Manejo de la Diabetes en el Anciano

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Definition of the “Elderly” Patient?

- No general agreement on the age at which a person becomes elderly
- Most developed countries: ≥65 yo
- Medicare eligibility: ≥ 65 yo
- United Nations: ≥ 60 yo
- WHO study in Africa: ≥ 50 yo

Umpierre: edad = 10 años mayor a la persona más anciana en este congreso

Exponential Growth of Adults ≥ 65 in the US

Population 65+ by Age: 1900-2050

• “By 2030, it is estimated that there will be 8.3 billion people on this planet, with 13% over the age of 65 years—the fastest-growing age group”

People are Living Longer

US Population of Adults 55+, (Millions)

2030
112
2020
98
2010
77

Between 2010-2028, 8000 baby boomers will turn 65+ each year

Average Life Expectancy

<table>
<thead>
<tr>
<th>Year</th>
<th>World</th>
<th>Women, US</th>
<th>Men, US</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>66.4</td>
<td>73.7</td>
<td>76.5</td>
</tr>
<tr>
<td>2008</td>
<td></td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>75</td>
<td>82.6</td>
<td>76.5</td>
</tr>
</tbody>
</table>

CDC 2010 data; [http://www.aarp.org/personal-growth/transitions/boomers_65](http://www.aarp.org/personal-growth/transitions/boomers_65)
Age at Diagnosis of Incident Cases of Diabetes, Aged 18–79 Years, US, 2011

Data Source: Centers for Disease Control and Prevention (CDC), National Center for Health Statistics, Division of Health Interview Statistics, data from the National Health Interview Survey, 2011.
Prevalent Comorbidities among older patients with T2DM

% of population with specific comorbidities

- Hypertension: 66%
- Lipid Disorders: 36%
- Coronary Atherosclerosis: 33%
- CHF: 23%
- Cardiac Dysthriasms: 19%
- OA: 17%
- Cataract: 15%
- Thyroid disorders: 14%
- COPD: 13%
- Peri. & Vis. Atherosclerosis: 13%

Nielfeld MR. Diabetes Care; 2003; 26:1344-1349
Longitudinal Trends in Hospital Admission for Hyperglycemia and Hypoglycemia in Older Adults

- Currently, hypoglycemia accounts for more hospital admissions than hyperglycemia
- Hypoglycemia risk is greatest in patients aged ≥ 75 years

Diabetes in Older Adults: A Consensus Report

M. Sue Kirkman, MD, Vanessa Jones Briscoe, PhD, NP, CDE, Nathaniel Clark, MD, MS, RD, Hermes Florez, MD, MPH, PhD, Linda B. Haas, PHC, RN, CDE, Jeffrey B. Halter, MD, Elbert S.

Standards of Medical Care in Diabetes

American Geriatrics Society (AGS) Guidelines for Improving the Care of the Older Adult with Diabetes Mellitus: 2013 Update
Lowering HgA1c
Preventing Hypoglycemia

Individualized Algorithm
American Geriatric Society: A1c Recommendations 2013 for 65+

- 7.5 - 8% in general for the older adults
- 7% - 7.5% may be appropriate if it can be safely achieved in healthy older adults with few comorbidities and good functional status
- 8% - 9% is appropriate for older adults with multiple comorbidities, poor health, and limited life expectancy (IIA)
- Potential harm in lowering A1C to < 6.5% in older adults with type 2 DM (IIA)

Consensus on Hypoglycemia Management and Prevention for Adults Aged ≥ 70 Years

Individualize treatment according to comorbidities, cognitive and functional status, and in agreement with the patient and/or caregiver

- Do not initiate treatment until FPG is consistently ≥ 126 mg/dL
- On-treatment targets:
  - HbA1C 7.0%-7.5%; FPG ≥ 108 mg/dL
- Strictly avoid BG < 90 mg/dL; hypoglycemia threshold: BG < 72 mg/dL
- Avoid RPG > 198 mg/dL to minimize symptoms and reduce the risk of other diabetes-related complications

