



# Endocrine Emergencies

Dr. Tim Root

Riverview Hospital EMS

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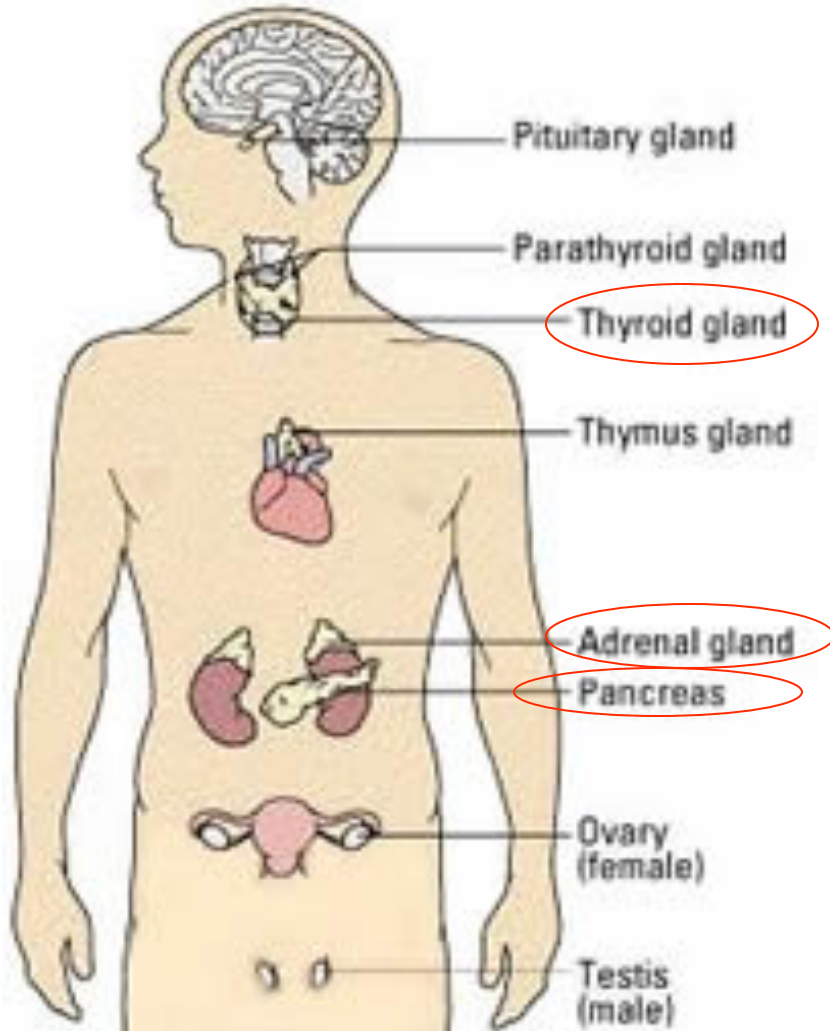
# Have I ever seen an endocrine emergency?



Yes!

...but we don't always think of them as endocrine-related.

# The Endocrine System



1. It's complicated.
2. Regulatory proteins secreted by the body to control housekeeping functions for the body.
3. Some parts malfunction more commonly, creating life-threatening problems.

# Why should I pay attention?

1. Some endocrine emergencies are very common...you will see these.
  - » *DKA, Hypoglycemia*
2. Endocrine system controls basic life functions...when things go bad, they go really bad.
3. You're the first medical personnel to see that patient!

# Can I always figure out the problem?



1. No
2. Often supportive treatment is all that is necessary
3. Good to have Endocrine in the back of your mind for the “weird” cases

# Case 1



1. At 3am you are called to meet a 22yo patient with seizure activity. Sister noticed that he was “shaking” in his sleep.
2. PMHx: IDDM
3. Meds: NPH insulin/Humalog insulin BID
4. Allergy: none
5. Social Hx: denies EtOH, drugs, tobacco

# Case 1

1. Vitals T98, P62, BP 110/72, R10 Sat 98% RA
2. Physical exam
  - » *Awake, confused male (GCS = 12)*
  - » *Otherwise unremarkable.*
3. Accu Check = 35

