Inpatient Endocrinology

It’s More Than Just Sliding Scale Insulin

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Disclosures

- No relevant commercial relationships to disclose

Learning Objectives

At the end of this lecture, learners should be able to:

- Describe the importance of normoglycemia in hospitalized patients
- Initiate or modify inpatient diabetes regimens to obtain better glucose control
- Identify and treat thyroid storm and myxedema coma
- Recognize and treat adrenal insufficiency

Outline

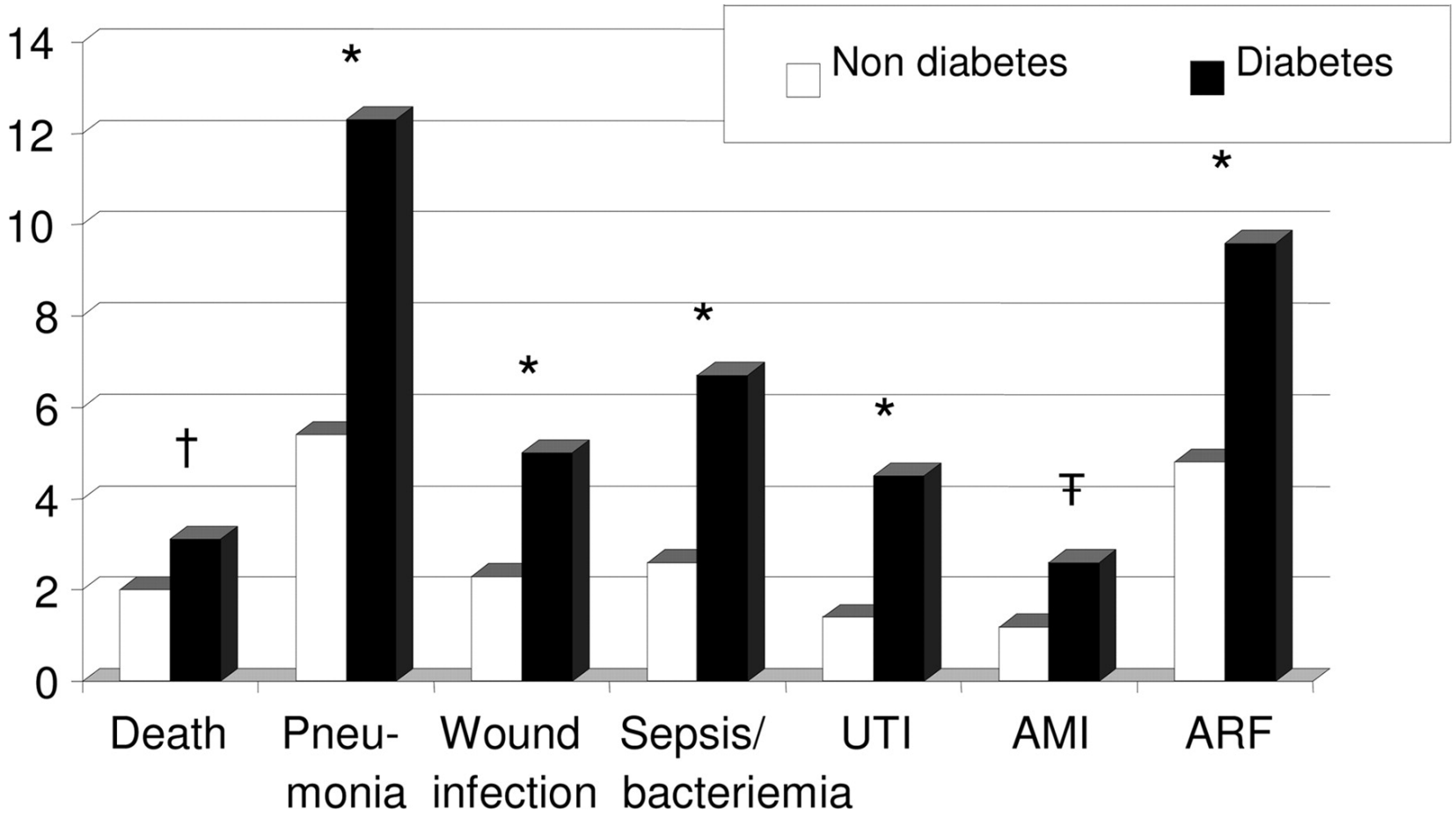
- 1. Diabetes & Hyperglycemia
  - General inpatient management
    - Hyper and hypoglycemia
    - Insulin initiation
  - Extremes of Hyperglycemia--DKA/HHS
  - Discharge planning
- 2. Thyroid disorders
  - Thyroid storm
  - Myxedema coma
- 3. Adrenal insufficiency

Diabetes--Why Do I Need to Know This?

- 34.2 million Americans have diabetes → nearly 10% of population
  - About 25% are undiagnosed
  - Up to 30% of hospitalized patients have diabetes and/or hyperglycemia

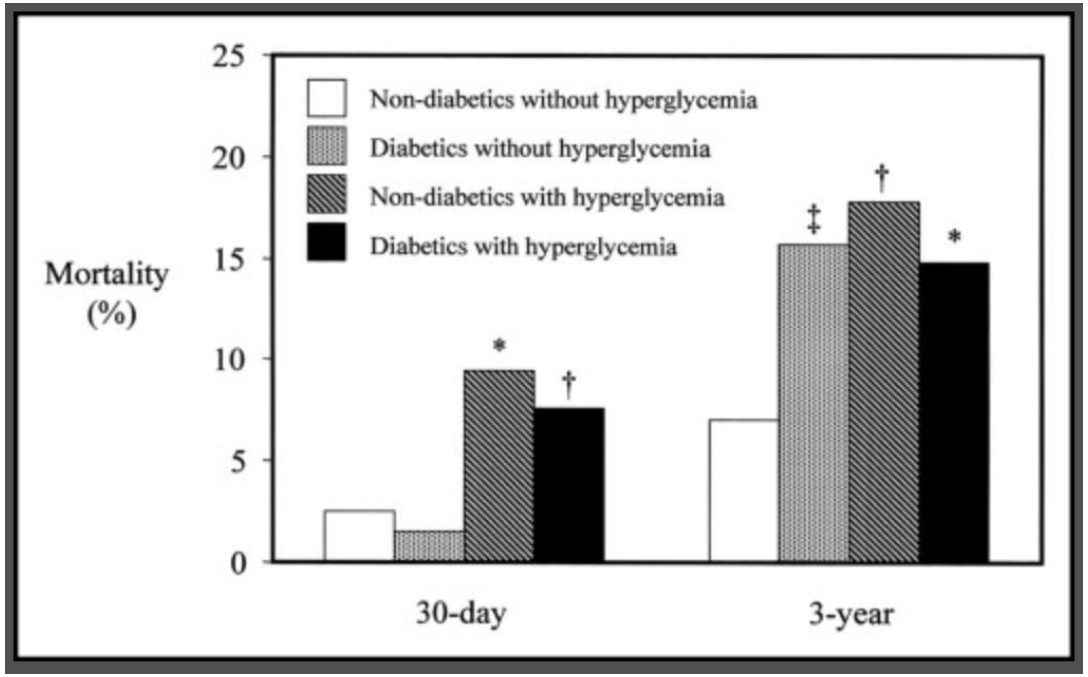
- Three categories of people with hyperglycemia in the hospital:
  - Diabetes that has already been diagnosed
  - Diabetes that has not yet been diagnosed
  - Stress hyperglycemia

Thirty-day mortality and in-hospital complication rates in patients with and without diabetes: blood infection (combined bacteriemia and sepsis); urinary tract infection (UTI), acute myocardial infarction (AMI), and ARF. *P < 0.001; †NS; ‡P < 0.017.

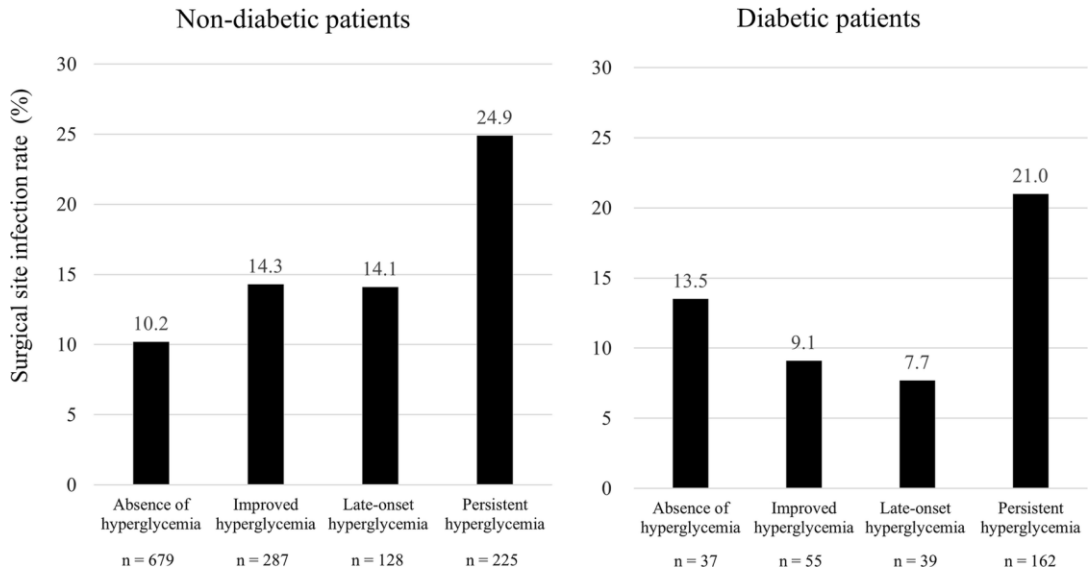


Anna Frisch et al. Dia Care 2010;33:1783-1788

American Diabetes Association.



Ishihara M,. *Am J Cardiol*. 2007;99(12):1674-9.



Yoneda, A.,. *World J Surg* **44,** 1450–1458 (2020).

Question 1--Inpatient Glucose Targets

- What is the target blood glucose range for most non-critically ill hospitalized patients?

    A. 80-110mg/dL

    B. 110-140mg/dL

    C. 140-180mg/dL

    D. 180-210mg/dL

    E. 210-250mg/dL

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ADA
VISEP
DIGAMI
HELP
ENDOCRINE SOCIETY
NICE-SUGAR

NICE-SUGAR TRIAL

Figure 2. Data on Blood Glucose Level, According to Treatment Group.

