Integrating Standards of Care in Diabetes for the Patient with Type 2
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Epidemic Facing APNs
CDC 2014 Statistical Report on Diabetes
- Total: 29.1 million Americans have diabetes
  - 9.3% of the population
  - Diagnosed: 21.0 million
  - 27.8% of the population is undiagnosed
- 2009-2012 Based on Fasting blood glucose levels 37% of the population age 20yrs and older have prediabetes...86million Americans!!
- Age 10-19years old are significantly increasing in numbers especially in Non Hispanic blacks, American Indian, & Hispanic populations.
- By the Year 2050 1 in 3 Americans will have type 2 diabetes.
- Web site: http://www.cdc.gov/diabetes

Local Epidemic: Greater Than National!!
- IN: Daviess 11.9%
  Gibson 12.6%
  Posey 12.9%
  Vanderburgh 12.4%
  Warrick 11.2%
- KY: Daviess 10.7%
  Henderson 11.1%
- IL: Goliasn 11.5%
  Wabash 12.4%
  White 10.9%
Targeting Pathophysiologic Defects: More than the Metabolic Syndrome

- Impaired insulin secretion
- Increased hepatic glucose production
- Decreased glucose utilization (insulin resistance in peripheral muscles)
- Accelerated lipolysis in the fat cell
- Incretin deficiency/resistance in the GI tract
- Hyperglucagonemia (alpha cell failure)
- Increased glucose reabsorption by the kidney
- Insulin resistance in the brain (reducing satiety)

- A1C <7%, ADA, <6.5 ACE and/or post prandial (2hrs: 1st bite) <180mg/dl ADA, <140mg/dl ACE

Where to Start?

- A1C (glycosylated hemoglobin)
- Two- Three month average blood glucose level
- Goal for reducing complications associated with Diabetes
  - <7 % (may need to be individualized)
  - Needs to be monitored quarterly.

Using the A1C in Practice.

- What is it not?
  - A tool for current management...It is a look in the past!
  - Proof of lying!

- What is it?
  - Your Report Card!
Where to Start?
Interpreting the Log Book.

Like Chess: One Move at a Time

Understanding The Options
For Diabetes Treatment

- Meal Planning: A Carb Is Carb Now Let's Make It A Heart Healthy One!
  - Registered Dietician
  - Reading a Food Label/What is a true serving size?
  - Calorie King, My Fitness Pal, & Weight Watchers etc..
  - Setting realistically (60-75 grams of carbs per meal...snacks too!)
- Exercise
  - Aerobic & Weight Training
- Medications
  - Cholesterol Medications
  - HTN medications
  - Antidiabetes agents
  - Hormone replacement
- Insulin
"Diabetes on A Dime.

WHAT CAN THE PATIENT REALISTICALLY DO?

Know your limitations? Medicare benefits, no insurance, limited means, misconceptions, fear of insulin & complications, significant stress, comorbidities etc.

Antidiabetic Drugs

<table>
<thead>
<tr>
<th>Antidiabetic Drugs</th>
<th>A1C 1-2%</th>
<th>A1C 1-2%</th>
<th>A1C 0.5-1.5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exenatide XR</td>
<td>Byetta</td>
<td>albiglutide</td>
<td>Tanzeum</td>
</tr>
<tr>
<td>Dulaglutide</td>
<td>Trulicity</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Consult pharmacist for proper dosing and side effects.
Antidiabetic Drugs (continued)

<table>
<thead>
<tr>
<th>SGLT2 Inhibitors/New Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canagliflozin/Invokana; dapagliflozin/Farxiga; empagliflozin/Jardiance</td>
</tr>
</tbody>
</table>

- Inhibits sodium glucose cotransporter 2 (SGLT2) in the kidneys, reducing glucose reabsorption and increasing urinary glucose excretion. Does lower A1C and weight loss (urinating calories).
- GFR at baseline
- Potassium level at baseline and then periodically
- Monitor for any signs of urinary tract infection
- Blood pressure
- Lipid panel at baseline
- Side effects: Ketoacidosis, hyperkalemia, orthostatic hypotension, pancreatitis, UTI, cholesterol increases, magnesium increases, genital mycotic infection, Cr increase, and may not pass the DOT medical exam test.

A1C 0.79%

Antidiabetic Drugs: Combinations
Antidiabetic Drugs: Combinations

History Should Always be Studied

1921 Fredrick Banting and Charles Best discover insulin
1923 Fredrick Banting and John J.R. Macleod win the Noble Prize for their discovery of insulin.