*Why did the patient seize?*

# Hypoglycemia

## Presenting Signs & Symptoms



1. Low blood sugar occurs commonly.
2. *It is life-threatening!* One of the two vital nutrients for the brain.
3. Many different presentations:
  - » *Depressed sensorium (52%)*
  - » *Other AMS (30%)*
  - » *Hyper adrenergic symptoms (8%)*
  - » *Seizure (7%)*
  - » *Focal neuro deficit (2%)*



# Hypoglycemia

## Who gets it & why?



### Who?

- » *Diabetics!*
- » *Alcoholics*
- » *Kids*
- » *Septic patients*
- » *Overdose patients*
- » *Adrenal crisis patients*
- » *Hypothyroid patients*

### Why?

- » *Hypoglycemic agents*
- » *Lack of reserve sugar*
- » *Unique physiology*
- » *All used up from stress*
- » *Drugs alter metabolism*
- » *Body unable to function normally*

# Hypoglycemia Assessment



1. Check their serum glucose! BLS skill now
2. Proper Accu check technique
3. Glucose < 60mg/dL is text definition.
4. Normal/rapid breathing, no odor
5. Pale or moist skin
6. Nl., rapid, or full pulse

# Hypoglycemia Treatment

## 1. Give glucose back

» *IV dextrose*

*Adult: 1cc/kg of D50 (50%  
dextrose soln)*

*Kid: 2-4cc/kg of D25*

*Newborn: 5-10cc/kg of D10*

» *IM/IV glucagon*

*1mg IM*

» *Glucocorticoids*

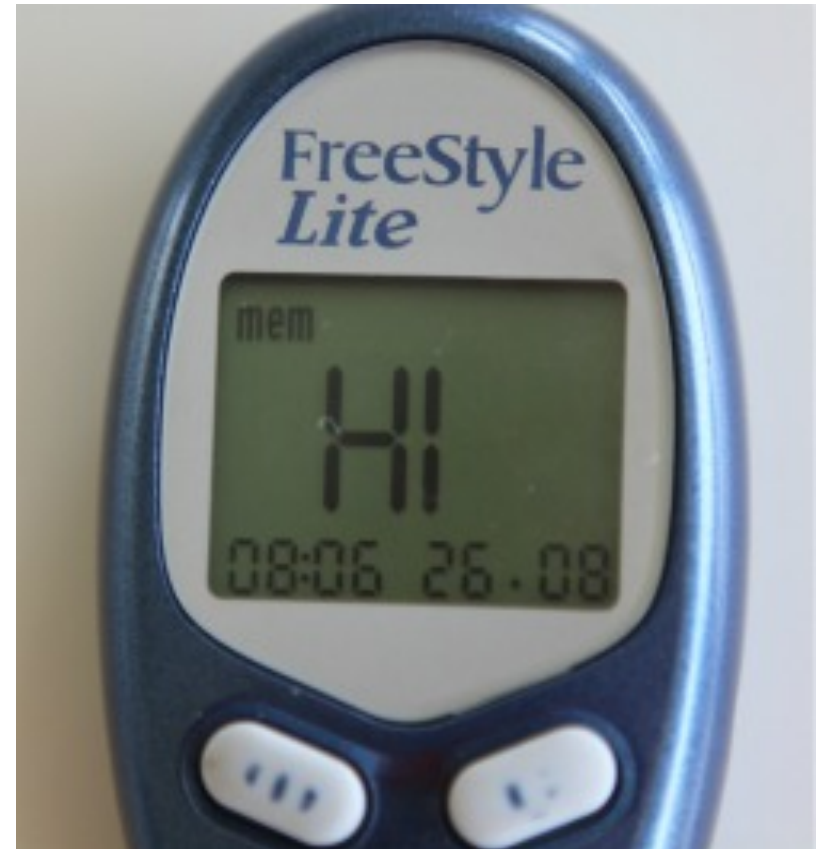


## Case 2

1. You are called to meet a 53yo female patient for worsening vomiting, headache, and abd pain for 12 hours. She states that she has also been having episodes or pressure-like SSCP for the past 1-2 days associated with dyspnea & sweats. No CP now.
2. PMHx: DM, HTN, arthritis
3. Meds: glyburide, reg insulin, amlodipine, ASA
4. Allergies: none

# Case 2

1. HR 115, BP 110/75, R 35, Sat 100%
2. Physical exam:
  - » *Diaphoretic, ill-appearing.*
  - » *Hyperventilation with deep breaths.*
  - » *Dry mucous membranes.*
3. Dex = “high”.



