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DIAGNOSIS AND THE OLDER ADULT
Objectives

At conclusion of the presentation the participant will:

1. Discuss challenges to glycemic control unique in the older population with diabetes.
2. Describe principles of medication management for older adults with diabetes.
Diabetes and the Older Adult
Scope of the Problem

- Fastest growing segment of the population → > 85 years of age
- US Diabetes incidence > age 65
  - 10.9 million – 26.9%
- 1/3 of older adults with diabetes are undiagnosed
- Older adults have the highest prevalence of complications
  - MI
  - End-stage-renal disease
  - Visual impairment
  - Lower extremity amputations
  - Diabetes related hospitalizations
Scope of the Problem

- Higher morbidity and mortality compared to elderly people without diabetes
- ~ $245 billion spent yearly on diabetes
  - $144.5 billion (59%) was for care for the elderly
Centers for Disease Control and Prevention (CDC)

“Even if diabetes incidence rates level off, the prevalence of diabetes will double in the next 20 years, in part due to the aging of the population.”
Physiological Alterations

- Older adults with diabetes
  - More likely to have normal fasting hepatic glucose production
  - Abnormal insulin secretion – beta cell dysfunction
    - Alterations in insulin release
    - Loss of first phase insulin secretion
    - Decreased response to incretin hormones
  - Decreased insulin sensitivity
    - Higher body fat content
    - Loss of fat free mass
    - Central distribution of fat
First phase of insulin

First Phase Insulin Release (FPIR)

Response to an i.v. Glucose Challenge

Plasma Insulin (µU/ml)

Time (Minutes)

Pfeifer et al., 1982

Normal

Type 2
Incretin Hormones

- Incretin, GLP-1
  - Stimulates insulin release
  - Inhibits glucagon release
  - DPP-4 enzyme inactivates GLP-1

- Lowering of blood glucose

- DPP-4 inhibitors (drugs) block DPP-4 and decrease glucose
Clinical Presentation

- Renal threshold for glucose increased
  - Glycosuria may not be detected
  - Polydipsia may be absent due to an impaired thirst mechanism
- Increased risk of dehydration
- Increased risk of nonketotic hyperosmolar state
- Clinical presentation
  - Infections
  - Neuropathic pain
  - Weight loss
Characteristics of Diabetes in Older Adults

- Incidence of diabetes increases until age 65 then levels off
- Older adults with diabetes
  - Onset in middle age or earlier
    - More likely to have retinopathy
  - Onset in later years
    - More common in non-Hispanic whites
    - Lower mean A1C and decreased use of insulin
- Cardiovascular disease or peripheral neuropathy
  - Not influenced by age of onset
Complications in Older Adults

- Highest rates than other age groups:
  - Major lower-extremity amputation
  - Myocardial infarction
  - Visual impairment
  - End-stage renal disease

- Aged ≥75 years have
  - Higher rates than those aged 65–74 years for most complications
  - Deaths from
  - ED visits for hypoglycemia
    - Twice as high as visits in the general population with diabetes
The Action to Control Cardiovascular Risk in Diabetes (ACCORD) Trial

- Study Population
  - N = 10,251 patients with T2DM
  - Mean age 62.2 years of age
  - Median A1C 8.1%
- Assigned to intensive therapy – target A1C < 6.0%
  - Or
- Standard therapy – target A1C from 7.0 to 7.9%
- Primary study outcome a composite of:
  - Nonfatal MI
  - Nonfatal stroke
  - Death from cardiovascular causes

The Action to Control Cardiovascular Risk in Diabetes Study Group


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The ACCORD Trial

- The finding of higher mortality in the intensive-therapy group led to a discontinuation of intensive therapy after a mean of 3.5 years of follow-up.
The Action in Diabetes and Vascular Disease (ADVANCE) Trial

- Intensive Blood Glucose Control and Vascular Outcomes in Patients with Type 2 Diabetes
- Study population
  - N = 11,140 patients with type 2 diabetes
  - Randomized to intensive treatment (A1C 6.5%) and standard care (A1C 7.3%)
- Composite outcome – macrovascular and microvascular complications
ADVANCE Trial

- No increased mortality in the intensive treatment group
- Renal Complications – 1/5 reduction in renal complications
- Composite outcome reduced – mainly due to the reduction in renal complications
- No separate reduction in macrovascular complications
ADVANCE Trial

- Primary Outcomes
- Composites of:
  - Major macrovascular events
    - Death from cardiovascular causes, nonfatal myocardial infarction, or nonfatal stroke
  - Major microvascular events
    - New or worsening nephropathy
    - New or worsening retinopathy
ADVANCE Outcomes

- ADVANCE
- trial resulted in a reduction by one fifth in the
development of new or worsening nephropathy
- and a more modest, though significant, reduction in that of new-onset microalbuminuria.
the Veterans Affairs Diabetes Trial (VADT)

- Intensive glucose control
  - No statistically significant effect on major CV events or death
  - Significant reductions in albuminuria
Prevention of Diabetes

Diabetes Prevention Program Research Group (DPP)

- ~20% of participants were aged ≥60 years
- Lifestyle intervention more efficacy than in younger groups
- No benefit to Metformin
- 10 year follow-up
  - 49% risk reduction in those aged ≥ years of age vs 34% in general study population
Environmental Impact

Diet
- Simple sugars
- Saturated fat
- Total energy
- Low fiber
- Low in complex carbohydrates
- Erratic eating patterns

Lack of Physical activity
Considerations

- Clinical Status
- Functional Status
- Psychological Status
Considerations

- Cognitive dysfunction
- Depression
- Hearing and vision loss
- Living situation
- Economic status
- Medications - polypharmacy
Cognitive Impairment

