Can Diabetes Be Cured?

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Diabetes Can Be Prevented. Can Diabetes Be Cured?
YES!
In Many People. When They Lose Weight, Often They Can Lose Diabetes Too!
Medical Complications of Obesity

Pulmonary disease
- abnormal function
- obstructive sleep apnea
- hypoventilation syndrome

Nonalcoholic fatty liver disease
- steatosis
- steatohepatitis
- cirrhosis

Gall bladder disease

Gynecologic abnormalities
- abnormal menses
- infertility
- polycystic ovarian syndrome

Osteoarthritis

Skin

Gout

Idiopathic intracranial hypertension

Stroke

Cataracts

Coronary heart disease

Diabetes

Dyslipidemia

Hypertension

Severe pancreatitis

Cancer
- breast, uterus, cervix
- colon, esophagus, pancreas
- kidney, prostate

Phlebitis
- venous stasis
Patient X

- 47 yo male seen at the consult request of Dr. Z for morbid obesity (Height: 70.5 in, Weight: 276 lb, BMI: 39 kg/m²) associated with:
  - Alcoholism
  - Depression
  - DM-2 (Type 2 Diabetes)
  - Hypertension (High blood pressure)
  - Hyperlipidemia (High cholesterol)
  - Sleep Apnea
  - Fatty liver Hepatitis
Patient X

- He felt his initial weight gain was associated with use of quetiapine which he was given for depression and for sleep.
- Food Life: Alcoholic beverages 6-12 beers + shots / day. Other caloric beverages: 4 cans of pop daily, 5 glasses milk many days, sweetened tea, endorses significant carbohydrate cravings, eats in front of TV, doesn’t eat out, has struggled with homelessness.
- Meds: glargine insulin 15 units at bedtime and glipizide XR 10 mg daily for diabetes, lisinopril and hydrochlorothiazide for blood pressure, atorvastatin for high cholesterol.
Patient X: Interventions

- Education visit was scheduled with nutritionist for 1500 calorie balanced meal
- He began working out 1 hour daily
- Chemical dependency intake, assessment, treatment
- Started him on naltrexone 50 mg daily to block opioidergic neurons involved in his strong carbohydrate cravings
- Other diabetes management - discussed increased risk of hypoglycemia when drinking alcohol. I did tell him that he may not have diabetes anymore if he stops drinking alcohol
Patient X: Success Story

• He cut out all beverages with calories in them & switched to drinking water
• He said the naltrexone really helped him with cravings
• He successfully lost 50 lbs!!!
• Diabetes status: glucose now in 100-190 range off of both meds (A1c 5.4%), off all insulin & oral diabetes meds
• High blood pressure status: blood pressure was normal off of all meds (112/62)
• High cholesterol status: lipid panel was normal off of med (LDL<100)
Patient Y

- 52+4 yo female with DM-2 with peripheral neuropathy, Foot ulcers, Hyperlipidemia, OSA, Asthma, Migranes, Low back pain, OA knees, Skin fold infections, Depression, Anxiety, Disabled due to cognitive disorder, learning disability, inability to read, physical limitation requiring electric wheelchair and/or wheeled walker, seen at consult request of surgeon Dr. Z

- Patient was pursuing bariatric surgery with starting BMI 55 and needed to lose 15 pounds prior to surgery - start weight of 349 was recorded on 9/15/10
Patient Y

- **NEUROPSYCHOLOGICAL EVALUATION:** “moderate mental retardation, with mildly to severely impaired performance across cognitive domains . . . uncooperative . . . irritable and sullen . . . resentful and angry . . . She appeared to be insulted to be asked the interview questions, and at one point turned away from the interviewer and faced the wall, remaining in that position even after being asked to turn around. At times, she appeared to be responding in a forthright manner, while at other times during the interview, she provided sarcastic and brief responses, or is some cases, no response at all.”
Patient Y

• NEUROPSYCHOLOGICAL EVALUATION: “Judgment and insight appeared poor . . . there are several concerns regarding her ability to emotionally tolerate the stress and physical discomfort associated with the surgery, as well as the changes in her lifestyle once the surgery is complete . . . concerns regarding adherence to treatment recommendations . . . she forgets to take her medications . . . has been unable to tolerate a CPAP and has not been using it . . . has been asked to stop smoking cigarettes, but becomes quite angry when the issue is raised with her”
Patient Y

• NEUROPSYCHOLOGICAL EVALUATION: “. . . a variety of cognitive and psychosocial concerns that may affect her ability to actively participate in treatment, follow through with treatment recommendations, and comprehend medical information.”