# DKA: Diabetic Ketoacidosis



1. It's what happens when you get really stressed and insulin doesn't work!
2. Who gets it?
  - » *Diabetics!*
  - » *Most common in younger, type 1 patients*
  - » *Frequently occurs in older, type 2 patients*
  - » *25% cases are undiagnosed diabetics.*
3. When severe, it can manifest with neuro symptoms.

# Diabetic Ketoacidosis

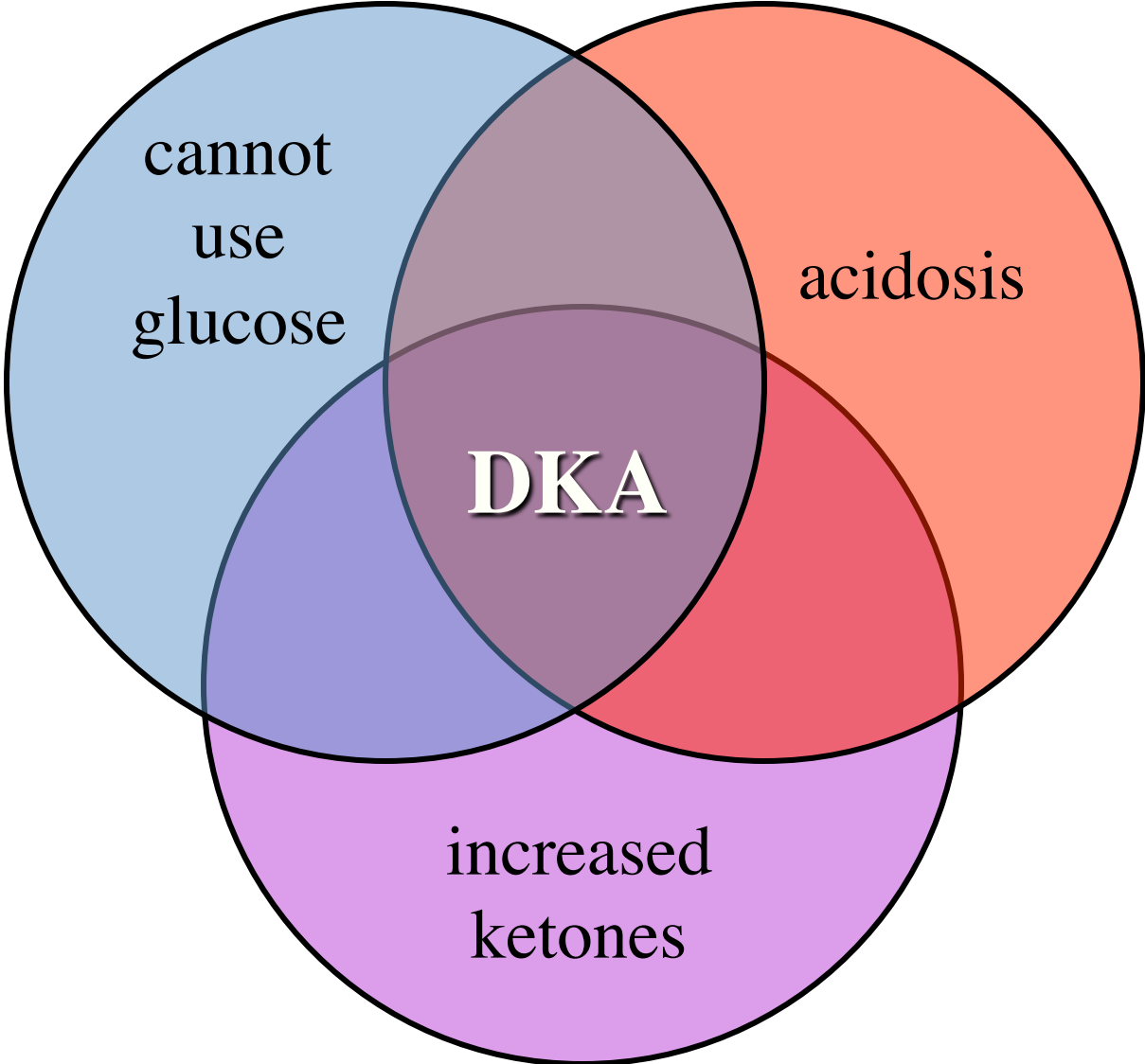
## What really happens?