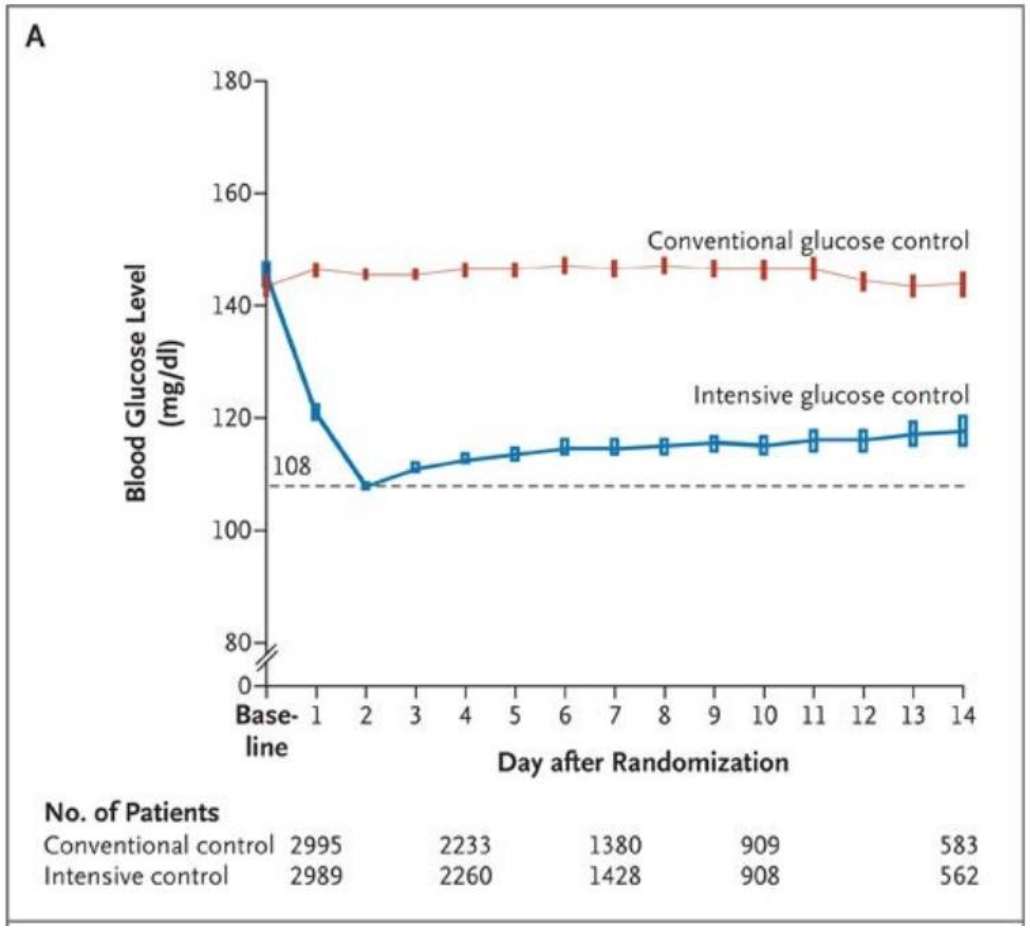
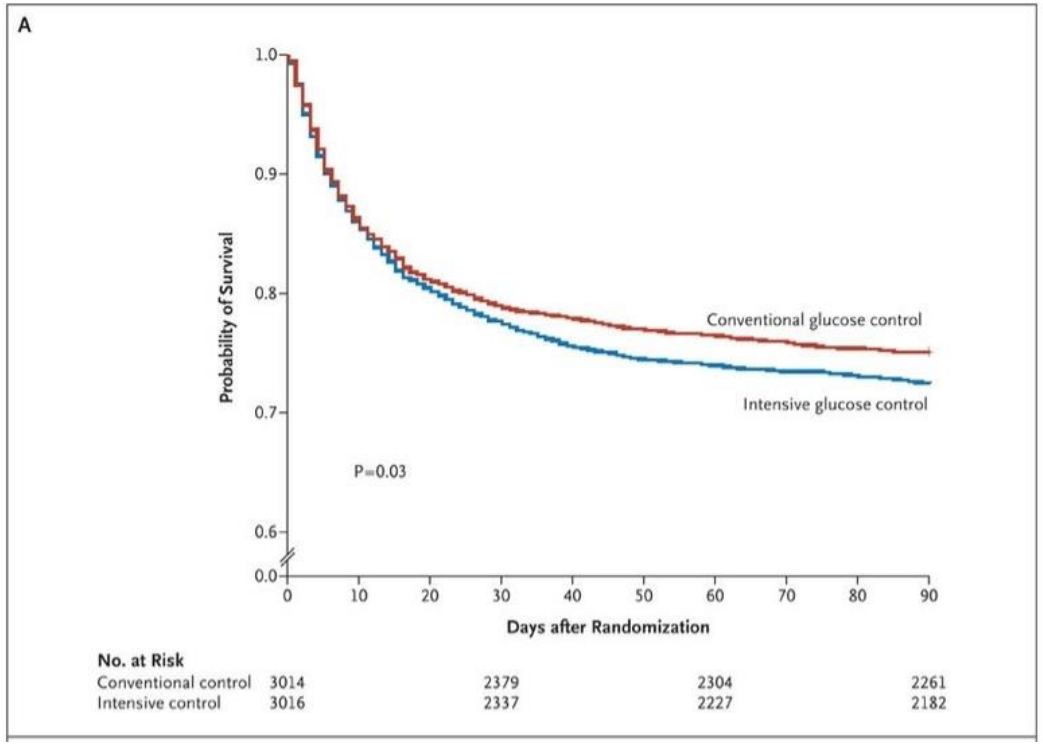


Figure 3. Probability of Survival and Odds Ratios for Death, According to Treatment Group.



Finfer S, et al. N Engl J Med. 2009;360:1283-1297.

General Inpatient Diabetes Management

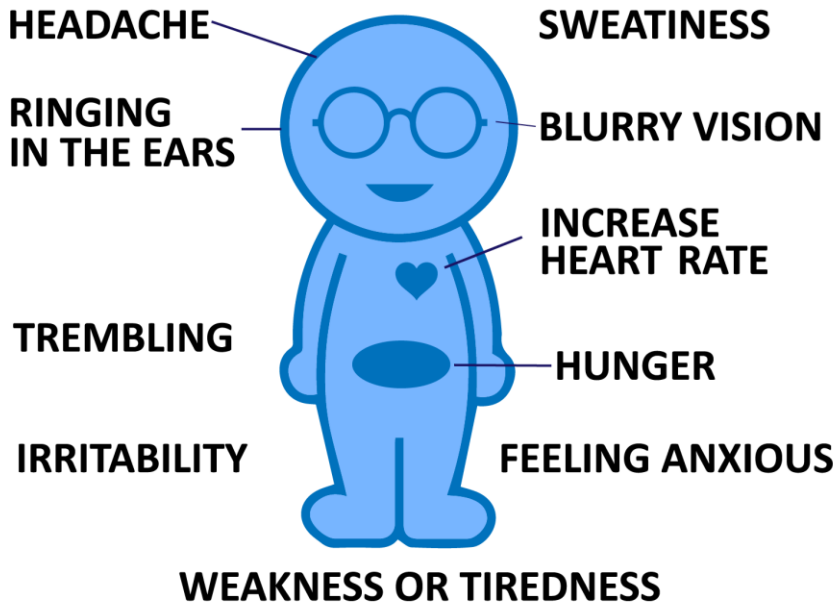
- Glucose target range: 140-180 mg/dL
  - 110-140mg/dL may be appropriate for select patients

American Diabetes Association. Diabetes care in the hospital: *Standards of Medical Care in Diabetes—2021*

Hypoglycemia

- Definitions:
  - Hypoglycemia <70 mg/dL
  - Severe hypoglycemia <40 mg/dL
- Cannot and should not be ignored!!
- One episode of hypoglycemia

  increases risk of another event



- Hypoglycemia is associated with increased morbidity, mortality and increased length of hospital stay

Hulkower RD, Pollack RM, Zonszein J. Understanding hypoglycemia in hospitalized patients. *Diabetes Manag (Lond)*

https://www.qualityandsafety.va.gov/ChoosingWiselyHealthSafetyInitiative/HypoglycemiaSite/Frequently_Asked_Questions_for_Veterans.asp

General Inpatient Diabetes Management

- Glucose target range: 140-180 mg/dL
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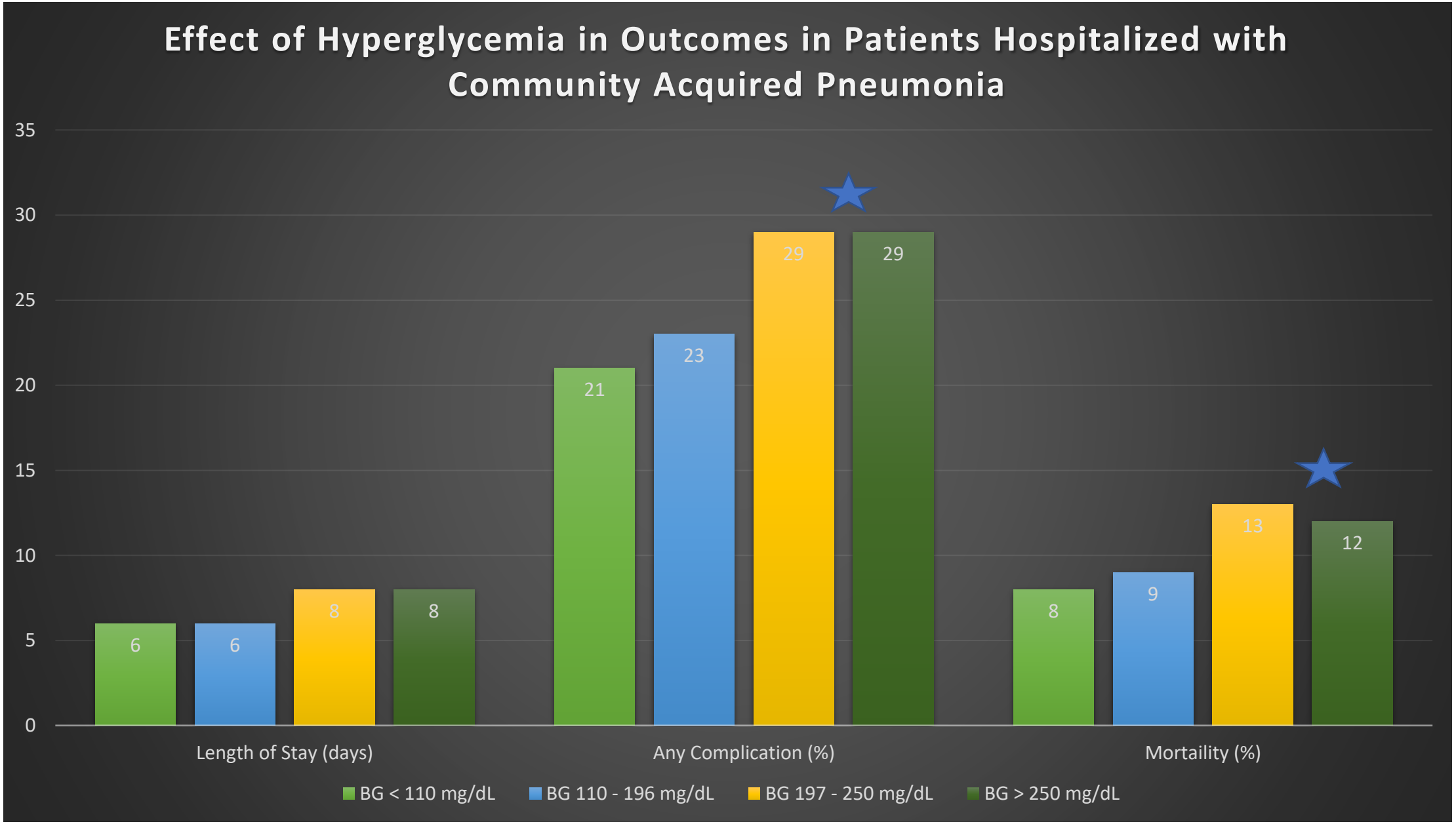
American Diabetes Association. Diabetes care in the hospital: *Standards of Medical Care in Diabetes—2021*

