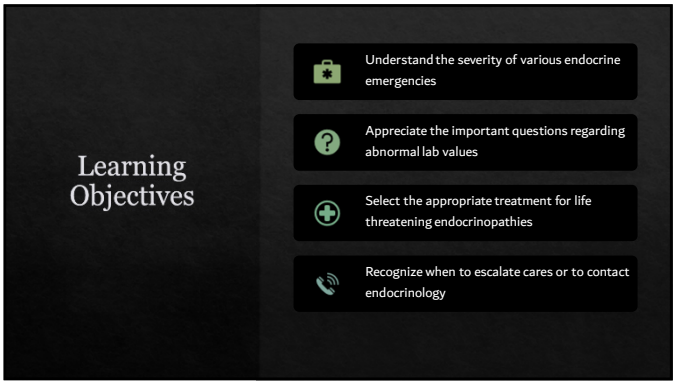

Endocrine Emergencies
From Bunny Hill to Black Diamond
Dave Newman
Big Sky 2026

1


Learning Objectives
Understand the severity of various endocrine emergencies
Appreciate the important questions regarding abnormal lab values
Select the appropriate treatment for life threatening endocrinopathies
Recognize when to escalate cares or to contact endocrinology

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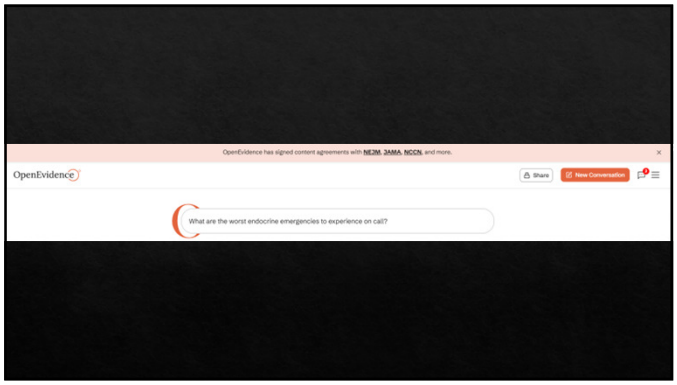
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New Conversation
What are the worst endocrine emergencies to experience on call?

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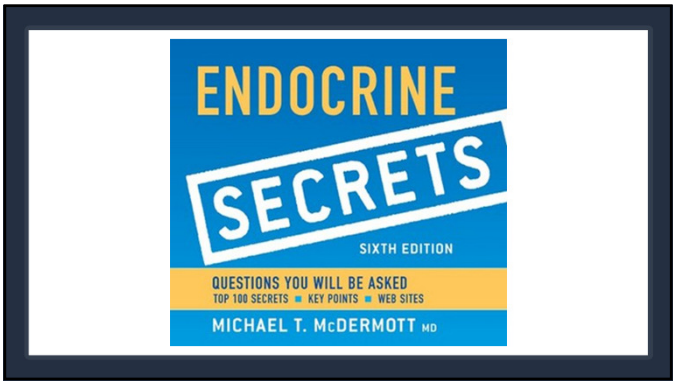
ENDOCRINE
SECRETS
SIXTH EDITION
QUESTIONS YOU WILL BE ASKED
TOP 100 SECRETS ■ KEY POINTS ■ WEB SITES
MICHAEL T. McDERMOTT MD

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Unication
4:45 on Friday
DIRECTMAGE

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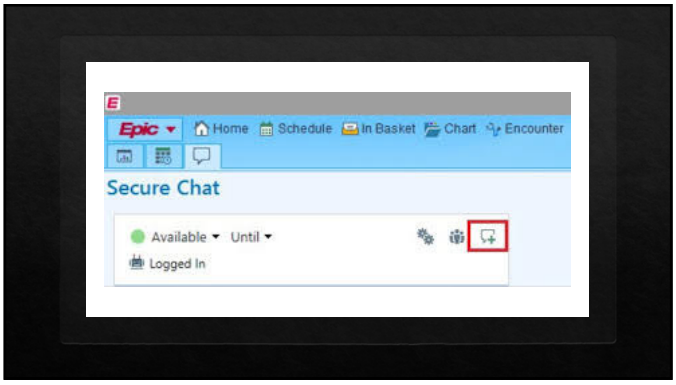
Epic
Home
Schedule
In Basket
Chart
Encounter
Secure Chat
Available
Until
Logged In