1. Something creates a stress/catecholamine state.
2. The body mobilizes energy (glucose), but can't get it where it needs to go
3. Cells don't get added energy > release more catecholamines
4. Increased sugar > Increased urine > dehydration
5. Next best thing: fat breakdown = lipolysis
6. Ketones generated

# Diabetic Ketoacidosis

## A Complex Process





# Diabetic Ketoacidosis

## What really happens?



1. There is an initial insult that creates a catecholamine stress:
  - » *Infection*
  - » *Stroke*
  - » *Myocardial Infarction*
2. Treating DKA has become standardized. Figuring out the precipitating cause is sometimes hard.

# Diabetic Ketoacidosis

## Diagnosis & Treatment



1. Clinical suspicion in the right setting, confirmation with lab testing.
2. Prehospital treatment:
  - » *IV Access*
  - » *Fluids, fluids, fluids!*
  - » *Monitor cardiac activity*
  - » *What is causing it???*

# Case 3

1. Called to your local favorite ECF for AMS
2. 100 y/o female with DM, CAD, and dementia
3. “Not Acting Right”



# Case Cont...



1. P 135, BP 80/palp, RR 42
2. Accucheck= "High"
3. Mucous Membranes are dry as a bone
4. Meds: glucophage, plavix, lisinopril
5. According to the nursing staff she just hasn't been eating but they have had to change their foley bag 3 times today already

# Hyperosmolar Non-Ketotic Syndrome (HNS)



1. Traditionally occurs in older diabetics.
2. Frequently presents as AMS, fatigue, anorexia, or weakness.
3. Usually has an initiating event: infxn, new meds, decreased water intake, etc.

# HNS

## What really happens?



1. The initiating insult leads to unchecked hyperglycemia.
2. Hyperosmolar state ensues...
3. ...leads to incredible diuresis of 9-15 liters!
4. End result: dehydrated, electrolyte imbalances, hyperglycemia.

# HNS

## Diagnosis & Treatment



1. Poorly understand why these patients avoid ketoacidemia.
2. Diagnosis confirmed with marked hyperglycemia in the right clinical setting.
3. Treatment:
  - » *Fluids, fluids, fluids!*
  - » *Supportive care.*

# Case 4

1. Called to meet a 65yo woman in an ECF for altered mental status and bradycardia. First noticed today by the ECF staff.
2. PMHx: CVA x 2, hypothyroidism
3. Meds: ASA, synthroid
4. Allergies: none



# Case Continued



1. P 44, BP 80/palp, RR 10, Temp 92
2. Cold to touch
3. Minimally responsive to you but protecting her airway

# Case 4

## Myxedema Coma

1. Extreme hypothyroidism.
2. Hypo metabolic state...
  - » *Hypothermia, hypotension, bradycardia, hypoventilation, altered mental status.*
3. Diagnosis requires a high degree of suspicion.
4. Treatment is supportive and also aimed at restoring euthyroid state.

# Hyperthyroidism & Thyroid Storm



1. Extreme hyperthyroidism...hypermetabolic state:
  - » *Tachycardia, hypertension, tremor, fever, etc.*
  - » *Treatment is symptomatic and aimed at decreasing peripheral activation of thyroid hormone.*
2. Prehospital treatment is oxygen, IVF.

