRATORY	Respiratory Acidosis $\uparrow \text{CO}_2$	Respiratory Alkalosis $\downarrow \text{CO}_2$
METABOLIC	Metabolic Acidosis $\downarrow \text{HCO}_3$	Metabolic Alkalosis $\uparrow \text{HCO}_3$

MIXED PICTURE

Let's practice...

- pH 7.49 pO₂ 11 pCO₂ 6.4 HCO₃ 28
 - Metabolic alkalosis with partial respiratory compensation
- pH 7.32 pO₂ 9 pCO₂ 7.0 HCO₃ 27
 - Respiratory acidosis with partial metabolic compensation
- pH 7.51 pO₂ 10 pCO₂ 4.0 HCO₃ 24
 - Respiratory alkalosis with no metabolic compensation
- pH 7.35 pO₂ 9 pCO₂ 3.0 HCO₃ 19
 - Metabolic acidosis with complete respiratory compensation

pH: 7.35 – 7.45

pO₂: 11 – 13 kPa (82.5 – 97.5 mmHg)

pCO₂: 4.7 – 6.0 kPa (35.2 – 45 mmHg)

HCO₃: 22 – 26 mmol/L

Base excess: (-2 to +2 mmol/L)

Respiratory disturbances

- Acidosis
 - High CO₂
 - Not breathing off
 - Respiratory failure - type 2
 - Respiratory depression
 - Opioid overdose
- Alkalosis
 - Low CO₂
 - Breathing too much - hyperventilating
 - Tachypnoea
 - Commonly anxiety/panic attacks
 - Also PE
 - Acute respiratory alkalosis



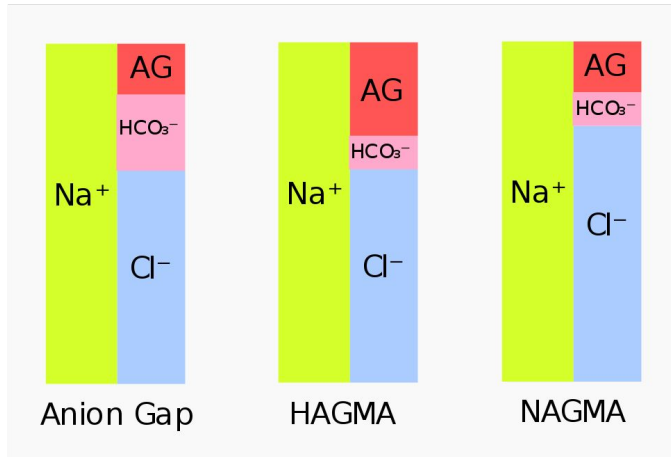
Metabolic disturbances

- Metabolic acidosis
 - Low bicarb
 - Causes depend on anion gap



Anion gap

- Normal anion gap
 - 4 - 12 mmol/L (variable depending on website)
- Maintained in MA when Cl^- reabsorbed to compensate raised H^+
- Raised gap if H^+ ions not being excreted so Cl^- unable to compensate



- NAGMA causes
 - GI losses
 - E.g. vomiting/diarrhoea/high output stoma
 - Renal losses
 - Renal tubular acidosis
- RAGMA causes - GOLDMARK
 - G - glycols
 - O - oxoproline
 - L - L-lactate
 - D - D-lactate
 - M - methanol
 - A - aspirin
 - R - renal failure
 - K - ketoacidosis

Metabolic disturbances

- Metabolic acidosis
 - Low bicarb
 - Causes depend on anion gap
- Metabolic alkalosis
 - High bicarb
 - Prolonged vomiting - sudden loss of H^+
 - E.g. Pyloric stenosis
 - Hypochloric, hypokalaemic metabolic alkalosis



Questions?

Bloods

65 y/o male

- Hb 80
- MCV 85

What is going on?

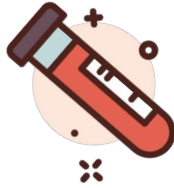
Next steps?

- Brief history
 - No overt symptoms
 - Maybe more tired than usual

Significant anaemia in elderly

- Think colorectal Ca
- 2WW - urgent colonoscopy
- Abdominal exam + PR
- Basic obs including weight
- Further bloods
- Stool sample

