Disclosure

0 I have no actual or potential conflict of interest in relation to this program or presentation.
0 I will not discuss off label or investigational use in my presentation.

Pharmacist Objectives

0 At the completion of this program, pharmacists will be able to:
  0 Identify specific goals regarding diabetes management in the elderly population.
  0 Discuss key concerns and risks in the elderly for certain medications used to treat diabetes.
  0 Apply the principals covered from the 2017 ADA guidelines to patient cases.
Technician Objectives

- At the completion of this program, technicians will be able to:
  - Identify specific goals regarding diabetes management in the elderly population.
  - Discuss key concerns and risks in the elderly for certain medications used to treat diabetes.
  - Identify key principals of the 2017 ADA guidelines.

Case 1

- It’s Friday and you are reviewing this patient’s chart at 4:45pm: 70 y/o male in an adult family home.
  - On Lantus 20 units at bedtime
  - About 10 fasting blood glucose levels <70 in a month

- What questions would you want to ask of the caregiver or patient?
- Any concerns you have?

Case 1 Discussion Points

- Has anything changed recently?
- Other medications? Last A1C? Comorbidities? Goals?
- When is the patient going low?
- Is less than 70 concerning?
- Did the patient experience symptoms while low and does that matter?
Justification

- Older persons have the highest prevalence of diabetes of any age group (22-33% in those aged ≥65 years).\(^{17}\)
- According to CDC projections in 2012, even if diabetes incidence levels off, the prevalence will double in the next 20 years, in part due to the aging of the population.\(^{5}\)
- Treatment can be complicated considering that often most of these patients are excluded from randomized controlled trials assessing treatments and treatment targets. This leaves us to extrapolate data from much younger populations which might not be appropriate for the older adult.

Justification cont.

- One study examined the reasons for medication-related ED visits by older adults and found that insulin (13.9%) and oral hypoglycemic agents (10.7%) were two of the most common.\(^{8}\)

Rates of diagnosed diabetes by age from 1980 to 2014 in the US.

Defining the “Elderly”

- Approximations (not hard definitions):
  - Youngest Old: 65-74
  - Middle Old: 75-84
  - Oldest Old: 85-99
  - Centenarians: 100 and older

Diabetes goals in the Elderly

| Reference 17 |
Shared Decision Making

- Older patients tend to focus on functional status and independence.\textsuperscript{15}
- In a study comparing patient perceived burden on quality of life of treatments vs disease state complications, comprehensive diabetes treatments had similar results as those with intermediate complications.\textsuperscript{7}
- Important to ensure patients understand significance of risk factors and value of risk reduction in order to appropriately discuss treatments and targets.

Pharmacologic Concerns with Diabetes in the Elderly

- Older patients may not benefit as much and may actually suffer from intensive glucose lowering\textsuperscript{12,14}
- Some benefit of intensive lowering not seen for 8-10 years.
- Other co-morbidities may be more critical.
- Goal is primarily to prevent hypoglycemia while providing reasonable control.
- This might mean tolerating some higher glucose levels.
- Some data suggests that low glucose levels (<70) even without hypoglycemic symptoms may still have negative cardiac effects.\textsuperscript{13}

Overall Treatment
More Generalities

- Usually unnecessary in the outpatient setting to establish control of diabetes therapy rapidly. It is ok to titrate to tolerance.
- It may be prudent to start medications at a lower dose (even ½ or ¼) of the typical adult starting dose, if feasible.
- "Start low, go slow, but still get somewhere."

Hypoglycemia and Falls

- Older patients may be:
  - More sensitive to the effects of hypoglycemia
  - Less able to recognize and appropriately manage symptoms of hypoglycemia
  - More likely to have end-stage complications (i.e., peripheral neuropathy, retinopathy, etc.) that contribute to a fall and affect recovery after a fall

Predictors

- Strongest predictors of severe hypoglycemia have been found to be: 18, 21
  - Advanced age
  - Recent hospitalization
  - Polypharmacy
  - These are all fairly common among the elderly population.
Renal/Hepatic Function

- Decrease in function with advancing age.
- Medications that the patient could tolerate at 50 might not be appropriate anymore now that they are 75.
- Medications that require renal dosage adj.: Metformin, Sulfonylureas*
- Repaglinide (Prandin)
- DPP-4 inh.*
- Canagliflozin (Invokana)
- Medications that require hepatic dosage adj.: Sulfonylureas

Functional Status

- Is the patient correctly understanding instructions about medications and information about their disease state?
  - Hearing impairment
  - Risk Factor: DM
  - Due to peripheral neuropathy, CHD, low HDL, general poor health
  - Cognitive dysfunction
  - Linked to both hyper- and hypoglycemia
  - Visual impairment

- Does the patient have the manual dexterity to administer their medications?