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43-year-old healthy female

- 4:45 Friday Afternoon
- BMP Results
  - Sodium 139
  - Potassium 4.3
  - Chloride nobody cares
  - Glucose 119
  - Creatinine 1.1
  - Calcium 13.2 (normal up to 10.5)

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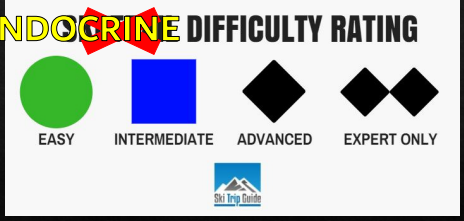
ENDOCRINE DIFFICULTY RATING



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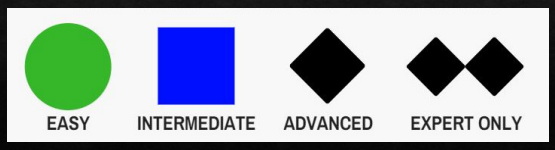
Corrected Calcium Levels

< 11.5	11.5 – 12.5	12.6 – 14	>14



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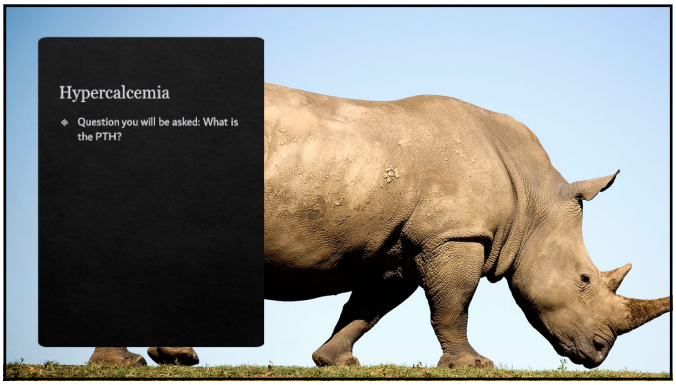

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Hypercalcemia

- Mostly primary hyperparathyroidism outpatient (70%) and sometimes inpatient (20%)
- Cancer causes half (50%) of inpatient hypercalcemia
- Hyperparathyroidism and cancer cause 90% of all elevated calcium levels

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The most likely diagnosis in this patient:
Hypercalcemia due to parathyroid adenoma

Other differentials of Hypercalcemia include:
-Vitamin D or A excess
-Immobilization
-Thyrotoxicosis
-Addison's disease/Acidosis
-Milk-alkali syndrome
-Inflammatory disorders
-Neoplastic disease
-Thiazide diuretic
-Rhabdomyolysis
-AIDS
-Paget's disease/Parenteral nutrition
-Sarcoidosis

"VITAMIN TRAPS"

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Super Useless Mnemonic

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Hypercalcemia Symptoms

	Mild (corrected calcium 10.5–11.9 mg/dL)	Moderate (corrected calcium 12.0–13.9 mg/dL)	Severe (corrected calcium > 14.0 mg/dL)
Neuropsychiatric	Anxiety, depression	Cognitive dysfunction	Lethargy, confusion, stupor, coma
Gastrointestinal	Anorexia, nausea, constipation	Anorexia, nausea, constipation	Pancreatitis
Renal	Polyuria	Dehydration	Renal insufficiency, dehydration
Cardiac	Shortened QT interval	Shortened QT interval	Arrhythmia, ventricular tachycardia
Musculoskeletal	None	Weakness	Weakness

Note. Information from Inzucchi (2004); Ahmed & Hashiba (1988); Kiewiet, Ponssen, Janssens, & Fels (2004).

