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## INTRODUCTION

- Heat stroke is a life-threatening condition in which the body can no longer dissipate heat properly, causing body temperatures to rise above 40°C or 104°F.
- With global climate change, people are increasingly exposed to higher temperatures, and many are unprepared for such extreme conditions leading to an additional 1,373 deaths per year (1,2).
- Moreover, individuals with comorbidities that impede the body's natural ability to dissipate heat or regulate hydration face additional risk factors for heat stroke.

## CASE DESCRIPTION

**HPI:** In this case, a female in her 50's with an unknown medical history presented to the emergency department after experiencing a witnessed syncope event outdoors. The patient's medical history is significant for Bipolar I disorder. Takes Depakote 3 times daily, bupropion and Haldol.

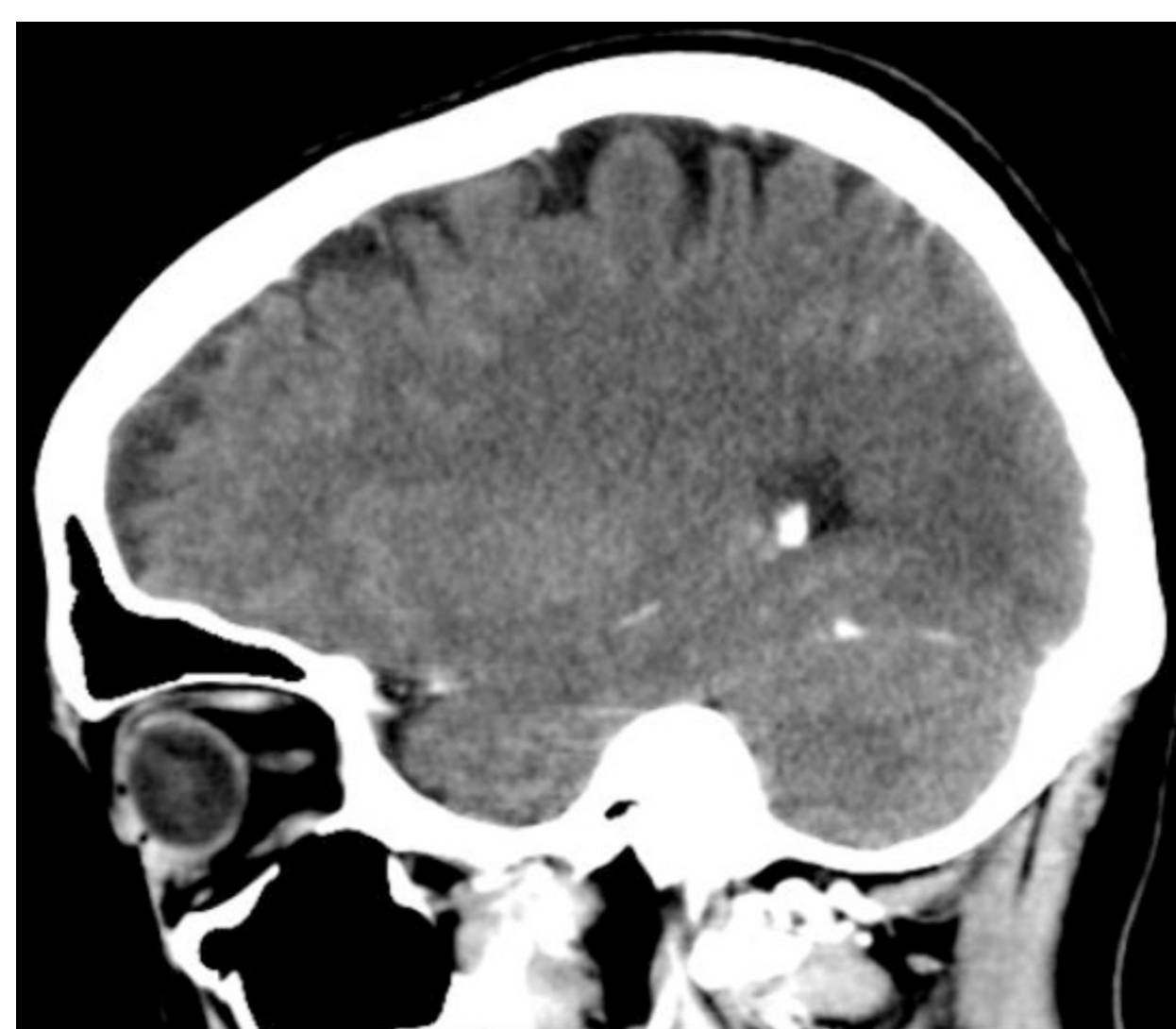
**Past Medical History :** Bipolar Disorder.