## Consensus Development Conference on Diabetes & Older Adults (≥65yo)

### A Framework for Considering Treatment Goals

<table>
<thead>
<tr>
<th>Health Status</th>
<th>Rationale</th>
<th>A1C%</th>
<th>FBG</th>
<th>HS BG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy (few illnesses, intact cognitive and fxnl status)</td>
<td>Longer life expectancy</td>
<td>&lt;7.5%</td>
<td>90-130</td>
<td>90-150</td>
</tr>
<tr>
<td>Complex/intermed</td>
<td>Intermed life expectancy, high tx burden, risk of hypos, fall risk</td>
<td>&lt;8.0%</td>
<td>90-150</td>
<td>100-180</td>
</tr>
<tr>
<td>Very complex/poor health (Long-term care or end-stage chronic illnesses)</td>
<td>Ltd remaining life expectancy makes benefit uncertain</td>
<td>&lt;8.5%</td>
<td>100-180</td>
<td>110-200</td>
</tr>
</tbody>
</table>

Diabetes May Be Over-treated Among Older Adults

VA Healthcare System

- About 25% of patients in the VA system have diabetes

N = 652,378 patients receiving insulin or sulfonylurea. The denominator population: patients 75 years or older; serum creatinine level, 2.0mg/dL; or diagnosis of cognitive impairment or dementia. A,B,C, outliers.

Longitudinal Trends in Hospital Admission for Hyperglycemia and Hypoglycemia in Older Adults

- Currently, hypoglycemia accounts for more hospital admissions than hyperglycemia
- Hypoglycemia risk is greatest in patients aged ≥ 75 years

Maintenance of Glycemic Control with Oral Antidiabetic Agents in Elderly Populations

Lifestyle changes

- Metformin
- DPP4-I
- SGLT2-I
- Acarbose
- GLP1-RA

Avoid/Caution:
1. Sulfonylureas due to hypoglycemia, CVD?
2. TZDs due to risk of osteoporosis, fractures, and HF
Efficacy of metformin in elderly and old-elderly (>75 yrs) vs. non-elderly (<65 yrs) patients.

Metformin in elderly patients with T2D is not different from that in non-elderly patients,

Data are mean SEM.
* $P < 0.05$;
** $P < 0.01$;
*** $P < 0.001$ vs. baseline.

Ito et al. Geriatr Gerontol Int 2011; 11: 55–62
Sulfonylureas

- Used by 50-66% of type 2 diabetics
- Those with longer half-life have increased risk of hypoglycemia
  - Glyburide
- Risk factors of hypoglycemia with sulfonylureas
  - Age > 60, disability, poor nutrition, polypharmacy
  - Drugs which potentiate their action
Relative Risk for experiencing hypoglycemia: Glyburide vs other secretagogues

<table>
<thead>
<tr>
<th>Study</th>
<th>Glyburide n/N</th>
<th>Secretagogue n/N</th>
<th>RR (random) 95% CI</th>
<th>RR (random) 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baba 1983</td>
<td>20/131</td>
<td>10/146</td>
<td></td>
<td>2.23 [1.08, 4.59]</td>
</tr>
<tr>
<td>Dills 1996</td>
<td>48/288</td>
<td>34/289</td>
<td></td>
<td>1.42 [0.94, 2.13]</td>
</tr>
<tr>
<td>Draeger 1996</td>
<td>74/520</td>
<td>60/524</td>
<td></td>
<td>1.24 [0.90, 1.71]</td>
</tr>
<tr>
<td>Haider 1976</td>
<td>2/76</td>
<td>0/80</td>
<td></td>
<td>5.26 [0.26, 107.61]</td>
</tr>
<tr>
<td>Hamblin 1970</td>
<td>7/50</td>
<td>2/47</td>
<td></td>
<td>3.29 [0.72, 15.05]</td>
</tr>
<tr>
<td>Harrower 1994</td>
<td>7/84</td>
<td>2/86</td>
<td></td>
<td>3.58 [0.77, 16.76]</td>
</tr>
<tr>
<td>Landgraf 1999</td>
<td>9/101</td>
<td>9/94</td>
<td></td>
<td>0.93 [0.39, 2.24]</td>
</tr>
<tr>
<td>Mafauzy 2002</td>
<td>19/119</td>
<td>15/116</td>
<td></td>
<td>1.23 [0.66, 2.31]</td>
</tr>
<tr>
<td>Marbury 1999</td>
<td>37/182</td>
<td>59/362</td>
<td></td>
<td>1.25 [0.86, 1.81]</td>
</tr>
<tr>
<td>Rosenstock 1993</td>
<td>3/70</td>
<td>1/69</td>
<td></td>
<td>2.96 [0.32, 27.74]</td>
</tr>
<tr>
<td>Wolffensbuttel 1999</td>
<td>13/139</td>
<td>26/286</td>
<td></td>
<td>1.03 [0.55, 1.94]</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>2199</td>
<td>2513</td>
<td></td>
<td>1.52 [1.21, 1.92]</td>
</tr>
</tbody>
</table>

