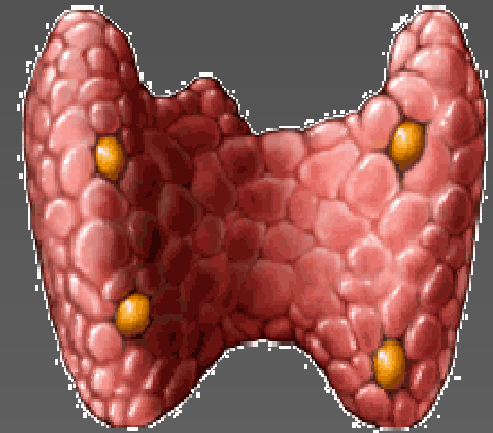


# Non – Diabetic Endocrine Emergencies



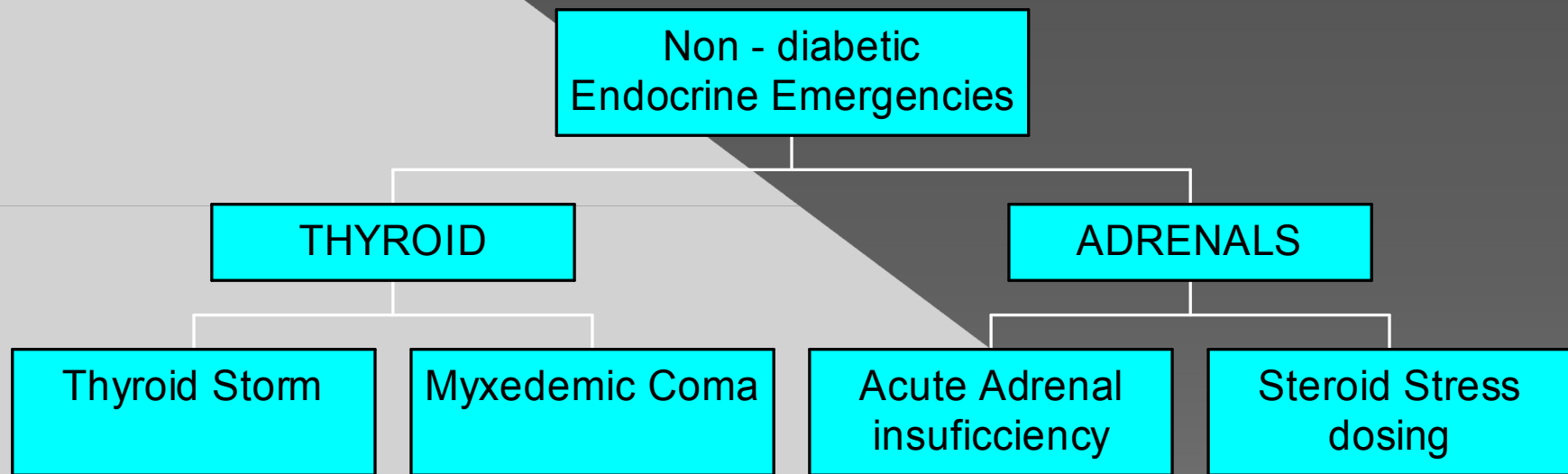
By  
Lt.Col Zujaja Hina Haroon

# Non – Diabetic Endocrine Emergencies

## ◎ WHY?

- ◎ Uncommon
- ◎ Potentially lethal
- ◎ Diagnostic dilemmas
- ◎ Emergency treatment may be life-saving

# Outline



# Objectives

- How uncommon?
- What defines thyroid storm, myxedemic coma, adrenal crisis?
- What are the main clinical features?
- When should these dx be considered?
- What investigations are pertinent?
- What is the emergency management?
- When and how do you give stress dosing for chronic adrenal insufficiency?