The Miracle

Although insulin doesn’t cure diabetes, it’s one of the biggest discoveries in medicine. When it came, it was like a miracle. People with severe diabetes and only days left to live were saved. And as long as they kept getting their insulin, they could live an almost normal life.
Behold the Power of Insulin

- Leonard Thompson 1908-1935
- 1st Person to receive insulin extract in 1922
- Survived to age 27

Exogenous Insulin

<table>
<thead>
<tr>
<th>Type of Insulin</th>
<th>Brand Name</th>
<th>Generic Name</th>
<th>Action</th>
<th>Peak</th>
<th>Duration</th>
<th>Information and Testing</th>
<th>Compatibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular Insulin</td>
<td>Novolin 70/30</td>
<td>70% NPH - 30% Regular</td>
<td>Early</td>
<td>1-2 hr</td>
<td>3-8 hr</td>
<td>Novolin 70/30</td>
<td></td>
</tr>
<tr>
<td>Regular Insulin</td>
<td>Humulin 70/30</td>
<td>70% NPH - 30% Regular</td>
<td>Early</td>
<td>1-2 hr</td>
<td>3-8 hr</td>
<td>Humulin 70/30</td>
<td></td>
</tr>
<tr>
<td>Intermediate Insulin</td>
<td>Novolin</td>
<td>70% NPH</td>
<td>Mid-Range</td>
<td>4-6 hr</td>
<td>12-16 hr</td>
<td>Novolin</td>
<td></td>
</tr>
<tr>
<td>Intermediate Insulin</td>
<td>Humulin</td>
<td>70% NPH</td>
<td>Mid-Range</td>
<td>4-6 hr</td>
<td>12-16 hr</td>
<td>Humulin</td>
<td></td>
</tr>
<tr>
<td>Long Acting Insulin</td>
<td>Novolog 70/30</td>
<td>70% NPH - 30% Regular</td>
<td>Late</td>
<td>10-12 hr</td>
<td>18-24 hr</td>
<td>Novolog 70/30</td>
<td></td>
</tr>
</tbody>
</table>

*Protamine suspension makes the very fasting acting insulin act like a intermediate acting insulin.

Pre-Mixed Insulin

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<tr>
<th>Brand Name</th>
<th>Generic Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Novolin 70/30</td>
<td>Humulin 70/30</td>
</tr>
<tr>
<td>Humalog Mix 75/25</td>
<td>Novolog Mix 75/25</td>
</tr>
<tr>
<td>Humalog Mix 75/25</td>
<td>Novolog Mix 75/25</td>
</tr>
</tbody>
</table>

*Protamine suspension makes the very fast acting insulin act like an intermediate acting insulin.*
Inhaled Mealtime Insulin

- Patient with increased insulin resistance and had previously required high doses of insulin in the basal/bolus regimen or severe COPD on steroids.
- Hospital policy varies on administration (TB vs. insulin syringe)
- Typically given three times a day with meals.

U-500 Regular

- 5 times stronger than Regular u-100
- Patient with increased insulin resistance and had previously required high doses of insulin in the basal/bolus regimen or severe COPD on steroids.
- Hospital policy varies on administration (TB vs. insulin syringe)
- Typically given three times a day with meals.

glargine U-300/Toujeo

- Once a day injection
- Side effects: nighttime hypoglycemia and weight loss
Carbohydrate Counting Vs. Sliding Scale

- 4 shots a day (3 meals and a basal injection)
- Individualized treatment plan for insulin administration to achieve tighter control of blood glucose levels.
- Assists in “merging” diabetes into a patient’s life.
- Meals: Carbohydrate Counting or Set Prandial doses (if patient unable to count carbohydrates and is very regiment in meal planning.)
- Correction Factor is preferred for high blood glucose levels over use of a sliding scale.
- Sliding Scale your chasing your tail.

Pattern Management

<table>
<thead>
<tr>
<th>Breakfast</th>
<th>Lunch</th>
<th>Supper</th>
<th>Bedtime</th>
</tr>
</thead>
<tbody>
<tr>
<td>297</td>
<td>304</td>
<td>324</td>
<td>368</td>
</tr>
<tr>
<td>217</td>
<td>227</td>
<td>288</td>
<td>308</td>
</tr>
<tr>
<td>194</td>
<td>205</td>
<td>427</td>
<td>288</td>
</tr>
</tbody>
</table>

- What type of diabetes?
- What would be the treatment?

Goal

- Target reversing the pathophysiology defects
- Early and aggressive treatment
- Reduce potential complications (Do not wait for “A medication to Fail”)
- Patient participation (Educate)
  - “The patient who knows the most lives the longest.” Elliot P. Joslin

Facts do not exist just because they are ignored.