Glyburide was associated with a 52% greater risk of experiencing at least one episode of hypoglycemia compared with other secretagogues (RR 1.52 [95% CI 1.21–1.92]) and with 83% greater risk compared with other sulfonylureas (1.83 [1.35–2.49]).

Hypoglycemia and Annualized Mortality Rates Within Treatment Groups: ACCORD

Mortality Rate (n=451 deaths)

Requiring Any Assistance, Medical

<table>
<thead>
<tr>
<th>Treatment Group</th>
<th>Requiring Medical Assistance</th>
<th>Requiring Any Assistance, Medical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>2.8</td>
<td>4.9</td>
</tr>
<tr>
<td>Intensive</td>
<td>3.7</td>
<td>3.7</td>
</tr>
</tbody>
</table>

Requiring Medical Assistance

<table>
<thead>
<tr>
<th>Treatment Group</th>
<th>Requiring Medical Assistance</th>
<th>Requiring Any Assistance, Medical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>2.9</td>
<td>1.0</td>
</tr>
<tr>
<td>Intensive</td>
<td>4.9</td>
<td>1.2</td>
</tr>
</tbody>
</table>

* Person-years
† *p* = .076 for interaction between history of hypoglycemia requiring any assistance and glycemia intervention
‡ *p* = .009 for interaction between history of hypoglycemia requiring medical assistance and glycemia intervention

Severe Hypoglycemia in 3 Outcome Trials of Intensive Glucose Control in Type 2 Diabetes

% Patients with at least one severe hypoglycemic event during the trial

- VADT: p < .001
- ACCORD: p < .001
- ADVANCE: p < .001

Adapted from:
Sulfonylurea use and risk of hip fractures among elderly men and women with T2D

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Sulfonylurea users</th>
<th>Non-sulfonylurea users</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>$n = 13,195$</td>
<td>$n = 13,195$</td>
</tr>
<tr>
<td>Hip fractures ($n$)</td>
<td>226</td>
<td>157</td>
</tr>
<tr>
<td>Unadjusted model</td>
<td>OR (95 % CI)</td>
<td>Referent group</td>
</tr>
<tr>
<td>Multivariable model$^a$</td>
<td>Adjusted OR (95 % CI)</td>
<td>Referent group</td>
</tr>
<tr>
<td>Men</td>
<td>$n = 7,050$</td>
<td>$n = 6,919$</td>
</tr>
<tr>
<td>Hip fractures ($n$)</td>
<td>77</td>
<td>43</td>
</tr>
<tr>
<td>Multivariable model$^a$</td>
<td>Adjusted OR (95 % CI)</td>
<td>Referent group</td>
</tr>
<tr>
<td>Women</td>
<td>$n = 6,145$</td>
<td>$n = 6,276$</td>
</tr>
<tr>
<td>Hip fractures ($n$)</td>
<td>149</td>
<td>114</td>
</tr>
<tr>
<td>Multivariable model$^a$</td>
<td>Adjusted OR (95 % CI)</td>
<td>Referent group</td>
</tr>
<tr>
<td></td>
<td>1.32 (1.03–1.69)</td>
<td>Referent group</td>
</tr>
</tbody>
</table>

