Endocrine Emergencies

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Have I ever seen an endocrine emergency?

Yes!

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

cannot use glucose

DKA

increased ketones

acidosis
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”
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.
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