# Altered Mental Status

## In Remote and Indigenous Communities

Queen's University is situated on the territory of the Haudenosaunee and Anishinaabek

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# DISCLOSURES

- PGY-5 in FRCPC EM program @ Queen's University, concurrently in Resuscitation and Reanimation fellowship with Kingston Resuscitation Institute → Haven't graduated yet
- Incoming Prehospital and Retrieval Medicine fellow with Ornge for 2023/2024 → Haven't started yet
- I have no financial or other disclosures to declare

# THE OBJECTIVES

1. A structured approach
2. Diving into the differential diagnosis
3. When all else fails / isn't available
4. Case discussion
5. The bottom line

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# A STRUCTURED APPROACH

# The Structure

Assessment - ABCDEfG

Initial steps - VOMIT

Differential - DIM TOPS

# ABCDEfG

**A** – Airway

**B** – Breathing

**C** – Circulation

**D** – Disability

**E** – Expose

***D*** *– Don't*

***E*** *– Ever*

***f*** *– forget the*

***G*** *– Glucose*

# VOMIT

**V** – Venous access

**O** – Oxygen

**M** – Monitors

**I** – Investigations

**T** – Therapeutics

🔑 *Defend your vital signs*

# DIMS TOPS

**D** – Drugs

**I** – Infection

**M** – Metabolic

**S** – Structural

**T** – Temperature

**O** – Oxygen

**P** – Psychiatric

**S** – Seizure

🔑 *Altered mental status isn't a disease, it's a symptom*

# What if . . .

## . . . I don't have that investigation?

## . . . I don't have that intervention?

🔑 *Defend your vital signs*

🔑 *Altered mental status isn't a disease, it's a symptom*

🔑 *Don't settle for the first diagnosis*

🔑 *Phone a friend*

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# DIVING INTO THE DIFFERENTIAL DIAGNOSIS

# The Toolbox

DDX
Discrete diagnoses under the umbrella category

| | |
|---|---|
| HISTORY<br>Particular clues to listen for / ask about | INVESTIGATIONS<br>What would we order if we could do a comprehensive workup up front? |
| EXAM FINDINGS<br>Particular clues to look for | MANAGEMENT<br>What to do in ideal circumstances |

# D – Drugs

DDX
- Opioids
- Benzos
- Alcohol
- Mental health meds
- Recreational drugs

| HISTORY | INVESTIGATIONS |
| --- | --- |
| Meds = access? | Urine tox* |
| **EXAM FINDINGS** | **MANAGEMENT** |
| Pupils<br>Reflexes<br>Tone | Supportive care<br>Decontamination<br>Enhanced elimination<br>Antidotes |

**Interpret with caution*

# I – Infection

DDX
- Sepsis
- Meningitis
- Encephalitis

| HISTORY | INVESTIGATIONS |
| --- | --- |
| Focal symptoms (ie: cough, dysuria) | CXR<br>UA / UCx<br>BCx<br>LP |
| **EXAM FINDINGS** | **MANAGEMENT** |
| Fever<br>Tachycardia<br>**Beware drowsy in the elderly** | Supportive care<br>Antibiotics - broad spectrum vs source specific |

# **M** – Metabolic

DDX
- HypoNa
- Hypoglycemia
- Adrenal crisis

| HISTORY | INVESTIGATIONS |
| --- | --- |
| Poor PO intake<br>PMHx suggestive | **Glucose**<br>Electrolytes<br>VBG<br>TSH |
| **EXAM FINDINGS** | **MANAGEMENT** |
| Vomiting<br>Tremulous | Supportive care<br>Electrolyte replacement<br>Stress dose sterioids |

# S – Structural

DDX
- Intracranial bleed
- Hydrocephalus
- Tumor

| HISTORY | INVESTIGATIONS |
| --- | --- |
| Headache (especially outside of their typical pattern)<br>Seizures | CT Head |
| **EXAM FINDINGS** | **MANAGEMENT** |
| Cushing's triad<br>↓HR ↑BP ↑↓RR<br>Dilated / fixed pupils | Supportive care<br>Move to tertiary hospital<br>Raised ICP treatment |

