

The Insulin Pump and/or Continuous Glucose Monitor in Diabetes Care

Vicki Cutshall, BSN, RN, NE-BC. Diabetes Educator,
St. Luke's Humphreys Diabetes Center
May 3, 2013

Insulin Pumps & Continuous Glucose Monitors

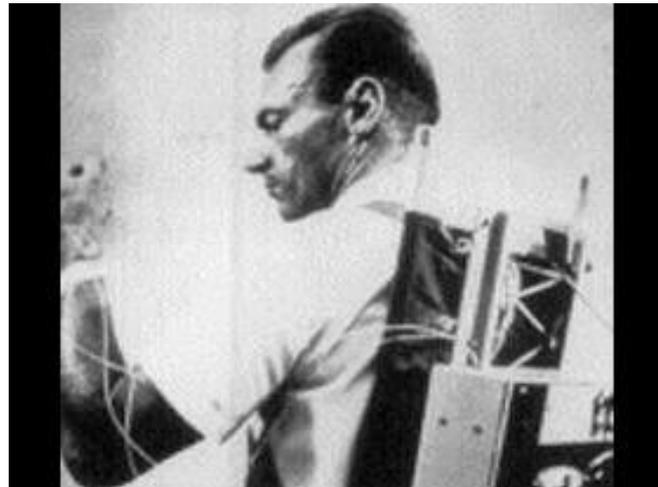
Objectives:

At the end of our discussion, you will be able to:

- Describe insulin pump therapy as a method of insulin delivery and how this may be helpful in diabetes management
- Describe continuous glucose monitoring and how this may be helpful in diabetes management
- Apply lessons learned in the selection of persons considering pump therapy
- Describe survival skills when encountering persons wearing pumps in the public or clinical setting

Delivering insulin is essential to life!

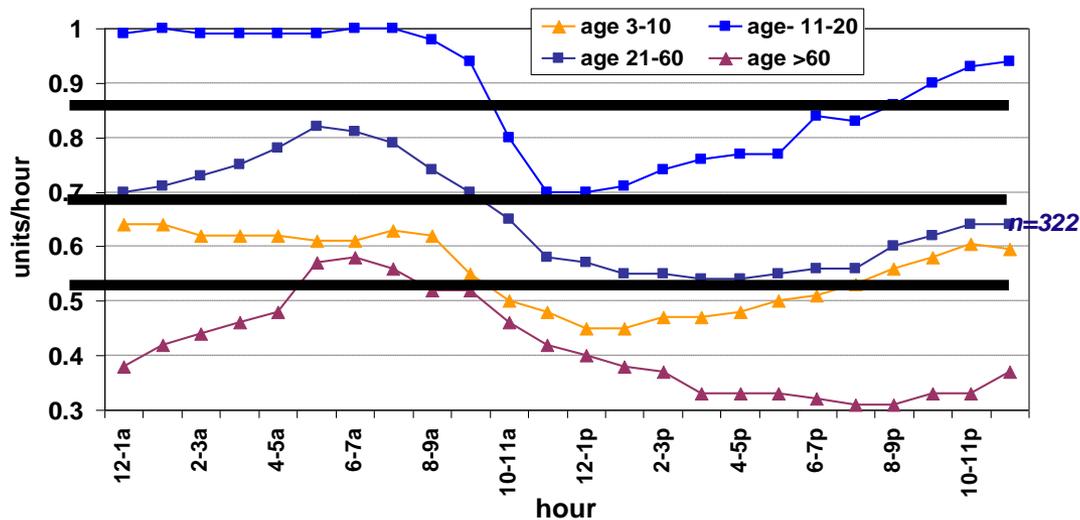
- Drawing comparisons for patients
 - Subcutaneous insulin
 - Monitoring
 - Record-keeping or some means of interpretation
- Insulin pump is able to deliver insulin continuously, but not able to self-adjust
- Continuous glucose monitor is able to report glucose levels, but also not able to self-adjust



Insulin Pump Basics—Basals

- With insulin pumps (CSII), many different basal levels can be delivered—important on an hourly basis and across the lifespan