# Case

- 32 yr old male
- High grade fever, chills, burning micturition, cough, pain abdomen – (1 day)
- PMHx- unwell for 3-4 months
- Recent weight loss
- Sinus tach 130
- Temp 105
- Agitated
- Bronchial breathing, bilat. Crepts (middle & lower zones)

# Case (contd.)

- C/P- TLC 1.7, MT rings seen
- LFT, PT, PTTK, Cardiac enzymes deranged
- USG hepatosplenomegaly
- X-ray (loss of lucency in mid zone bilaterally)
- CSF-NAD
- Blood culture-negative
- Provisional diagnosis: bilat. Pneumonia & malaria

# Case (cont.)

Treatment :

- Inj. Rociphen
- Inj. Klaracid
- Tab. Quinine
- Antipyretics
- Condition deteriorated (within 9 hrs of admission)
- H.R 150-190/min, B.P 80/40
- Digitalized & given inotropic support

# Case (cont.)

Treatment :

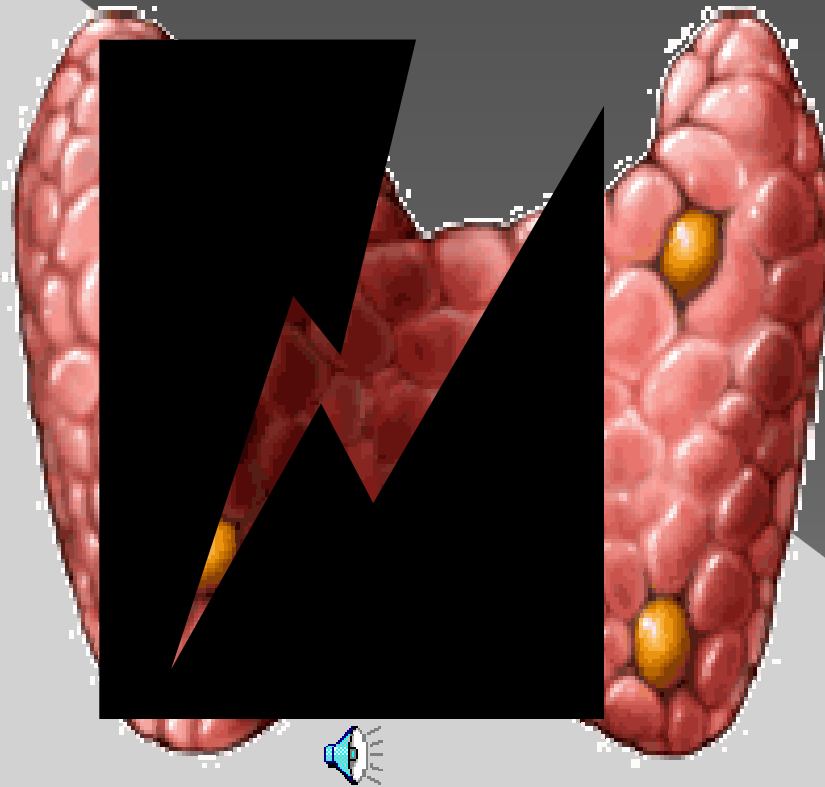
- Patient placed on ventilator
- Thyroid enlarged
- $\uparrow$ T3(8.9nmol/L),  $\uparrow$ T4 (>77pmol/L),  $\downarrow$ TSH(0.1 mIU/L)



