

Cabrini Practice OSCE Station THREE

Candidate Instructions:

You are the consultant in charge of your tertiary ED. Your resident has just assessed a 35 year old intravenous drug user with fevers and hypotension.

Your registrar detected a murmur. He wonders if this patient might have infective endocarditis.

Vital Signs:

Temperature (°C)	38.2
HR (/min)	110
BP (mmHg)	105/70
RR (/min)	28
O2 sats (%)	88

The patient has received initial resuscitation and his condition has stabilised.

The patient's **Arterial Blood Gas** result is on the next page:



FiO2	1.0		
pH	7.15		(7.35-7.45)
pCO2	35	mmHg	(35-45)
pO2	72	mmHg	(80-95)
Bicarbonate	12	mmol/L	(22-28)
Base excess	-14		(-3 - +3)
Lactate	5.8	mmol/L	(< 1.3)
Na	145	mmol/L	(134-146)
K	4.7	mmol/L	(3.4-5)
Cl	115	mmol/L	(98-106)
Urea	10	mmol/L	(3-8)
Creatinine	70	micromol/L	(60 – 120)
Glucose	3.5	mmol/L	(3.5-5.5)

Your Tasks are to:

- Explain and Interpret and the ABG to the Resident.
- Outline management priorities

Domains:

Medical Expertise Assessment	40%
Medical Expertise Management	20%
Scholarship and Teaching	40%

Role Player Instructions

You are a Junior Registrar, you have just started assessing a 35 year old intravenous drug user with fevers and hypotension.

You detected a murmur and wonder if this patient might have infective endocarditis.

You have asked the consultant for assistance interpreting the Arterial Blood Gas.

Introduce yourself and ask them to help you interpret it.

Questions to ask if not addressed by the candidate:

“What is the A-a gradient? What is this patients A-a gradient?”

“What are the potential causes of this patients acid base disorders?”

“What is the Anion Gap?”

“How do I work out the respiratory compensation?”

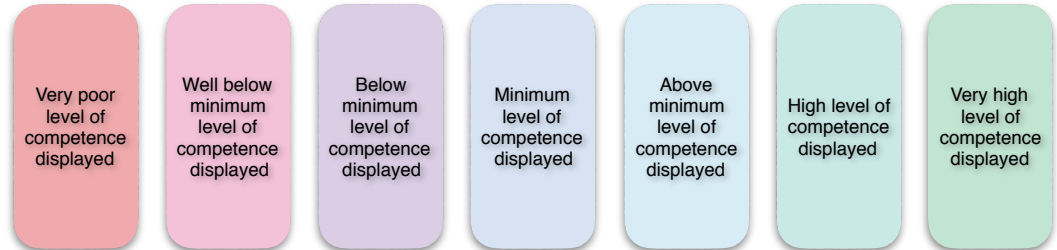
Prompt 5:30 mins

“What are our management priorities?”

Examiner Marking Sheet

COMPONENT ASSESSMENT

For each Domain below, select the ONE best option that best represents the candidate's level of performance. The option "**minimum level of competency displayed**" represents the level of safe independent practice as a **junior FACEM** in Australasia



Please rate ALL the following domains:

Medical Expertise - Assessment	☐	☐	☐	☐	☐	☐	☐
Medical Expertise - Management	☐	☐	☐	☐	☐	☐	☐
Scholarship & Teaching	☐	☐	☐	☐	☐	☐	☐

[Detailed assessment criteria](#)

Please use the following criteria to inform your ratings above (mandatory items in **bold italics**)