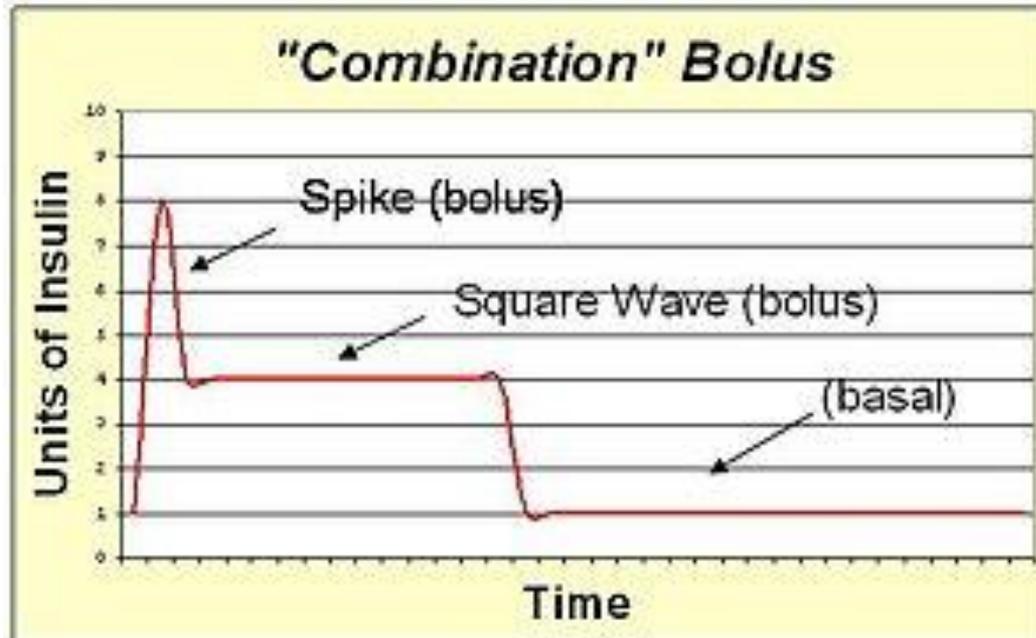
Basal Insulin Needs Vary



Scheiner, Gary; Boyer, Bret A. Characteristics of basal insulin requirements by age and gender in Type-1 diabetes patients using insulin pump therapy. *Diab Res and Clin Prac*, 69 (2005) pg. 14-21.

Insulin Pump Basics—Boluses

- With insulin pumps, boluses can be delivered in multiple ways without having to give an injection



What's out there today—Insulin Pumps?

- Animas Ping
- Insulet OmniPod
- Medtronic Paradigm 523/723
- Roche Accu-Chek Combo
- Tandem t:slim

Successful pumpers are those who...

- Monitor blood glucose readings throughout the day
- Count carbohydrates accurately and consistently
- Problem-solve using diabetes management skills
- Attend routine follow-ups with their health care providers
- Have good support systems (kids and teens still need their parents help)
- Have realistic expectations

Things patients tell us to keep in mind when using advanced technologies...

Advantages

- Fewer needle sticks
- The possibility to improve my A1c
- More flexibility with regard to meals
- Use different basal rates at different times of day
- Reduce lows with small amounts of basal rate
- Reports and historical data
- Makes everyday life so much easier
- Weight control
- Better control for exercise
- Technology keeps changing

Challenges

- Takes planning ahead and budgeting—CO\$T
- Greater risk for ketosis
- Ordering supplies so you don't run out (you can't buy these at the pharmacy)
- Watching sites for infections and irritation to tapes
- Something is on your body 24/7
- Your life is depending on a battery
- Dealing with alarms & device failures
- Can gain weight if you eat too much
- Technology keeps changing

What to do when a pump turns up in your setting!