Hyperglycemia



Modified from McAlister FA,.The relation between hyperglycemia and outcomes in 2,471 patients admitted to the hospital with community-acquired pneumonia. *Diabetes Care,* 2005

General Inpatient Diabetes Management

- Glucose target range: 140-180 mg/dL
  - 110-140mg/dL may be appropriate for select patients
- Hypoglycemia cannot be ignored
- Hyperglycemia should not be ignored either
- HgbA1c should be obtained on anyone with diagnosis of diabetes OR admission blood sugar > 140mg/dL if there is not one available from the past 3 months

American Diabetes Association. Diabetes care in the hospital: *Standards of Medical Care in Diabetes—2021*

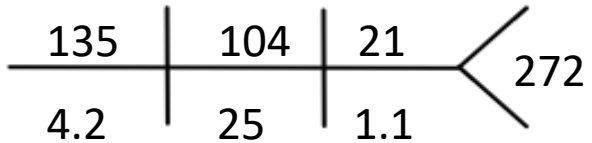
Mr. A

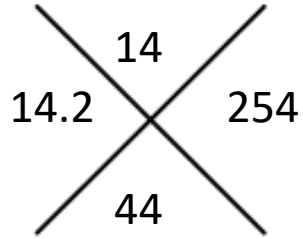
- Mr. A is a 57 yo man with CAD, HTN, HFpEF, obesity and DM2 who presented to the ED with progressive right lower extremity erythema and edema. He cut his leg four days prior to admission and has noted drainage from the wound. Initially, there was only mild erythema right by the wound but now, it has been spreading. It has progressed despite outpatient antibiotics. He is admitted to your service for IV antibiotics.

Medications:

- ASA 81 mg
- Lisinopril 40mg
- Atorvastatin 40mg
- **Metformin 1000mg BID**
- **Empagliflozin 25mg**

Labs:





Question 2– Inpatient Glucose Management

- Which of the following regimens would you order for Mr. A's glucose control?
  - A. Continue home metformin, SGLT2 inhibitor
  - B. Hold home medication, initiate sliding scale insulin
  - C. Hold home medication, initiate basal insulin only
  - D. Hold home medication, initiate basal/bolus insulin + correctional sliding scale
  - E. Hold home medication, do not order anything yet and just monitor

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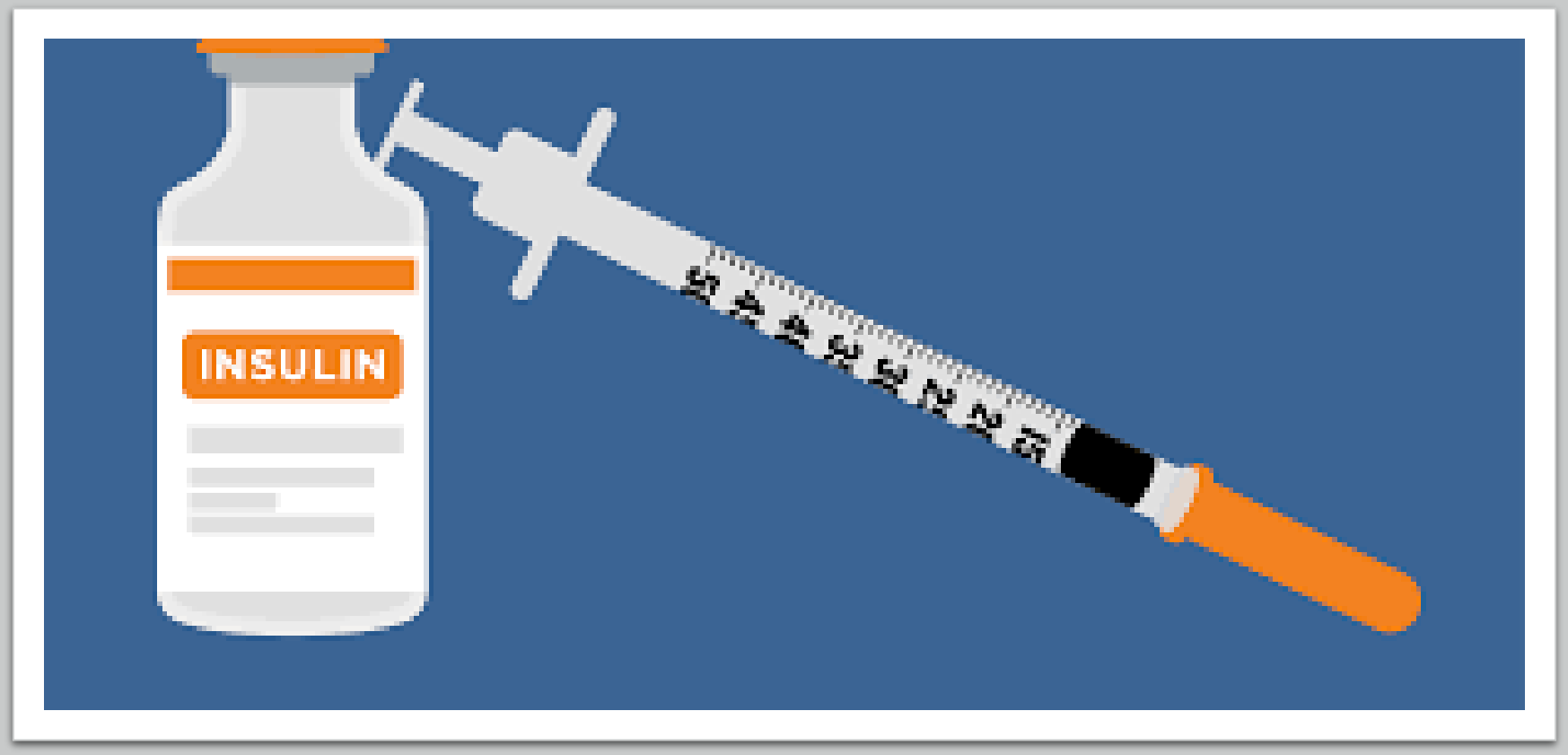
Non-Insulin Agents: Why They Are A Bad Idea in the Inpatient Setting

Metformin → MALA, fluctuating renal, hepatic function
Sulfonylureas → hypoglycemia esp with changes in renal function
TZD → slow onset, fluid retention; contraindicated in heart failure or hepatic dysfunction
SGLT2i → euglycemic DKA, hypovolemia, GU infections
GLP-1 agonist → GI side effects
DPP-4 inhibitors → ?



Initiation of Insulin

Weight based approach

Calculate

Calculate Weight Based Dosing

- Insulin naïve:
- 0.3 u/kg/day – 0.5 u/kg/day

Adjust

Adjust Dosing Based on Clinical Scenario

- Lower: Elderly, renal insufficiency, hepatic insufficiency, pancreatic insufficiency
- Higher: Insulin resistance (A1c > 10), high dose steroids

Divide

Divide between Basal and Bolus

- ~40-50% basal
- ~50-60% bolus

Add

Add Sliding Scale

- Low (1:50 > 151)
- Moderate (2:50 > 151)
- High (custom)

Mr. A Revisited

- You have opted to put Mr. A on basal-bolus insulin
- He has normal renal and liver function
- His weight is 100kg

Question 3—Estimating Insulin Needs

- What would be a reasonable starting basal/bolus regimen for Mr. A based on his weight and clinical status?
  - A: 5u basal insulin, 5u short acting TID with meals + SSI
  - B. 10u basal insulin, 3u short acting TID with meals + SSI
  - C. 10u basal insulin, 10u short acting TID with meals + SSI
  - D. 25u basal insulin, 8u short acting TID with meals + SSI
  - E. 25u basal insulin, 25u short acting TID with meals + SSI

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Question 3—Estimating Insulin Needs

Weight 100kg. Normal renal function. 57 yo

0.5u/kg/day = 0.5x100 = 50u per day

- ~25 units basal
- ~25 units bolus total/3 meals → ~8 units TIDcc

0.4u/kg/day = 0.4x100 = 40u per day

- ~20 units basal
- ~20 units bolus total/3 meals → ~7units TIDcc

0.3u/kg/day = 0.3x100 = 30u per day

- ~15 units basal
- ~15 units bolus/3 meals → ~5 units TIDcc

Question 4—Estimating Insulin Needs

- Ms. T is a 78 yo woman with DM2 (A1c 8.1 last month) who presents with a heart failure exacerbation. She is on metformin and SGLT2 inhibitor as an outpatient.
- Labs on arrival notable for glucose of 234, Cr of 2.4 (baseline 0.8)
- Weight: 75kg
- What would be a reasonable starting basal/bolus regimen for Ms. T based on her weight and clinical status?
  - A: 5u basal insulin, 5u short acting TID with meals + SSI
  - B. 11u basal insulin, 4u short acting TID with meals + SSI
  - C. 18u basal insulin, 6u short acting TID with meals + SSI
  - D. 18u basal insulin, 18u short acting TID with meals + SSI

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Question 4—Estimating Insulin Needs

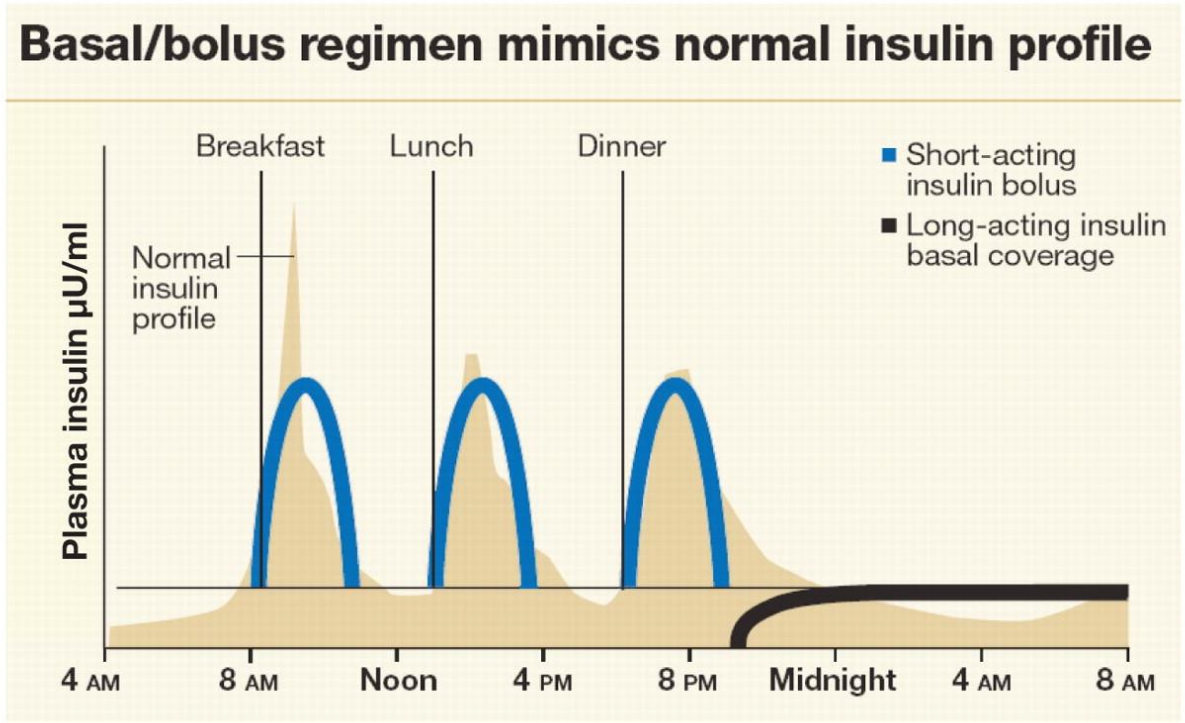
- Weight 75kg. AKI. 78 yo
  - Gets a “point” for acute kidney injury and her age so you will adjust her starting dose down by 0.1u/kg/day for EACH of these
  - So, start with 0.5u/kg/day and subtract 0.2u → 0.3u/kg/day
  - 0.3u/kg/day = 0.3x75 = 22.5u per day
    - ~11 units basal
    - ~11 units bolus total/3 meals → ~ 4 units TID cc

