

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

Kristi Kleinschmit, MD
Triple Board Physician
Assistant Professor,
Division of Child Psychiatry,
University of Utah
June 20, 2012

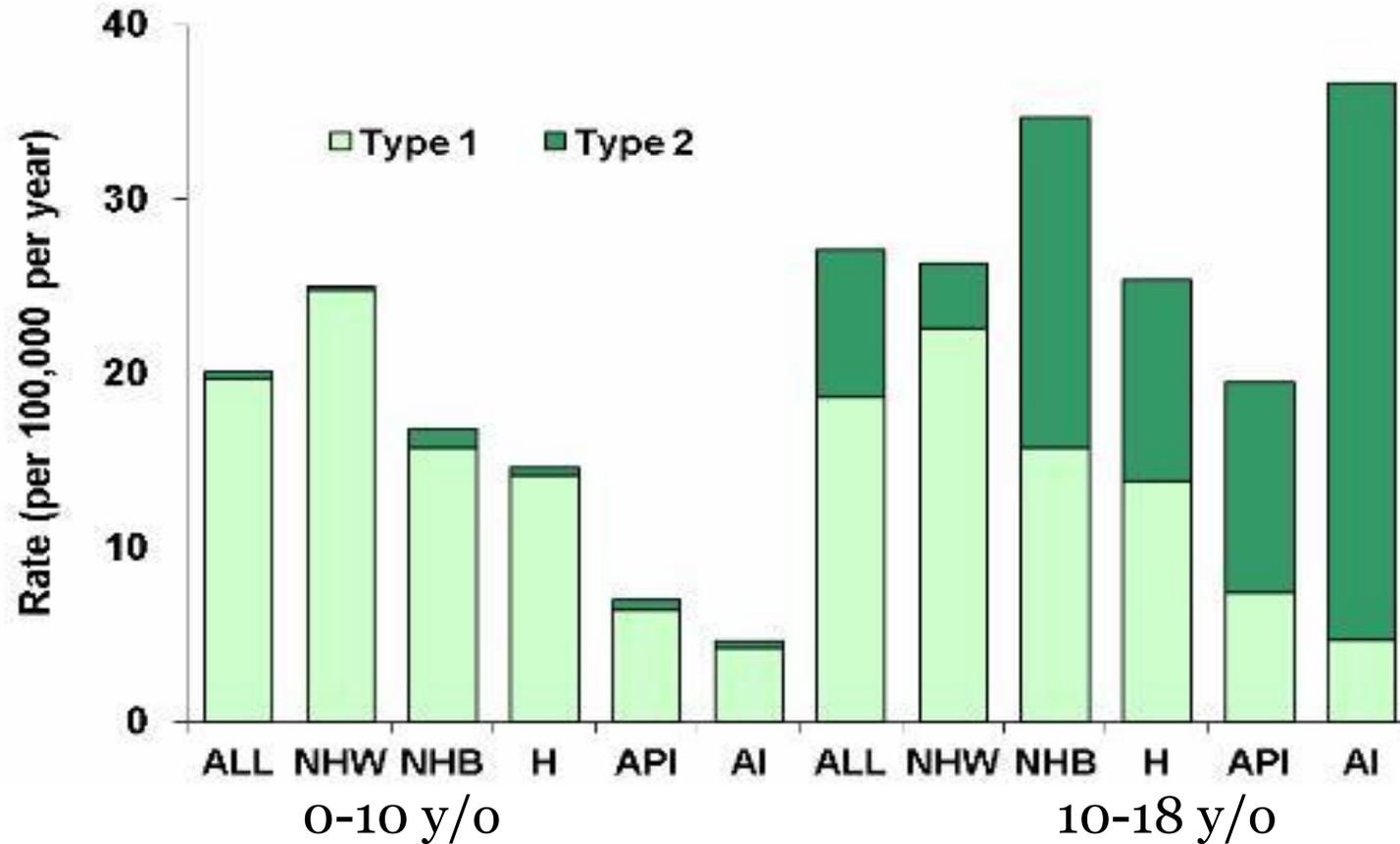
- I have no disclosures

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 %

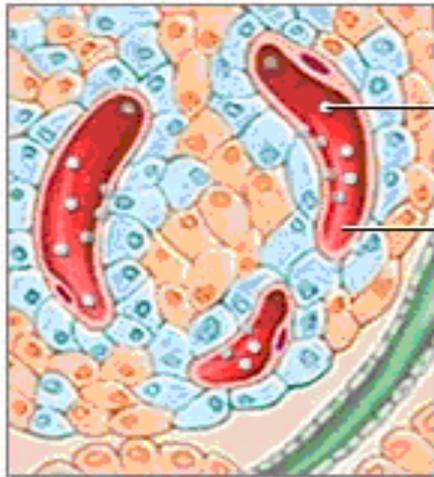


- Source: SEARCH for Diabetes in Youth Study
 NHW=non-Hispanic whites; NHB=non-Hispanic blacks; H=Hispanics;
 API=Asians/Pacific Islanders; AI=American Indians