# Case 5

1. Called to meet a 36yo male patient with altered mental status. Was taking steroid to control Crohn's symptoms, but out for 2 days.
2. PMHx: Crohn's disease, GERD
3. Meds: hydrocortisone 5mg QD (out), mesalamine, ranitidine
4. Allergies: PCN

# Case 5

1. HR 80, BP 70/45, R 12, Sat 95%, T 96.5
2. Physical exam:
  - » *GCS 11*
  - » *Dark pigmented skin on arms legs*
  - » *Otherwise unremarkable.*
3. Dex = 54.



# Case 5

## Adrenal Crisis

1. What do the adrenal glands normally do?

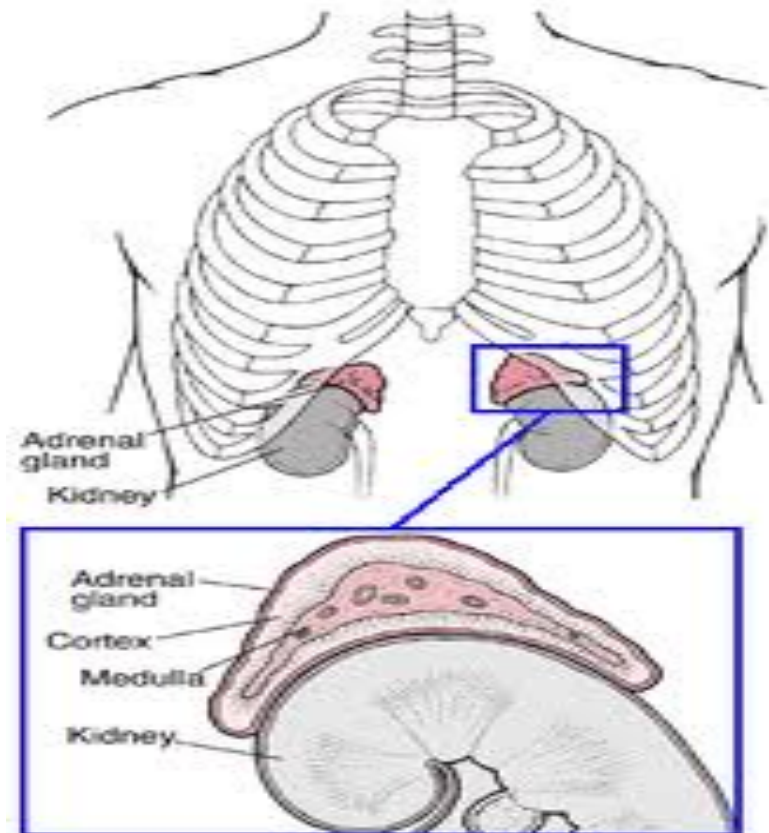
» *Medulla makes catecholamines*

» *Cortex makes lots of important hormones:*

*Glucocorticoids - BP, glucose metabolism*

*Mineralocorticoid - BP, salt/water homeostasis*

*Androgenic steroids - secondary sex characteristics*



# Adrenal Crisis

## Clinical Picture

1. What do you see when Adrenals don't work?
  - » *Anorexia, nausea, vomiting*
  - » *Weakness, fatigue, lethargy, AMS*
  - » ***Hypoglycemia***
  - » ***Hypotension, circulatory collapse***
  - » *Hyponatremia with severe dehydration*
  - » *Hyperkalemia (not usually severe)*
  - » *Brownish pigmentation (no feedback suppress.)*
2. *Decreased aldosterone & cortisol.*

# Adrenal Crisis

## How do you get it?

**1. Iatrogenic**

2. Trauma

3. Surgery

4. Burns

5. Autoimmune

1. Infection

2. Pregnancy

3. Hyperthyroidism

4. Drugs (anesthetics)



# Adrenal Crisis

## Assessment & Treatment

1. Diagnosis is clinical and supported by lab data.
2. Prehospital treatment:
  - » *Correct hypotension*
  - » *Correct hypoglycemia*
  - » *Other supportive measures.*
3. Patient will receive hydrocortisone at ED.

# In Summary



1. Complications of diabetes can be quite variable
2. Not every accucheck reading high is DKA
3. Be aware of the cold, bradycardic and hypotensive patients
4. Chronic steroids + hypotension → Think adrenal crisis