End of Life

- Since comfort is the primary concern, agents that might cause nausea, GI disturbance, or excess weight loss (ie. metformin or GLP-1 agonists) may need to be discontinued.
- Even insulin may need to be withdrawn in some patients.
- Acceptable blood glucose goals can be as lenient as 200-300 mg/dL.
- Patient and caregiver education about end-of-life goals important.
Tips and Tricks

- **Metformin**
  - Low incidence of hypoglycemia as it does not increase insulin release.
  - Could still cause hypoglycemia in combo with other agents (i.e., sulfonylureas, insulin, etc.)
  - Renal considerations: Newer guidance...
    - eGFR > 45 mL/minute/1.73 m²: no adjustment
    - eGFR 30-45 mL/minute/1.73 m²: Do not start. Already on? Consider risk vs benefit. (Some suggest ½ the dose and monitor every 3 months)
    - eGFR < 30 mL/minute/1.73 m²: Use is contraindicated.

Tips and Tricks

- **Sulfonylureas**
  - Glyburide is recommended to be avoided in the elderly considering its longer half-life in comparison to the other sulfonylureas.
  - More likely to cause hypoglycemia because less likely to match food intake.
  - Glipizide or glimepiride need to be used cautiously.

Tips and Tricks

- **Meglitinides (Glinides):** Repaglinide (Prandin) and Nateglinide (Starlix)
  - One advantage of these medications is flexible dosing for patients with irregular eating patterns.
  - Particularly useful in older patients who may not eat three meals per day.
  - Can potentially cause less hypoglycemia than SUs if administered and dosed appropriately.
Tips and Tricks

- SGLT-2 Inhibitors: canagliflozin (Invokana), dapagliflozin (Farxiga), and empagliflozin (Jardiance)
- Patients ≥65 years old tend to experience a higher rate of volume depletion than younger patients resulting in dizziness and orthostasis.
- Effects are dose-dependent and noticeable in those ≥75 years old.
- Good starting doses:
  - Invokana 100 mg daily
  - Farxiga 5 mg daily
  - Jardiance 10 mg daily

GLP-1 agonists

<table>
<thead>
<tr>
<th>Product</th>
<th>Needles</th>
<th>Considerations</th>
<th>Impact on A1c</th>
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<tbody>
<tr>
<td>Albiglutide</td>
<td>Comes with 29 gauge needle with</td>
<td>Injection wait time (15-30 min after</td>
<td>0.6-1.0%</td>
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<td>(Tanzeum)</td>
<td>pen. Patient must attach to pen.</td>
<td>reconstitution)</td>
<td></td>
</tr>
<tr>
<td>Dulaglutide</td>
<td>Comes with needle already attached</td>
<td>No reconstitution needed</td>
<td>0.9-1.4%</td>
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<tr>
<td>(Trulicity)</td>
<td>to pen.</td>
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<tr>
<td>Exenatide</td>
<td>Byetta requires separate Rx for</td>
<td>Several steps for reconstitution with</td>
<td>0.8-1.5% BID</td>
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<tr>
<td>(Byetta)</td>
<td>needles. Bydureon kit and pen do</td>
<td>injection kit. Bydureon pen should</td>
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</tr>
<tr>
<td></td>
<td>come with needles</td>
<td>sit out 15 minutes before reconstituting</td>
<td></td>
</tr>
<tr>
<td>Liraglutide</td>
<td>Need Rx for needles</td>
<td>No reconstitution needed</td>
<td>1.0-1.4%</td>
</tr>
<tr>
<td>(Victoza)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lixisenatide</td>
<td>Need Rx for needles</td>
<td>No reconstitution needed</td>
<td>0.3-0.8%</td>
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<tr>
<td>(Adlyxin)</td>
<td></td>
<td></td>
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</table>

Sliding Scale Insulin

- True SSI not recommended in the elderly according to the “Beers List”.
- Refers to sole use of short- or rapid-acting insulin to manage or avoid hyperglycemia in the absence of basal or long-acting insulin.
- Reason: Higher risk of hypoglycemia without improvement in hyperglycemia management regardless of care setting.
Summary

- Less intensive blood glucose goals should be considered in older patients with more comorbidities.
- Hypoglycemia, renal and hepatic function, and functional status are all important considerations when choosing appropriate therapy in the elderly person with diabetes.
- Refer to specific slides for tips and tricks for managing elderly patients on common anti-hyperglycemic medications.

Case 2

- 72 y/o male has had a few falls recently including one that resulted in an ER visit where they measured a blood glucose of 42 mg/dL. You are asked to review his medication regimen and make adjustments, if necessary, to reduce his fall risk.
- PMH: type 2 DM, peripheral neuropathy, and hyperlipidemia.
- Vitals today: BP: 132/74, P: 76, RR: 16, A1C 7.6%.
- Medications:
  - Glyburide 20 mg daily
  - Metformin XR 2000 mg daily
  - Gabapentin 600 mg TID
  - Insulin glargine 10 units QHS
  - Insulin lispro per sliding scale
  - Rosuvastatin 20 mg daily

Discuss with the people around you:
- What questions would you like to ask?
- What medications would you consider changing, if any?
Case 2 Discussion Points

- Kidney and liver function?
- When are the lows? What preceded the recent 42?
- Glyburide?
- Sliding scale or Lantus?
- Are the falls all associated with low BGs?
- Gabapentin history?
- Could they be mechanical in nature? (neuropathy)
- Dehydration?
- What is his A1C goal?