1. Ask or assist the patient to perform **current blood glucose**.
When did you last **change your site**? Show me!
Is there **insulin in your pump**? Are you sure?
Are you using your **bolus calculator**?
(Vicki's "acid test" question) Can you tell me what your insulin-on-board setting is?
2. Turn the pump over. **Call Tech Support**. Confirm settings.
They will guide you AND they will make a report for this pump user.
3. It is very possible for pump users to wear their pump in the hospital and even through surgery, but the pump user must be able to operate the pump and work closely with the health care team. Facility policies may still vary.

CONTINUOUS GLUCOSE MONITORING (CGM)

ADA 2012 Standards of Medical Care in Glucose Monitoring

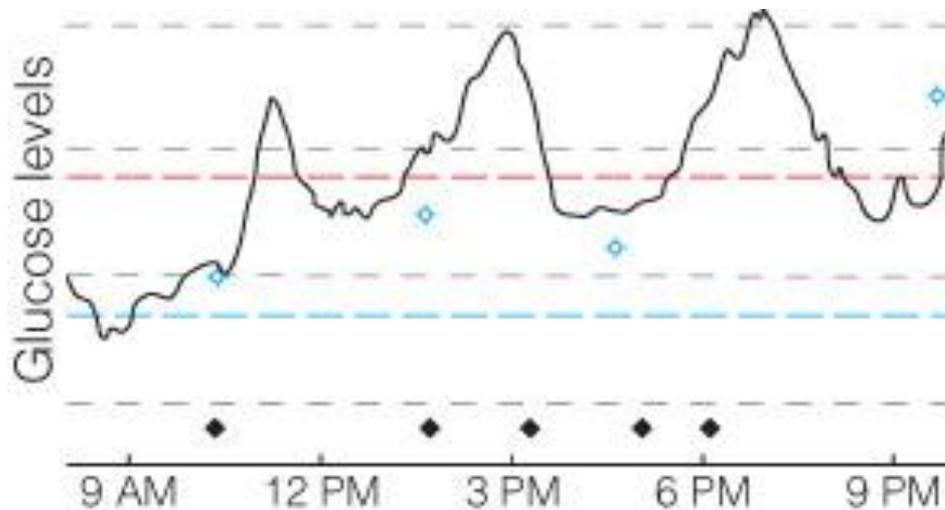
- Continuous glucose monitoring (CGM) may be a supplemental tool to self monitoring blood glucose (SMBG) for individuals with hypoglycemia unawareness and/or frequent hypoglycemic events¹
- CGM may be beneficial to patients who have already achieved excellent control (A1c below 7%) with reduction of A1c without increasing hypoglycemia²
- Success in lowering A1c correlates with an individual's ongoing use of CGM

1. ADA, *Diabetes Care* 2012; 34 (suppl1): S11-S61

2. JDRF Continuous Glucose Monitoring Study Group. *Diabetes Care*. 2009; 32: 1378-1383.

What is Continuous Glucose Monitoring (CGM)?

- Blood glucose meters measure glucose in your blood and glucose sensors measure glucose levels in the fluid around the cells
- They are not exactly the same numbers and that's normal
- Traditional blood glucose monitoring with a meter looks at only one point in time
- The meter doesn't tell you where you've really been or where you are going
- CGMs help understand glucose trends, rate and direction of change



How is Continuous Glucose Monitoring Done?

- A **sensor** which has the ability to measure glucose readings is inserted under the skin and secured in place for several days
- Data is sent through a **transmitter** to a **receiver**
 - The receiver may or may not be an insulin pump
 - The patient may not even be on a pump
- The data is collected every ~5 minutes and appears on your receiver
- You can download the data from the receiver and use a variety of reports with your health care team

What's out there today—Continuous Glucose Monitors

- Dexcom G-4
- Dexcom Seven Professional
- Medtronic Guardian Real-Time System
- Medtronic MiniMed Paradigm REAL-Time Revel system
- Medtronic iPro

Patients who can benefit from CGM

- A1c above goal
- Blood glucose variability
- Hypoglycemia
- Hypoglycemia unawareness
- Gastroparesis
- Pre-conception/pregnancy
- Insulin-requiring diabetes—with or without a pump
- Type 2 patients on intensive insulin therapy
- Patients desiring more time in target range

Thank you!

Questions?