$OR$ odds ratio, $CI$ confidence interval

$^a$ Derived from logistic regression models which considered matching on propensity score, and including region, osteoporosis, use of benzodiazepines, antipsychotics, antidepressants, opioids, and corticosteroids, as well as a history of hypoglycemia in the baseline period

Saxagliptin compared with Glimepiride in elderly patients with type 2 diabetes

Schernthaner et al. Diabetes, Obesity and Metabolism 17: 630–638, 2015
Linagliptin Shows Rates of Hypoglycemia Similar to Placebo

Investigator-defined hypoglycemia AEs at week 24 by category

- All hypoglycemia AEs: Placebo 23.2%, Linagliptin 22.0%
- Documented symptomatic (≤72 mg/dL): Placebo 18.7%, Linagliptin 17.0%
- Documented symptomatic (<54 mg/dL): Placebo 8.7%, Linagliptin 8.6%
- Severe: Placebo 0.6%, Linagliptin 0.3%

The durability of sitagliptin in elderly patients with T2D

Linagliptin Significantly Reduced Hba1c After 24 Weeks in Patients on a Stable Insulin Dose

Baseline HbA1c (%): 8.29 8.31

Adjusted* Mean HbA1c (%):

Placebo (n = 617) Linagliptin (n = 618) Linagliptin placebo corrected†

-0.58 -0.65 0.07

Full analysis set (last observation carried forward).
Change-from-baseline HbA1c at Week 24 is the primary endpoint.
*Model includes treatment, baseline HbA1c, renal function, concomitant OADs. †Sensitivity analyses (FAS OC and PPS) revealed similar results.
DPP-4 Inhibitors and Basal Insulin: Low Risk of Severe Hypoglycemia or Weight Gain

The proportion of patients attaining A1C < 7% with ALO, LINA, or SAXA in combination with basal insulin ranges from 8% to 20%\(^1\),\(^a\)

SITA in combination with basal insulin.

24- to 26-week trials for named agent at maximum dose in combination with basal insulin and 0-2 OADs; BL A1C, 8.3%-9.3%; BL Wt, not reported. \(^a\) Data not reported for SAXA.

1. US FDA. Drugs@FDA. http://www.accessdata.fda.gov/Scripts/cder/DrugsatFDA.
## Comparative Efficacies of DPP-4s

### Placebo-corrected change from baseline in HbA1c - Monotherapy

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>ΔHbA1c (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Alogliptin</strong></td>
<td>12.5mg 25mg</td>
<td>-0.56 -0.59</td>
</tr>
<tr>
<td></td>
<td>7.9% 7.9%</td>
<td></td>
</tr>
<tr>
<td><strong>Linagliptin</strong></td>
<td>5mg 5mg</td>
<td>-0.6 -0.7</td>
</tr>
<tr>
<td></td>
<td>8.1% 8.0%</td>
<td></td>
</tr>
<tr>
<td><strong>Saxagliptin</strong></td>
<td>5mg 5mg</td>
<td>-0.4 -0.6</td>
</tr>
<tr>
<td></td>
<td>7-10% 8.0%</td>
<td></td>
</tr>
<tr>
<td><strong>Sitagliptin</strong></td>
<td>100mg 100mg</td>
<td>-0.6 -0.6</td>
</tr>
<tr>
<td></td>
<td>8.0% 8.0%</td>
<td></td>
</tr>
<tr>
<td><strong>Vildagliptin</strong></td>
<td>50mg BID 50mg</td>
<td>-0.5 -0.7</td>
</tr>
<tr>
<td></td>
<td>8.6% 8.4%</td>
<td></td>
</tr>
</tbody>
</table>

The current DPP-4s have comparative efficacy.