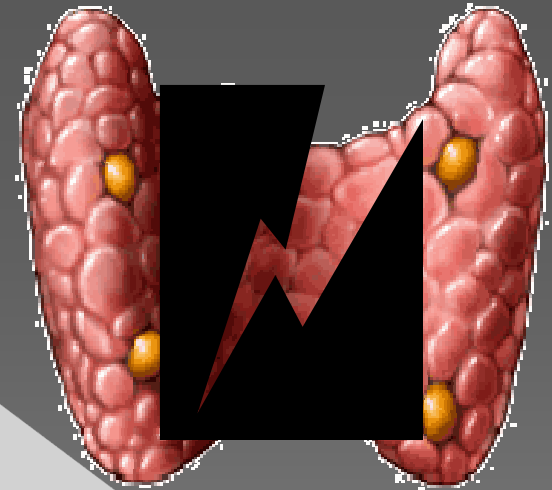
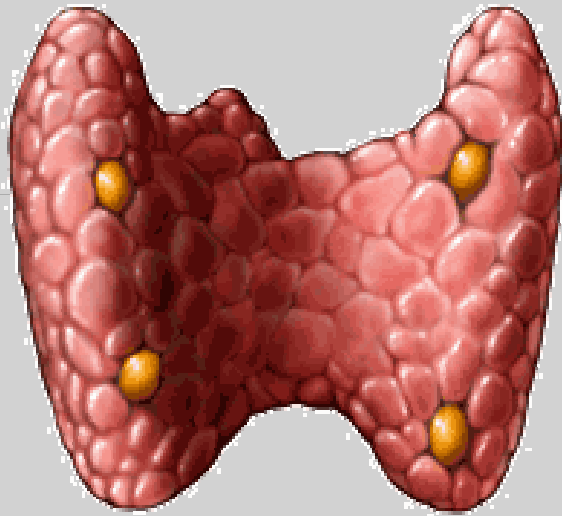
# Patient died( within 24 hrs )

- AUTOPSY FINDINGS :
- Pneumonia both lungs
- Malarial pigment & rings of falciparum in spleen
- Adenomatous goiter with hyperplastic changes- thyroid

# Thyroid Storm



# What is Thyroid Storm?



# What is Thyroid Storm?

## Burch 1993

**Table 2. DIAGNOSTIC CRITERIA FOR THYROID STORM\***

<b>Thermoregulatory Dysfunction</b>		<b>Cardiovascular Dysfunction</b>	
Temp		Tachycardia	
99-99.9	5	90-109	5
100-100.9	10	110-119	10
101-101.9	15	120-129	15
102-102.9	20	130-139	20
103-103.9	25	≥140	25
≥104.0	30		
<b>Central Nervous System Effects</b>		<b>Congestive Heart Failure</b>	
Absent	0	Absent	0
Mild	10	Mild	5
Agitation		Pedal edema	
Moderate		Moderate	10
Delirium	20	Bibasilar rales	
Psychosis		Severe	15
Extreme lethargy		Pulmonary edema	
Severe	30	Antrial Fibrillation	
Seizure		Absent	0
Coma		Present	10
<b>Gastrointestinal-Hepatic Dysfunction</b>		<b>Precipitant History</b>	
Absent	0	Negative	0
Moderate	10	Positive	10
Diarrhea			
Nausea/vomiting			
Abdominal pain			
Severe	20		
Unexplained jaundice			

\*In patients with severe thyrotoxicosis, points are assigned to the highest weighted description applicable in each category and scores totaled. When it is not possible to distinguish the effects of an intercurrent illness from those of the severe thyrotoxicosis per se, points are awarded such as to favor the diagnosis of storm and hence, empiric therapy. A score of 45 or greater is highly suggestive of thyroid storm; a score of 25-44 is suggestive of impending storm, and a score below 25 is unlikely to represent thyroid storm.

# Thyroid Storm

- 1% of all hyperthyroids
- Mortality 30%
- Precipitants
  - > Vascular
  - > Infectious
  - > Trauma
  - > Surgery
  - > Drugs
  - > Obstetrics
  - > Any acute medical illness

# KEY FEATURES of Thyroid Storm

- ◎ FEVER
- ◎ TACHYCARDIA
- ◎ ALTERED LOC
- ◎ Features of underlying Hyperthyroidism
  - > Weight loss, heat intolerance, tremors, anxiety, diarrhea, palpitations, sweating, SOB
  - > Goiter, eye findings, pretibial myxedema

# When should you consider Thyroid Storm and what is the ddx?

- ◉ Infectious: sepsis, meningitis, encephalitis
- ◉ Vascular: ICH, SAH
- ◉ Heat stroke
- ◉ Toxicological
  - > Sympathomimetics, serotonin syndrome, anticholinergic syndrome