- Psychomotor function
- Global cognition
- Semantic memory
- Episodic memory
- Executive dysfunction → frontal lobe
Depression

- May go unrecognized
- Signs of depression
  - Poor glycemic control
  - Insomnia
  - Hypersomnia
  - Changes in weight by > 5% with the previous month
  - Crying spells
Screening for Depression

- Validated screening tools
- Patient Health Questionnaire-2 (PHQ-2)
  - Over the past two weeks, have you often been bothered by:
    1. Little interest or pleasure in doing things?
    2. Felt down, depressed or hopeless?
PHQ-2

- One positive answer indicates a positive screen
- If this occurs:
  - Use a more detailed screening tool
  - Refer the patient to his/her PCP for follow-up
  - Refer to a mental health professional

- Comprehensive care management
Functioning in Older Adults with Diabetes

Large community based case control study

- Functioning in older adults with diabetes
- Reduction in physical function and health status
- More likely to use a mobility aid
- More likely to be dependent on caregivers

Increased Risk for Falls

- Lower limb dysfunction
- Cardiovascular disease
- Polypharmacy
- Impaired balance
Polypharmacy

- The use of six or more prescription drugs
- Associated with an increased risk of falls
Pharmacokinetics in older adults

- Decreased GI motility
  - May affect the rate of drug absorption
- Altered renal function
  - Decreased elimination of renally excreted drugs
- Reduced serum albumin
  - Decreased protein binding
Pharmacokinetics in older adults (cont’d)

- Decreased phase I hepatic metabolism
  - Potential accumulation of drugs metabolized by oxidation, reduction, hydrolysis
- Increased ratio of body fat to lean mass
  - Increased volume of distribution of fat-soluble drugs
- Decreased total body water
  - Decreased volume of distribution of water-soluble drugs
Polypharmacy

- Older adults consume more OTC medications than younger adults
- Increased risk of drug interactions
- Costs are substantial
Medication Principles for Older Adults

- Start with a low dose – titrate slowly
- Consider that drugs will have longer half-lives
- Avoid rapid dose escalations to avoid ADR
- Use the fewest number of drugs possible
- Presentation of drug toxicity may be atypical
  - May manifest as CNS changes
- Review medication and diseases when adding new drugs to avoid ADRs
Hypoglycemia

- More frequent and severe in older adults
- Higher risk due to pharmacokinetics

Outcomes
- Falls
- Fractures
- Hospitalizations
- Worsening of other conditions
Factors contributing to hypoglycemia in Older Adults

- Decreased renal clearance
- Polypharmacy
- Drug to drug interactions
- Coexisting comorbidities
Association with Hypoglycemia

- Cognitive Function
- Hypoglycemia unawareness
- Prolonged hypoglycemia-induced reaction time
- Lower health-related quality of life
Hypoglycemic Symptoms

Warning symptoms

► Younger adults
  ► Tremors, palpitations, sweating, confusion

► Older Adults
  ► Confusion, delirium, weakness, dizziness and falls

► Patients and caregivers need to be educated about symptoms of hypoglycemia
Exercise and Older Adults with Diabetes

- Diabetes associated with lower skeletal muscle strength
- Benefits of exercise
  - Muscle strength
  - Gait
  - Balance
Benefits of Exercise (cont’d)

- Decreased risk of falls
- Improves self-reported health and well being
- Low intensity exercise has positive benefits
- Resistance training improves glycemic control
Diet

- Challenges
  - Life long eating patterns
  - Depend on others for food shopping and preparation
  - Inconsistent appetite
Dietary Concerns

- Decreased food intake and weight loss
- Higher body weight associated with lower mortality in patients > 65 compared with younger patients with T2DM
Medication Management of Diabetes in Older Adults

- Metformin ➔ first-line therapy
  - Low risk of hypoglycemia
  - Limiting factors
    - Renal insufficiency
    - GI side effects
    - Weight loss
Insulin Secretagogues

- Longer-acting insulin secretagogues
  - Sulfonylureas → increased risk of hypoglycemia
- Shorter-acting secretagogues
  - Repaglinide
  - Nateglinide
    - Taken just before the meal
    - May be skipped or added based on meal patterns
Incretin-mimetic Agents

- DPP-4 inhibitors
  - Januvia
  - Onglyza
  - Tradjenta
- Well tolerated
- Does not cause weight loss
- May be used for patients with renal insufficiency
- Less efficacy than other agents
Incretin-mimetic Agents

- GLP-1 analogs
  - Causes weight loss
  - Injectable
Insulin

- May improve glycemic control
- Increases the risk of hypoglycemia
- Consider ability to self-administer and/or caregiver resources
- Monitoring of blood glucose/SMBG
- Insulin Pens
Education Strategies

- The capacity to learn is intact throughout the life cycle
- Accommodate
  - Hearing changes
  - Visual changes
  - Cognitive status
Education Strategies

- Assess older adults for comprehension and memory
- Equipment
  - SMBG
    - Larger display screens
    - Audible beeping prompts
    - Reduced sample size
    - Easy to grip bodies
Equipment

- Insulin administration
  - Insulin pens
    - Easier to read
    - Audible clicks
    - Emphasize the need to push hard enough to administer the dose of insulin
    - Assess ability to screw the pen needle on and off
Other Considerations

- Financial concerns
- Insurance issues
- Transportation
Institutional Settings

- Assure
  - Monitoring
  - Appropriate diet
  - Prevent and act on acute hyperglycemia and hyperglycemia

- Medications
  - Insulin – given correctly and at the right times
  - Medication interactions

- Skin and foot care are part of the daily care regimen
Questions?