Learning Objectives

- Identify factors that increase patients' risk for hypoglycemia
- Describe actions to mitigate hypoglycemia in at-risk patients
- Apply concepts learned to case studies
Polling Question

True or False: For most patients with diabetes, an A1c goal of <7% is recommended

UKPDS

- Glycemic control early in diabetes has a lasting benefit, including for CVD risk
- Interpreted as everyone should have A1c goal <7%, and national guidelines followed suit
  - Only included healthy, newly diagnosed patients <65 years old

Who isn’t a little afraid of hypoglycemia?

Serious Sequelae:
- Tachycardia
- Bradyarrhythmias
- ST Depression
- T-wave Flattening
- QT Prolongation
- Hypokalemia
- Severe Hypertension
- Falls
- Death

A1c Variability

- A1c test result is within a range; it is not an absolute lab value
- Other clinical factors can impact the relationship between A1c and glycemic control

Tight control OK for young patients, not older
**American Geriatric Society**

- Avoid using medications to achieve A1c <7.5% in most adults >65 years old; moderate control is generally better
- No evidence that using medications to achieve tight glycemic control in older adults with Type 2 diabetes is beneficial

**Risk Factors for Hypoglycemia**

- Intensive glucose control / A1C targets
- Advanced age and/or cognitive decline
- Low health literacy and numeracy
- Social determinants including food insecurity
- Prior hypoglycemic event
- Hypoglycemia unawareness
- Liver / kidney disease

**Health Literacy Issues – US Adults**

- 77 million have basic or below basic health literacy.
- Only 12% had proficient health literacy.
- Association between limited health literacy and numeracy and poor diabetes outcomes.

**Translation into Practice**

- Appropriately tailor interventions and provide health education
- Communicate using simple language
  - Utilize the “2 syllable rule” when creating written and spoken educational materials
- Utilize visual aids and written materials
- Use teach back and Ask Me 3

**Shared Decision Making**

Shared Decision Making with the patient when choosing INDIVIDUALIZED goals of therapy is key

**Patient Case #1**

86 year old patient with DM1 continual hypoglycemia episodes & unawareness A1c 7.0%.
### Risk of Hypoglycemia

<table>
<thead>
<tr>
<th>Drug Class</th>
<th>Low Risk</th>
<th>Moderate Risk</th>
<th>High Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biguanide (metformin)</td>
<td></td>
<td></td>
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<tr>
<td>TZDs (Pioglitazone, Rosiglitazone)</td>
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<tr>
<td>DPP-4 Inhibitors (Sitagliptin, Saxagliptin, Linagliptin, Albiglutide)</td>
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<td></td>
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<tr>
<td>SGLT-2 Inhibitors (Canagliflozin, Dapagliflozin)</td>
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<td></td>
<td>Insulin</td>
</tr>
<tr>
<td>GLP-1 Agonists (Exenatide, Lixisenatide, Albiglutide, Lixesenaside, Dulaglutide)</td>
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### Clinical Pearls

- **Insulin**
  - Highest risk for hypoglycemia of all meds; greatest A1c lowering effect
  - Pre-mixed insulins are more convenient but allow for less individualizing and often more hypoglycemia
  - Consider earlier in therapy based on A1c goals

### Drug Class and A1c Lowering

<table>
<thead>
<tr>
<th>Drug Class</th>
<th>A1c Lowering</th>
<th>Clinical Pearls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meglitinides</td>
<td>0.5-1%</td>
<td>Metformin dosing may ↓ adherence</td>
</tr>
<tr>
<td>Alpha-Glucosidase Inhibitors</td>
<td>0.5-1%</td>
<td>Metformin dosing may ↓ adherence</td>
</tr>
<tr>
<td>SGLT-2 Inhibitors</td>
<td>0.5-1.5%</td>
<td>Metformin dosing may ↓ adherence</td>
</tr>
<tr>
<td>DPP-4 inhibitors</td>
<td>0.6-1%</td>
<td>Metformin dosing may ↓ adherence</td>
</tr>
<tr>
<td>GLP-1 Agonists</td>
<td>0.6-2.1%</td>
<td>Metformin dosing may ↓ adherence</td>
</tr>
</tbody>
</table>

### VHA Choosing Wisely® Hypoglycemia Safety Initiative

- In concert with ABIM’s Choosing Wisely® Initiative
- Supported by VA/DoD DM guidelines since 1997; more recently by DHHS and CMMS
- A voluntary program to improve patient-centered care and reduce the risk of hypoglycemia across the VHA nation-wide

### Patient Case #2

62 year old with h/o alcoholic cirrhosis and DM2 (x1 year). A1c 8.5% with relative morning hypoglycemia and loose stools.