# Etiology of Thyroid Storm

Undiagnosed  
Undertreated

(Grave's disease  
or Multinodular  
toxic goiter)

Acute  
Precipitant

Thyroid  
Storm





# INVESTIGATIONS

- Thyroid Testing

- > TSH
- > Free T4

- Look for precipitant

- > ECG
- > CXR
- > Urine
- > Labs
- > Blood cultures
- > Tox screen
- > ? CT head
- > ? CSF

# Thyroid Storm:

## Goals of Management

- ① 1 - Decrease Hormone Synthesis
- ② 2 - Decrease Hormone Release
- ③ 3 - Decrease Adrenergic Symptoms
- ④ 4 - Decrease Peripheral T4 → T3
- ⑤ 5 - Supportive Care

# Decrease Hormonal Synthesis

- Inhibition of thyroid peroxidase
- Propylthiouracil (PTU) or Methimazole (Tapazole)
- **PTU is the drug of choice**
  - > PTU 1000 mg po/ng/pr then 250 q4hr
  - > No iv form
  - > Safe in pregnancy
  - > S/E: rash, SJS, BM suppression, hepatotoxic
  - > Contraindications: previous hepatic failure or agranulocytosis from PTU

# Decrease Hormone Release

- ◉ Iodine or lithium decreases release from hormone stored in colloid cells
- ◉ MUST not be given until 1 hr after PTU
- ◉ Potassium Iodide (SSKI) 5 drops po/ng q6hr
- ◉ Lugol's solution 8 drops q6hr

# Decrease Adrenergic Effects

- Most important maneuver to decrease morbidity/mortality
- Decreases HR, arrhythmias, temp, etc
- **Propranolol 1 – 2 mg iv** q 10 min prn
- Propranolol preferred over metoprolol
- Contraindications to beta-blockers
  - > Reserpine 2.5 – 5.0 mg im q4hr
  - > Guanethidine 20 mg po q6hr
  - > Diltiazem

# Decrease T4 -> T3

- ◉ Corticosteroids
- ◉ PTU and propranolol also have some effect
- ◉ **Dexamethasone 2 – 4 mg iv**
- ◉ Relative or absolute adrenal insufficiency also common

# Supportive Care

- ◉ Fluid rehydration
- ◉ Correct electrolyte abnormalities
- ◉ Control temperature aggressively
  - > Ice, cooling blanket, tylenol, fans
- ◉ Search for precipitant
  - > Think vascular, infectious, trauma, drugs, etc

# Summary of Management

- ⦿ PTU
- ⦿ PROPRANOLOL
- ⦿ POTASSIUM IODIDE
- ⦿ STERIODS
- ⦿ SUPPORTIVE CARE

⦿ P3S2



## Case 2

- 65 yo F previously in good health
- Brought by family to the ED with fatigue, decreased memory
- Symptoms of viral URI x 1 day
- confusion
- PMH: Thyroxine (off treatment for almost 10 months)
- FH: none

# Case 2, continued

- cold intolerance, occasional vomiting; cough

Physical exam

- BP 110/60, P=55, R=10
- Confused
- Puffy face, deep voice
- Delayed reflexes, lid lag

Labs

- Na=125
- TSH=100

## Case 2, continued

- Patient was admitted because of worsening mental status, inability to tolerate oral intake and high TSH
- Started on thyroid hormone replacement
- FT4 later came back undetectable
- Required ventilatory support for 24 hrs
- Awake and conversant after 48 hrs

# Myxedemic Coma

○ Hypothyroidism

○ Myxedemic Coma



# What is Myxedemic Coma?

- Myxedema = swelling of hands, face, feet, periorbital tissues
- Myxedemic coma = decreased LOC associated with severe hypothyroidism
- Myxedemic coma/Myxedema generally used to mean severe hypothyroidism

# Etiology of Myxedemic Coma

Undiagnosed  
Undertreated

(Hashimoto's  
thyroiditis, post  
surgery/ablation  
most common)