Bones Stones Moans Groans

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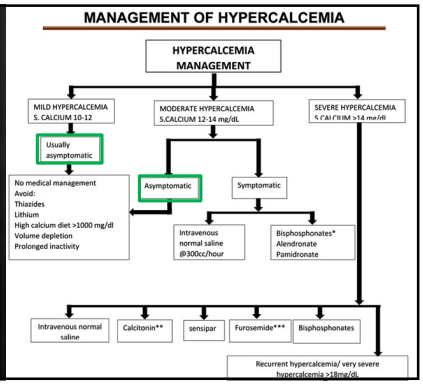
Treatment

- IV Fluids
- IV Fluids
- IV Fluids
- Sometimes Bisphosphonates
  - Pamidronate
  - Zolidronic Acid
- REALLY Bad
  - Denusomab
  - Emergent parathyroid surgery
  - Dialysis



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Hypercalcemia

- Treat the underlying cause

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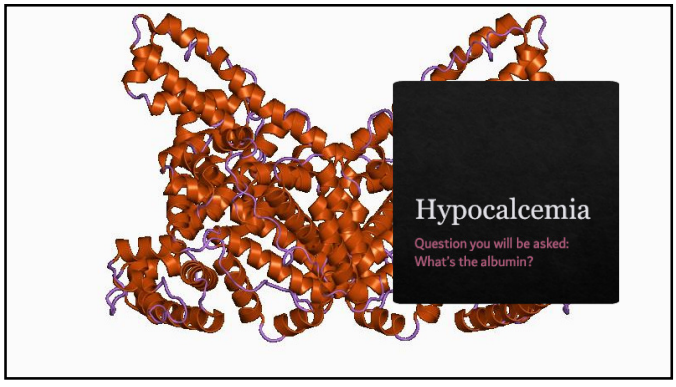

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Corrected Calcium Levels

>8 7-7.9 6-6.9 <6

EASY INTERMEDIATE ADVANCED EXPERT ONLY

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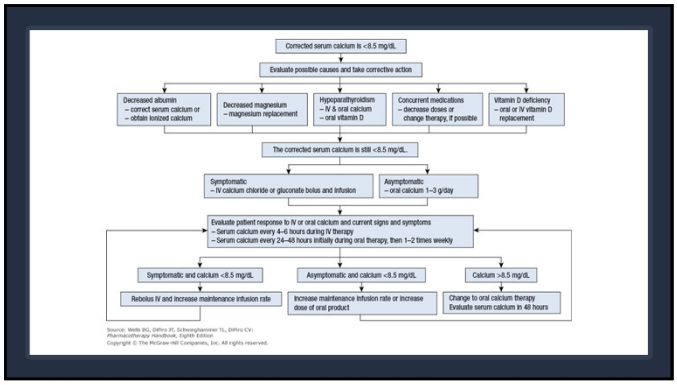

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Hypoparathyroidism

- ***Postsurgical***, Autoimmune, Idiopathic
- Give IV and oral calcium
  - Ideally off of IV calcium for about a day before discharge
- NEED ORAL CALCITRIOL
- Replace vitamin D and magnesium

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Carbonate vs Citrate

- Carbonate less expensive
  - Take with meals
- Citrate absorbed better
- Carbonate 40% elemental
  - Less pills
- Citrate 21% elemental

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Umm, elemental calcium?

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Elemental Calcium

Product	Strength per Tablet (mg)	Milligrams of Elemental Calcium	Vitamin D (IU)
Calcium Carbonate Preparations			
Alka-Mints®	850	340	—
Caltrate	1500	600	—
Caltrate + D®	1500	600	200
Oyster-shell calcium	1250	500	Various amounts present in some formulations
Oscal	1250	500	—
Tums®	500	200	—
Tums E-X®	750	300	—
Tums Ultra®	1000	400	—
Viactiv®	1200	500	—
Viactiv with D	1200	500	100
Calcium Citrate Preparations†			
Citracal	950	200	—
Citracal + D	1500	315	200
Calcium Phosphate Preparations			
Posture	1500	600	—
Posture-D	1500	600	125

‡May also be used as an antacid.
†Also contains magnesium, zinc, copper, manganese, and boron.
If taking calcium, calcium citrate is better absorbed than calcium carbonate.