Further Adjustments: 10-20-30 "Rule"

- For glucose consistently in the 180s-200 → increase total daily insulin by 10%
- For glucose consistently in the 200s → increase total daily insulin by 20%
- For glucose consistently in the 300s → increase total daily insulin by 30%

Other Adjustments

- If AM fasting sugar is elevated, increase basal dose
  - Be sure they are actually fasting!
- If BG is elevated consistently at the same time point, increase the preceding bolus
- Hypoglycemia? Do the opposite!



American Diabetes Association.

Vasudev Magaji, and Jann M. Johnston Clin Diabetes 2011;29:3-9

Sliding Scale Insulin

- Historically, use of sliding scale insulin only in patients with hyperglycemia
- BUT, are there

ORIGINAL RESEARCH

Inpatient Glycemic Control With Sliding Scale Insulin in Noncritical Patients With Type 2 Diabetes: Who Can Slide?

J. Hosp. Med. 2021 August;16(8):462-468. Published Online Only July 21, 2021 | 10.12788/jhm.3654

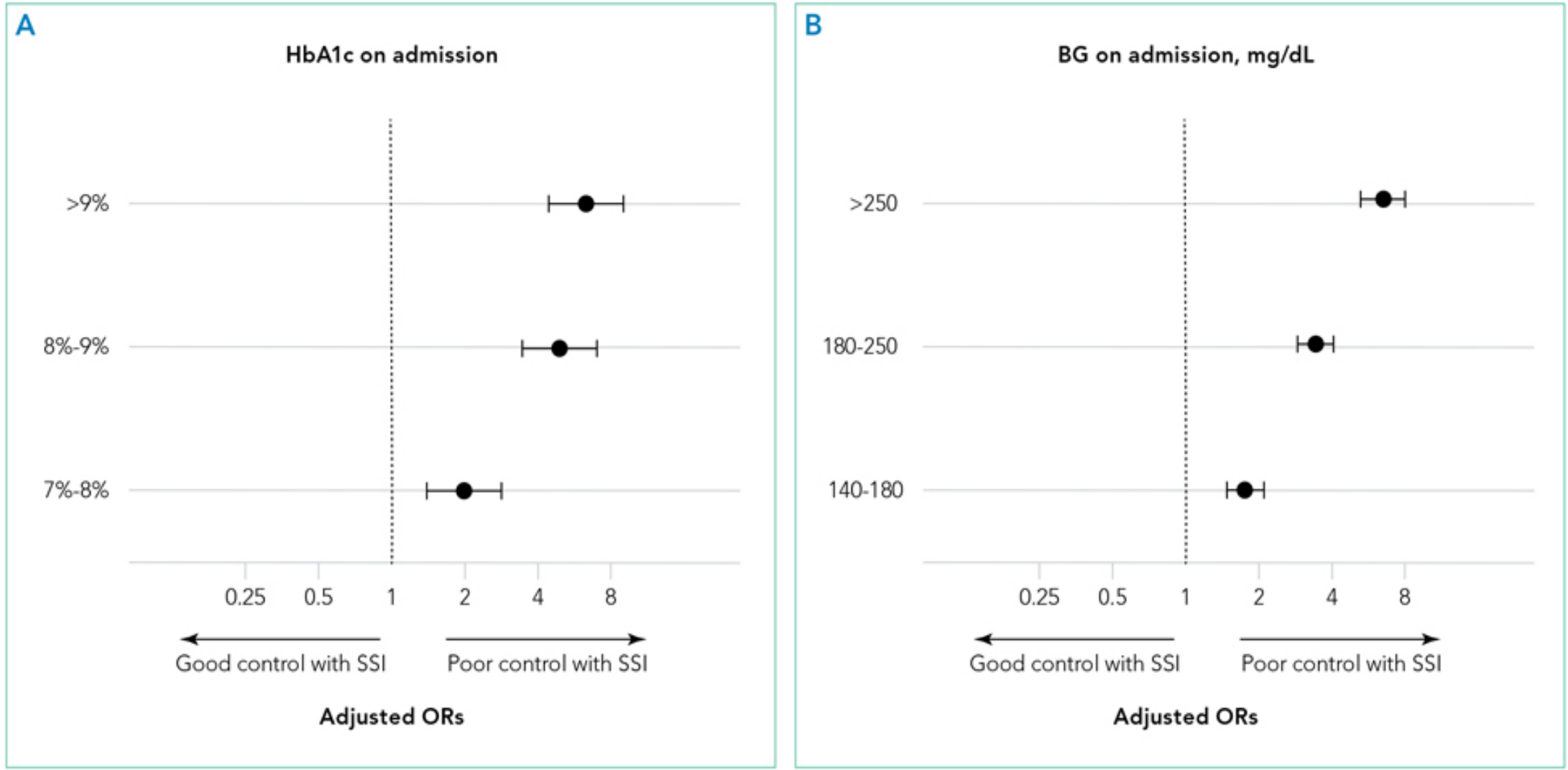


FIG. Results of Logistic Regression Analysis. Odds of poor glycemic control (mean hospital blood glucose [BG] >180 mg/dL) with sliding scale insulin (SSI) alone according to (A) hemoglobin A1c (HbA1c) on admission (reference group: HbA1c <7%) and (B) BG on admission (reference group: BG <140 mg/dL). Models adjusted by age, gender, body mass index, race, hospital setting (medicine or surgery), and Charlson Comorbidity Index.

Migdal, Inpatient Glycemic Control With Sliding Scale Insulin in Noncritical Patients With Type 2 Diabetes: Who Can Slide?. *J. Hosp. Med* 2021;8;462-468

Sliding Scale Insulin

- If admission BG < 180mg/dL, SSI alone may achieve target glycemic control for non-ICU patients
- For patients with admission BG > 180mg/dL, SSI alone does not result in optimal glycemic control
- → can be reasonable option in select patients BUT overutilized
- If admission BG > 180mg/dL, consider basal-bolus (or basal + SSI) instead

Migdal, Inpatient Glycemic Control With Sliding Scale Insulin in Noncritical Patients With Type 2 Diabetes: Who Can Slide?. *J. Hosp. Med* 2021;8;462-468

Perioperative Glucose Management

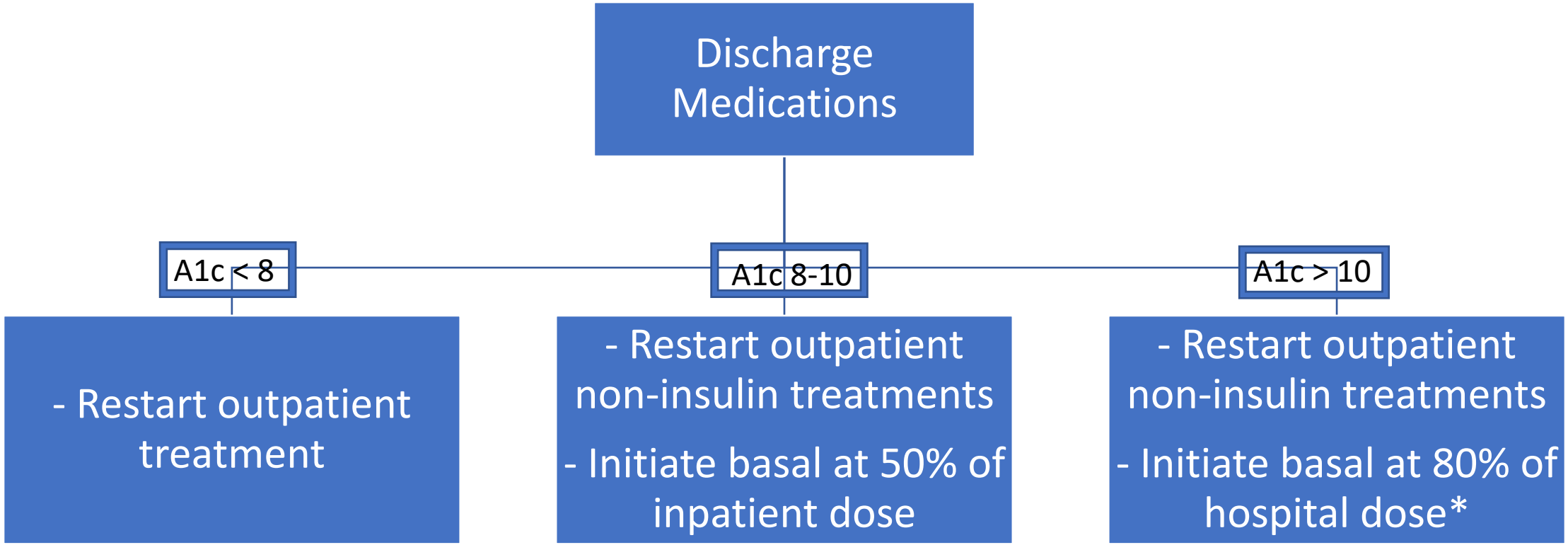
- Glucose target range in perioperative period: 80-180mg/dL
- HOLD SGLT2 inhibitors three to four days before surgery
- HOLD metformin, other orals on day of surgery
- If using NPH, give HALF normal dose
- Reduce long-acting insulin by ~25% the night before and/or morning of surgery
- Basal-bolus insulin dosing rather than reactive sliding scale coverage generally preferred in perioperative period

American Diabetes Association. Diabetes care in the hospital: *Standards of Medical Care in Diabetes—2021*

Common Inpatient Pitfalls

- Basal insulin held in a Type 1 diabetic.
- Sliding scale insulin ordered as only insulin in persistently hyperglycemic patient
- Rapid-acting insulin re-dosed <4 hours after previous dose
- Basal insulin held in evening when BG is low or normal. Treat the low, and double check/adjust the basal insulin dose, but still give their long-acting
- No changes in regimen in response to hypoglycemia