Medical Expertise - Assessment

- **Severe hypoxia** on 100% O₂
 - $PAO_2 = [(atm\ pressure - water\ vapour) \times FiO_2] - PaCO_2/RQ = [(760 - 47) \times 1.0] - 35/0.8 = 669$
 - (Rule of thumb $PAO_2 = 5 \times FiO_2 = 5 \times 100 = 500$)
 - A-a gradient = $669 - 72 = 597$, expected A-a grad = $35(age)/4 + 4 = 12$.
 - Therefore **very high A-a gradient - ?Pneumonia/septic emboli/ARDS/APO**
- Moderate - severe **Metabolic Acidosis** with a HCO₃ of 12,
- **Anion Gap = $145 - (115 + 12) = 18$** (normal 12) accept higher if K⁺ used
 - **HAGMA** – Lactate moderately high - most likely due to peripheral hypo-perfusion, less likely ARF/ketosis/toxins
- Delta gap
 - $\Delta AG/\Delta HCO_3 = (18 - 12)/(24 - 12) = 6/12 = 0.5$
 - Confirms **NAGMA** present - consider due to Saline administration, diarrhoea from possible bowel insult (?septic emboli), other causes unlikely (ureteric/pancreatic fistulae, Addison's, Carbonic Anhydrase inhibitors, RTA)
- **Expected pCO₂ = $(1.5 \times 12) + 8 (\pm 2) = 26 \pm 2$**
 - Measured pCO₂ 35 suggesting additional **respiratory acidosis**
 - Hypoventilation decreased level of consciousness (caused by hypotension/shock or drugs eg heroin, opioids)
- Normal Potassium but relatively low for degree of acidosis so ?potassium deplete, ?poor nutrition,
 - Corrected K = each fall in pH by 0.1 K rises by 0.5
 - Therefore $\Delta pH\ 7.40 - 7.15 = 0.25$, $\Delta K\ 2.5 \times 0.5 = 1.25$, corrected K $4.7 - 1.25 = 3.45$ (low/normal)
- Mildly elevated urea and normal creatinine suggesting a degree of dehydration, less likely ARF
- Normoglycaemic
- **Summary- Septic shock with combination Lactic acidosis HAGMA, NAGMA(likely from normal saline) and Respiratory Acidosis**

Medical Expertise - Management

- A/B - **Ventilatory Support** - high flow O₂, may need NIV/intubation for hypoxia/drowsiness
- C - **Aggressive Volume Resuscitation** - avoid Normal saline, could use compound Sodium lactate, "Ringers Solution", "Hartmans", or "Normal Bicarbonate"- 150mmol NaHCO₃ in 850mls sterile water
- Early **IV antibiotics** - (after blood cultures) as per local protocols
 - Gentamicin 240mg iv daily
 - Flucloxacillin 2gm iv 4/24
 - Benzylpenicillin 1.8gm iv 4/24(replace with Vancomycin 1.5gm iv bd if MRSA suspected)
 - Would accept empirical sepsis Rx – Gentamicin/Flucloxacillin same doses
- Consider naloxone for narcosis - titrate to avoid acute withdrawal

- Care with universal precautions
- **Appropriate Disposition** - Consider IDC/CVC/Art Line, ICU/HDU admission, ID consult, general medicine admission

Scholarship and Teaching

- **Assess Resident Knowledge**
- **Frame teaching episode** with headings
- **Checking for knowledge and understanding**
- Link to **Future learning goals** and other resources

INFORMATION

Station Summary: ABG with metabolic acidosis(both HAGMA and HAGMA) respiratory acidosis and severe hypoxia. Management of septic shock and respiratory failure

EXAMINER NOTES (For examiner reference only)

OSCE 'incident reporting' notes: Please provide details if an issue occurs which may influence the candidate's exam outcome e.g. protocol breach, candidate illness, etc

GLOBAL RATING FOR STANDRD SETTING:

This scale is used in the standard setting process for the OSCE. Please rate the candidate's OVERALL performance in this OSCE. The rating should take into account the entirety of the OSCE, rather than just a sum average of the individual domain scores. This element MUST be completed for the standard of the examination to be set.

	Well Below Standard	Below Standard	Just at Standard	Above Standard	Well Above Standard
In terms of a safely practising junior emergency physician , select the ONE option that best reflects the candidate's	☐	☐	☐	☐	☐

EXAMINER SIGNATURE: