# Diabetes and Related Emergencies

*** CME Version ***

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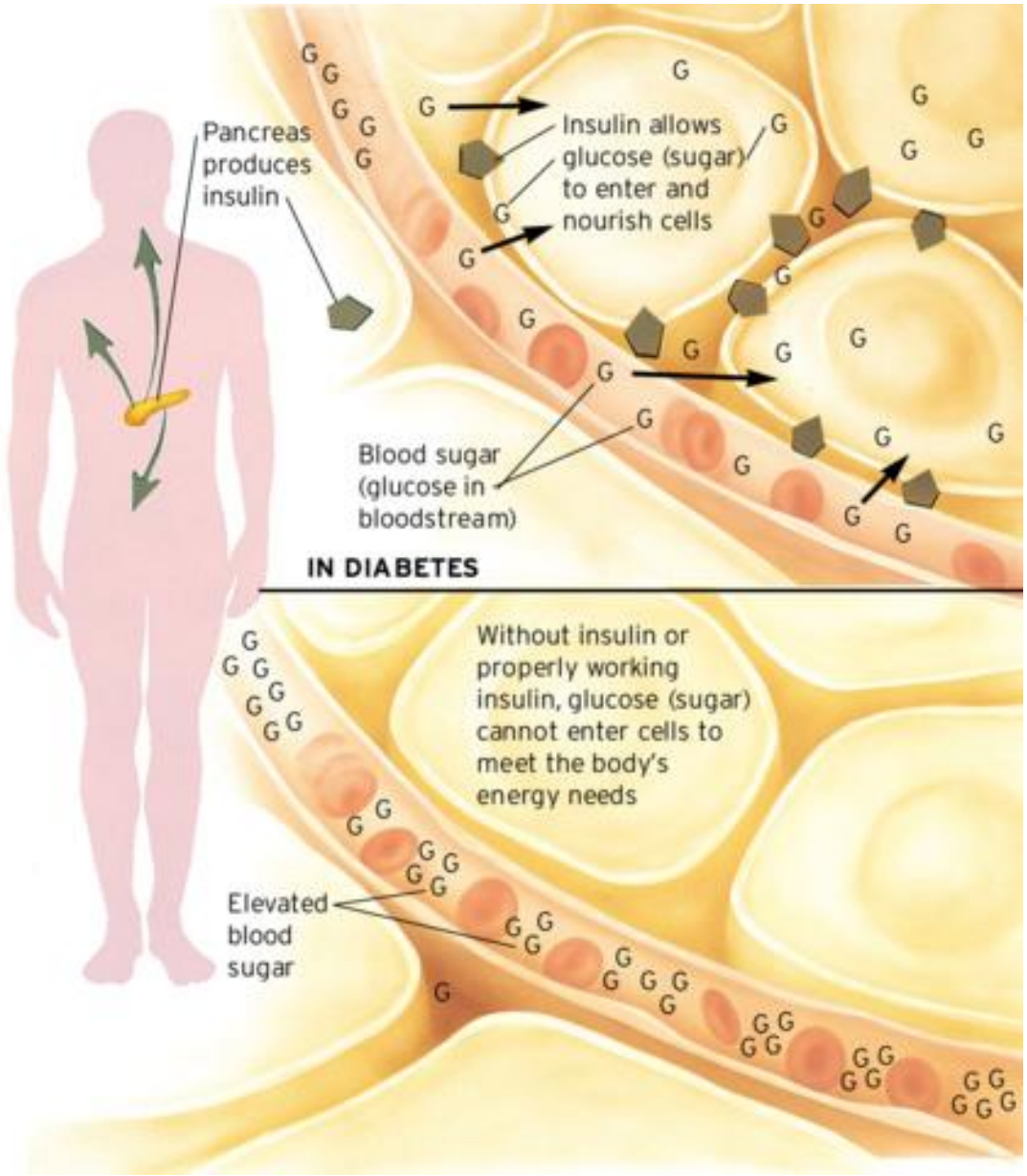
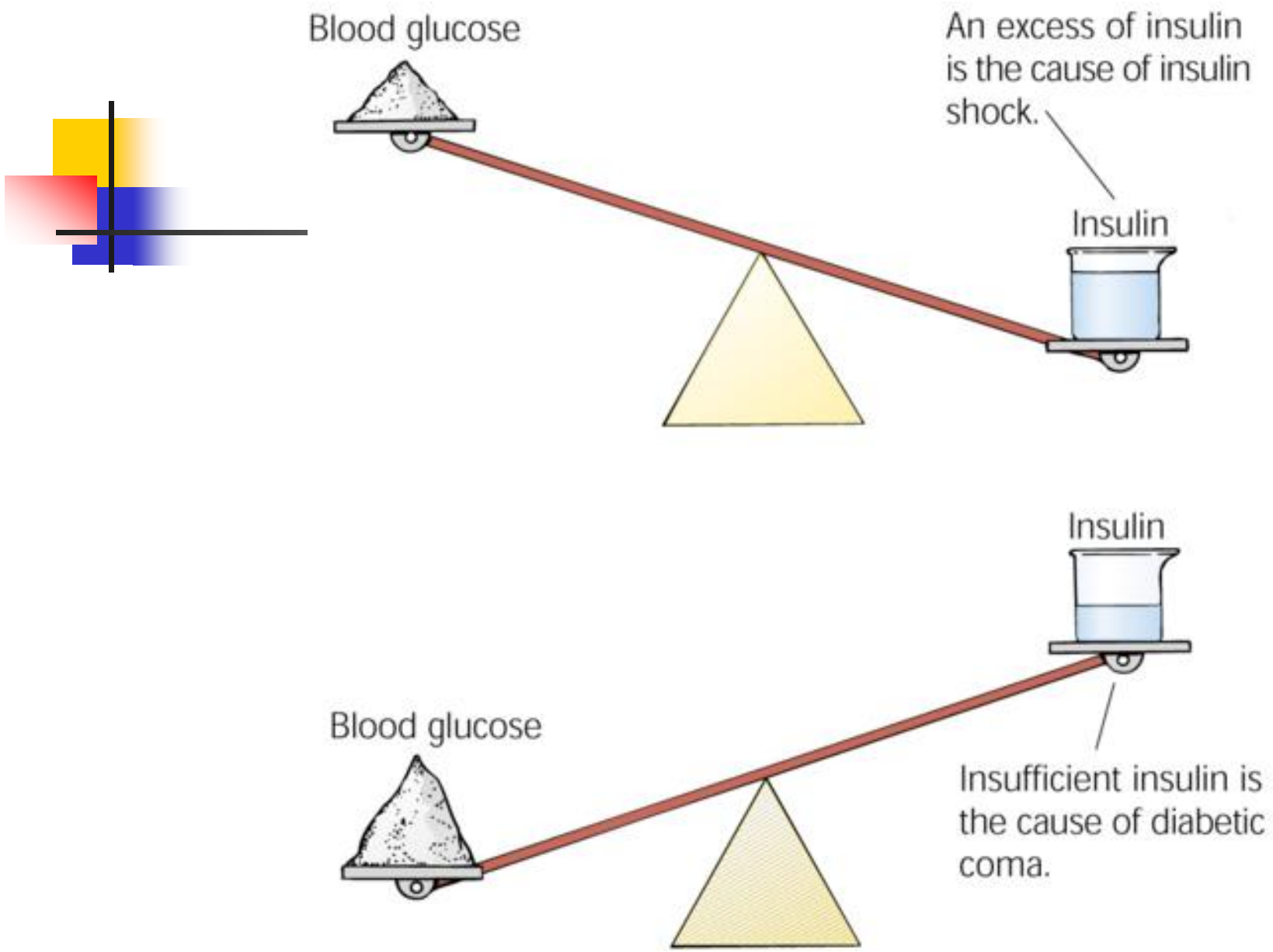
# Agenda