Discharge Planning



Transition of Care

- Diabetic education
- Insulin teaching!
- Glucometer teaching
- Insulin tupplies
- Communication re: changes to regimen
  - To patient
  - To PCP
  - To endocrinology
- Follow up appointment with PCP

Quick Summary of Inpatient Diabetes Management

- Hold non-insulin medication
- If BG is > 140, then they need insulin!
- SSI only is really only suitable if admission BG < 180
- Use weight-based dosing for insulin initiation (other than SSI), adjusting for age, clinical status
- Make adjustments for hypoglycemia and hyperglycemia
- Make changes on discharge based on A1c, clinical status. Communicate changes clearly to patient and ensure they have needed supplies

Question 5—Management of DKA

- Ms. M is a 23 yo woman with DM1. She presents to ED with several days of dysuria, nausea and vomiting. Because she was not eating much, she had not been taking any of her insulin.
- ON exam, she is lethargic but protecting her airway, tachycardic
- Labs on arrival are notable for the following:
- Na 132, K 3.1, CO2 8, Cl 93, BUN 32, Cr 1.6 (bl 0.7), glucose 437; pH 7.05
- Urine: + ketones, TNTC WBCs, + leuk esterase, + nitrites

Question 5—Management of DKA

- What your first steps be in treatment of Ms. M's DKA?
  - A. IV fluid and phosphate repletion
  - B. IV fluid and IV insulin
  - C. IV fluid and potassium
  - D. IV fluid, insulin and bicarbonate
  - E. IV fluid, insulin and phosphate

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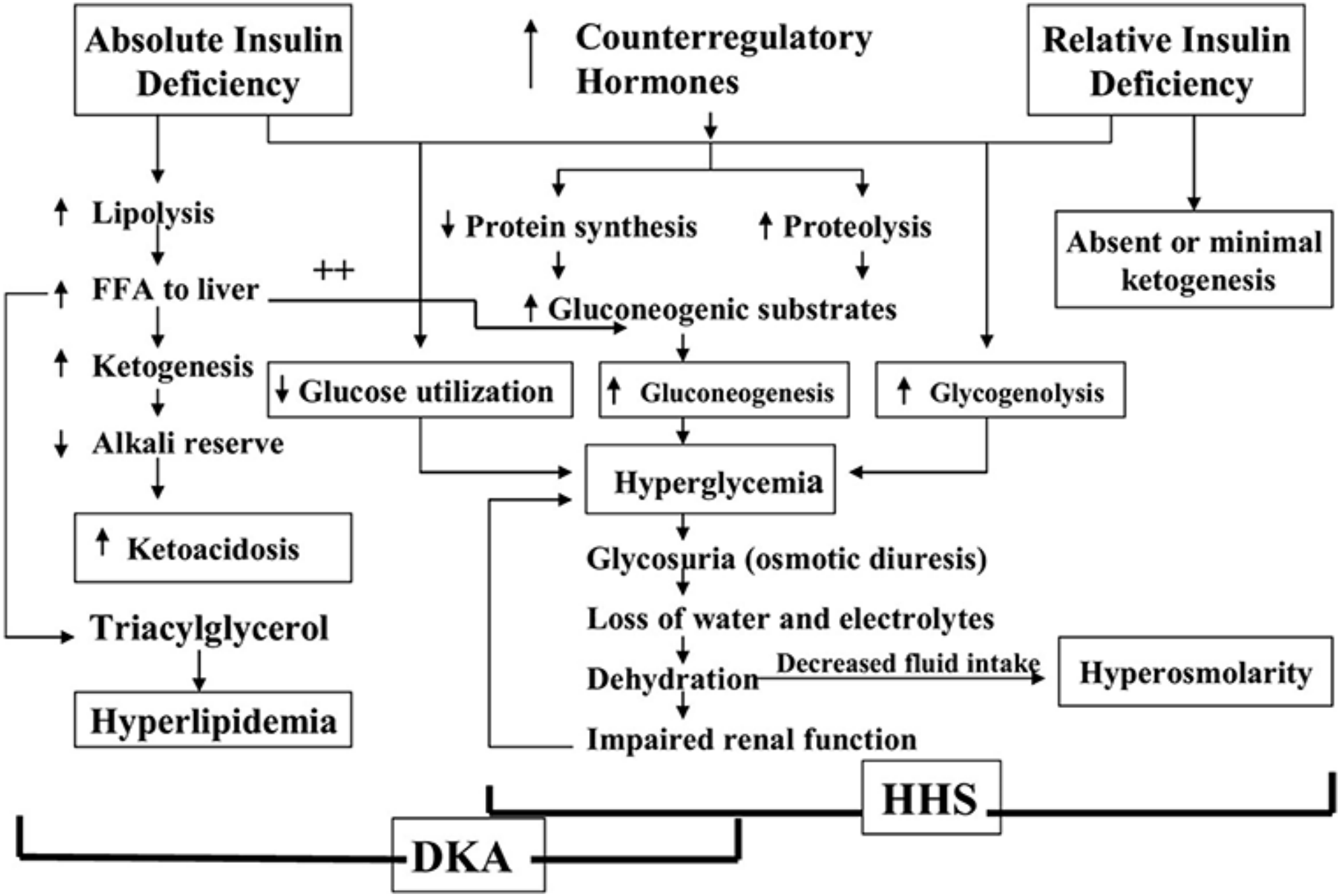
Criteria for Hyperglycemic Emergencies

- Diabetic Ketoacidosis (**DKA**)
  - **D**iabetic: BG > 250 mg/dL
  - **K**eto: ketonemia/uria
  - **A**cidosis: pH < 7.3 OR serum bicarb < 18mEq/L
- Hyperosmolar Hyperglycemic State **(HHS)**
  - **H**yperosmolar: effective serum osm > 320 mOsm/kg
  - **H**yperglycemic: BG > 600 mg/dL
  - pH > 7.30, bicarb > 18mEq/L
  - Mild ketonuria may be present


Absolute Insulin Deficiency
Counterregulatory Hormones
Relative Insulin Deficiency
Lipolysis
Protein synthesis
Proteolysis
Absent or minimal ketogenesis
++
FFA to liver
Gluconeogenic substrates
Ketogenesis
Glucose utilization
Gluconeogenesis
Glycogenolysis
Alkali reserve
Hyperglycemia
Ketoacidosis
Glycosuria (osmotic diuresis)
Triacylglycerol
Loss of water and electrolytes
Decreased fluid intake
Dehydration
Hyperosmolarity
Hyperlipidemia
Impaired renal function
HHS
DKA

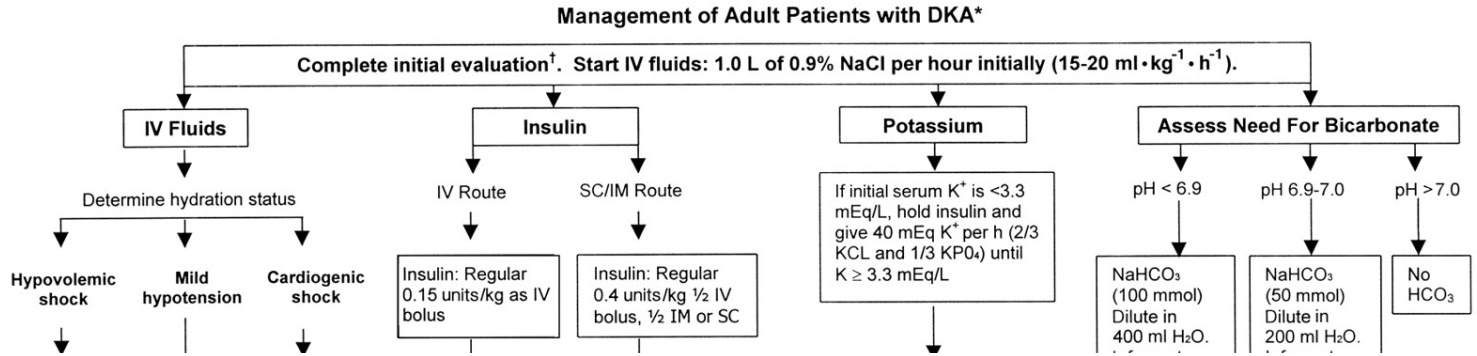
Treatment of DKA and HHS

FLUIDS

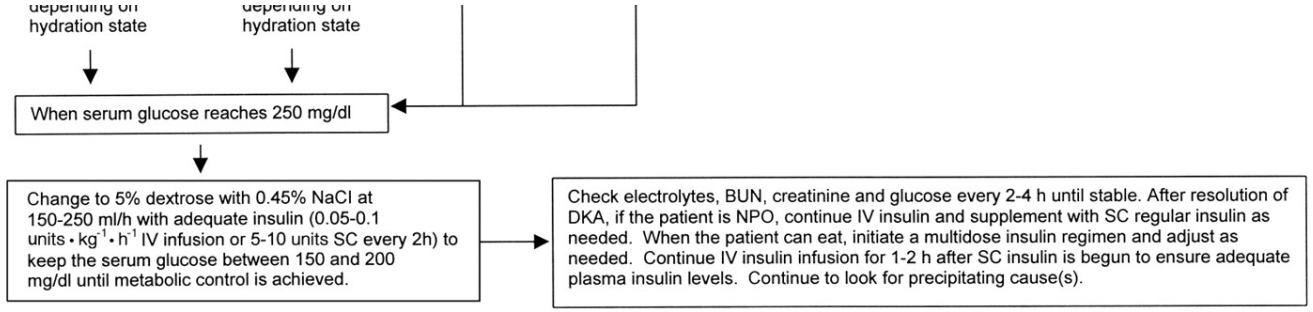
ELECTROLYTES

INSULIN

Protocol for the management of adult patients with DKA. *DKA diagnostic criteria: blood glucose >250 mg/dl, arterial pH <7.3, bicarbonate <15 mEq/l, and moderate ketonuria or ketonemia.



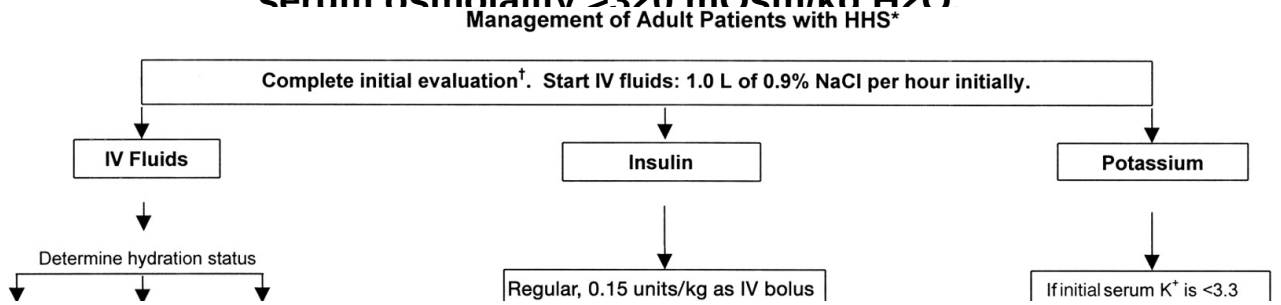
If using drip, transition to subq when the **GAP HAS CLOSED**--not when the glucose has normalized.



