
Station Number TWO: Standardised Case Based Discussion

Candidate Instructions

This is a 7 minute **standardised case based discussion**. You will be interacting directly with an examiner. Further information will be provided as the case evolves. The examiner will be assessing your medical knowledge, as well as the reasoning and rationale to your approach and decisions. Please be as specific as possible when answering. For example, when discussing drugs describe doses, when discussing investigation or management provide reasons why you chose that approach.

Case information

You are the consultant working in a mixed tertiary ED and have just commenced a day shift. A 2 year old boy has been brought into a cubicle by his Grandmother, who speaks limited English. She found him playing with her medication packets after accessing a low kitchen cupboard 2 hours ago.

She is worried that he may have accidentally ingested an unknown quantity of medication which she takes for her type II diabetes mellitus - Gliclazide and Metformin - although she did not see any tablets in his mouth and is unsure if there are any missing.

There were no other medications present in the house.

The child's vital signs are:

GCS 15

HR 115

BP 90 systolic

RR 25

Sats 100% RA

Temp 36.8 C

BSL 5.7

Your tasks are to:

- Outline your immediate risk assessment for this patient
- Answer any further questions from the examiner

This SCBD will assess the following domains:

- Medical Expertise
 - Assessment and diagnosis 40%
 - Management 40%
 - Health advocacy 20%
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Examiner Instructions

This is a 7 minute standardised case based discussion involving a paediatric patient with Sulphonylurea and Metformin toxicity.

The Candidates tasks are to:

- Outline their immediate risk assessment of the patient
- Answer any further questions from the examiner

This OSCE will assess the candidates' ability to:

- Perform an appropriate risk assessment of a paediatric patient for potential medication toxicity
 - Interpret the venous blood gas provided, identifying a HAGMA secondary to metformin toxicity (causing moderate hyperlactataemia), and hypoglycaemia due to gliclazide toxicity
 - Manage the patient safely in relation to their above diagnosis
 - Recognise this paediatric patient as being vulnerable and at-risk and manage as such
 - Demonstrate factors in relation to health advocacy that should be addressed during the patients presentation
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LEAD EXAMINER SCRIPT

Section 1: (Minute 0-2)

“What is your risk assessment of this patient?”

Dose/kg unknown - Need **weight** on patient, reasonable to estimate at ~12kg.

Unknown quantity taken therefore **need to presume worst case scenario** (number of tablets within a full packet).

Thorough history and examination required to determine whether there are objective signs or symptoms of overdose (in this case, symptomatic hypoglycaemia);

- Autonomic: tachycardia, sweating, anxiety
- CNS: drowsiness, altered mental status, coma, seizures

Time of ingestion is known, but a **normal BSL and vital signs are non-reassuring** this early post alleged ingestion.

Other **co-ingestions** unlikely as child did not have any access to any other medications.

Regarding potential Gliclazide overdose:

In acute overdose the major toxicity is **hypoglycaemia**.

This can be prolonged, severe, recurrent and delayed by many hours - up to 18 hours following extended release formulations.

Ingestion of just one tablet is potentially lethal in a child

Regarding potential Metformin overdose:

Metformin overdose is usually benign, however **severe lactic acidosis** may still occasionally occur and should be anticipated.

In children ingestions of less than 1700 mg of metformin do not cause toxicity.

Need to ascertain any relevant co-morbidities from the history that would be risk factors for severe lactic acidosis (renal, hepatic or cardiac failure, dehydration).

For paediatric ingestions, an admission of at least 8 hours is required for suspected metformin toxicity, and 18-24 hours for suspected sulphonylurea toxicity.

Section 2: (Minute 2-3)

“5 hours later, you are asked by the nursing staff to reassess the patient. He has become agitated and diaphoretic. His vitals are unchanged. A venous blood gas is taken.”

(Hand the prop to the candidate).

“Please interpret the blood gas provided.”