	Formulation, dose	Elemental calcium dose	Number of tablets that provide elemental calcium ≥1.5 g/day	Number of tablets that provide elemental calcium ≥2.0 g/day
Calcium acetate	PhosLo 667 mg	169 mg	9	12
Calcium carbonate	Calci-Mix powder 1250 mg	500 mg	3	4
	Calcium carbonate (generic)			
	400 mg	160 mg	10	13
	500 mg	200 mg	8	10
	600 mg	240 mg	7	9
	650 mg	260 mg	6	8
	Caltrate 600 Plus 1500 mg	600 mg	3	4
	Os-Cal 1250 mg	500 mg	3	4
	Tums			
	Regular, 500 mg	200 mg	8	10
	Extra strength, 750 mg	300 mg	5	7

Tablet numbers were rounded up to the nearest whole tablet.

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Just tell me what to do

- 0.5 mcg calcitriol twice daily
- 2-3 TUMS three times a day
- 50,000 units ergocalciferol weekly

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Low Cortisol

- Question you will be asked: Have they received steroids?
  - Oral
  - Injections
  - Topical
  - Inhaled
  - Eye drops

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Have they received steroids over the last few days?

Yes

No

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Adrenal Crisis

- Give steroids now
  - Hydrocortisone
  - Prednisone
  - Dexamethasone
- Figure out the rest later
- Real adrenal insufficiency gets better in hours

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Adrenal Replacement

Corticosteroid Conversion Chart

Glucocorticoid	Approximate Equivalent Dose (mg)	Relative Anti-Inflammatory (Glucocorticoid) Potency	Relative Mineralocorticoid (Salt Retaining) Potency	Biological Half-Life (Hours)
Short-Acting				
Cortisone	25	0.8	0.8	8 - 12
Hydrocortisone	20	1.0	1.0	8 - 12
Intermediate-Acting				
Methylprednisolone	4	5	0.5	18 - 36
Prednisolone	5	4	0.8	18 - 36
Prednisone	5	4	0.8	18 - 36
Long-Acting				
Dexamethasone	0.75	25	0.0	36 - 54

Meikle AW et al. Potency and Duration of Action of Glucocorticoids. Am J of Med. 1977; 63 (2):200 - 207. PMID: 888843

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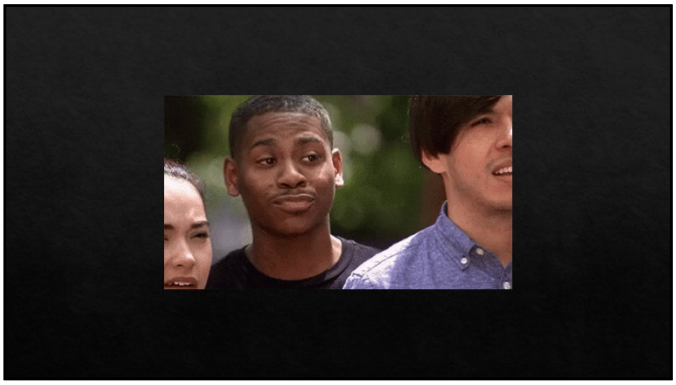

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55 year old female

- "Hi Dr. Newman this is Karen with One Call and Dr. Potluri would like to transfer a patient for thyroid storm."
- "Ah yeah this is Dr. Potluri, this patient isn't doing so hot, they have thyroid storm, we are going to need your assistance."
- "So they came in for a fall, but they were getting crazy in the ER and they were found to have a fib. They also have COPD and maybe heart failure. A TSH was checked and it was pretty low."
- "Um, let me check, oh yeah, TSH under 0.01, and oh man, temp is 104, and yeah, now that you mention it, they are pretty gorked out. . ."