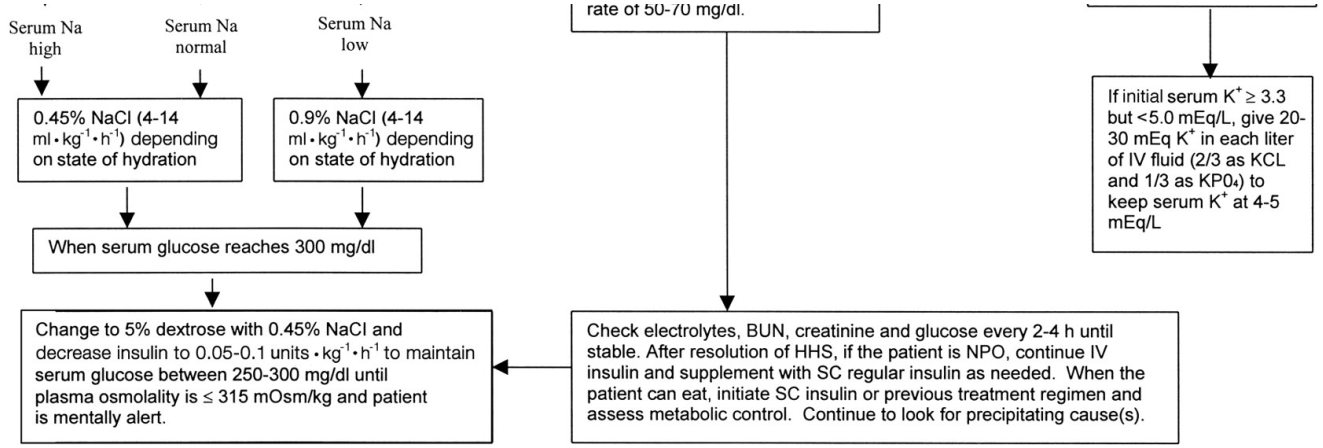
American Diabetes Association Dia Care 2004;27:s94-s102

American Diabetes Association.

Protocol for the management of adult patients with HHS. *Diagnostic criteria: blood glucose >600 mg/dl, arterial pH >7.3, bicarbonate >15 mEq/l, mild ketonuria or ketonemia, and effective serum osmolality >320 mOsm/kg H2O



Goal is **NOT** normoglycemia in acute setting. Goal is improvement in plasma osmolality and patient mental status



American Diabetes Association Dia Care 2004;27:s94-s102

American Diabetes Association.

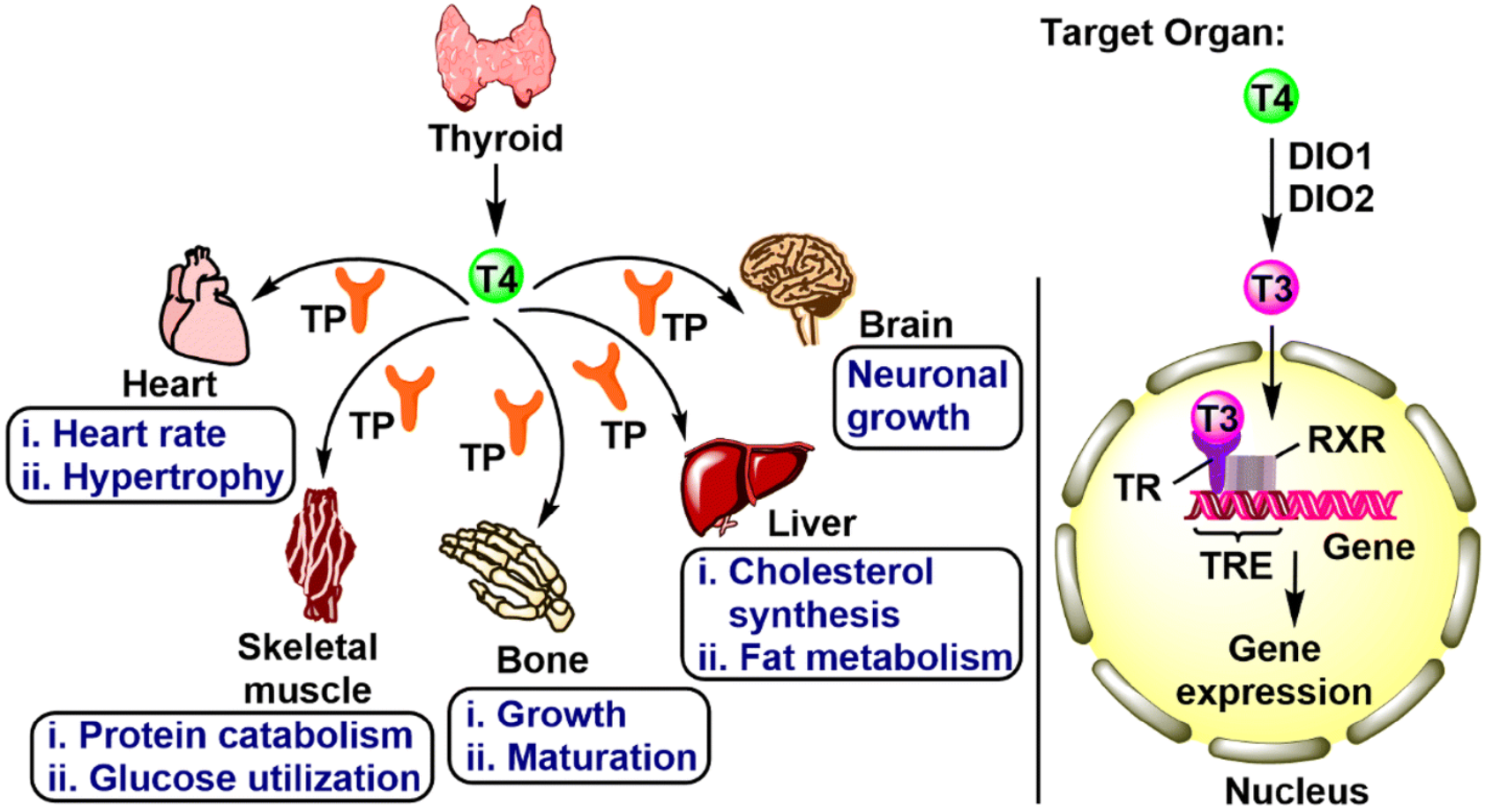
Treatment of DKA and HHS

FLUIDS

ELECTROLYTES

INSULIN

The Thyroid Gland



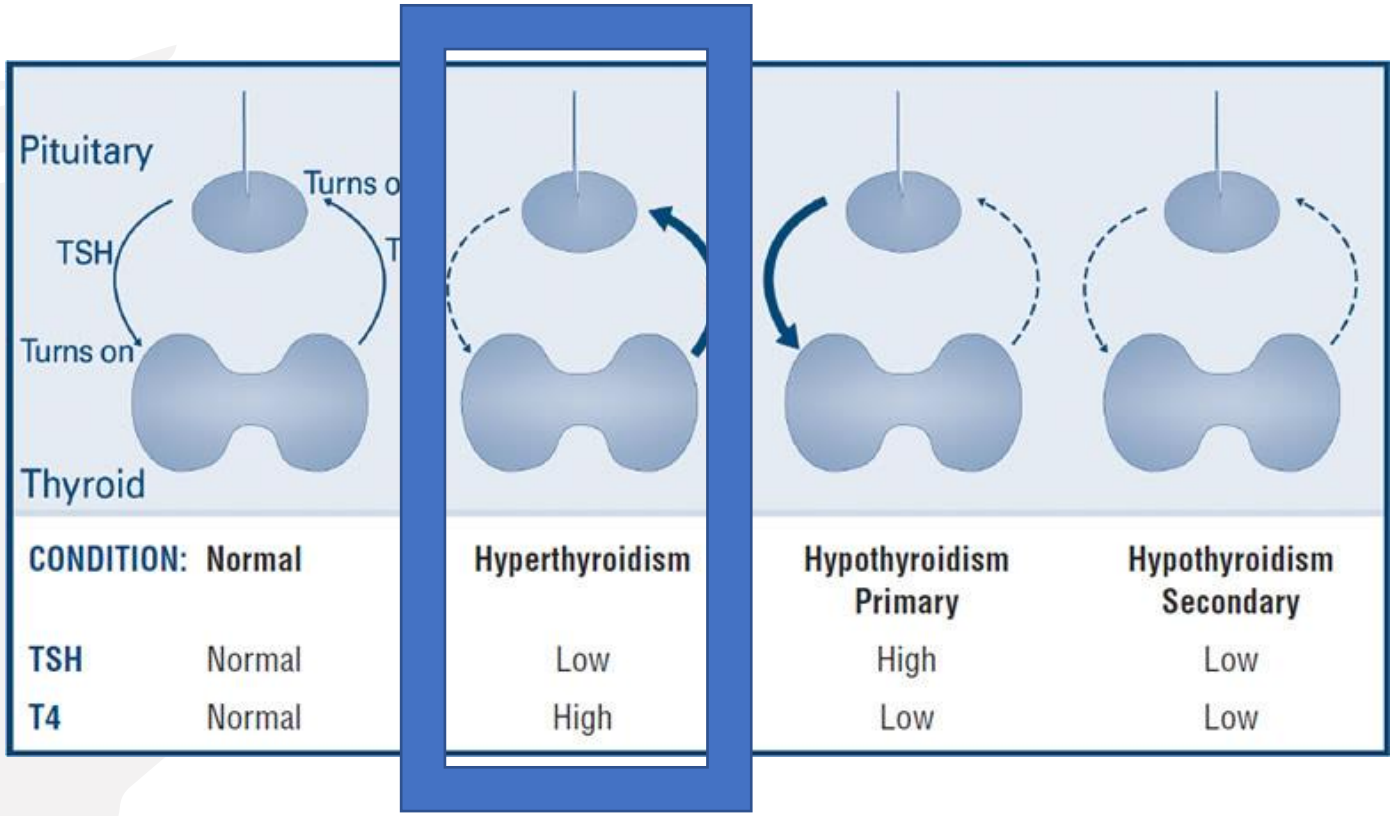
Mondal. Halogen Bonding in the Molecular Recognition of Thyroid Hormones and Their Metabolites by Transport Proteins and Thyroid Hormone Receptors. *J Indian Inst Sci* **100,2020**

Thyroid Storm

- Severe clinical manifestations of thyrotoxicosis
- Usually in patients with hyperthyroidism plus acute event (surgery, infection, iodine load, amiodarone use, childbirth, DKA, MI, medication non-adherence)
- Common features: hyperpyrexia (104-106F), altered mental status (agitation, psychosis, delirium), tachycardia and arrythmias, nausea, vomiting, tremulousness
- On exam: altered, ophthalmopathy (if Graves' disease), lid lag, tremor, warm, moist skin

Work-up of Thyroid Storm

- TSH, T4, T3
- CMP
- CBC
- Search for precipitating cause:
  - UA, CXR, Blood cultures
- EKG, consider trop



Burch-Wartofsky Point Scale

Point Scale for the Diagnosis of Thyroid Storm

Thermoregulatory dysfunction

Temperature (8F)	
99.0–99.9 5	0
100.0–100.9	10
101.0–101.9	15
102.0–102.9	20
103.0–103.9	25
>104.0	30

Cardiovascular

Tachycardia (beats per minute)	
100–109	5
110–119	10
120–129	15
130–139	20
>140	25

Atrial fibrillation

Absent	0
Present	10

Congestive heart failure

Absent	0
Mild	5
Moderate	10
Severe	20

Gastrointestinal-hepatic dysfunction

Manifestation	
Absent	0
Moderate (diarrhea, abdominal pain, nausea/vomiting)	10
Severe (jaundice)	20

Central nervous system disturbance

Manifestation	
Absent	0
Mild (agitation)	10
Moderate (delirium, psychosis, extreme lethargy)	20
Severe (seizure, coma)	30

Precipitant history

Status	
Positive	0
Negative	10

Scores totaled

>45 Thyroid storm

25–44 Impending storm

<25 Storm unlikely

De Groot LJThyroid Storm. [Updated 2018 Dec 17]. In: Feingold KR, Anawalt B, Boyce A, et al., editors. Endotext [Internet]. 2000-.

