

# Hypoglycemia

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# Resources/References





# Hypoglycemia Defined

ADA

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Level	Glycemic criteria/description
Level 1	Glucose $<70$ mg/dL (3.9 mmol/L) and glucose $\geq 54$ mg/dL (3.0 mmol/L)
Level 2	Glucose $<54$ mg/dL (3.0 mmol/L)
Level 3	A severe event characterized by altered mental and/or physical status requiring assistance



# Hypoglycemia

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- Symptomatic or asymptomatic
- Can progress to loss of consciousness, seizure, coma, or death
- Among older adults with T2 DM, a hx of severe hypoglycemia can be associated with greater risk of dementia
- ACCORD and ADVANCE trials- severe hypoglycemia was associated with increased mortality
- Providers should be vigilant in preventing hypoglycemia and should not aggressively attempt to achieve near normal A1C levels in patients in whom such targets cannot be safely and reasonably achieved

# Risks for low BG

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- Insulin/secretagogue excess, ill timed use, wrong type of insulin
- Decrease of exogenous glucose delivery (missed meal; fasting)
- Increased glucose utilization (exercise)
- Longer duration DM
- Frail or older adults
- Polypharmacy (beta blockers)
- Decreased endogenous glucose (alcohol)
- Increased sensitivity to insulin (weight loss, regular exercise, improved glycemic control)
- Decreased insulin clearance (renal impairment)
- Cognitive or physical impairment
- Hypoglycemia unawareness



# Other Factors Contributing to Hypoglycemia

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- Adrenal Insufficiency
- Insulinoma
- Renal disease
- Gastroparesis
- Gastric surgery
- Critically ill patient
- Accidental

# Signs and Symptoms of Hypoglycemia

- Being nervous or anxious
- Sweating, chills and clamminess
- Irritability or impatience
- Confusion
- Fast heartbeat
- Feeling lightheaded or dizzy
- Hunger
- Nausea
- Color draining from the skin (pallor)
- Feeling Sleepy
- Feeling weak or having no energy
- Blurred/impaired vision
- Tingling or numbness in the lips, tongue, or cheeks
- Headaches
- Coordination problems, clumsiness
- Nightmares or crying out during sleep
- Seizures





# Be the Detective

*determine the cause of  
hypoglycemia...*

- ✓ Medications- user or prescriber
- ✓ Behaviors- intake, activity
- ✓ Other contributing factors/risks

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*...and prevent another episode*



- ✓ Educate on recognition, treatment, prevention
- ✓ Follow-up



# Medications

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## Prescriber Error

- Targets- fasting, pre meal, post meal, middle of night goals
- How meds work
- Teach patient how to properly administer and monitor and make adjustments based on response to therapy

## User Error

- Administration of meds
- Over treatment: too much insulin or orals in respect to intake and/or activity;  
Stacking insulin



# Drugs That Do Not Cause Hypoglycemia

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- **Biguanides** (Metformin)
- **TZDs** (pioglitazone- Actos)
- **GLP-1 agonists** (Victoza, Trulicity, Bydureon, Byetta, Ozempic)
- **DPP4-inhibitors** (Januvia, Onglyza, Tradjenta)
- **Alpha glucosidase inhibitors** (Acarbose)
- **SGLT-2 inhibitors** (Jardiance, Farxiga)



# Drugs that Cause Hypoglycemia

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- **Insulin**
- **Secretagogues** – Sulfonylureas  
(Glipizide, Glyburide, Glimeperide)
- **Non-sulfonylurea secretagogues**  
(Glinides: Prandin, Starlix)



# Behavioral Changes

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- **Activity**

- ADA recommends 150 min exercise per week, spread over 3 days, with no more than 2 days between
- Effects of exercise *are different for every patient*
- Intensity of activity matters
- Pre-exercise BG < 90, may need to Pre-treat with CHO; may need CHO during and after activity
- Adjust dosing- insulins, sulfonylureas, and non sulfonylureas
- More frequent monitoring

- **Intake**

- Reduced CHO and meals with higher fat content
- Waiting too long between meals
- Skipping meals
- Must have readily available simple and complex carbs

# Alcohol

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- ❖ Alcohol blocks the production of glucose in the liver
  - ❖ Liver contains “emergency stores” of glucose to raise blood sugar if it drops too low
  - ❖ Once the liver's stores of glucose are used up, a person who has consumed a lot of alcohol cannot make more right away, and that can lead to dangerously low blood glucose or even death



# Alcohol

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- ❖ Women: no more than 1 drink per day
- ❖ Men: no more than 2 drinks per day
- ❖ \*One drink is equal to a 12 oz beer, 5 oz glass of wine or 1 ½ oz distilled spirits (vodka, whiskey, gin, etc.)