Acute  
Precipitant

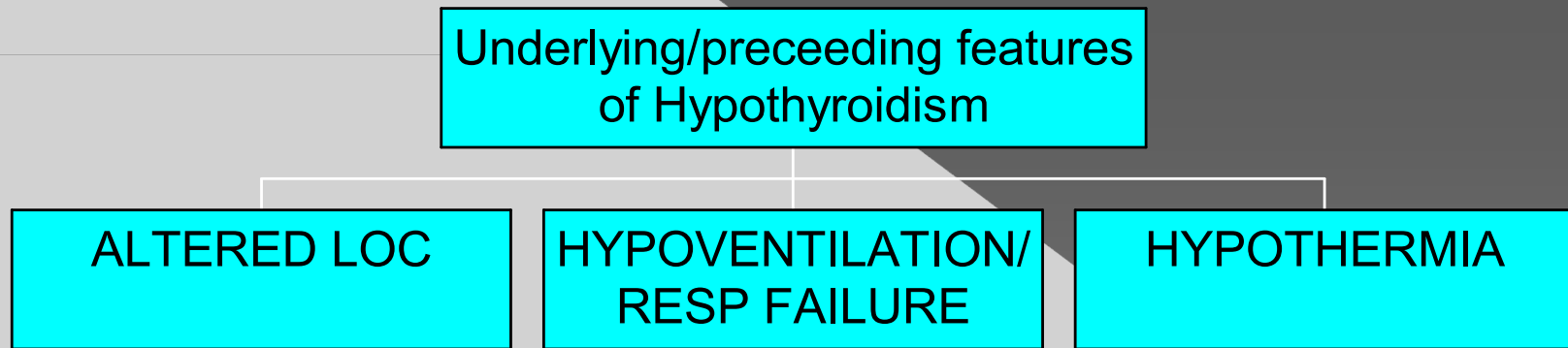
Myxedemic  
Coma



# Myxedemic Coma

- Precipitants of Myxedemic Coma
  - > Infection
  - > Trauma
  - > Vascular: CVA, MI, PE
  - > Noncompliance with Rx
  - > Any acute medical illness
  - > Cold

# KEY FEATURES of Myxedema





# When should Myxedema be considered and what is the ddx?

## ⊙ Altered LOC

- > Structural vs metabolic causes of decreased LOC

## ⊙ Hypoventilatory Resp Failure

- > Narcotics, Benzodiazepines, obesity hypoventilation, brain stem CVA, neuromuscular disorders ( GBS)

## ⊙ Hypothermia

- > Environmental
- > Medical: pituitary or hypothalamic lesion, sepsis

# Myxedemic Coma

## ◉ Investigations

> TSH and Free T4

> Look for ppt

- ECG

- Labs

- Septic work up (CXR/BC/urine/ +/- LP)

- Random cortisol

- CT head

# Myxedemic Coma

## ◉ Investigations

> TSH and Free T4

> Look for ppt

- ECG

- Labs

- Septic work up (CXR/BC/urine/ +/- LP)

- Random cortisol

- CT head

# Myxedemic Coma

## ◉ Investigations

> TSH and Free T4

> Look for ppt

- ECG

- Labs

- Septic work up (CXR/BC/urine/ +/- LP)

- Random cortisol

- CT head

# Management of Myxedemic Coma

- ◉ **Levothyroxine is the cornerstone of Mx**
  - > Levothyroxine 500 ug po/iv (preferred over T3)
  - > Ischemia and arrhythmias possible: monitor
- ◉ **Other**
  - > Intubate/ventilate
  - > Fluids/pressors/thyroxine for hypotension
  - > Thyroxine for hypothermia
  - > Stress Steroids: hydrocortisone 100 mg iv

## Case 3

- 32 yo F with history of prolactinoma resected 2 years ago, brought to ED
- Symptoms of flu
- Decreased mental status (delirious)
- Shaking chills
- Intractable nausea, vomiting x 24 hrs
- Unknown medications