Treatment of Thyroid Storm

The 5 B's

- **B**lock synthesis (antithyroid medication- methimazole, PTU)
- **B**lock release (iodine)
- **B**lock conversion of T4 into T3 (PTU, corticosteroid)
- **B**eta blocker
- **B**lock enterohepatic circulation (cholestyramine)

Carroll R, Matfin G. Endocrine and metabolic emergencies: thyroid storm. *Ther Adv Endocrinol Metab*. 2010

Treatment of Thyroid Storm

	Oral Dose	Rectal Dose	Intravenous Dose
Propranolol	60 - 120mg q6hrs	---	1mg (Test Dose), then 1 - 2mg q15min until HR 100BPM*
Esmolol	---	---	50 - 100mcg/kg/min
Propylthiouracil (PTU)	Loading Dose 500 - 1000mg, then 250mg q4hr	400 - 600mg q6hr	---
Methimazole	20mg q6hrs	20 - 40mg q6 - 8hrs	10 - 30mg q6 - 8hrs
Saturated Solution of Potassium Iodide (SSKI)	5 drops q6hr	250 - 500mg q6hr	---
Lugol's Solution	8 drops q6hrs	5 - 10 drops q6hrs	---
Sodium Iodide	---	---	0.5g q12hrs
Lithium	300mg q6 - 8hrs	---	---
Dexamethasone	---	---	4mg IV q6hr
Hydrocortisone	---	---	300mg IV, then 100mg q8hrs

*Once HR is 100BPM may start propranolol drip at whatever dose it took to get IV load control (Max Dose = 3 - 5mg/hr)

REBEL REVIEWS

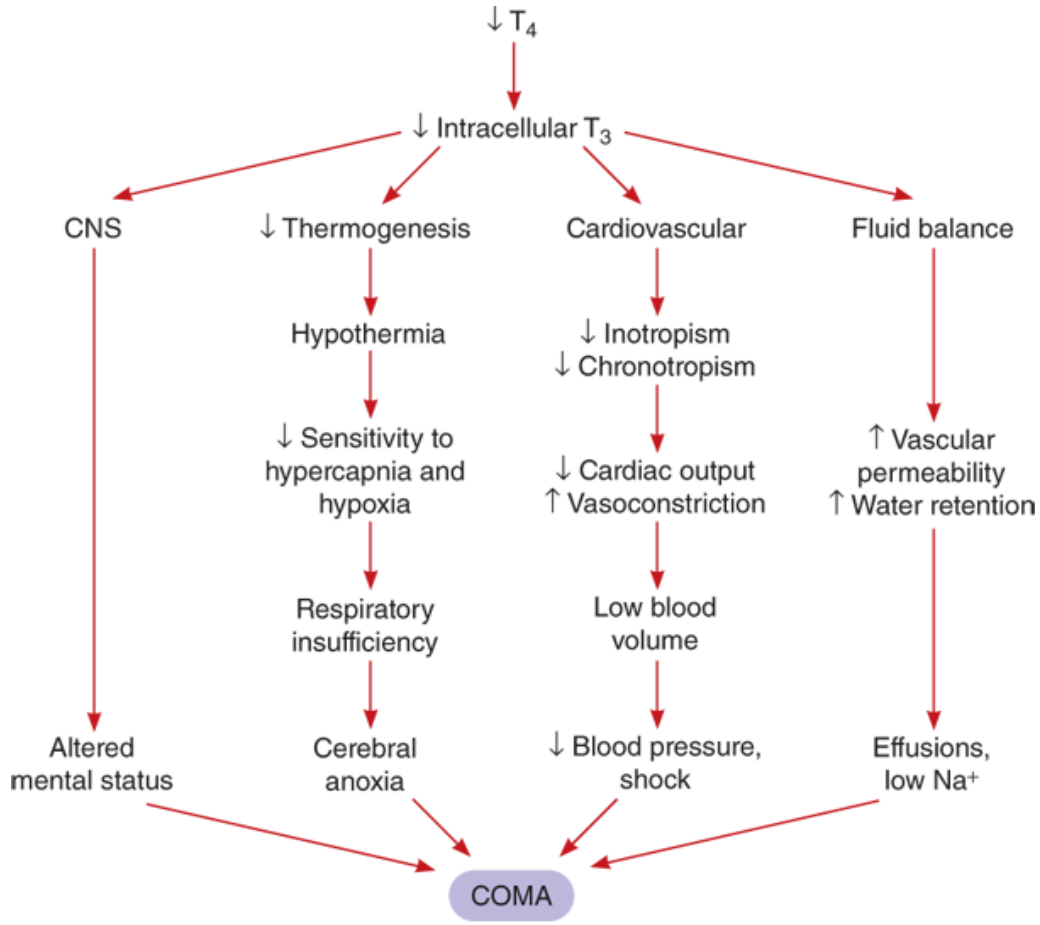
https://rebelem.com/wp-content/uploads/2019/03/Treatment-of-Thyroid-Storm.png

Myxedema Coma—aka Decompensated Hypothyroidism

- Myxedema coma: severe hypothyroidism resulting in altered mental status (lethargy, somnolence, confusion), hypothermia
  - Myxedema **coma** is a misnomer
- Common features: hypothermia, hypotension, bradycardia, hyponatremia, hypoglycemia
- On exam: altered, generalized puffiness of face, macroglossia, ptosis, periorbital edema, coarse/sparse hair, nonpitting edema of the lower extremities, delayed deep tendon reflexes
- Look for this in patients with history of hypothyroidism, thyroidectomy, radioactive iodine treatment

Wall CR. Myxedema coma: diagnosis and treatment. Am Fam Physician. 2000

Pathogenesis of Myxedema Coma



Source: David G. Gardner, Dolores Shoback: Greenspan's Basic & Clinical Endocrinology, Tenth Edition

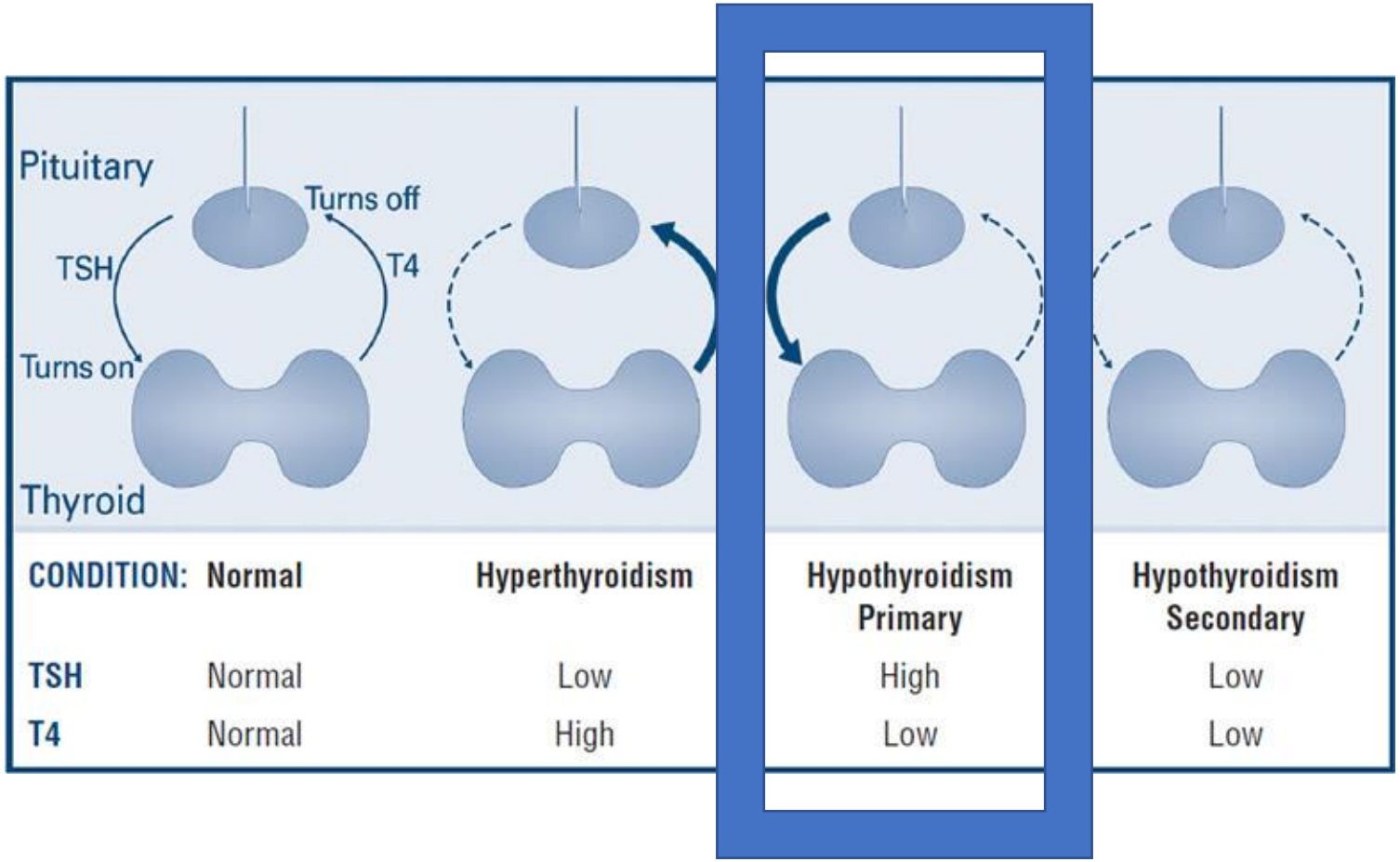
Myxedema

Kim J. N Engl J Med 2015;372:764-764.

The NEW ENGLAND JOURNAL of MEDICINE

Work-up of Myxedema Coma

- TSH, T3, T4
- CMP
- CBC
- CPK
- Search for precipitating cause:
  - UA, CXR, Blood cultures
- Cortisol
- EKG



CONDITION:	Normal	Hyperthyroidism	Hypothyroidism Primary	Hypothyroidism Secondary
TSH	Normal	Low	High	Low
T4	Normal	High	Low	Low

Wall CR. Myxedema coma: diagnosis and treatment. Am Fam Physician. 2000.