- BLS Level **review** of normal physiology of glucose metabolism
- What happens when normal becomes abnormal
- A little bit more than BLS
- Other related emergencies
- Scenario
- ?Questions?

# Diabetes -- basics

- **Glucose** – “simple” form of sugar
- **Glucose** – the body’s basic energy source
  - Glucose must be absorbed into body cells to produce energy
  - Glucose can not be absorbed into body cells without ***insulin***
- Insulin – hormone produced and secreted by the pancreas
- Glucose/insulin
  - Lock & key analogy
  - Balance scale


Pancreas produces insulin
Insulin allows glucose (sugar) to enter and nourish cells
Blood sugar (glucose in bloodstream)
IN DIABETES
Without insulin or properly working insulin, glucose (sugar) cannot enter cells to meet the body's energy needs
Elevated blood sugar


Blood glucose
An excess of insulin is the cause of insulin shock.
Insulin
Insulin
Blood glucose
Insufficient insulin is the cause of diabetic coma.

# hyp**er**glycemia

- Insufficient insulin?
- A dangerous chain reaction:
- Decreased absorption of glucose
- Excess sugar in bloodstream
- Spills over into the urine
- Patient urinates excessively (“polyuria”)
- Patient becomes excessively thirsty (“polydypsia”)
- Patient becomes dehydrated
- → **BUT THE BODY REQUIRES ENERGY, so…**

# Hyperglycemia – cont'd

- Body converts fat to energy
- Inefficient creation of energy
  - Less energy produced per gram
- **Produces dangerous wastes**
  - **Ketones**
    - Produces the classic "fruity breath"
  - **Diabetic Ketoacidosis ("DKA")**
- **Very often, pt is found in DKA is not aware that they are diabetic**

# Diabetes

- Diabetes Mellitus (“DM”)
  - “Sweet Urine”