Venous blood gas on room air:

	Na 142 mmol/L
pH 7.20	K 5.5 mmol/L
PO2 98 mmHg	Cl 106
PCO2 30 mmHg	Lactate 4.5
HCO3 14 mmol/L	Glucose 2.8
BE -10	

Expected answer:**Acid-base status:**

- Moderate acidaemia with low bicarb - **metabolic acidosis**
- Mild hypocapnoea - respiratory alkalosis ($8 + 1.5 \times 14 = 29$ therefore appropriate respiratory compensation)
- Anion gap = $142 - 14 - 106 = 22$ (HAGMA)
- Delta ratio = $(22-12) / (24-14) = 10/10 = 1.0$ = isolated HAGMA

Electrolytes

- Normonatraemia
- Mild hyperkalaemia (for pH 7.20 expect $5.0 + (2 \times 0.5) = 6.0$)
- Normochloraemia
- **Moderate lactataemia - likely cause given clinical scenario is Metformin toxicity**
- **Moderate hypoglycaemia - likely cause is Sulphonylurea toxicity**

Note: Unable to comment on oxygenation / AA gradient due to venous sample.

Summary & Interpretation:

Isolated HAGMA due to lactataemia, and hypoglycaemia - **confirms diagnosis of Gliclazide and Metformin toxicity**

*bold to pass

Section 3: (Minute 3-5)

“Outline your management of this patient”

Resuscitation:

- Move to a higher acuity/ resuscitation cubicle if available
- IV access
- **Immediately correct hypoglycaemia:**
 - **5 mls/kg of 10% glucose (note average 2 year old is ~12kg)**
 - Followed by infusion of 1-2mg/kg/hour of 10% glucose
 - Ongoing hourly glucose monitoring

Decontamination

Charcoal not indicated - it may be given within 1-2 hours of ingestion of Metformin, and within 4 hours of the ingestion of a slow release preparation of Gliclazide, providing the patient is alert, oriented and co-operative.

Specific antidote/treatment:

- **Administer IV Octreotide**
- Give 1 microgram/kg IV stat dose followed by an infusion of 1 microgram/kg/hour (for at least 24 hours)

For lactic acidosis:

If normal renal function and lactate concentration < 10 mmol/L, treatment is with supportive care only

Disposition

Will require **HDU admission** for close glucose monitoring, and a **Toxicology consult**.

Section 4: (Minutes 5-7)

“The patient is admitted.

After a toxicology consult, subsequent venous blood gases indicate a resolving metabolic acidosis, normal renal function and stable blood glucose with the treatment you have initiated, negating the need for additional therapies.”

“Are there any other issues relating to this presentation that need addressing?”

Paediatric population

- At risk for potentially fatal medication toxicity; long period of observation/admission required
- Duty of care to ensure there are **no indications of neglect or NAI present** (may check previous ED presentations etc). Social work involvement may be required if a suboptimal home environment is suspected.

Carer factors

- Non English speaking: Need to ensure **translating services are used** in order to efficiently communicate with patients Grandmother regarding rationale for management decisions
- Potentially advocate for safer medication storage in consult with Pharmacist/GP

[Note: From ACEM curriculum on Health advocacy for vulnerable patients:

“On completion of Advanced Training Stage 3, a FACEM will be able to use their expertise and influence to protect and advance the health and well-being of any individual patients, communities and populations”

“Advocate for the provision of appropriate resources for vulnerable patients within the Emergency Department, hospital and community”]

*Bold as minimum pass criteria

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Glucose 2.8

Examiner Marking Sheet

Examiner name(s):

Candidate Name:

OSCE Station:

DOMAIN	ASSESSMENT CRITERIA	MET/NOT MET
Medical Expertise	- Risk assessment includes dose/kg, patient weight, co-ingestants and time of ingestion - Must recognise potentially lethal nature of OD and that normal vitals and BSL are not reassuring at this stage - Mention of hypoglycaemia and lactic acidosis as potential features of this ingestion - Appropriate VBG interpretation - Management including correction of hypoglycaemia and octreotide. Appropriate admission and toxicology consultation	
Health advocacy	- Consideration of neglect or NAI - Use of translator - Advocates for child safety	

COMMENTS AND CONSTRUCTIVE FEEDBACK

GLOBAL ASSESSMENT RATING

Please rate this candidate's OVERALL performance in this OSCE:

In terms of a **safely practising junior emergency physician** please select the ONE option which best reflects this candidate's performance in this station

**Well
Below
Standard**

☐

**Below
Standard**

☐

**Just at
Standard**

☐

**Above
Standard**

☐

**Well
Above
Standard**

☐