Bloods



- FBC

- Hb
- MCV
- WCC (breakdown)
- Platelets

- U&Es

- Na
- K
- Ca
- Mg
- Urea
- Creatinine
- eGFR

- LFTs

- ALT
- AST
- ALP
- Bilirubin
- GGT

- Coagulation screen

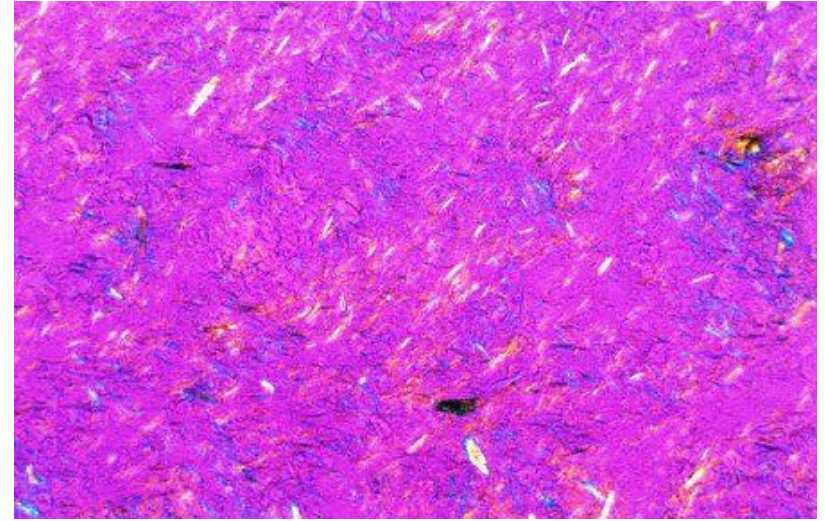
- PT
- APTT
- Fibrinogen
- D-dimer

- Iron study

- Ferritin
- Total serum iron
- Transferrin
- Transferrin saturation
- TIBC
- Vit B12
- Folate

28 y/o female with ALL

- Hb 90 g/L (130-180)
- MCV 88 fL (80-100)
- WCC $3.5 \times 10^9/L$ (3.6-11.0)
- Platelets $180 \times 10^9/L$ (140-400)
- Na⁺ 135 mmol/L (133-146)
- K⁺ 5.7 mmol/L (3.5-5.3)
- Mg⁺ 0.9 mmol/L (0.7-1.0)
- Ca²⁺ 1.8 mmol/L (2.2-2.6)
- Urea 7.8 mmol/L (2.5-7.8)
- Creatinine 100 $\mu\text{mol/L}$ (59-104)
- Urate 470 $\mu\text{mol/L}$ (200-430)



Tumour lysis syndrome >>> urate
crystals in joint >>> gout

Questions?

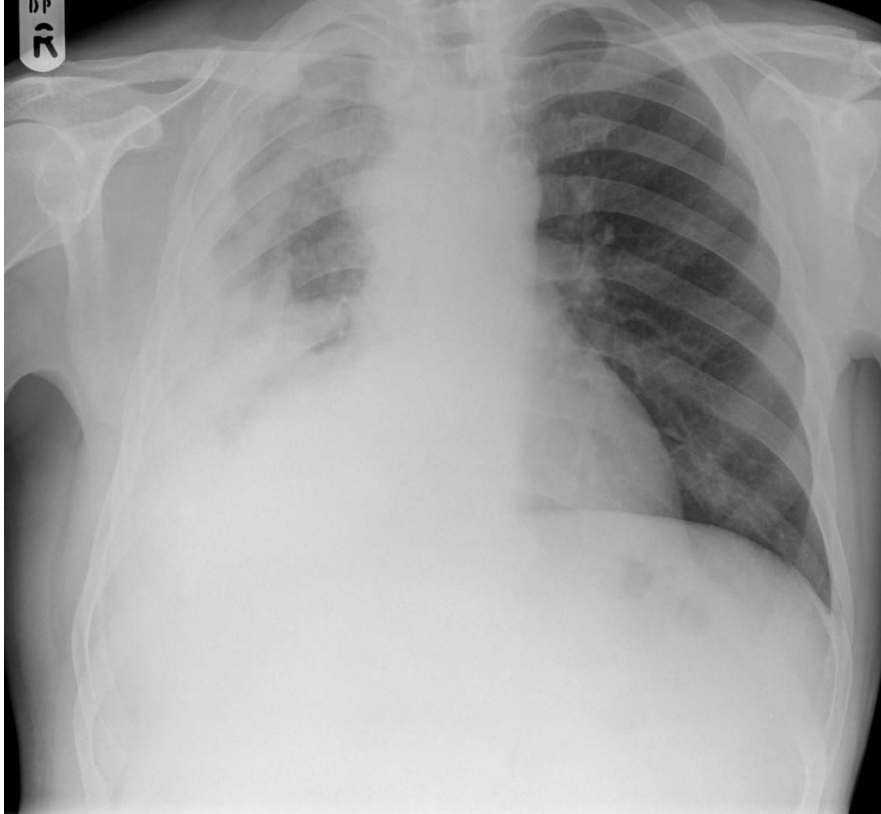
CXR

Structure

- RIPE
 - Rotation
 - Inspiration (no. of ribs)
 - Projection (usually PA)
 - Exposure
- ABCDE
 - Airways
 - Breathing
 - Cardiac
 - Diaphragms
 - Everything else



Mesothelioma



COPD

Questions?

Communication Station

Britney Spears (55F) presented to her GP 2 weeks ago with jaundice and lethargy. She had some blood tests, shown below, and is here to discuss her results. Please explain the blood test findings and answer any questions the patient might have.

Bilirubin: 30 $\mu\text{mol/L}$

AST: 150 U/L

ALT: 63 U/L

ALP: 159 U/L

GGT: 50 U/L

Communication Station

You will be shown the chest x-ray of an inpatient. The patient had difficulties swallowing following a stroke and is now having trouble breathing. Please talk through the chest x-ray and detail the next steps for this patient.



Questions?

To summarise

- Breakdown any results given
- Try to understand why there is an abnormality
- Try to apply this to the clinical scenario given
- You'll do great!!!



Feedback Form

Thank you for attending the session -

Please fill in the feedback form:

https://docs.google.com/forms/d/1ZcxmFe-2E2d4wzliKhM-2VJuxvBoQv8yC-cltKNu11Q/viewform?edit_requested=true

Contact:

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