Type 1 Diabetes Mellitus (T1DM)

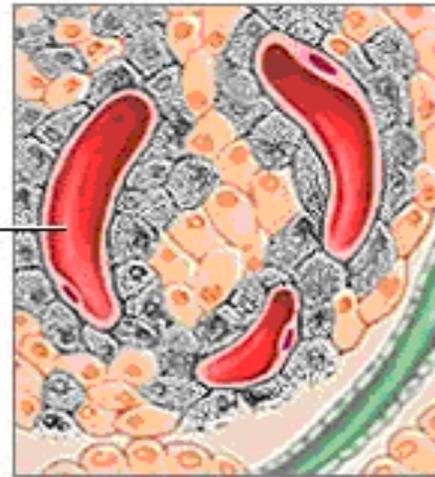
- More common in whites, 23.6 per 100,000
- Some genetic and geographic contributors
- Destruction of beta cells in pancreas leads to decreased insulin
 - Autoimmune, Cystic Fibrosis





Insulin secreted into bloodstream

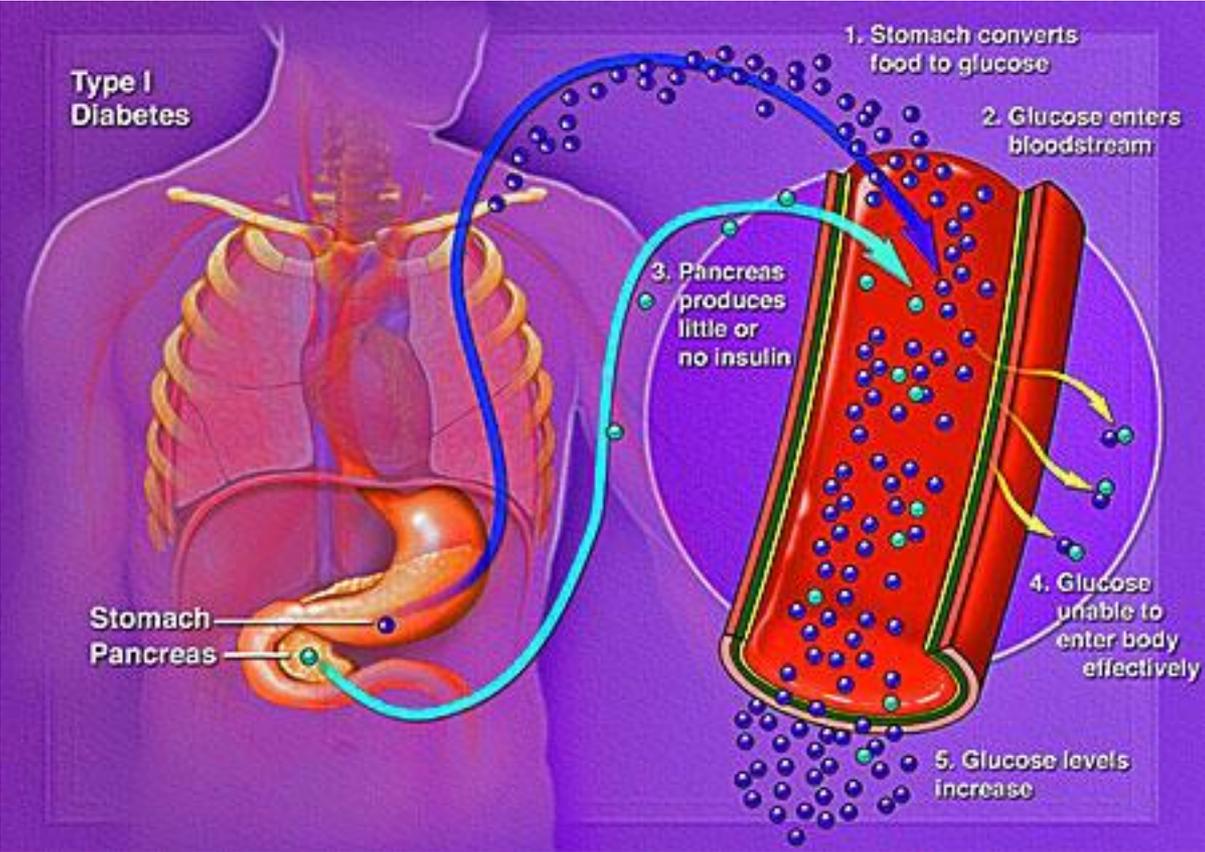
Blood capillary

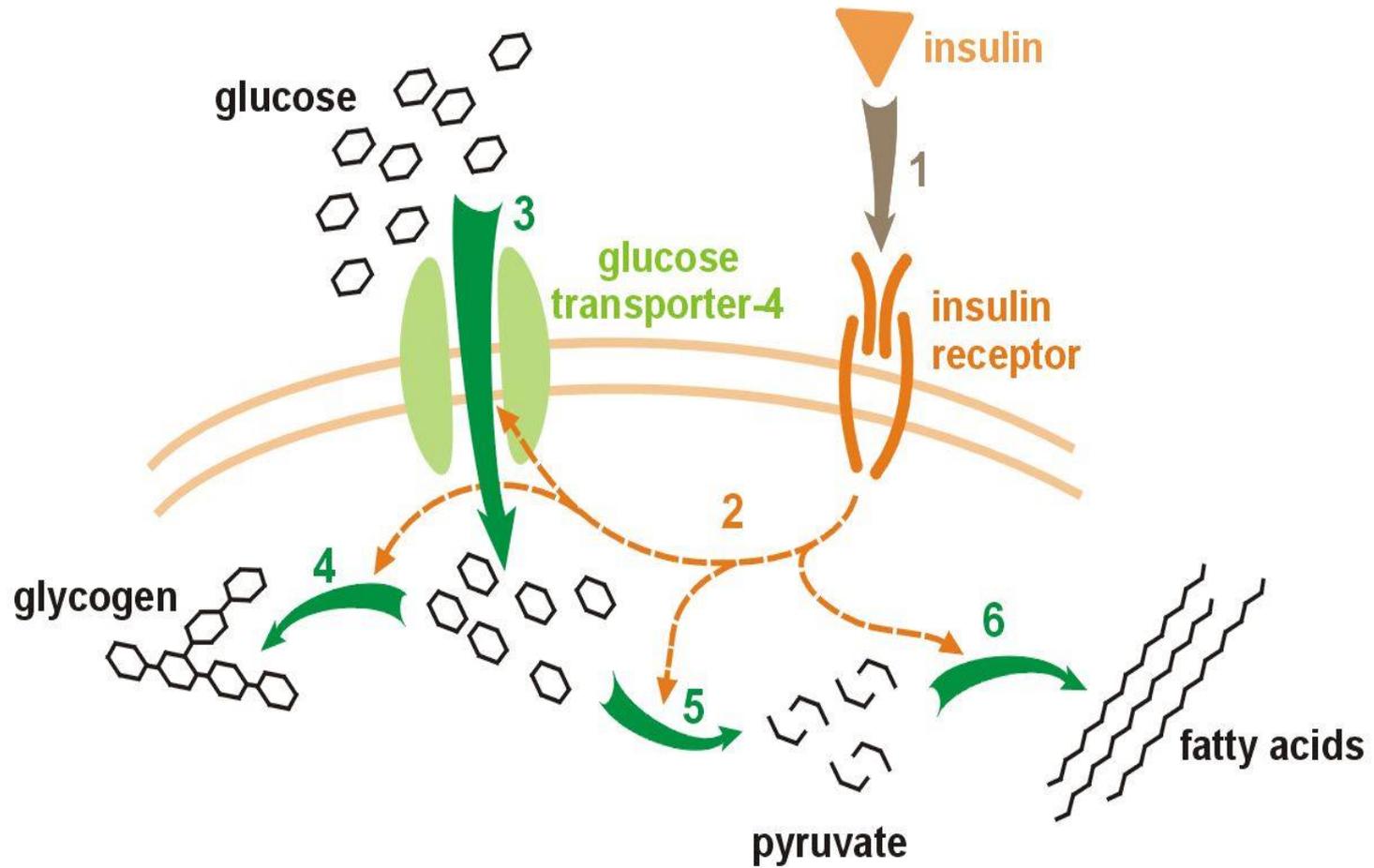


 Insulin-producing cells

 Insulin-producing cells destroyed

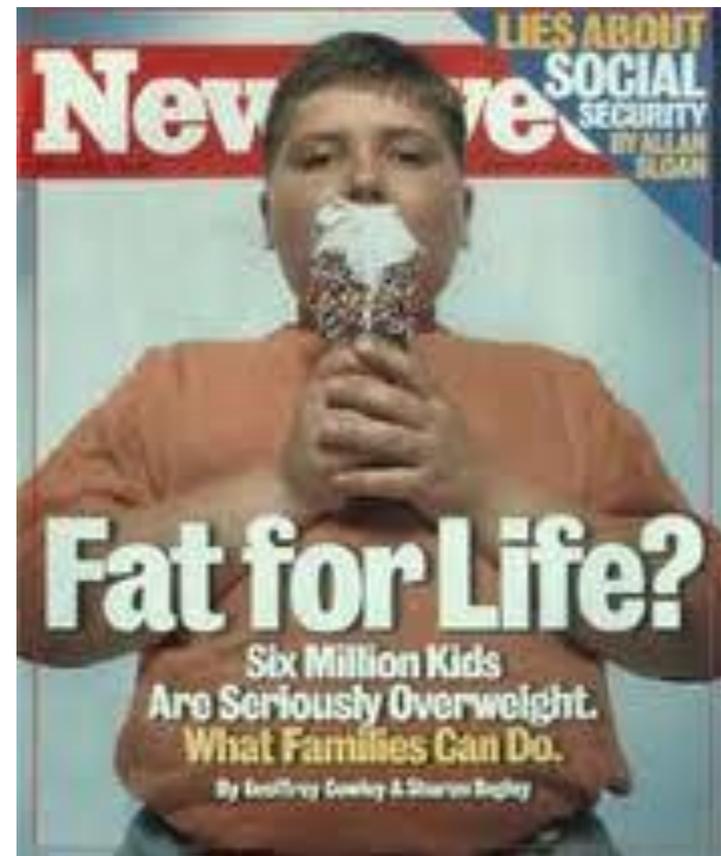


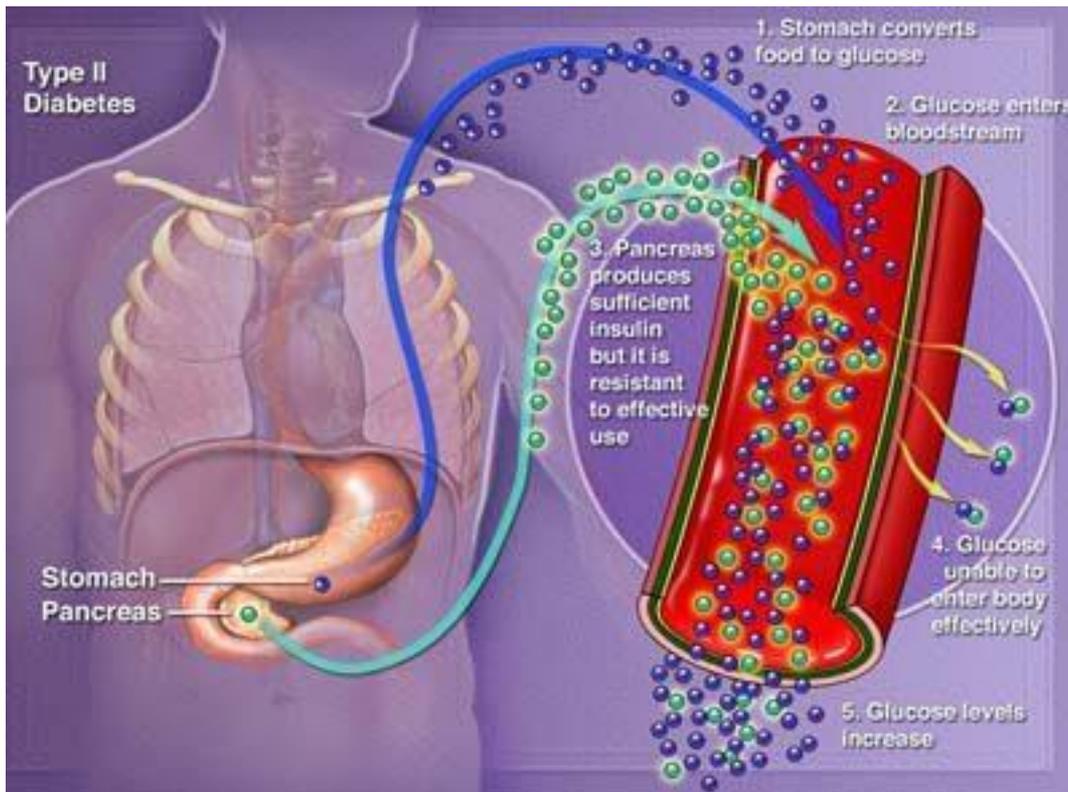




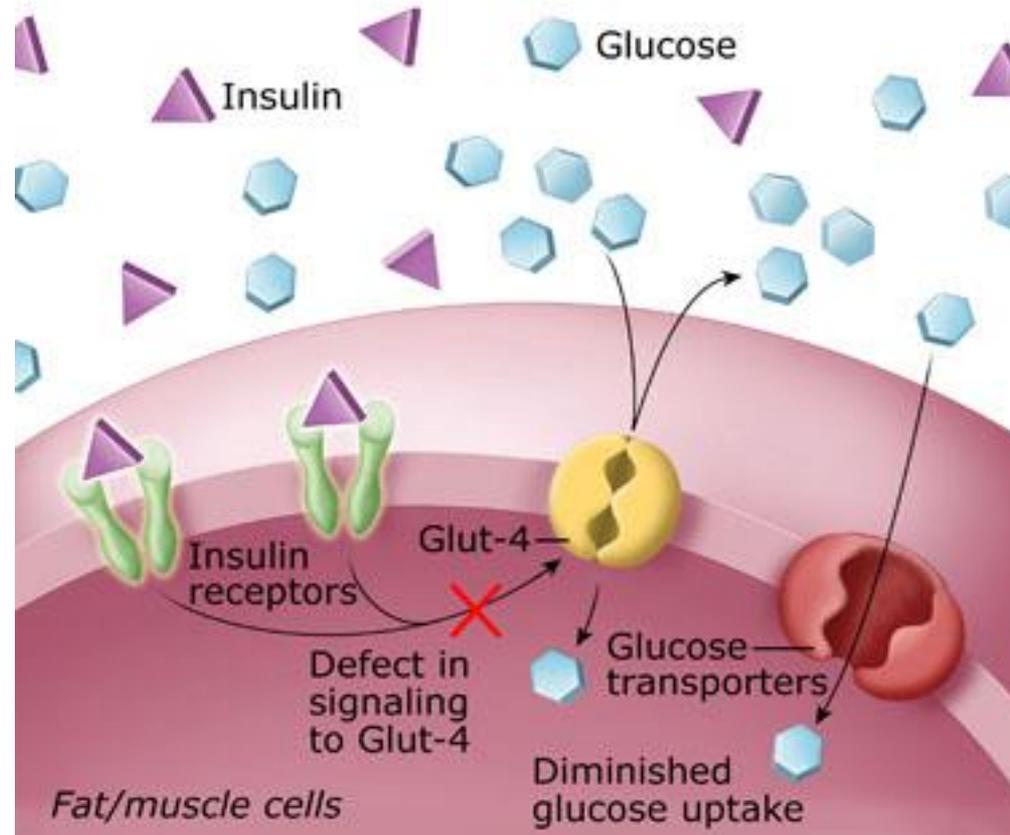