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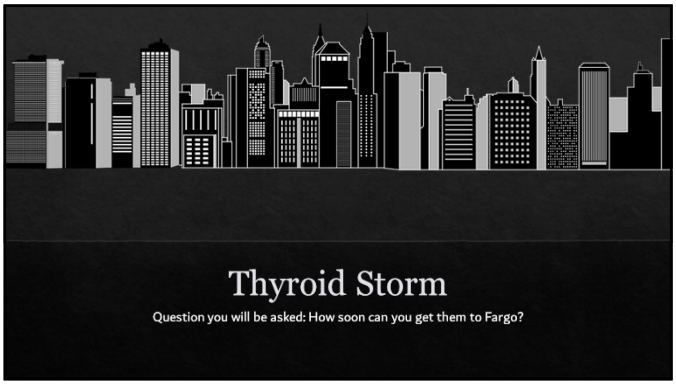

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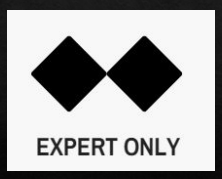
Thyroid Storm



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Thyroid Storm

- 20% Mortality
- Needs immediate cares, even before some labs return
- Call endocrine even if you don't have an endocrinologist on staff

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Thyroid Storm

- Bad thyroid disease AND a superimposed precipitating event
  - Surgery, infection, trauma
- TSH completely suppressed (<0.01)
- Free T3 and T4 substantially elevated
- Don't wait for tests to return to start treatment
- Labs can be misleading → same in hyperthyroidism
- Differential: Sepsis, pheochromocytoma, malignant hyperthermia

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Thyroid Storm

TABLE 2
Burch-Wartofsky Point Scale

Temperature (°F)		Cardiovascular dysfunction	
99-99.9	5 points	Tachycardia (beats/min)	
100-100.9	10	99-109	5
101-101.9	15	110-119	10
102-102.9	20	120-129	15
103-103.9	25	130-139	20
≥ 104.0	30	≥ 140	25
Central nervous system effects		Atrial fibrillation	10
Absent	0	**Heart failure**	
Mild (agitation)	10	Mild (pedal edema)	5
Moderate (delirium, psychosis, extreme lethargy)	20	Moderate (bibasilar rales)	10
Severe (seizure, coma)	30	Severe (pulmonary edema)	15
Gastrointestinal-hepatic dysfunction		**Precipitant history**	
Moderate (diarrhea, nausea/vomiting, abdominal pain)	10	Positive	0
Severe (unexplained jaundice)	20	Negative	10

Total: < 25, storm unlikely; 25 – 45, impending storm; > 45, thyroid storm

Source: Burch, Wartofsky. *Endocrinol Metab Clin North Am.* 1993.[2]

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Thyroid Storm Treatment

- **PTU or methimazole** → Decrease hormone synthesis
- **SSKI or Lugol's solution** → Inhibit thyroid hormone release
- **Beta Blocker** → reduce the heart rate
- **Dexamethasone/Hydrocortisone and IV fluids** → Support Circulation
- **Fix the underling cause**

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Thyroid Storm Pearls

- Call for help ASAP: ICU, endocrine, pharmacy, cardiology
- Just about any beta blocker will work
- The OR sometimes has SSKI or Lugol's solution
- Don't forget about sepsis

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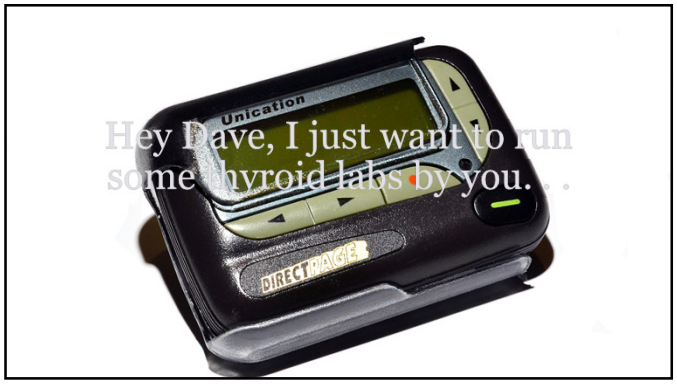