# Diabetes -- causes

- Minimal/No insulin production
  - IDDM
  - Insulin dependent
  - Juvenile onset?
  - **Requires insulin**
- Decreased insulin production or inability of body cells to use insulin properly
  - NIDDM
  - Adult onset?
  - **Very often associated with obesity**
  - **Controlled by some combination of diet and/or oral hyperglycemic medications**

# Hy**po**glycemia

- **Most common and dangerous diabetic emergency**
- Causes include:
  - Too much insulin/oral medications
  - Reduced food/sugar intake
  - Excessive exercise
  - Vomits a meal
    - The takes insulin anyway

# Effects of hypoglycemia

- **Altered mental status!**
- Unconsciousness
- Seizures
- Brain damage
- Death
  - **Remember: 20-25 minutes of no glucose in the brain is the equivalent of 4-6 minutes with no oxygen!**

# Patient assessment

- Perform initial assessment
- **Identify AMS**
- Get SAMPLE history
- Determine LOC
  - Can the patient maintain their airway?
  - **Can the patient swallow a source of glucose?**
  - Monitor vital signs

# Get SAMPLE history

- History of present episode
- Does patient have diabetes?
- Gather evidence
  - **Medical bracelet**
  - Medications such as Diabinase, Glucophage, Avandia
  - Insulin **in the fridge?**
  - Speak with family, bystanders

# Hypoglycemia – S/S

- AMS
  - Intoxicated appearance, staggering, slurred speech, unconsciousness (CVA S/S)
- Tachycardia
- Cool diaphoretic skin
- Extreme hunger (“polyphagia”)
- Seizures
- Strange behavior
- Anxiety
- Combativeness

# Suspected hy*po*glycemia -- treatment

- **Request ALS**
- Are they diabetic?
  - **NOT TOO IMPORTANT!**
- Give oral glucose source if:
  - **NO HEAD INJURY!**
  - AMS
  - Patient can swallow – can they drink with no help?
- ABCs
- Oxygen
- Monitor level of consciousness!
- Transport
- **Never give anything orally unless patient can hold it in their own hand!**

# Hypoglycemia treatment – cont'd

- For patients who can not swallow:
  - **Request ALS**
  - ABCs – airway control
  - Oxygen
  - Rapid transport
  - **They need IV glucose**

# Suspected hyp*er*glycemia - treatment

- "Supportive care"
  - **Call ALS**
  - ABCs – airway control
  - Oxygen
  - Rapid transport

# Children – add'l issues

- More at risk for hypoglycemia
- Exercise more aggressively
- Use up glucose quickly
- Less disciplined about eating correctly
- **Need to be diligent about modifying insulin doses with changing weight**

# Hyperglycemic emergencies

- Not enough insulin for glucose ingested
- Forgets to take insulin
- Overeats
- **Has infection – upsetting insulin glucose balance**

# Hypoglycemia vs. hyperglycemia

- **Very similar** signs and symptoms
- **NOT IMPORTANT TO DISTINGUISH**
- ***Rule of thumb: "Sugar for all"***

# More than BLS

- What does the body do with the extra glucose that it does not need?
- It gets stored in the liver in the form of “Glycogen”
- Why is this important?

# More than BLS -- 2

- How does the body protect itself against hypoglycemia?
- By converting Glycogen stored in the liver to glucose
- How?
- The pancreas produces “Glucagon” which releases Glycogen stored in the liver as glucose
- How do diabetic patients benefit from this?

# Diabetes Related Emergencies

- Caused by
  - Effects on blood vessels
  - Effects on nerve endings
  - Effects on vision
  - Effects on the kidneys
- Many calls that we respond to can be traced to one or more of these
  - Examples...

# Scenario

You are called to the scene for a “diabetic problem”. Upon arrival, you find a 70 Y/O male who although conscious seems confused. His friends tell you that he’s diabetic and is usually “very with it”.

# This was the treatment given

- A tube of oral glucose was given
- V/S
- Transport to the hospital
- Oxygen?

# Issues with the treatment?

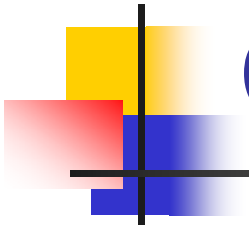
- Anything done that should not have been?
- Anything not done that should have been done?
- What?
- Why is that important?

# Things to think about

- Q: Normal glucose range?
- A: 70 – 110
- Q: What was **this** patients glucose level?
- A: We have **NO IDEA**!
- Q: How fast will the oral glucose work for this patient?
- A: We have **NO IDEA**!
- Q: What happens if the oral glucose does not work “fast enough”?
- A: Patient probably becomes unconscious
- Q: How quickly will they get treated in the ER?

# ALS Treatment

1. BLS
2. IV/SL NS KVO
3. D50
4. Diabetic & No IV?
    1. Glucagon 1mg IM
5. No improvement?
    1. Narcan in 0.4mg increments to max of 2.0mg (*Narcan first in suspected Narcotic OD)*
6. Repeat D50 PRN
7. MC Options: Repeat any SO.



# Questions?