Type 2 Diabetes Mellitus (T2DM)

- 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 2 Diabetes: Insulin Resistance



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 drunk
- 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 aripiprazole
- 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 cha
- Pediatricians mnemonic:
1-0
 - 5 servings fruits/veggies
 - No more than 2 hours of screen time daily
 - 1 hour physical activity
 - Zero sugared beverages



References

- Block WM, Putzer GJ, Jaramillo JR. “Children with type 2 diabetes mellitus and the prevalence of psychaitric disorders.” *South Med J.* 2010 Dec; 103 (12): 1214-8.
- Centers for Disease Control and Prevention. National Diabetes Fact Sheet: national estimates and general information on diabetes and prediabetes in the United States, 2011. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2011. <http://www.diabetes.niddk.nih.gov/DM/PUBS/statistics/#NewCasesDDY20>
- Channon SJ et al. “A multicenter randomized controlled trial of motivational interviewing in teenagers with diabetes.” *Diabetes Care.* 2007 Jun; 30(6): 1390-5.
- Goran et al. “Obesity and risk of type 2 diabetes and cardiovascular disease in children and adolescents.” *J Clin Endocrin Metab.* 2003; 88 (4): 1417-27.
- Graue M et al. “The coping styles of adolescents with type 1 diabetes are associated with degree of metabolic control” *Diabetes Care.* 2004 Jun; 27 (6) 1313-17.
- Fritsch SL, Overton MW, Robbins DR. “The interface of child mental health and juvenile diabetes mellitus.” *Pediatr Clin North Am.* 2011 Aug;58(4):937-54, xi.
- Kaklas K et al. “Psychosocial problems in adolescents with type 1 diabetes mellitus.” *Diabetes Metab.* 2009 Nov; 35(5): 339-50.

Thank you!