# T – Temperature

DDX
- Hypothermia
- Hyperthermia

- Hypothyroid
- Hyperthyroid

| HISTORY | INVESTIGATIONS |
| --- | --- |
| Environmental exposure<br>Previous thyroid dysfunction | **Core** T°C<br>CK<br>Liver enzymes<br>TSH |
| EXAM FINDINGS | MANAGEMENT |
| Skin T°C<br>Dry / wet skin | Supportive care<br>T°C regulation |

# O – Oxygen

DDX
- Respiratory failure
- MI
- Stroke

| HISTORY | INVESTIGATIONS |
| --- | --- |
| Not breathing well<br>PMHx - T2DM, hyperlipidemia, CAD, PAD | Troponin + ECG<br>VBG / ABG<br>CXR<br>CT head + angio |
| **EXAM FINDINGS** | **MANAGEMENT** |
| Poor respirations<br>Hypoxia<br>Cool extremities | Supportive care<br>If MI / stroke - lysis |

# P – Psychiatric

DDX
- Depression
- Catatonia
- Dementia

| | |
|---|---|
| HISTORY<br>PMHX | INVESTIGATIONS<br>Absence of significant findings |
| EXAM FINDINGS<br>“Light’s on but nobody is home” | MANAGEMENT<br>Supportive care<br>Consultation w/psychiatry |

# S – Seizure

DDX
- Active seizure
- Non convulsive status
- Post ictal

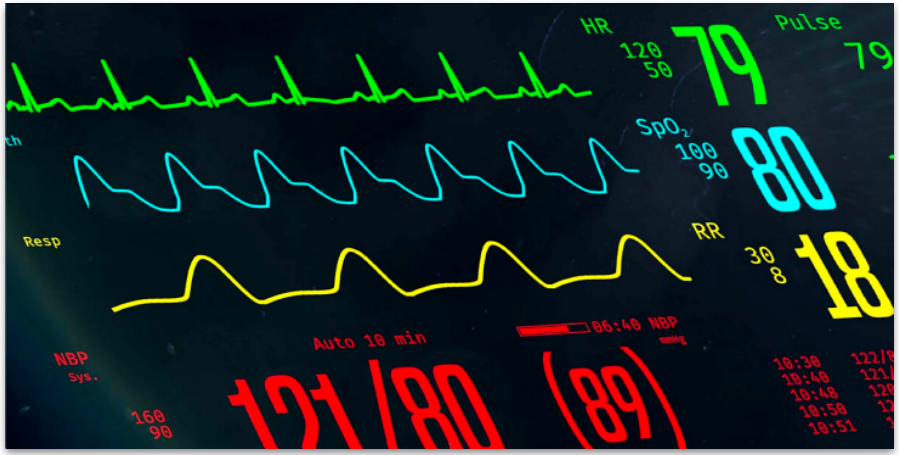
| HISTORY | INVESTIGATIONS |
| --- | --- |
| Epilepsy<br>Toxic ingestion<br>Witnessed seizure | Lactate<br>*Search for precipitants* |
| **EXAM FINDINGS** | **MANAGEMENT** |
| Tongue biting<br>Bladder incontinence | Supportive care<br>Benzos<br>Anti-epileptics |

# 3

# WHEN ALL ELSE FAILS OR ISN'T AVAILABLE

# The Common Theme

***Defend your vital signs***




ABCDEfG

VOMIT

***Supportive Care***

# What if . . .

## . . . I don't have that investigation?

## . . . I don't have that intervention?

🔑 *Defend your vital signs*

🔑 *Altered mental status isn't a disease, it's a symptom*

🔑 *Don't settle for the first diagnosis*

🔑 *Phone a friend*

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# CASE DISCUSSION

# Case #1

A 32yo female is brought to see you after being found on a hiking trail near town

She is drowsy, pale, and her skin is clammy

**What do you think is going on?**
**What would you like to know / do?**

# Case #1

## ABCDEfG

Airway patent
Rapid respirations
Pale/cool extremities
GCS 13
Gluc 0.8

## VOMIT

You establish a 20G IV in her R AC
SpO2 94% RA
HR 112; BP 100/60; RR 53
T°C (axilla) 37.5C