## Case 3, continued

- T=101, BP=80/60 , P=110
- Pale, cold skin, not answering questions
- Tachycardic

### Labs

- Fingertstick glucose = 50
- Na=130, K=4.5

## Case 3, continued

- Patient admitted to ICU
- Hydrocortisone 100 mg q8hrs
- Head CT showed no hemorrhage
- Review of medications – pt on full pituitary replacement medications
- Likely protracted viral GI, leading to no oral steroids, leading to acute adrenal insufficiency



# Adrenal Insufficiency

- Primary = Adrenal disease = Addison's
  - > Idiopathic, autoimmune, infectious, infiltrative, infarction, hemorrhage, cancer, CAH, postop
- Secondary = Pituitary
- Tertiary = Hypothalamus
- Functional = Exogenous steroids

# Etiology of Adrenal Crisis

Underlying  
Adrenal  
Insufficiency  
(Addison's and  
Chronic Steroids)



Acute  
Precipitant



Adrenal  
Crisis

# Acute adrenal crisis?

- Underlying Adrenal insufficiency
  - > Addison's disease
  - > Chronic steroids
- No underlying Adrenal insufficiency
  - > Adrenal infarct or hemorrhage
  - > Pituitary infarct or hemorrhage
- Precipitants of Adrenal crisis
  - > Surgery
  - > Anesthesia
  - > Procedures
  - > Infection
  - > MI/CVA/PE
  - > Alcohol/drugs
  - > Hypothermia

# Adrenal Hemorrhage

- Overwhelming sepsis (Waterhouse-Friderichsen syndrome)
- Trauma or surgery
- Coagulopathy
- Adrenal tumors or infiltrative disorders
- Spontaneous
  - > Eclampsia, post-partum

# Key Features of Adrenal Crisis

- Nonspecific
  - > Nausea, vomiting, abdominal pain
- Shock
  - > Shock not responsive to fluids or pressors
- Laboratory (variable)
  - > Hyponatremia, hyperkalemia, metabolic acidosis
- Known Adrenal insufficiency
- Features of undiagnosed adrenal insufficiency
  - > Weakness, fatigue, weight loss, anorexia, N/V, abdo pain, salt craving, hyperpigmentation

# Features of Adrenal Insufficiency

**PRIMARY  
ADRENAL INSUFF**

Hyperpigmentation  
Hyponatremia  
Hyperkalemia  
Metabolic Acidosis

**SECONDARY /  
TERTIARY ADRENAL  
INSUFFICIENCY**

NO Hyperpigmentation  
Mild hyponatremia  
NO hyperkalemia  
NO met acidosis

# Hyperpigmentation



## **Addison's disease:**



- Note the generalised skin pigmentation (in a Caucasian patient) but especially the deposition in the palmar skin creases, nails and gums.

- She was treated many years ago for pulmonary TB. What are the other causes of this condition?

