Diabetes Meds for Type 2: Objectives

1. Describe the main action of the different categories of type 2 diabetes medications.
2. Discuss using the AACE and ADA 2015 Guidelines to determine best therapeutic approach.
3. Using the ADA Guidelines, describe strategies to initiate and adjust insulin therapy.
Path to Type 2 Diabetes

Patti Labelle "divabetic" -- that's a mix of diabetic and diva
Natural Progression of Type 2 Diabetes

Adapted from Bergenstal et al. 2000; International Diabetes Center.
Patient Centered Approach

“...providing care that is respectful of and responsive to individual patient preferences, needs, and values - ensuring that patient values guide all clinical decisions.”

• Gauge patient’s preferred level of involvement.
• Explore, where possible, therapeutic choices.
• Utilize decision aids.

• **Shared decision making** – final decisions re: lifestyle choices ultimately lie with the patient.

ADA-EASD Position Statement: Management of Hyperglycemia in T2DM

ADA Standards of Care 2015
Other Considerations

- Cost
- Hypoglycemia
- Age
- Weight
- Comorbidities
  - Kidney disease
  - Heart disease – CHF, CAD
  - Liver dysfunction

ADA-EASD Position Statement: Management of Hyperglycemia in T2DM
Diabetes Care 2012;35:1364–1379
Diabetologia 2012;55:1577–1596

Glycemic Targets - ADA

- Adult non pregnant A1c goals
  - A1c < 7% - a reasonable goal for adults.
  - A1c < 6.5% - may be appropriate for those without significant risk of hypoglycemia or other adverse effects of treatment.
  - A1c < 8% - may be appropriate for patients with history of hypoglycemia, limited life expectancy, or those with longstanding diabetes and vascular complications.
**Goals for Glycemic Control**

**A1c ≤ 6.5%**
For healthy patients without concurrent illness and at low hypoglycemic risk

**A1c > 6.5%**
Individualize goals for patients with concurrent illness and at risk for hypoglycemia

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**Multiple, Complex Pathophysiological Abnormalities in T2DM**

Adapted from: Inzucchi SE, Sherwin RS in: Cecil Medicine 2011

- Decreased incretin effect
- Increased pancreatic glucagon secretion
- Decreased pancreatic insulin secretion
- Decreased gut carbohydrate delivery & absorption
- Increased hepatic glucose production
- Decreased renal glucose excretion
- Increased peripheral glucose uptake

HYPERGLYCEMIA
Antihyperglycemic Therapy – 1st Step

- **Lifestyle Changes**
  - Weight control
  - Healthy eating
  - Activity

ADA-EASD Position Statement: Management of Hyperglycemia in T2DM

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### Oral Diabetes Medications

<table>
<thead>
<tr>
<th>Class/Main Action</th>
<th>Name(s)</th>
<th>Daily Dose Range</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>biguanides</td>
<td>metformin (Glucophage)</td>
<td>500 – 2500 mg (usually BID w/meal)</td>
<td>Side effects: nausea, bloating, diarrhea. Use XR to minimize. Lactic acidosis precaution: avoid in pts with creat &gt;1.4 mg/dL, 1.5 men, during illness or surgery. Benefits: decreased cholesterol, no weight gain or hypoglycemia. Lowers A1c 1.0% – 2.0%.</td>
</tr>
<tr>
<td>sulfonylureas</td>
<td>glyburide (Micronase, DiaBeta (Glyminase))</td>
<td>1.25 – 20 mg 0.75 – 12 mg</td>
<td>Can take once or twice daily before meals. Side effects include hypoglycemia and weight gain. Eliminates via kidney. Caution: Glyburide most likely to cause hypoglycemia. Lowers A1c 1.0% – 2.0%.</td>
</tr>
<tr>
<td>DPP-4 inhibitors</td>
<td>saxagliptin (Onglyza)</td>
<td>Up to 5 mg daily (eliminated via kidney, feces)</td>
<td>Side effects include nasopharyngitis, headache and upper-respiratory tract infection. Report signs of pancreatitis (abdominal pain, nausea, vomiting). Lowers A1c 0.5% – 0.8%.</td>
</tr>
<tr>
<td>DPP-4 inhibitors</td>
<td>sitagliptin (Januvia)</td>
<td>100 mg daily (eliminated via kidney)</td>
<td>Side effects include nasopharyngitis, headache and upper-respiratory tract infection. Report signs of pancreatitis (abdominal pain, nausea, vomiting). Lowers A1c 0.5% – 0.8%.</td>
</tr>
<tr>
<td>DPP-4 inhibitors</td>
<td>alogliptin (Tanixina)</td>
<td>15 mg once daily (eliminated via kidney)</td>
<td>Side effects include nasopharyngitis, headache and upper-respiratory tract infection. Report signs of pancreatitis (abdominal pain, nausea, vomiting). Lowers A1c 0.5% – 0.8%.</td>
</tr>
</tbody>
</table>

More medications on back. Note: These meds are for people with Type 2 diabetes and should not be used during pregnancy. Content is for educational purposes only; please consult prescribing information for details.