You arrange for bloodwork, ECG, and imaging within the limits of your setting

You astutely notice her glucose is dangerously low and administer 2 amps of D50W

# Case #1

Your patient is more interactive with the glucose and is able to provide some more information

## DIMS TOPS

| HISTORY | INVESTIGATIONS |
| --- | --- |
| - She has a hx of T1DM<br>- Was out for a hike (it's July and 32°C outside)<br>- She ran out of snacks and water (she got lost) | CK ↑↑<br>Urea ↑<br>Cr ↑<br>Gluc is now 3.2 |
| **EXAM FINDINGS** | **MANAGEMENT** |
| - Skin is hot + sweaty<br>- Her core temperature is 38.5°C | - You begin IV fluid replacement including dextrose<br>- You turn on the air conditioner / fan |

# Case #1

**What do we think happened?**

**Does she need to be transferred out?**

If so, what can we do in the meantime?

If no, how are we going to treat her?

# Case #2

An adult male is brought to see you after being found in a park with injection paraphenelia around him

He is not waking up to any stimuli

**What do you think is going on?**
**What would you like to know / do?**

# Case #2

## ABCDEfG

Airway patent
?Respiratory effort
Weak pulse
GCS 3 - pupils pinpoint
Gluc 5.4

## VOMIT

You begin supporting his respirations with the BVM, and clip the SpO2 probe to his finger and find him at 83%. You turn up the O2 source to flush, and bag until you note his SpO2 to be 100%

You then trial 4mg intranasal naloxone, with an improvement in his respiratory effort, now RR 8.

# Case #2

## VOMIT

You now establish a 20G IV in his L wrist
You apply nasal prongs, and titrate his O2 supply to >92%
You apply monitors

You arrange for bloodwork, ECG, and imaging within the limits of your setting

You continue to administer aliquots of naloxone IV at 0.1mg at a time, and consider whether there could be a 2nd underlying problem

# Case #2

Your patient is protecting his airway with the titrated naloxone
As part of your exam, you changed him into a gown, and found his ID in his pocket

## DIMS TOPS

| HISTORY | INVESTIGATIONS |
|---|---|
| ID = record system → PMHX: T2DM; HTN, substance use | CK ↑ ↑<br>WBC ↑<br>UTox: opioids, benzos, amphetamines |
| **EXAM FINDINGS** | **MANAGEMENT** |
| - Extremities are cool<br>- His core temperature is 34.5°C<br>- His clothing is damp | - You apply a warming blanket<br>- You start warmed IVF<br>- You reassess if he needs ongoing naloxone |

# Case #2

**What do we think happened?**

**Does he need to be transferred out?**

If so, what can we do in the meantime?

If no, how are we going to treat him?

# Case #3

An adult female is brought to see you because she's seeing pink elephants following her around and it's scaring her

**What do you think is going on?**
**What would you like to know / do?**

# Case #3

## ABCDEfG

Airway patent
Respirations normal
Tachycardiac
GCS 15
Gluc 4.1
Tremulous

## VOMIT

You delay establishing an IV because she's scared would rather you didn't
SpO2 98% RA
HR 122; BP 152/68; RR 20
T°C (axilla) 37.2C

You decide to ask her more history, and arrange for an ECG, while building some rapport

# Case #3

Your patient is looking over your shoulder repeatedly, but cooperative

With some rapport built, she consents to an IV + labs as part of your workup

## DIMS TOPS

| HISTORY | INVESTIGATIONS |
|---|---|
| Drinks daily - “some”<br>Last drink 12hours ago<br>She feels nauseated | Ketonuria<br>Metabolic acidosis<br>Cr ↑<br>Mg ↓ |
| **EXAM FINDINGS** | **MANAGEMENT** |
| Diffuse tremor<br>Diaphoretic<br>Absence of other significant findings | Diazepam 10mg IV given with effect<br>Thiamine 500mg IV<br>Mg 2mg IV<br>IVF |

# Case #3

**What do we think happened?**

**Does she need to be transferred out?**

If so, what can we do in the meantime?

If no, how are we going to treat her?

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# THE BOTTOM LINE

🔑 *Defend your vital signs*

🔑 *Altered mental status isn't a disease, it's a symptom*

🔑 *Don't settle for the first diagnosis*

🔑 *Phone a friend*


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# REFERENCES