Myxedema Coma Management

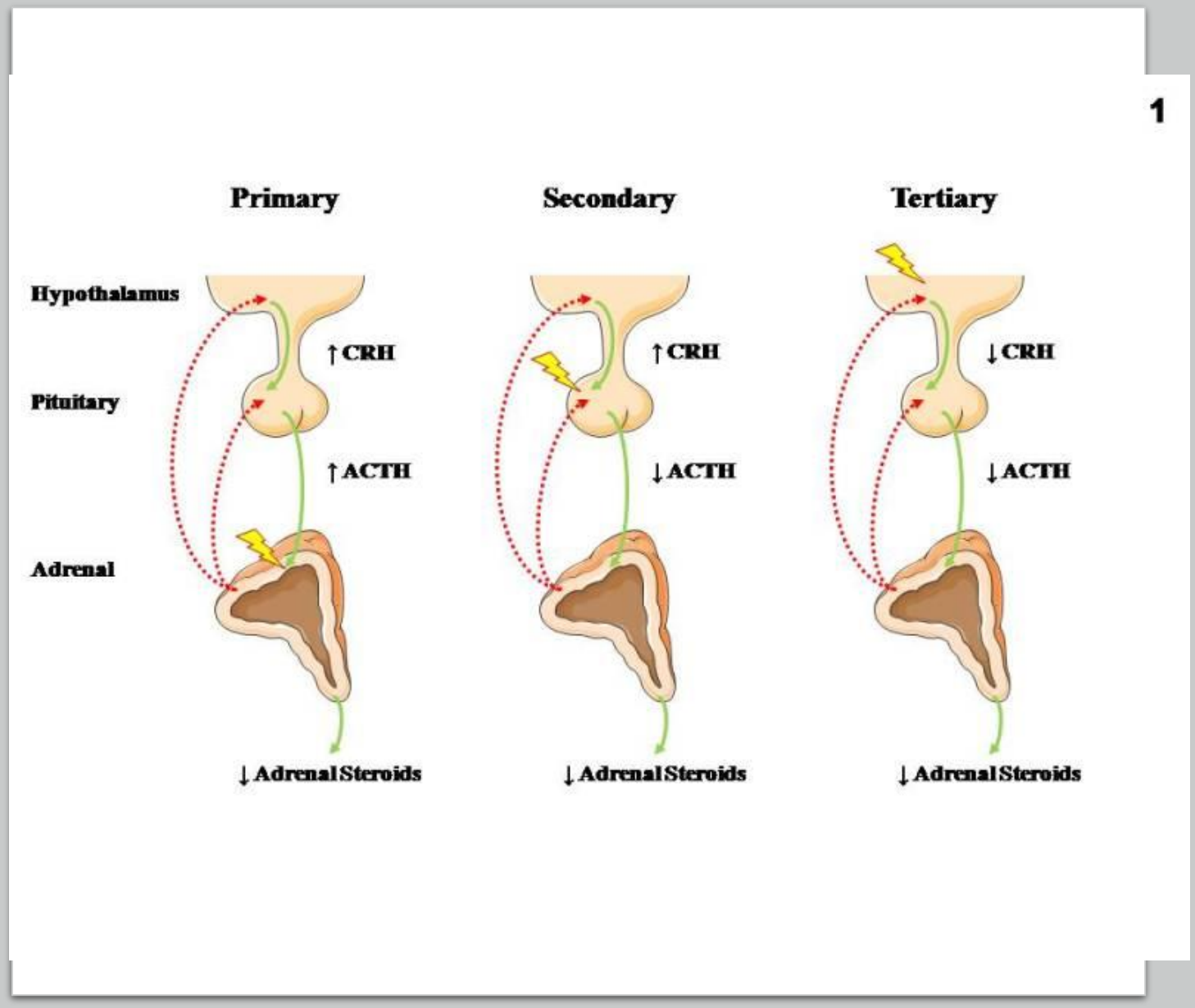
- Treat if clinical suspicion is high while awaiting labs!!
- Admit to ICU for ventilatory support and management
- Give IV thyroxine
  - Loading dose of 300-400 ug IV x 1
  - Followed by 50-100 ug IV daily
  - Consider T3 10ug IV every 8 hours x 48 hours if no contraindications
- Hyponatremia: water restriction, avoid fluid overload
- Hypoglycemia: IV glucose
- Hydrocortisone 100mg q8h
  - Test HPA axis and taper accordingly
- Treat precipitating factors

Chapter 24 Endocrine Emergencies, Gardner DG, Shoback D. *Greenspan's Basic & Clinical Endocrinology*

Adrenal Insufficiency → Adrenal Crisis

Adrenal Insufficiency

- Pathophysiology:
  - Glucocorticoid receptor: vascular tone, mood/sleep, general wellbeing
    - Fatigue, anorexia, weight loss, hypotension, hypoglycemia
    - Located diffusely throughout body
  - Mineralocorticoid: sodium reabsorption, volume homeostasis, potassium homeostasis
    - Intravascular volume depletion, hypotension, hyperkalemia
    - Located in distal nephron



Nicolaides NC, Chrousos GP, Charmandari E. Adrenal Insufficiency. [Updated 2017 Oct 14]. In: Feingold KR, Anawalt B, Boyce A, et al., editors. Endotext [Internet]. South Dartmouth (MA): MDText.com, Inc.; 2000-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK279083/

Adrenal Crisis

- Presentation:
  - Hypotension, shock out of proportion to severity of illness
  - Nausea, vomiting
  - Abdominal pain
  - Hypoglycemia without explanation
  - Hyponatremia
  - Hyperkalemia
  - Hyperpigmentation
  - Other autoimmune endocrine deficiencies
- Much more common in primary adrenal insufficiency due to mineralocorticoid deficiency

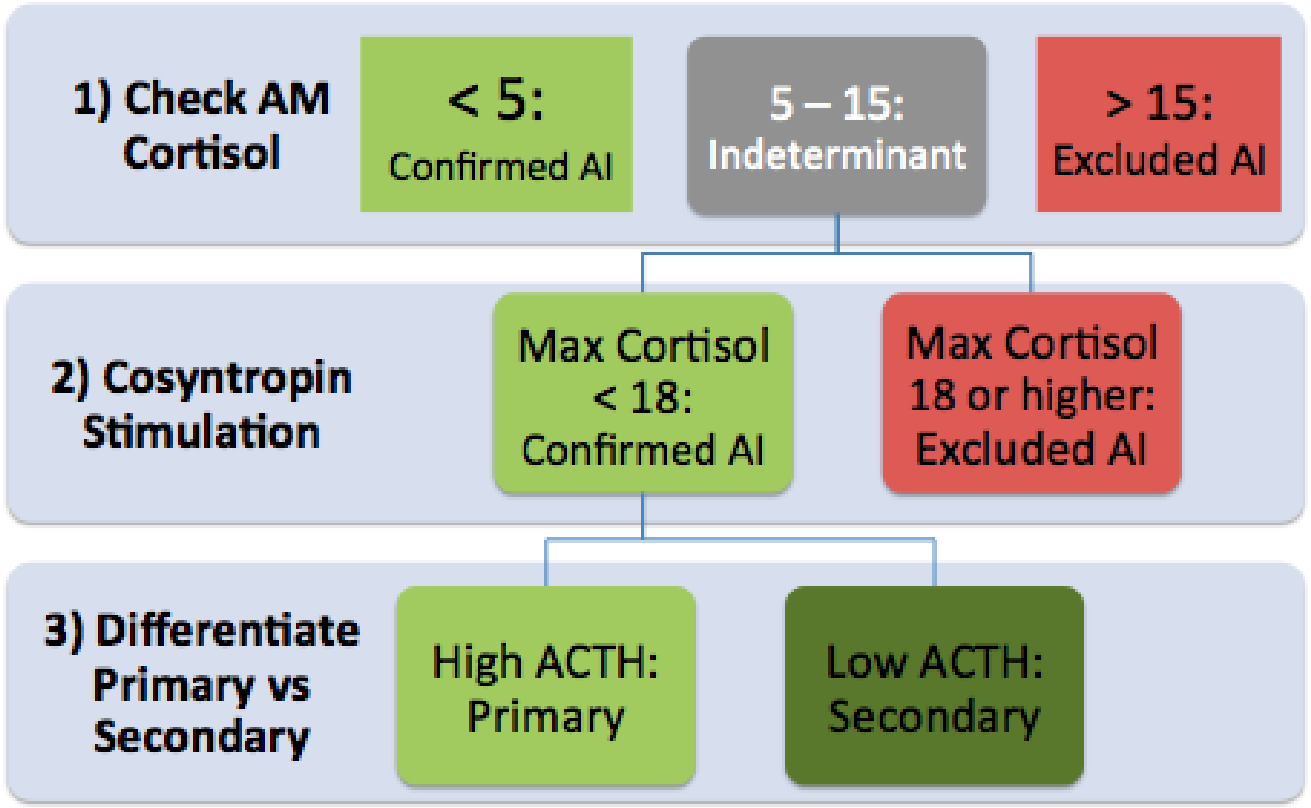
Hyperpigmentation in Addison's disease

(A) A 57-year-old woman presented with symptoms of primary adrenal insufficiency secondary to autoimmune Addison's disease. Diffuse skin hyperpigmentation had developed during the last year, as illustrated by her facial appearance.
(B) The hands demonstrate increased pigmentation of the palmar creases and wrists compared to a normal female control (far right).
(C) With long-term glucocorticoid and mineralocorticoid therapy, her hyperpigmentation resolved, as shown by the normal palmar skin pigmentation in the patient at age 83. Of note, she wears a medical bracelet indicating her requirement for glucocorticoids in case of severe illness.

Courtesy of André Lacroix, MD.

UpToDate®

Diagnosis of Adrenal Insufficiency



https://ucsfmed.wordpress.com/2019/11/12/diagnosing-adrenal-insufficiency/

Treatment for Adrenal Crisis

- Get IV access, send labs (do NOT wait for results to treat)
- IV Fluids
  - Add glucose if hypoglycemic
- Steroids
  - Hydrocortisone 100mg IV (or IM) followed by 100mg q6h
  - Dexamethasone 4mg bolus PLUS fludrocortisone 0.1mg
- Treat for underlying causes
- Taper after 1-3 days once patient tolerating PO

Tintinalli JE et al. Adrenal insufficiency and adrenal crisis. Tintinalli's Emergency Medicine: A Comprehensive Study Guide. 2011; 7

Take Home Points

- Describe the importance of normoglycemia in hospitalized patients
  - → both hypo and hyperglycemia are associated with poor outcomes
  - Aim for 140-180mg/dL in most cases
- Initiate or modify inpatient diabetes regimens to obtain better glucose control
  - Avoid SSI only!
  - Weight based dosing of 0.5u/kg/day, divided between basal and bolus
- Identify and treat thyroid storm and myxedema coma
  - Storm: 5 “Bs”
  - Myxedema: IV thyroxine
- Recognize and treat adrenal insufficiency
  - Hypotension, hypovolemia, hyperkalemia, hyponatremia → give steroids!

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