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### GLP-1 Agonists

**Class/Main Action**: Increase insulin release with food, slows gastric emptying, promotes satiety, suppresses glucagon

<table>
<thead>
<tr>
<th>Name(s)</th>
<th>Dose Range</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exenatide</td>
<td>5 or 10 mcg BID (renally excreted)</td>
<td>Side effects: nausea, vomiting, weight loss, injection site reaction. Report signs of acute pancreatitis (severe abdominal pain, vomiting), stop med. <strong>Black box:</strong> Thyroid C-cell tumor warning for exenatide XR, albiglutide, and dulaglutide (avokib) if family history of medullary thyroid cancer. Notify MD of hoarseness, throat lump.</td>
</tr>
<tr>
<td>Exenatide XR</td>
<td>2mg 1x a week (renal lymph excreted)</td>
<td>Side effects: nausea, vomiting, weight loss, injection site reaction. Report signs of acute pancreatitis (severe abdominal pain, vomiting), stop med. <strong>Black box:</strong> Thyroid C-cell tumor warning for exenatide XR, albiglutide, and dulaglutide (avokib) if family history of medullary thyroid cancer. Notify MD of hoarseness, throat lump.</td>
</tr>
<tr>
<td>Liraglutide</td>
<td>0.6 - 1.8 mg daily</td>
<td>Side effects: nausea, vomiting, weight loss, injection site reaction. Report signs of acute pancreatitis (severe abdominal pain, vomiting), stop med. <strong>Black box:</strong> Thyroid C-cell tumor warning for liraglutide, exenatide XR, albiglutide, and dulaglutide (avokib) if family history of medullary thyroid cancer. Notify MD of hoarseness, throat lump.</td>
</tr>
<tr>
<td>Albiglutide</td>
<td>30 and 50 mg t.i.w. per day</td>
<td>Side effects: nausea, vomiting, weight loss, injection site reaction. Report signs of acute pancreatitis (severe abdominal pain, vomiting), stop med. <strong>Black box:</strong> Thyroid C-cell tumor warning for albiglutide, exenatide XR, liraglutide, and dulaglutide (avokib) if family history of medullary thyroid cancer. Notify MD of hoarseness, throat lump.</td>
</tr>
<tr>
<td>Dulaglutide</td>
<td>0.75 and 1.5 mg t.i.w. per day</td>
<td>Side effects: nausea, vomiting, weight loss, injection site reaction. Report signs of acute pancreatitis (severe abdominal pain, vomiting), stop med. <strong>Black box:</strong> Thyroid C-cell tumor warning for dulaglutide, exenatide XR, liraglutide, and albiglutide (avokib) if family history of medullary thyroid cancer. Notify MD of hoarseness, throat lump.</td>
</tr>
</tbody>
</table>

**Amylin Mimetic**

**Class/Main Action**: Slows gastric emptying, promotes satiety

<table>
<thead>
<tr>
<th>Name(s)</th>
<th>Type 1: 15 - 60 mcg; Type 2: 60 - 120 mcg immediately before major meals</th>
<th>Considerations</th>
</tr>
</thead>
</table>
Multiple, Complex Pathophysiological Abnormalities in T2DM

Adapted from: Inzucchi SE, Sherwin RS in: Cecil Medicine 2011

Life Study

- 61 year old overweight woman with type 2 diabetes 3 months. Has been trying to control diabetes with diet and exercise. GFR in 90s. Worried about weight gain.
- Most recent A1c 6.4%
  - ADA
  - AACE
  - Cash pay
ADA Step Wise Approach to Hyperglycemia 2015

- Start with lifestyle coaching
- When lifestyle alone is not achieving A1c goal – Metformin should be added at, or soon after diagnosis (unless contraindicated).
- Metformin has a long standing evidence base for efficacy and safety, is cheap and may reduce CV risk.
When goal is to avoid weight gain