On Metformin 1000mg BID and Insulin Glargine 15 units QPM.
CW-HSI Methods

- Identify high-risk cohort
  - HbA1c < 7%
  - Insulin or Sulfonylurea
  - Age ≥ 75 or Dementia / Cognitive Impairment or SCr > 1.7 mg/dL

- Integrated Approach

CW-HSI Pilot Findings

Evaluation
  - Over 9,300 patients have been evaluated using the EMR template
  - Evaluation rate for high-risk patients assigned to primary care is 87%

Occurrence
  - Hypoglycemia has been reported by 25% of those evaluated

Action
  - Of all patients evaluated, 95% have documented shared decision making
  - Of those reporting hypoglycemia, 56% have made a shared decision with their provider to relax treatment

Behaviors Leading to Hypoglycemia

<table>
<thead>
<tr>
<th></th>
<th>Intensive Glycemia % (n)</th>
<th>Standard Glycemia % (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>14% (79)</td>
<td>11% (20)</td>
</tr>
<tr>
<td>Food Related</td>
<td>48% (263)</td>
<td>58% (107)</td>
</tr>
<tr>
<td>Delayed or missed meal</td>
<td>31% (167)</td>
<td>44% (81)</td>
</tr>
<tr>
<td>Ate less carbohydrate</td>
<td>26% (144)</td>
<td>25% (47)</td>
</tr>
<tr>
<td>Unexpected, vigorous exercise</td>
<td>15% (80)</td>
<td>12% (23)</td>
</tr>
<tr>
<td>Ate more insulin than prescribed</td>
<td>5% (30)</td>
<td>7% (13)</td>
</tr>
<tr>
<td>Ingested alcohol</td>
<td>3% (18)</td>
<td>2% (4)</td>
</tr>
</tbody>
</table>

Causes of Severe Hypoglycemia

Food Insecurity by Day

At Risk Populations

- Low-income households with incomes below 185% of the poverty threshold
- Households with children headed by a single woman
- Households with children headed by single man
- Black, non-Hispanic households
- Hispanic households
- Households with children under age 6; All households with children; Women living alone; Men living alone

Food Insecurity & Diabetes

- Food insecurity is more prevalent in households including a person with diabetes.¹
- Diabetes prevalence rises with increasing severity of food insecurity.²
  - 10% mild insecurity
  - 16% severe insecurity


Patient Case #3

- 73yo carpenter with T2DM >20 years, widowed 2012.
- BMI 20.7 (BMI target for age >23)
- CKD stage 3 with eGFR 32
- Taking Insulin Glargine Q bedtime & Aspart with meals
- Recent ER visit; cut finger off while helping family member with a project. Did not want to stop for lunch

Risk Stratification Tool & Action Steps

Be Proactive!
How can you work at your facility to identify patients at higher risk?

https://www.youtube.com/watch?v=FqQJuIl8DKl
Resources
2017 VA/DoD DM Clinical Practice Guidelines
https://www.healthquality.va.gov/guidelines/CD/diabetes/
Includes:
- Full Guideline
- Provider Summary
- Pocket Guide
- Additional Tools

United States Department of Agriculture

Adult Carb Quiz
- Validated method of assessing patients’ knowledge of carbohydrate counting
- 43 item quiz that takes ~15 minutes to complete
- 6 domains:
  - Carbohydrate food recognition
  - Carbohydrate food content
  - Nutrition label reading
  - Glycemic targets
  - Hypoglycemia prevention and treatment
  - Calculating carbohydrate composition in a mixed meal


AdultCarbQuiz Sample Questions

AHRQ SHARE MODEL

Health Literacy Domains
- Cultural and conceptual knowledge
- Speaking and listening skills
- Writing and reading skills

Teach Back Method or "Show Me" Method

Ask them to explain in their own words
- If needed, re-explain and check again
- Use plain language
- Comfortable body language and eye contact
- Open-ended questions
- Non-shaming

Diabetes Numeracy Test (DNT)

Sample Questions
1. What is my main problem?
2. What do I need to do?
3. Why is it important to do this?

Apply the Ask Me 3

Disclosure to Participants

Notice of Requirements For Successful Completion
- Please refer to learning goals and objectives.
- Learners must attend the full activity and complete the evaluation in order to claim continuing education credit/hours.

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- Presenter: Sharon A. Watts, DNP, FNP-BC, CDE - Nothing to disclose
- Presenter: Sandra C. Hedin, PharmD, BCACP - Nothing to disclose
- Presenter: Mary M. Julius, RDN, CDE - Nothing to disclose

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