CASE 1A: BACKGROUND

Ideal Emotional Response **DURING** Case

Frustration: I know what I ***would*** do back home to manage this disease, but I ***don't have the ability*** to do it here.

Ideal Emotional Response **AFTER** Debriefing

Adaptability: I was able to ***overcome obstacles*** encountered in a resource-limited environment and ultimately ***help this patient***.

Supplies

- Mannequin or actor
- IV equipment
- IV fluids (NS or LR)
- D50 solution
- Regular Insulin
- Glucagon
- Glucometer and strips
- Urine dipsticks

Keys to Reaching Desired Emotional Response

- Allow case to mimic ***slow pace*** often found in resource-limited medical environments. Case may take ***over 30 minutes*** to complete.
- Allow ample time for participants to overcome obstacles from ***lack of resources, resisting prompting*** in problem solving if at all possible.

Ideal Medical Objectives

- Recognize presentation of ***Diabetic Ketoacidosis*** and initiate therapy ***(fluid replacement + insulin)*** overcoming obstacle of not having a fluid pump by using ***drop count method***
- Overcome the inability to do insulin drip or monitor frequent labs by determining appropriate use of ***subcutaneous insulin*** and determining ***most important labs*** to follow
- Manage complications encountered while treating DKA including ***hypoglycemia*** overcoming obstacle of ***having to dilute D50 to D10***

IDEAL CASE FLOW: *Specifics less important than flow – Remember goal is to allow frustration*

FIRST STATE
Presentation in DKA
Lethargic
Glucose too high to read

→ Insulin Fluids →

SECOND STATE
Improved mentation after insulin and fluids

→ Artificially Elapsed Time after Insulin →

THIRD STATE
Hypoglycemic
Worsening mental status
Gluc: 1.7 mmol//L

→ Glucose or Glucagon →

FOURTH STATE
Improved mentation after administration of glucose or glucagon

KEY MEDICAL MANAGEMENT REMINDERS

SIGNS OF DKA

- ***Hyperglycemia*** (>11 mmol/L) + metabolic acidosis (pH <7.3 or bicarb <15 mEq/L)
- Polydyspia/Polyuria
- Vomiting/Dehydration
- Kussmaul Respirations (labored, deep breaths)
- Fruity breath
- Signs of increased ICP (confusion, altered mental status, headache)

REHYDRATION

- Start with 10 ml/kg bolus of NS over 1 hr. May repeat.
- Replace remainder of deficit over ***48 hours***. After bolus, start ~ 1.5 times maintenance of NS +KCL switching to D5 NS + KCL when RBG < 14 mmol/L or glucose decreasing rapidly
- Stop IV fluids when patient can drink or tolerate NG
- **Drop Count Method:** (If no pump) 20 drops = 1 ml; Can provide a rate by adjusting rate of drops (i.e. 90 ml/hr = 1,800 drops/hr = 30 drops per min = 5 drops in 10 seconds)

INSULIN DOSING

- Ideal would be to start insulin drip at ***0.05-0.1 units/kg/hr***
- Can ***mix insulin 1:1 in 0.45 NS*** to make solution of insulin that is 1 unit/ml. Then piggyback with IVF using drop count method (give as close to vein as possible)
- If drip not available, can do ***intermittent SQ dosing*** as sliding scale. Assume 1 unit/kg/day needed and determine sliding scale with **Rule of 1800:** 1800/insulin units per day = amount in mg/dL glucose will drop for each unit of insulin

HYPOGLYCEMIA

- Treat with ***dextrose bolus*** or ***glucagon***.
- **Rule of 50:** Percent dextrose multiplied by the volume to give in ml/kg should equal fifty (i.e. 5ml/kg of D10; 2 ml/kg of D25)
- Do not give more than D12.5 through peripheral IV
- ***Dilute D50 to D10*** by mixing 1 part D50 to 4 parts NS
- Approximate ***conversion*** of mmol/L to mg/dL by multiplying by 18 (i.e. 1.7 mmol/L = 31 mg/dL)

PROCEED TO CASE PRESENTATION, EXPECTED INTERVENTIONS, AND OBSTACLES

CASE 1A PRESENTATION: Provide information only as it is requested

Introduction: "You are called to the Casualty Ward to see a 5 year old male with ***vomiting and lethargy***. You have access to a nurse and the parent. If you want to know an exam finding, perform the exam and ask for the finding out loud."