---

2. Linagliptin Prescribing Information.
3. Saxagliptin Prescribing Information.
4. Sitagliptin Prescribing Information.
Benefits and Advantages of DPP4-i Therapy in Elderly Patients with T2D

- Lower HbA1c ~0.4%–0.9% from baseline
- Weight neutral
- Once-daily oral therapy
- Low-risk of hypoglycemia (as monotherapy)
- Minimal GI side effects
- Approved as monotherapy or combination therapy
Hypoglycemia Associated With Common Treatment Regimens in Long-Term Care Settings

- 42% had BG < 70 mg/dL, 7% had BG < 40 mg/dL
- 18.8% of those with hypoglycemia were treated with SUs, 64% were treated with insulin
- All current guidelines recommend against prolonged use of SSI in long-term care settings

Older Adults Have the Highest Risk of Insulin-Related Hypoglycemia and Errors Leading to ED Visits

- Patients aged ≥ 80 years have the highest risk of ED visits for hypoglycemia
- 94.6% of hospitalizations related to antihyperglycemic agents in older adults are for hypoglycemia

National estimate of 97,648 insulin-related hypoglycemia and insulin errors derived from 8100 cases reported in CDC databases during 2007-2011.

SGLT-2 Inhibitor – kidney is target organ
Renal glucose reabsorption

Glucose

Proximal tubule
S1 segment

SGLT2
~90% glucose reabsorption

SGLT-1
~10% glucose reabsorption

S3 segment

Collecting ducts
# Perspectives on SGLT2 Inhibition

## Advantages
- Improved glycemic control
- Weight loss
- Low risk of hypoglycemia
- Blood pressure lowering
- Reduce cardiovascular events and mortality

## Concerns
- Polyuria
- Electrolyte disturbances
- Urinary tract infections
- Fungal genital infections
- DKA
- Bone fractures
### Management of Hyperglycemia in Type 2 Diabetes: A Patient-Centered Approach

**Position Statement of the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD)**

#### Diagram:

<table>
<thead>
<tr>
<th>Therapy Level</th>
<th>Drugs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monotherapy</td>
<td>Metformin, SU, TZD, DPP4, SGLT2, GLP1, Insulin</td>
</tr>
<tr>
<td>Dual therapy</td>
<td>Metformin + SU, Metformin + TZD, Metformin + DPP4, Metformin + SGLT2, Metformin + GLP1, Metformin + Insulin</td>
</tr>
<tr>
<td>Triple therapy</td>
<td>Metformin + SU + TZD, Metformin + SU + DPP4, Metformin + SU + SGLT2, Metformin + TZD + DPP4, Metformin + TZD + SGLT2, Metformin + DPP4 + SGLT2, Metformin + GLP1 + SGLT2, Metformin + Insulin + SGLT2</td>
</tr>
</tbody>
</table>

**Healthy eating, weight control, increased physical activity, and diabetes education**

**If A1C target not achieved after ~3 months of monotherapy, proceed to 2-drug combination (order not meant to denote any specific preference—choice dependent on a variety of patient- and disease-specific factors):**

- Metformin + Sulfonylurea (SU)
- Metformin + Thiazolidinedione (TZD)
- Metformin + DPP-4 inhibitor
- Metformin + SGLT2 inhibitor
- Metformin + GLP-1 receptor agonist
- Metformin + Insulin

**If A1C target not achieved after ~3 months of dual therapy, proceed to 3-drug combination (order not meant to denote any specific preference—choice dependent on a variety of patient- and disease-specific factors):**

- Metformin + SU + TZD
- Metformin + SU + DPP-4 inhibitor
- Metformin + SU + SGLT2 inhibitor
- Metformin + TZD + DPP-4 inhibitor
- Metformin + TZD + SGLT2 inhibitor
- Metformin + DPP-4 inhibitor + SGLT2 inhibitor
- Metformin + GLP-1 receptor agonist + SGLT2 inhibitor
- Metformin + Insulin + SGLT2 inhibitor

**If A1C target not achieved after ~3 months of triple therapy and patient (1) on oral combination, move to injectables; (2) on GLP-1 RA, add basal insulin; or (3) on optimally titrated basal insulin, add GLP-1 RA or mealtime insulin. In refractory patients consider adding TZD or SGLT2 inhibitor.**