**Social History:** Denies tobacco, marijuana, cocaine, meth, amphetamine, opioid, and alcohol use. Currently experiencing homelessness.

**ROS:** Denies any preceding symptoms including fever chills chest pain shortness of breath headache, palpitations, abdominal pain, nausea, vomiting, or genitourinary symptoms.

**Physical Exam:** Altered with decreased alertness reactive to noxious stimuli. Skin hot to the touch with dry mucous membranes.

**Labs/ Imaging :** An ECG showed sinus tachycardia with no signs of acute ischemia, and a subsequent chest x-ray revealed mild cardiomegaly with pulmonary congestion.



Representative CT: Radiopaedia (3)

Vitals: BP: 129/65 RR:16  
HR: 134. Temp: 41°C

143	102	3	151
2.1	27	1.39	

Lactic Acid: 3.4  
Troponin: 101  
CK: 446  
Phosphate: 1.7

## CLINICAL COURSE

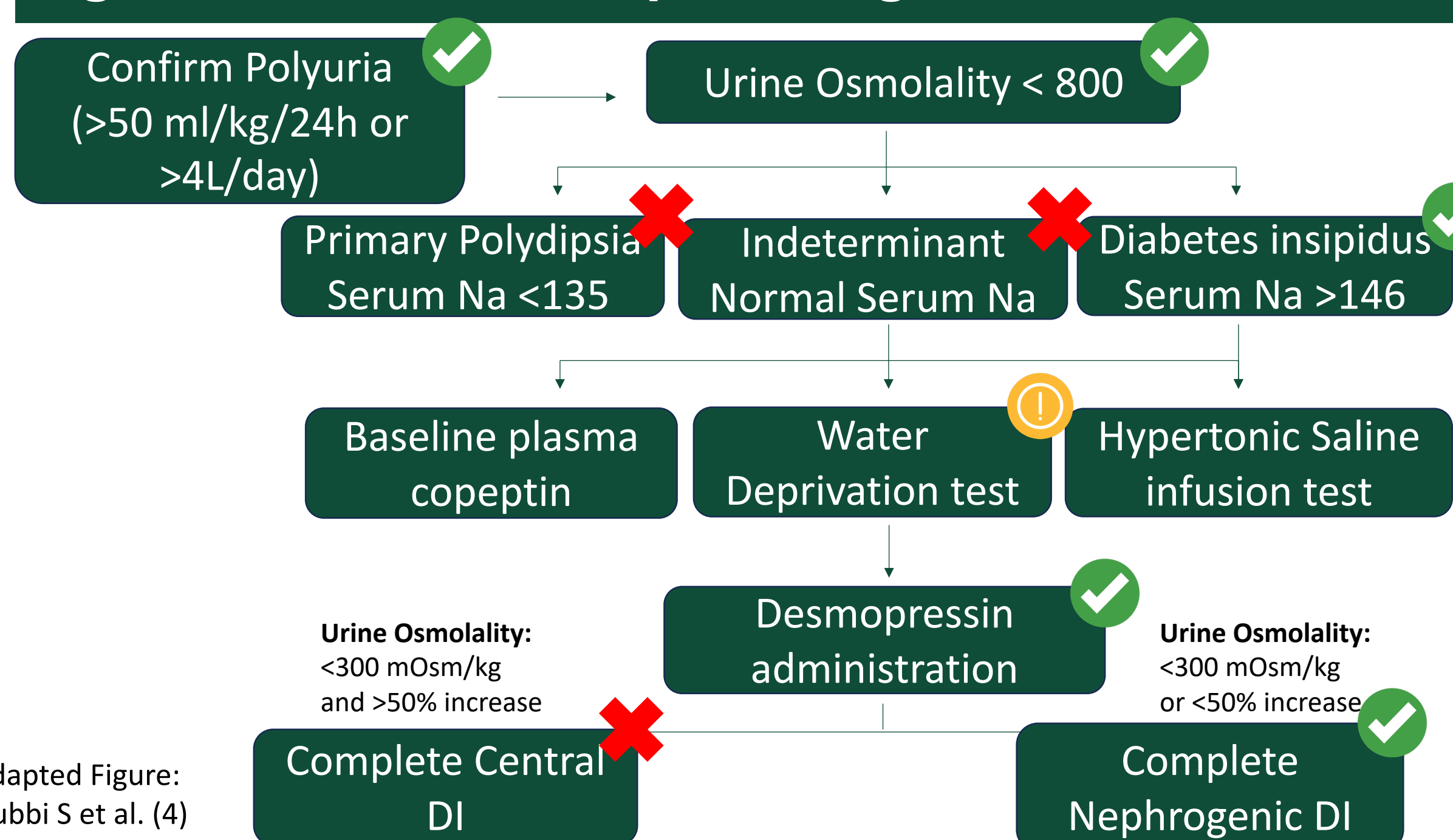
- The patient was promptly immersed in an ice bath, started on an IV to replenish electrolytes, and regained consciousness.
- Over the following days, the patient exhibited fluctuating levels of lactic acid, ranging from 3.0 to 5.0, and elevated sodium levels exceeding 150 due to dehydration.
- Even after being placed on D5W at 125 ml/hr, the patient continued to show elevated sodium levels.
- Further questioning revealed a history of Lithium use for bipolar disorder switched due to symptoms of diabetes insipidus.