CC: Vomiting and lethargy

HPI: 5 yo male w/ 2 wk hx of ***decreased energy*** and fatigue. ***Abdominal pain*** since yesterday w/ NB/NB ***emesis*** that is becoming more frequent. No diarrhea. ***Lots of urine.*** Now, ***less awake and responsive.***

PMH: none **FH:** Brother w/ URI **SH:** Lives w/ parents and 3 sibs

Medications: none **Allergies:** None

Pertinent Positives on Exam
(assume normal if not noted)

GEN: lethargic, no spontaneous eye opening
HEENT: eyes sunken, mouth dry, neck supple
RESP: mild tachypnea, deep respirations
CV: tachycardic, no m/r/g, weak pulses, cool ext.
ABD: minimal tenderness, no HSM
NEURO: difficult to arouse, responds to vigorous stim
EXT: cool, thin and wasted
SKIN: cool, no rashes

Initial Vitals: Wt 20 kg T 37.6 HR 182 RR 46 BP 94/52 O2 95%
Adjust vital signs according to which state above the patient is in

POTENTIAL INTERVENTIONS AND OBSTACLES

Expected Intervention	Obstacle	Possible Solution(s)	Outcome(s)
Check glucose	Given glucometer and sticks; nurse not available to help	Residents must figure out how to use glucometer	Glucose: too high to read
Check urine for ketones	Can't find dipsticks	Assume DKA from other clinical clues and begin treatment	Dipsticks eventually found; positive ketones and glucose
Fluid resuscitation	After bolus, don't have pump to run fluids at a rate	Drop counting technique, intermittent boluses, or use of NG	Improved mentation after fluids given
Initiate insulin	Pump not available; only regular insulin and syringes	Intermittent subcutaneous dosing vs. mixing insulin and piggy backing in with IVF	Improved mentation; next glucose: 19.3 mmol/L (347 mg/dL)
Monitor labs frequently	Chemistry not available; only ten urine dipsticks for whole hospital	Follow serial glucoses Improvise: Follow clinical signs of acidosis.	Adjust labs according to which state the patient is in
Identify resultant hypoglycemia and initiate treatment	Glucagon in pharmacy in separate building; Only D50 available	Dilute D50 with NS to make D10, then give 5 ml/kg	Improved mentation; Pre-D10 Glucose: 1.7 mmol/L (31 mg/dL) Post-D10 Glucose: 10.2 mmol/L (184 mg/dL)

STOP CASE WHEN THE FOLLOWING ARE TRUE

Providers have encountered obstacles and found ways to work around limited resources

Enough time has passed to allow for sense that case takes longer to manage than at home

PROCEED TO CASE 1A DEBRIEFING SCRIPT

CASE 1A DEBRIEFING SCRIPT[1]

Remember: Goal of debriefing is not to lecture, but to facilitate discussion

Setting the Scene: "We are going to spend the next 20-30 minutes debriefing the case with you. We are going to focus our attention to the ***emotions*** encountered, but will also address the medical management of the case. Keep in mind, many providers find managing a case like this abroad to be quite ***frustrating***, and we want to be sure to address those emotions during the debriefing."

Reaction: "How did that feel?"

Pay attention to cues pointing to frustration at lack of resources, lack of ability to do what one would normally do at their home institution, etc.

Description/Clarification: "Can someone summarize what the case was about from a medical point of view by taking us through what happened. I just want to make sure everyone is on the same page."

You may need to clarify/keep this moving by asking follow up questions (i.e. "What happened next?")

Analysis:

"What aspects of the case do you think you ***managed well***?"
"Were there aspects you'd wish to manage ***differently the next time***?"
"***What was different*** about this case management or flow than what you are used to?"
"How might you see yourself ***reacting to those changes abroad?*** How might your reactions ***be perceived by the local medical providers***?"
"What ***obstacles*** did you encounter to providing the care that you felt the child needed?"
"How did you ***overcome*** those obstacles?"

Review the individual obstacles on Page 2 of the case and the possible solutions. Be sure to address the drop count method, Rule of 1800 and Rule of 50 (all in bold on Key Medical Management Reminders)

Framework for Formulating Effective Debriefing Questions – Choose one prompt from each column

Observation	Point of View	Question
I noticed that...	I liked that...	How do you all see it?
I saw that...	I was thinking...	What were the team's priorities at the time?
I heard you say...	It seemed to me...	How did the team decide that...

Application/Summary: "Is there anything you learned during the course of this case, that has changed your perspective about your experience abroad?"

End with each learner providing a take-home point from the case

[1]Adapted with permission from Eppich, W., & Cheng, A. (in press). Promoting Excellence And Reflective Learning in Simulation (PEARLS): Development and Rationale for a Blended Approach to Healthcare Simulation Debriefing. Simul Healthc.