**Combination injectable therapy:**

- Basal insulin + Mealtime insulin or GLP-1 RA
Patient Preference ORAL Agents in the Elderly: Hypoglycemia Avoidance

Preferred

- metformin
- DPP4 inhibitor
- α-glucosidase inhibitor

Caution

- SGLT2-I
- TZD

Not Preferred

- sulfonylurea
- glinide
- Insulin
- GLP1 Analogs
Randomized Controlled Study Comparing Linagliptin (± Metformin) and Glargine (± Metformin) in elderly patients in LTC

- **Aim:** Differences in glycemic control with Basal (glargine) insulin (± Metformin) vs linagliptin (± Metformin) in nursing home patients with diabetes.

- **Study Sites:** Emory, Grady and Atlanta VAMC Affiliated LTC facilities.

- **Patient Population:** Diabetic subjects treated with diet and/or OADs with BG >180 mg/dl and/or A1C >7.5%.

  Umpierrez et al, NCT01131052
STEP IT UP A Bit (Pens vs Needles)

- **Study Type:** Prospective, randomized, cross-over trial
- **Aim:** Compare efficacy, patient satisfaction, and safety of an add-on basal insulin via insulin pen vs by vial/syringe in elderly with diabetes.

- **Study Site:** Grady Memorial Hospital

- **Patient Population:** 56 subjects ≥60 years old on diet ± OADs w/ A1c >7%

Newton, Ivie, Smiley, et al. ADA Scientific Sessions 2013, Abstract Poster 804; NCT 01240200
Screening (Week -1)  
Crossover (Week 12)  
Randomization (Week 0)  
Termination (Week 24)  
Pen (SoloSTAR) phase  
Vial/Syringe phase  

Treatment Plan - Flowsheet  

CA Newton et al. ADA Scientific Meeting, 2013
Insulin initiation improves glycemic control in older adults

Newton, Ivie, Smiley, et al. ADA Scientific Sessions 2013, Abstract Poster 804
Insulin Pens Are Associated With Lower Risks of Dosing Errors and Hypoglycemia Than Vial-and-Syringe Insulin Delivery

Dosing Errors vs Delivery Device

Hypoglycemia vs Delivery Device

- Insulin is implicated in 67% of all adverse drug event–related hospitalizations in older adults\(^2\)
- With vials and syringes, dosing errors are more common and lead to more hypoglycemic events (1.5 vs 0.4 events, \(P = .01\))\(^1,a\)
- With pens, dosing errors did not significantly increase hypoglycemic events\(^1,a\)

Hypoglycemia, BG < 70 mg/dL; \(^a\) Events measured per person.

63% had ≥1 episode of hypoglycemia (BG<70 mg/dl)

Device specific hypoglycemia

- 15 patients had 36 events while using pens
- 22 patients had 72 events while using syringes
- 8 patients had events while using both devices
Diabetes in Long-Term Care Setting

- **Aim:** Determine the prevalence of diabetes, quality of diabetes care and glycemic control (A1c and daily BG) in the NH setting

- **Study Sites:** Budd Terrace, A.G. Rhodes and VA Medical Center

- **Patient Population:** 1409 subjects admitted 1/2008-12/2008

Newton et al. JAMDA 14 (2013) 842e846
Prevalence of Diabetes and Glycemic Control in Long-Term Care Residents

**Prevalence of DM**

- No-DM: 65.8%
- DM: 34.2%

**Insulin Therapy**

- NPH Premixed: 16%
- No Drug Rx: 10%
- SSI: 25%
- Basal +/- SSI: 24%
- OAD +/- SSI: 

Source: Newton et al. JAMDA 14 (2013) 842e846
Survival Plot

Hazard ratio for mortality: 1.44 (DM vs non-DM, (p=0.027)

*The survival probability conditional on the patient lives beyond age 50.
Glycemic Control in NH Residents in Atlanta