### Desmopressin Challenge

Admission day	Treatment	Serum Osmolality	Urine Osmolality
Day 3	N/A	557	59
Day 4	N/A	297	<50
Day 5	ADH (30 mins)	Not collected	98
Day 5	ADH (60 mins)	Not collected	112
Day 5	ADH (90 mins)	Not collected	105
Day 5	ADH (120 mins)	Not collected	109

- Desmopressin challenge, confirming the diagnosis of nephrogenic diabetes insipidus.
- The patient was educated on proper hydration and preventive measures and was subsequently discharged.

### Figure 1. Diabetes Insipidus Algorithm



Adapted Figure: Gubbi S et al. (4)

## DISCUSSION/CONCLUSIONS

- This case underscores the increasing risk of heat stroke in vulnerable patient populations with comorbidities that heighten the risk of dehydration and syncope.
- With increasing global temperatures individuals are at a higher risk of heat related injuries including heat stroke (1).
- A recent case report demonstrated central DI also leading to heat stroke (5).
- Both social determinants and medical determinants put people at risk for heat related injury (1).
- People who are experiencing housing insecurity are at an increased risk of heat related injuries due to lack of barriers to the elements, lack of resources, and comorbid medical conditions (6).
- Psychiatric disorders can put people at risk for heat stroke due to impaired situational awareness.
- Patients with psychiatric disorders still be at greater risk even when controlled by medication as there have been positive associations between heat related injuries and medications including antipsychotics, antidepressants and anticholinergics (6).
- In this case lithium was a predisposing factors due to its incidence of nephrogenic diabetes insipidus in 20 to 40% of patients (7).
- Although this case was complicated by the lack of medical records, it highlights the importance of investigating potential risk factors for heat stroke and syncope in newly admitted patients. There is a paucity of research in of climate change induced injuries and the intersection of factors that predispose to heatstroke. With changing climate these will be important areas of research.

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