Diabetes, Mental Health, and Improving Adherence to treatment in Children

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Objectives

1) Reviewing the cross-over between diabetes and mental illness, including considerations for treatment
2) Describe evidence-based treatments to improve diabetes adherence in youth.
Facts about Diabetes (From CDC)

- 1 in 400 children and adolescents has diabetes
  - Rate of diabetes in kids is increasing, jumping by 23% from 2001-2009
- Medical costs are 2.3 times higher, just due to having diabetes
- Glycemic control is huge: For every 1 point drop in your HbA1c, your risk of complications drops 40%
- Source: SEARCH for Diabetes in Youth Study
- NHW=non-Hispanic whites; NHB=non-Hispanic blacks; H=Hispanics; API=Asians/Pacific Islanders; AI=American Indians
Type 1 Diabetes Mellitus (T1DM)

- More common in whites, 23.6 per 100,000
- Some genetic and geographic contributors
- Destruction of beta cells in pancreas leads to decreased insulin
  - Autoimmune, Cystic Fibrosis
Insulin-producing cells

Insulin secreted into bloodstream

Blood capillary

Insulin-producing cells destroyed
Type 2 Diabetes Mellitus (T2DM)

- Genetics and lifestyle factors
- Increased by 21% from 2001-2009
- In a clinic-based study published in 2002, 25% of 55 obese children and 21% of 112 obese adolescents had impaired glucose tolerance
  - 4% had undiagnosed type 2
- New CDC data, 2012
  - 17% of kids/teens obese (BMI > 97%ile)
Type II Diabetes

1. Stomach converts food to glucose
2. Glucose enters bloodstream
3. Pancreas produces sufficient insulin but it is resistant to effective use
4. Glucose unable to enter body effectively
5. Glucose levels increase
Type 2 Diabetes: Insulin Resistance

Fat/muscle cells

Insulin receptors → Glut-4

Defect in signaling to Glut-4

Glucose transporters

Diminished glucose uptake
Treatment in brief

- **Type 1 diabetes**
  - Insulin, basal and short-acting
  - Lifestyle/self-care

- **Type 2 diabetes**
  - Medications (increase insulin, decrease liver production of glucose, or decrease glucose breakdown in the GI tract)
  - Diet, exercise, weight control

- Monitoring: HbA1c
Developmental Issues with Diabetes

- Diagnosis <5 y/o
  - Higher risk of hypoglycemia
- Communication is key
- Pubertal changes
  - Relative insulin resistance, especially Tanner II-IV
  - Increased Growth Hormone Secretion
  - Overall poorer control, predicted by pre-pubertal control
    - May cause dismay, hopelessness about diabetes care
- Due to above, kids have higher target HbA1c
Adolescent Development

• Main tasks are identity and autonomy
• However, risk of poor control worse with less parental involvement

• Diabetes control complicated by sense of invulnerability
Risks of hypoglycemia

• Acutely: confusion, poor concentration (selective attention), seizures, coma
• Chronically: Lower IQ, decreased spatial intelligence, delayed recall, lower gray volume in left superior temporal region
Risk of hyperglycemia

• Acutely: EXTERNALIZING BEHAVIORS, cerebral edema, diabetic ketoacidosis
• Chronically: Physical sequelae (due to microvascular damage); Decreased verbal intelligence, decreased brain volume in right posterior parietal and right cuneus regions
Mental Illness and Diabetes

• Rates of psychiatric disorders of 33-42% in adolescents and young adults with DM
  ▫ 60% of those have >1 psychiatric disorder
• Increased risk for adolescents with internalizing disorders for medical readmission
• Poorer control for those with mental illness
• Recent study showed 26% of kids with Type 2 DM with psychiatric illness
Adjustment Disorder and Diabetes

- 30% of kids develop within 3 months of diagnosis
- Ability to weather this acute stress predicts for future mental illness
Eating Disorders and Diabetes

- 2.4 times more likely in teens with diabetes
  - Sub-syndromal 1.9 times more common
- 15-40% of adolescents omit insulin administration
- Prevalence of diabetic retinopathy 86% if eating disorder x 5 years plus T1DM (24% prevalence in adolescents without eating d/o)
- Risks of developing: weight gain, female ages 13-14, preoccupation with food, family history, psychiatric comorbidities
Depression and Diabetes

- Diagnosis can be difficult due to symptom overlap
  - Poor energy
  - Weight loss
- Should treat the diabetes, and reassess
- 10%-26% prevalence of depression in teens with diabetes
- Depressed kids with diabetes have poorer control → more complications, higher costs
- 10 time risk for suicidality
Anxiety and Diabetes

• 9-19% of teens with diabetes
• Overlapping symptoms
  ▫ Autonomic symptoms due to hypoglycemia
• Anxious family may complicate care

• Internalizing disorders in general
  ▫ Female, having diabetes in poor control, maternal depression, high conflict family
Other disorders and Diabetes

• Substance Use
  ▫ UK study showed 29% of teens with diabetes used street drugs
  ▫ Increased alcohol and tobacco use
    • 45-50% of teens had drank