<table>
<thead>
<tr>
<th>Variables</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean BG on admission BG, mg/dl</td>
<td>117 ± 41</td>
</tr>
<tr>
<td>Mean HbA1c on admission, %</td>
<td>6.7 ± 1.1</td>
</tr>
<tr>
<td>Mean daily BG, mg/dl</td>
<td>156 ± 39</td>
</tr>
<tr>
<td>DM Patients with hypoglycemia, n</td>
<td>207 (43%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>DM-hypos n=207</th>
<th>DM-no hypos n=275</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOS, median</td>
<td>52</td>
<td>29</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>ER or hospital transfers (%)</td>
<td>69</td>
<td>56</td>
<td>0.005</td>
</tr>
<tr>
<td>Mortality (%)</td>
<td>20</td>
<td>10</td>
<td>0.002</td>
</tr>
</tbody>
</table>

Newton et al. JAMDA 14 (2013) 842e846
A randomized controlled trial comparing treatment with oral agents and basal insulin in elderly patients with type 2 diabetes in long-term care facilities
Diabetes Care in Elderly Patients Admitted to Long-Term Care Facilities

Study Type: Pilot, RCT trial

Aim: Determine differences in glycemic control with Basal insulin vs versus oral antidiabetic agents in nursing home patients with type 2 diabetes

Patient Population: 150 diabetic subjects treated with diet and/or OADs with BG >180 mg/dl or A1C >7.5%

Pasquel et al. BMJ Open Diabetes Research and Care 2015
Mean daily glucose levels in patients with T2D treated with basal insulin and oral agents in long-term care facilities

Pasquel et al, BMJ Diabetes Care & Research 2015
Frequency in hypoglycemia in nursing home patients treated with basal insulin or OADs

Pasquel et al, BMJ Diabetes Care & Research 2015
Complications during nursing home stay in patients treated with basal insulin or OADs

Pasquel et al, BMJ Diabetes Care & Research 2015
Complications in LTC/SAR patients with hypoglycemia

Pasquel et al. ADA 2015, Boston
Glycemic Treatment Goals in Elderly Subjects with Diabetes.  **Summary**

- Patients ≥ 65 years of age represent the largest growing population with diabetes
- The life expectancy is projected to increase and this population is at greater risk of having diabetic complications
- Individualize glycemic targets and educate
  - Target A1C < 7% for the healthier, older patient
  - Target 7-8 for the older patient with multiple comorbidities, poor health, ↑ risk of hypoglycemia and limited life expectancy
- More research is needed! Safest and most effective regimen?
## Glycemic Targets in Older Adults, ADA

<table>
<thead>
<tr>
<th>Target</th>
<th>Rationale</th>
<th>Fasting</th>
<th>Bedtime</th>
<th>Blood Pressure</th>
<th>Lipids</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A1C &lt; 7.5%</strong></td>
<td>Longer remaining life expectancy</td>
<td>90-130</td>
<td>90-150</td>
<td>&lt;140/90</td>
<td>Statin unless contraindicated or not tolerated</td>
</tr>
<tr>
<td><strong>A1C &lt; 8%</strong></td>
<td>Intermediate remaining life expectancy, high treatment burden, hypoglycemia, vulnerability, fall risk</td>
<td>90-150</td>
<td>100-180</td>
<td>&lt;140/90</td>
<td>Statin unless contraindicated or not tolerated</td>
</tr>
<tr>
<td><strong>A1C &lt;8.5%</strong></td>
<td>Limited remaining life expectancy makes benefit uncertain</td>
<td>100-180</td>
<td>110-200</td>
<td>&lt;150/90</td>
<td>Consider likelihood of benefit with statin (secondary prevention more so than primary)</td>
</tr>
</tbody>
</table>

Patient Preference ORAL Agents in the Elderly: Hypoglycemia Avoidance

Preferred
- metformin
- DPP4 inhibitor
- \(\alpha\)-glucosidase inhibitor

Caution
- SGLT2-I
- TZD

Not Preferred
- sulfonylurea
- glinide
- Insulin
- GLP1 Analogs
Thank you!

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