Table 1 – A framework for considering treatment goal for glycemic, blood pressure, and lipid objectives in older adults with diabetes

2017 ADA Guideline Updates

Focusing on medication-related updates.
Metformin

- New evidence suggests that long-term metformin use is associated with B-12 deficiency.
- ACTION: Consider periodic measurement of B-12 levels and supplement as necessary.
- FOCUS: Any patient, but especially those with anemia or peripheral neuropathy

“Biosimilar” Insulins

- Basaglar (Insulin glargine) 100 units/mL KwikPen
  - Approved through an abbreviated FDA approval pathway.
  - NOT interchangeable with Lantus (requires a new Rx).
  - Patients can be converted from Lantus on a unit-per-unit basis.
  - Potentially less expensive than Lantus, but still costly.

Agents with CVD benefits

- Sodium–Glucose Co-transporter 2 (SGLT2) Inhibitors
  - Currently ONLY data for empagliflozin (Jardiance)
  - NEW (12/16) indication: risk reduction of cardiovascular mortality in adults with type 2 diabetes mellitus and established cardiovascular disease
  - Based on the EMPA-REG OUTCOME trial.
- Glucagon-like peptide 1 (GLP-1) receptor agonist
  - Currently ONLY data for liraglutide (Victoza)
  - Based on the LEADER trial.
Acknowledgment of Cost

New Algorithm

Specifically for injectable therapy for patients with type II DM.

Reflects studies demonstrating non-inferiority of the following treatments:

- Basal insulin + GLP-1 agonist
- Basal insulin + Rapid-acting insulin (before largest meal)
- BID dosing of premixed insulin

Also non-inferiority of:

- Multiple dose premixed insulin
- Basal-Bolus


New Cost Tables

- New tables were added due to concerns about the affordability of anti-hyperglycemic agents.
- It is very important to consider insurance coverage status and also specific plan when developing a care plan for a patient with type II DM.
Summary

- Consider monitoring for B-12 deficiency in your diabetic patients on Metformin.
- Basaglar might be a cheaper option for some patients needing a basal insulin.
- Victoza and Jardiance might be good options for your patients with co-morbid CVD.
- NPH and Regular insulin might be cheaper options for some patients, but also have their limitations.

Case 3

- A 65 y/o female with uncontrolled type 2 diabetes, hypertension, CKD stage 3 and depression.
- Current A1c 9.2%, eGFR 43 mL/min, BP today 139/80
- Medications:
  - Humulin 70/30: 30 units BID
  - Metformin 1000 mg BID
  - Citalopram 20 mg daily
  - Lisinopril/HCTZ 20/12.5 mg daily
  - ASA-81mg daily
- You are asked to recommend a plan to get this patient’s DM under control.

Case 3

- What is this patient’s A1c goal?
- What adjustments would you make to get this patient to goal based on the most recent guideline changes?
- Any other concerns?
Case 3 Discussion Points

- Renal function? (Metformin)
- Compliance (Cost)? Diet?
- Any lows?
- Next step according to the guidelines for injectable therapy?
  - Would require switching to basal/bolus or other fixed analog insulin (i.e. Humalog 70/30) to add TID dosing.
- Oral therapy?

Conclusion

- Recognition of importance and relevance of topic
- Targets defined
- Precautions to consider and minutia to keep in mind when it comes to selecting medications for the elderly patient with diabetes.
- General guideline updates as related to medications summarized

Assessment Questions
Assessment Question 1

According to the information presented, what is an appropriate A1C goal for an older patient with multiple co-morbidities and mild to moderate cognitive impairment?

a) < 7.5%

b) 7-8%

c) < 8%

d) 9-10%

Assessment Question 2

When a patient is initiated on metformin what should you consider monitoring for according to the ADA 2017 Guidelines?

a) B-12 deficiency

b) Elevated cobalamin levels

c) Elevated vitamin D levels

d) Increased constipation and shortness of breath

Assessment Question 3

What can be an issue with older patients taking GLP-1 inhibitors?

a) Complicated reconstitution steps

b) Lack of the dexterity to use the pens

c) Excess weight loss

d) All of the above
Assessment Question 4

T or F: Some data suggests that low glucose levels (<70) even in the absence of hypoglycemic symptoms may still have negative cardiac effects.

Assessment Question 5

Which agents have positive clinical trial evidence and are now recommended in type 2 diabetic patients with co-morbid CVD disease for risk reduction of cardiovascular mortality?

a) Trulicity and Jardiance
b) Jardiance and Victoza
c) Prandin and Glucophage
d) Victoza and canagliflozin

Questions?
References


References