• Disruptive Behavior Disorders
  ▫ 12-20% of teens with diabetes
Suicidality in Diabetes

- As before, 10 times the risk
- Risks increases the longer the diagnosis has been present
- Single parent homes
- Non-compliance with treatment regimen
Factors that influence poor metabolic control

- High family conflict
- Low family cohesion
- Premorbid disruptive behaviors
- Current psychiatric illness
Family Factors

- 22% of mothers of kids with T1DM report clinically significant depression
- Risk of anxiety or depression is higher in parents who feel greater stress of parenting, and who feel lower ability to successfully manage their child’s diabetes
- As above, depressed mom’s are risk for mental illness in kids, and high family conflict/stress is risk for non-compliance, which is risk for mental illness in kids
Other complicating factors:

- Cortisol release: increases blood sugar due to gluconeogenesis
- Adrenaline/epinephrine: Inhibits insulin secretion, increases glycogenolysis in liver and muscle, and increases glucagon secretion by pancreas
Medications for depression and anxiety in diabetes

• Depression treatments:
  ▫ SSRI’s: May decrease appetite, also may enhance effects of insulin, so decrease glucose
  ▫ TCA’s: Increase appetite, so increase glucose

• Also, as depression improves, appetite gets better, but physical activity increases as well

• For Anxiety: Be wary of Beta blockers, as may block hypoglycemic sensations
Medications for Bipolar in diabetes

- Lithium: May mimic insulin or stimulate glucagon, so varying effects on blood sugar. Also, may be toxic to already stressed kidneys
- Atypical antipsychotics: Beware the weight gain and appetite induction. Increases weight both by stimulating appetite and genetic polymorphisms
  - Weight gain higher in kids than adults
  - Olanzapine and clozapine > quetiapine and risperidone > ziprasadone and arapiprozole
- Valproate: Beware the appetite and weight increase
Medications for ADHD

- Stimulants may mimic hypoglycemia symptomatology
- Bupropion lowers seizure threshold
- Alpha agonists may mask hypoglycemia
Other considerations

- Sedating/sleep medications: May inhibit body’s middle of night awakening for low glucose levels
- Poor glucose control can mimic mental illness, so clear diagnostic picture is best
- However, under/untreated mental illness could complicate diabetes control, i.e. ADHD
Youth in Poor Control

- Repeatedly shown that tighter insulin regimen, more family involvement leads to improved control
- More frequent visits to diabetes clinic yields improved control
- However, too much control leads to teen disengagement
- Some argue for looser insulin regimens in these cases
Deceptive behaviors (to name a few)

- Insulin roulette
- Test solution instead of testing blood
- Not dosing insulin to lose weight
- Skipping meals to avoid having to dose self
- Binge eating after already high
- Not checking because hopeless it will help
Coping styles teens with diabetes

- Graue et al, 116 adolescents, HbA1c 9.4
- Poor metabolic control: More likely to use emotion-focused coping, like behavioral and mental disengagement and aggressive coping
- Reduced diabetes-related quality of life and higher diabetes-related worry associated with self-blame and learned helplessness
- Active coping styles shown in teens with better metabolic control
Non-medication Treatments

• Cognitive behavioral therapy
  ▫ Can help with depression and diabetes
    • Positive studies in adults with diabetes
  ▫ Also could focus on learned helplessness
  ▫ Could help with needle phobia in younger

• Behavior plan to reward adherence

• Coping Skills Training
  ▫ Help increase positive, active coping methods
Treatments for Non-Adherent Youth

- Motivational Interviewing (MI):
  - Channon SJ, randomized controlled trial, 12 months intervention, 12 month follow up
- Facets of (MI): Awareness Building, Alternatives, Problem Solving, Making Choices, Goal Setting, Avoidance of Confrontation
- Statistically significant decrease in HbA1c
- Also increased life satisfaction, lower life worry, decreased anxiety, more positive well-being, and realistic beliefs about seriousness of diabetes
  - These differences held at 12 and 24 months
Treatments for Non-Adherent Youth

• Multisystemic Therapy
• “Care Administrator” to get families to clinic
• Parent training (to help decrease conflict around diabetes care and increase positive attention for pro-diabetes behaviors)
• Educational interventions for teens and families
What I do:

• Increased limits and behavioral interventions
• Education: Tying emotions to glucose levels to self-care
• Try to allow as much normalcy as possible
FOOD LOG DATE: _________________

Time to Sleep: _______  Time Awake: _______

Breakfast:
Glc: _______  Mood: _______________
Correction: _____Units
Carb Count: _____Grams  What Ate:
Carb Insulin: _____Units

Snack:  Mood: _______________
Carbs: _____ Grams  What Ate:
Insulin: _____Units
Weight loss

- Motivational interviewing
- Entire family needs to change
- Pediatricians pneumonic: 5-2-1-0
  - 5 servings fruits/veggies
  - No more than 2 hours of screen time daily
  - 1 hour physical activity
  - Zero sugared beverages
References

Thank you!