



TPN 101

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Disclosures

Sara Glanz is an employee of Dietitians On Demand. She does not benefit financially from the content of this presentation.

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Objectives

1. Discuss the difference between total parenteral nutrition (TPN) and peripheral parenteral nutrition (PPN).
2. Review the indications and contraindications for parenteral nutrition (PN).
3. Compare and contrast different types of IV access devices.
4. Describe the different PN preparations, including premixed and custom solutions.
5. Practice PN calculations.
6. Discuss routine lab monitoring approaches.
7. Troubleshoot common PN concerns and complications.

Common Terms Associated with PN

- **“CPN”**—Central Parenteral Nutrition; aka Total Parenteral Nutrition
- **Central line**—larger bore IV access placed in a larger blood vessel
- **Osmolarity**—particles dissolved in 1 L of water
- **Refeeding syndrome**—occurs when a patient is “refed” after a period of starvation; characterized by sharp and sudden decreases in serum K+, Mg, Phos
- **Glucose infusion rate**—measured in mg/kg/minute; ideally less than 5 to avoid hyperglycemia and hypertriglyceridemia

TPN vs. PPN

TPN

- Intended to meet comprehensive nutritional needs
- Can be concentrated
- Long-term use
- Requires central IV line

PPN

- May not meet comprehensive nutritional needs
- Short-term use
- Infuses through peripheral IV line
- Osmolarity limited to 900 mOsm/L or less

When to Use (and Avoid) PN

Indications

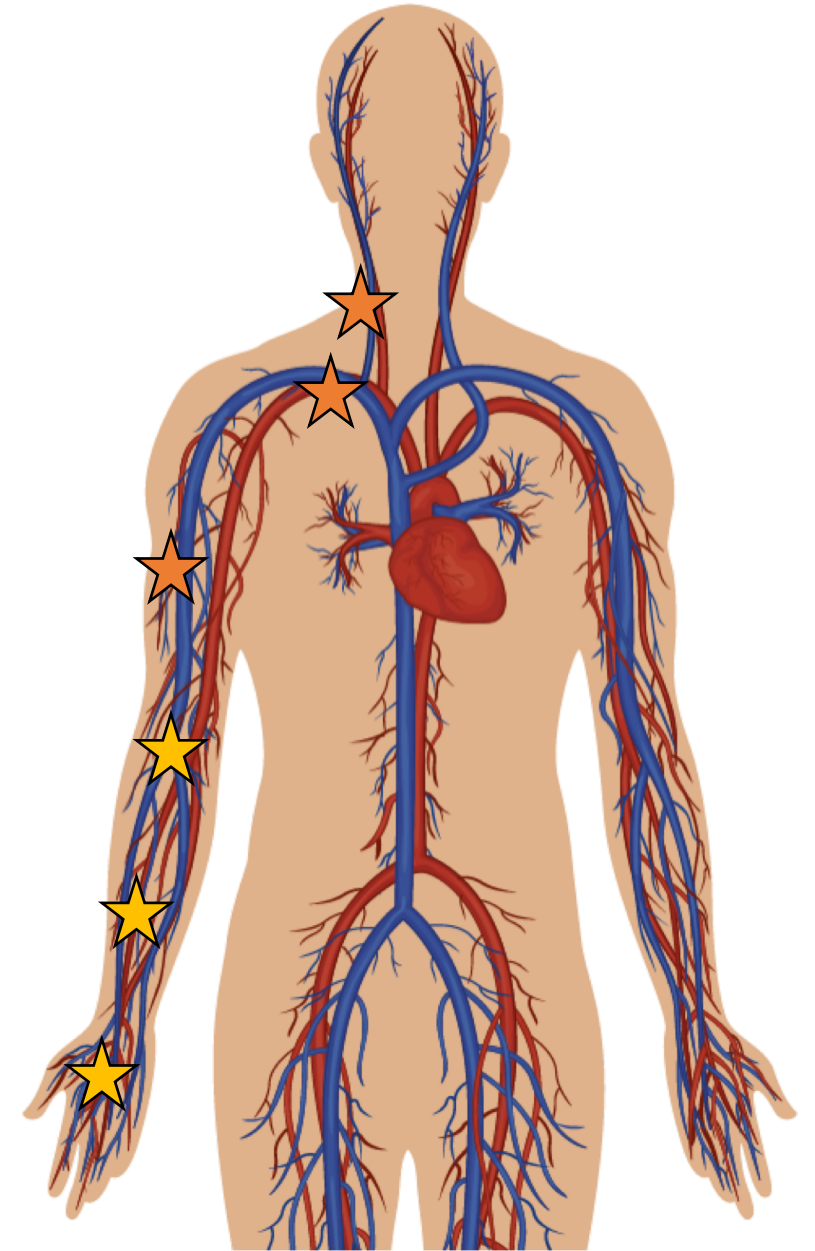
- Malfunctioning GI tract
 - Obstruction
 - Distal high-output fistula
 - Short bowel syndrome
 - Severe necrotizing pancreatitis
 - Mesenteric ischemia
 - Ileus