- These meds are weight neutral
  - Metformin
  - DPP-IV Inhibitors: Januvia, Onglyza, Tradjenta, Nesina
  - Acarbose

- These meds associated with wt loss
  - GLP-1 agonists (Byetta, Bydureon, Victoza, Tanzeum, Trulicity)
  - SGLT-2 Inhibitors (Canagliflozin, Dapagliflozin, Empagliflozin)
  - Symlin (Pramlintide)

When goal is to minimize cost

- Go generic.
- Oral Meds - Metformin and Sulfonylureas
  - Walmart offers 3 mo supply of following meds for ~ $10
    - Metformin and Metformin XR
    - Glipizide, Glyburide, Glimepiride

- Insulins – Oldies but Goodies
  - NPH, Regular, 70/30 mix
  - $25 a vial at Walmart – ReliOn
  - Vials and needles cheaper
Life Study

- 54 year old smoker, creatinine 1.2, BMI 27. Not checking BG, even though he has glucose meter. On Metformin 500mg BID for past 4 months. Had bad experience with hypoglycemia on glyburide.

- Most recent A1c 7.9%
  - ADA
  - AACE
When goal is to avoid Hypoglycemia

- Avoid sulfonylureas
- Careful insulin dosing
- May need to up adjust glucose goals
- Monitor kidney function
- Reinforce for patients on insulin to “TIE”
  - Test
  - Inject
  - Eat

ADA Standards of Care 2015
Life Study

- 71 year old woman with type 2 diabetes for past year. BMI 24. Has been trying to control diabetes by limiting carbs and exercise. Creat 1.6. Good social support.

- Most recent A1c 8.6%
  - She has great insurance or
  - She is cash pay, hates needles
Older Adults - Considerations

- Reduced life expectancy
- Higher CVD burden
- Reduced GFR
- At risk for adverse events from polypharmacy
- More likely to be compromised from hypoglycemia

✔ Less ambitious targets
✔ A1c <7.5–8.0%
✔ Focus on drug safety

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What next?

- 69 year old male, BMI 31, on Metformin 2000mg a day and Glipizide 40mg a day.
- A1c 9.1%. Creat 1.2
- Pt is obese, 11 yr history of diabetes
  - What next?
  - Insurance
  - No insurance
Case Study

- 70 yr old, weighs 100kg
- History of CABG, tobacco
- A1c – 11.3%, BG 400-500 for past weeks
- Insulin – 100+ units Lantus at hs (solostar)
- Oral Meds: Metformin, Invokana
- Pt can’t afford Lantus insulin pen – what other option?
Case Study

- 70 yr old, weighs 100kg
- History of CABG
- A1c – 11.3%, BG 400-500 for past weeks
- Insulin – 100+ units Lantus at hs (solostar).
- Metformin 1000mg BID
- What is max basal insulin should he be on?
Case Study

- 70 yr old, weighs 100kg
- History of CABG
- A1c – 11.3%, BG 400-500 for past weeks
- Insulin – 100+ units Lantus at hs (solostar)
- Metformin 1000mg BID
- What is max basal insulin should he be on?
  - 100kg x 0.5 = 50 units a day
- What can we do next to improve BG?
Case Study

What is max basal insulin should he be on?
- 100kg x 0.5 = 50 units a day

What can we do next to improve BG?
- Add GLP-1 (Exenatide, Victoza, Trulicity, Tanzeum)
- Add bolus insulin to largest meal
- Switch him to 70/30 insulin ac breakfast and dinner
  - Total previous basal dose – 100 units
  - 2/3 in am – 65 units am (43 NPH and 22 regular)
  - 1/3 pre dinner – 35 units pm (23 NPH and 12 regular)

Case Study

- 70 yr old, weighs 100kg
- History of CABG, tobacco
- A1c – 11.3%, BG 400-500 for past weeks
- What will inform you of how to proceed?
Critical Points

- Individualize Glycemic targets & BG-lowering
- Diet, exercise, & education: foundation T2DM therapy
- Metformin = optimal 1st-line drug.
- After metformin, data limited. Combo therapy reasonable
- Ultimately, many T2 patients will require insulin therapy
- All treatment decisions should be made in conjunction with the patient (focus on preferences, needs & values.)
- CV risk reduction - a major focus of therapy.

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Thank You

- Have fun tonight
- Reps here tomorrow
- Not too late to sign up for Adv Assessment