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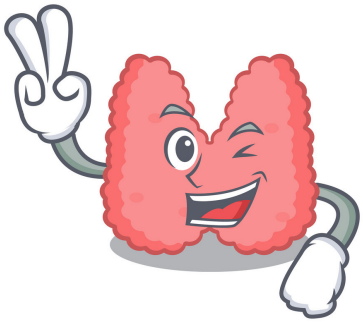
High TSH

Question you will be asked:
Just tell me what the TSH is



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High TSH Levels

<20	20.1 - 50	50.1 - 100	>100
EASY	INTERMEDIATE	ADVANCED	EXPERT ONLY

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Myxedema coma

- Really bad hypothyroidism (TSH over 100)
- Older patients or patients without thyroids
  - Thyroidectomy scar
- Precipitating event
  - Infection, trauma, MI, CHF, PE, stroke, GI bleed, CNS suppressing drugs, prolonged cold exposure
- Mortality 0% to 45%
  - Anecdotal experience closer to 0%

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Myxedema Coma Treatment

- Stress steroids first → hydrocortisone 100 mg every 8 hours
- LT4, LT3, or both
- Combination therapy generally accepted → 200 to 300 mcg IV LT4, 20 to 50 mcg LT3 IV, 100 mcg LT4 oral with 25 mcg LT3 orally
- Long term cares

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Myxedema Coma Pearls

- Give steroids first
- Check if they have pituitary disease (Both TSH and FT4 will be undetectable)

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What are the worst endocrine emergencies to experience on call?

Finished thinking

The **most severe endocrine emergencies** encountered on call include **adrenal crisis, thyroid storm, and myxedema coma (decompensated hypothyroidism)**. These conditions are life-threatening and require immediate recognition and treatment.

Adrenal crisis is characterized by hypotension (systolic blood pressure <100 mm Hg in adults or ≥20 mm Hg lower than usual), along with symptoms including nausea, vomiting, severe fatigue, abdominal pain, and impaired consciousness. NEJM The condition presents as shock out of proportion to the severity of any trigger and is typically resistant to inotropes and fluid resuscitation until treated with parenteral glucocorticoids. Clinical Endocri... Common precipitants include infections (particularly gastroenteritis), trauma, surgery, and abrupt glucocorticoid withdrawal. NEJM Immediate treatment consists of 100 mg hydrocortisone intravenously or intramuscularly, followed by rapid volume resuscitation with 0.9% saline (1000 mL within the first hour), then maintenance with 200 mg hydrocortisone per 24 hours. Clinical Endocri... + 2

Thyroid storm represents extreme thyrotoxicosis occurring when metabolic, thermoregulatory, and cardiovascular compensatory mechanisms are overwhelmed. Endocrine Pract... Clinical features include hyperthermia, neuropsychiatric symptoms, and tachyarrhythmias. Management is multipronged and stepwise, consisting of first-line thionamide and beta-adrenergic receptor antagonist therapy, followed by inorganic iodine, with cholestyramine, plasmapheresis, or emergent thyroidectomy reserved for severely ill patients. Endocrine Pract...

Myxedema coma (decompensated hypothyroidism) presents with altered mental status, hypothermia, and depressed vital signs, often with multiple organ failure. Endocrine Pract... + 1 Treatment includes high-dose levothyroxine with the addition of liothyronine for critically ill patients, along with early steroid supplementation to address possible concomitant adrenal insufficiency. Endocrine Pract...

All three conditions require supportive care for cardiovascular, respiratory, and thermoregulatory manifestations, as well as treatment of precipitating events. Endocrine Pract...

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Review

- Hypercalcemia → IV Fluids
- Hypocalcemia → IV calcium, oral calcitriol and lots of oral calcium
- Adrenal Crisis → IV steroids followed by oral steroids, IV Fluids
- Thyroid Storm → Transfer, call endocrine
- Myxedema Coma → IV thyroid hormone followed by oral thyroid hormone

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