# Hyperpigmentation





# Adrenal Crisis

- Consider on the differential diagnosis of **SHOCK NYD**

# Investigations

- Adrenal Function

- > Electrolytes
- > Random cortisol
- > ACTH

- Look for Precipitant

- > ECG
- > CXR
- > Labs
- > Urine

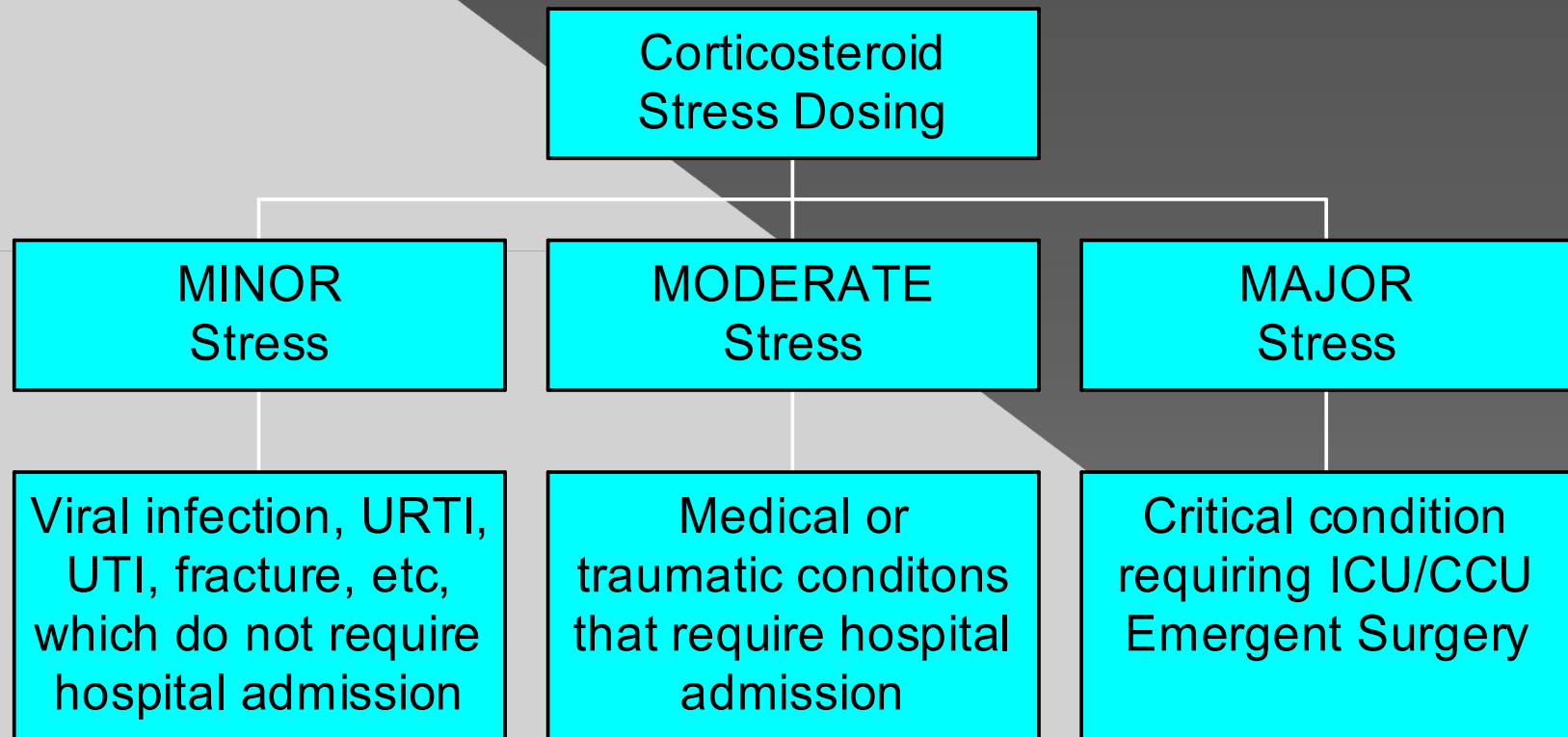
# Management of Adrenal Crisis

- Corticosteroid replacement
  - > **Dexamethasone 4mg iv q6hr** is the drug of choice (doesn't affect ACTH stim test)
  - > Hydrocortisone 100 mg iv is an option
  - > Mineralocorticoid not required in acute phase
- Other
  - > Correct lytes, fluid resuscitation (2-3L)
  - > Glucose for hypoglycemia

# Corticosteroid Stress Dosing: Who? When? How much?

- Who needs stress steroids?
  - > ?Addison's
  - > ?Chronic prednisone
  - > ?Chronic Inhaled Steroids
- When?
- How Much?

# Corticosteroid Stress Dosing



# Corticosteroid Stress Dosing

- MINOR

- > Double chronic steroid dose for duration of illness (only needs iv if can't tolerate po)

- MODERATE

- > Hydrocortisone 50 mg po/iv q8hr

- MAJOR

- > Hydrocortisone 100 mg iv q8hr



The End...