# Alcohol

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- ❖ Do not drink on an empty stomach or when blood glucose is low
- ❖ Do not skip a meal if going to drink
- ❖ Often insulin dose will need to be decreased if having more than one drink
- ❖ Wear an I.D.- hypoglycemia may be mistaken for being drunk
- ❖ Craft beers- can have twice the alcohol and calories as a light beer



# Alcohol

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- ❖ Do not drive or plan to drive for several hours after drinking alcohol
- ❖ Alcohol can cause hypoglycemia shortly after drinking and for up to 24 hours after drinking
- ❖ Check sugars
  - Before drinking
  - While drinking
  - Before bed and throughout the night
  - More often for up to 24 hours
- ❖ Safe BG before going to bed: 100 and 140 mg/dL; If lower, eat something, repeat prior to going to sleep

# Treatment of Hypoglycemia

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## 15-15 Method

- **15 gm of CHO will increase BG by 15 mg/dL for 15 min**
- Check BG and if  $< 70$ , treat with simple carb
- Repeat BG in 15 min, if still low, repeat
- Repeat process until BG over 70
- Eat complex carb or next meal that is coming to maintain BG

## Examples of Simple CHO

- Glucose tablets – 3 or 5 at a time
- Glucose gel tube
- 4 ounces (1/2 cup) of juice or regular soda (not diet)
- 1 tablespoon of sugar, honey, or corn syrup
- 8 ounces of nonfat or 1% milk
- Hard candies, jellybeans, or gumdrops—see food label for how many to consume



# Treatment of Hypoglycemia

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## Glucagon

- Inject 1 mg Glucagon IM or SC
- Follow with oral intake
- May need assistance with EMS
- Contact provider
- Follow up

## Remember

- Those at high risk
- Expiration date
- Educate pt, family, friends, etc.
- Demonstration of admin

# Strategies to Prevent Hypoglycemia

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- ❖ Educate on meds and behavior changes
- ❖ Relax glucose targets in the short term
- ❖ Revise A1C targets
- ❖ Increase frequency of monitoring
- ❖ Consider continuous glucose monitoring
- ❖ Different goals based on age, co-morbidities, functional status



# Monitoring

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## Glucometers

- Update every 2-3 years
- Educate on proper use
- Should still document BG

## Continuous Glucose Monitoring

- CGM: Dexcom, Guardian
- Freestyle Libre System
- Not as accurate as fingerstick or blood draw
- Good option for hypoglycemia unawareness

# Emergency Kit

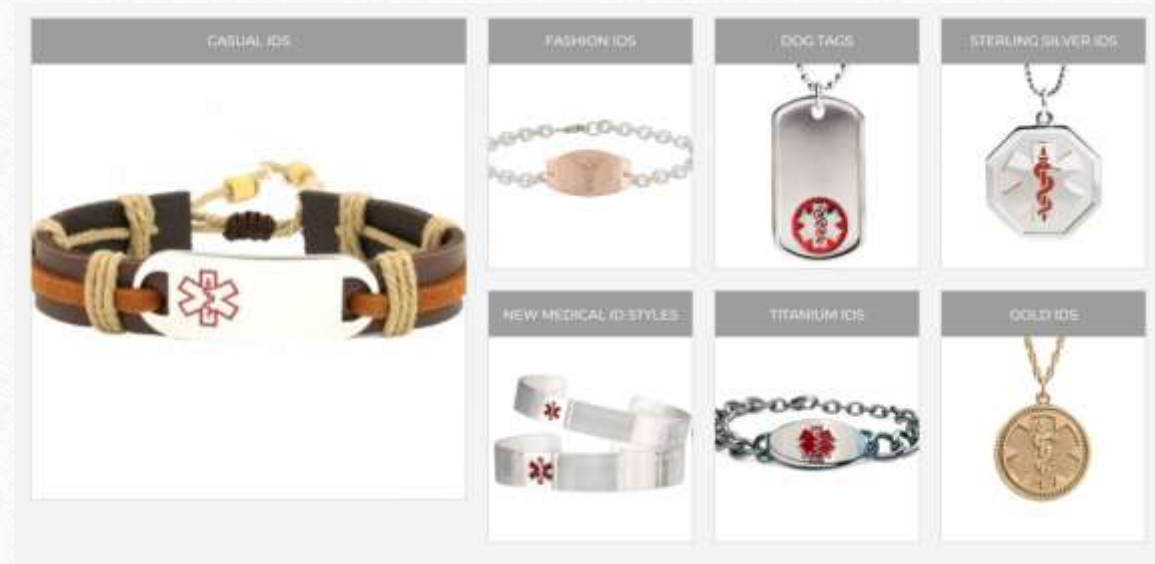
## *Be Prepared!*





# Medical alert ID

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# Follow-up Hypoglycemia Tx

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## Complex Carbs

- Should follow a reversal of hypoglycemia by a CHO with protein source

## Notify provider

- Follow up with provider to discuss recognition, triggers, treatment, prevention, management



# Patient Education is Key

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- Know the risk factors for hypoglycemia
- Know how meds work and the dosing/administration of meds
- Adding new agents may mean decreasing others
- More frequent monitoring, documenting, and communicating BG is important
- Determining triggers, making associations, correcting the problem, following up
- Help patients be prepared for lows
- Educate patients



Thank you...

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