Contraindications

- Functional GI tract
- Able to meet nutritional needs via oral or enteral nutrition
- Expected need very short (less than 5 days)
- Aggressive care not desired

Types of IV Access

- Peripheral IVs ★
 - Limits osmolarity of PN infusion → <900 mOsm/L
 - Must be replaced every 2-4 days
- Central lines ★
 - Tip lies in superior vena cava or right atrium
 - Percutaneous, non-tunneled (i.e., IJ, PICC)
 - Tunneled (i.e., Broviac, Hickman)
 - Implanted (i.e., port)



Components of PN

- **Macronutrients**
- Micronutrients
- Electrolytes
- Trace elements
- Sterile water
- Insulin

Carbohydrate

Dextrose

3.4 kcal/gm

Protein

Amino acids

4 kcal/gm

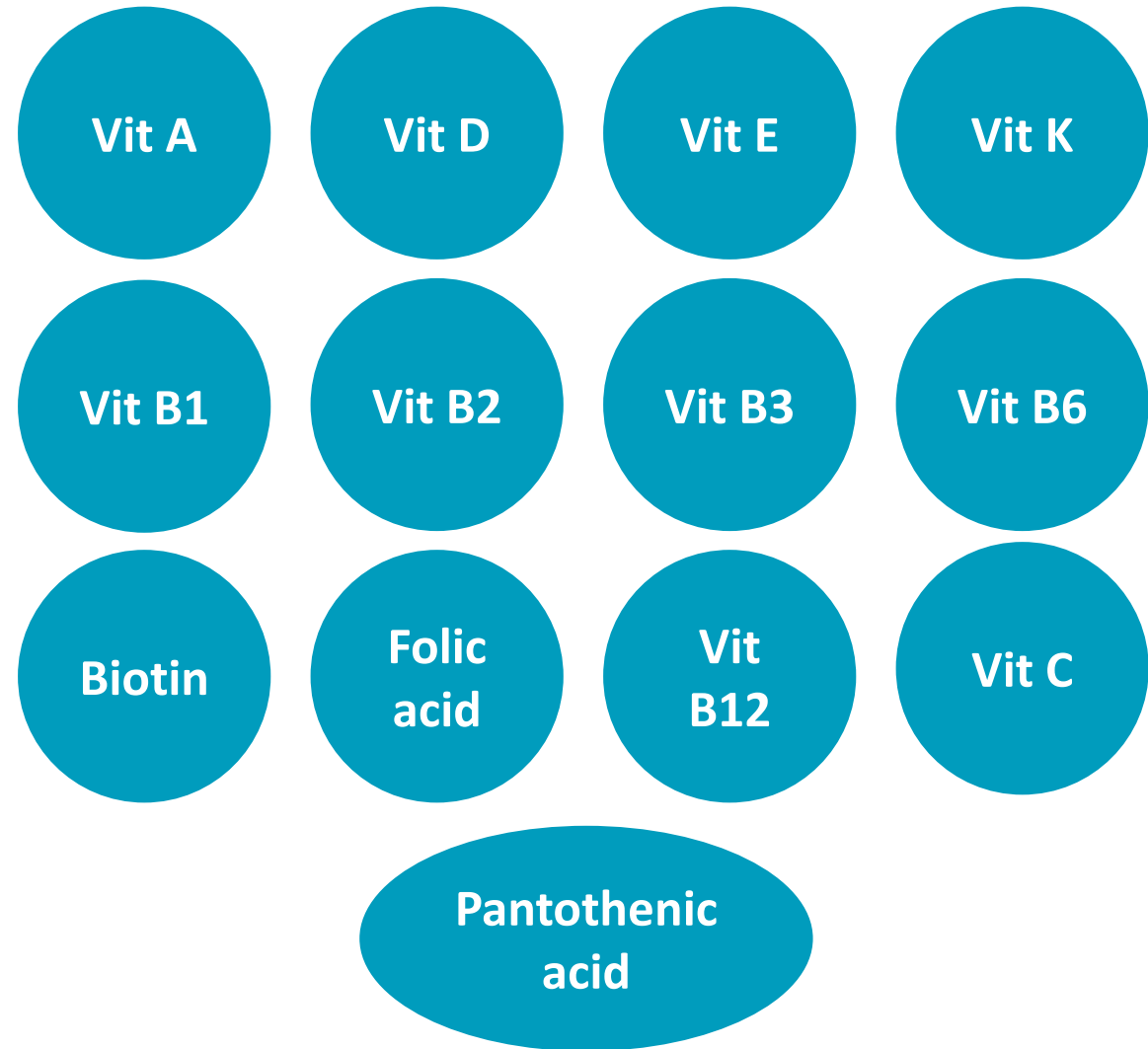
Fat

Lipids

10 kcal/gm

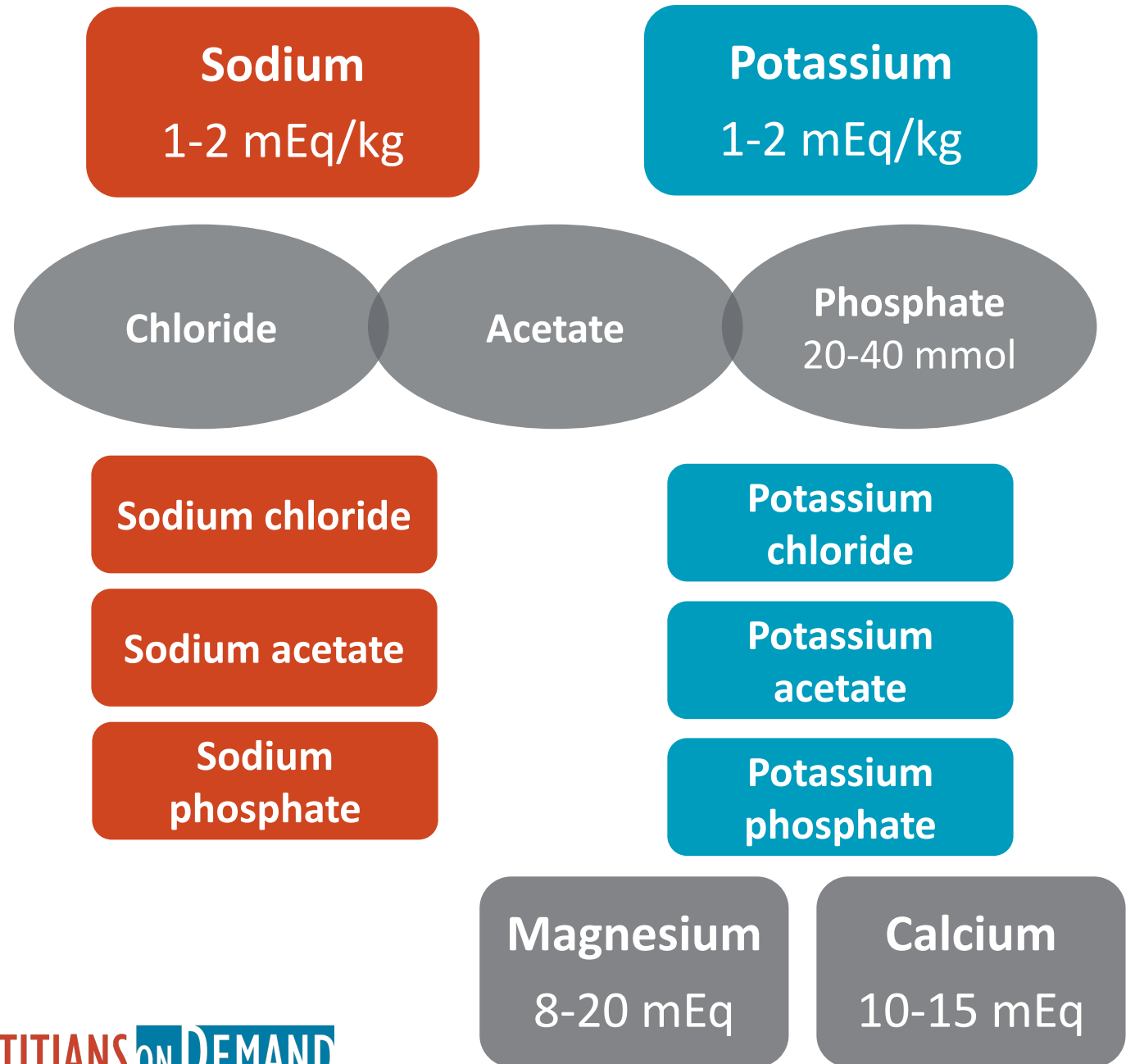
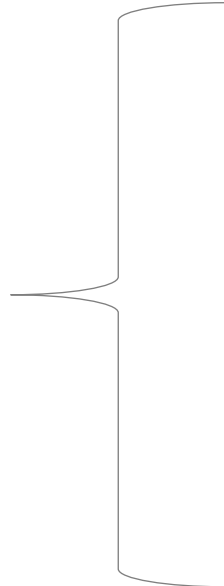
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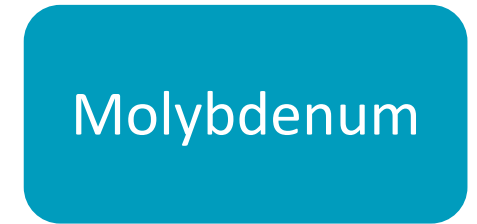
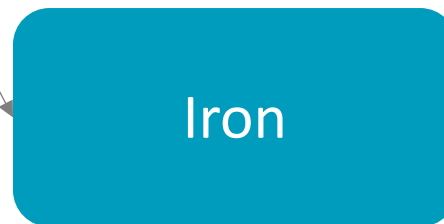
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Components of PN

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- Micronutrients
- Electrolytes
- Trace elements
- **Sterile water**
- Insulin

TPN:

- More concentrated
- Allows for fluid restriction

PPN:

- More diluted

Components of PN

- Macronutrients
- Micronutrients
- Electrolytes
- Trace elements
- Sterile water
- **Insulin**

Initial Regimen:

0.05 to 0.1 units of insulin
per gram of dextrose

250 gm dextrose x 0.1 = 25 units of insulin

If Already Hyperglycemic:

0.15 to 0.2 units of insulin
per gram of dextrose

250 gm dextrose x 0.2 = 50 units of insulin



PRO TIP: *Still hyperglycemic?*

Add 1/2 to 2/3 of sliding scale insulin
received during the previous 24 hours.