• . . . perhaps more concerning is her ability to follow dietary restrictions . . . she has gained more than 20 pounds since her presurgical seminar, despite having been asked to lose over 20 pounds”

• She refused to work with psychologist or psychiatrist
Patient Y: A Work in Progress

• Patient has been working on the following dietary changes: reduced portions

• Patient has been working on the following activity changes: completed our exercise program on riverside campus, doing hand weights and walking using walker, is limited by shoulder pain, neck pain, and back pain, so Pool therapy was ordered for her, she wants to start bike riding again daily

• She actually just needed someone to appreciate her diversity, listen to her & take care of her – TLC Medicine goes a long way
Patient Y: Other Interventions

- **Medications associated with weight loss:** was taking exenatide 10 mcg 2x daily and topiramate 100 mg at bedtime (was on 100 mg 2x/day at one point)

- In past, we started with orlistat and weaning her sedatives and analgesics down as these can be associated with weight gain (gabapentin, trazadone)

- Convinced her that if treated vit B12 deficiency and if she lost significant weight, her neuropathy (nerve pains) would get better through better circulation to her nerves
Patient Y: Success Story

• She has exceeded expectations by losing 117 lbs down to new weight of 232 lbs BMI 36 from 9/15/10 to 1/14/13

• **Weight is net down 121 lbs at 4/11/17 visit, without bariatric surgery**

• She is still taking glargine insulin 70 units daily, metformin 1000 mg 2x/day, dulaglutide 1.5 mg weekly, topiramate 100 mg at bedtime (for migranes).

• Increased glargine since sugars in 200s. She says, “what pop?”
Why do people overeat?

• Most motivations to eat have biological origin – including habit, circadian, as well as hunger, craving, mood management

• Circumstance, pleasure, reward, emotion, habit, food availability and cost can extend appetite beyond homeostatic regulation - eating behavior is complex

• Limbic mechanisms may help drive a desire for eating that is not directly related to energy or nutritional needs

• Specific brain regions such as the amygdala and nucleus accumbens are involved in emotive properties of food, such as the incentive reward value and pleasurable aspects
American Indian History

Removal and Reservations 1880
Assimilation and allotment 1934
Reorganization 1954
Termination and Relocation 1970
Restoration and Recognition To-date
Neural Correlates of Food Reward in American Indian Women: an fMRI Study

Tiffany R. Beckman, MD, MPH
Utility of Functional Neuroimaging in Studies of Metabolism

- Translational
- *In vivo* studies of CNS in humans
- Integrate cognitive, reward, homeostatic control of food intake
- Mapping of function to anatomic brain locations
Functional Magnetic Resonance Imaging (fMRI): Translational Science

- Blood oxygen level-dependent (BOLD) response
  - The change in regional blood flow that follows a burst of neural activity in response to a stimulus
Does brain response to food cues differ based on the food depicted?
Brain activation to fattening food cues in reward pathways differs from that to non-fattening food.

High Calorie Visual Stimuli
Low Calorie Visual Stimuli
Participants

- American Indian women living in Minneapolis
- obese (BMI 30-57)
- lean control group (BMI 20-24.9)
- right-handed
- age 18-45
- normal or corrected-to-normal vision
- non-smokers
Brain Activation by Food Cues Varies with Choice of Visual Stimulus in Obese American Indian Women

1-sample T-Test: High Calorie > Low Calorie Foods

Rt. Caudate, Accumbens
Ant. Cingulate gyrus

Obese Placebo
## Suggested Energy Intake Based on Initial Body Weight

<table>
<thead>
<tr>
<th>Body Weight (lb)</th>
<th>Suggested Energy Intake (kcal/d)</th>
<th>Approximate Initial Energy Deficit (kcal/d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>150-199</td>
<td>1000</td>
<td>500</td>
</tr>
<tr>
<td>200-249</td>
<td>1200</td>
<td>750</td>
</tr>
<tr>
<td>250-299</td>
<td>1500</td>
<td>1000</td>
</tr>
<tr>
<td>300-349</td>
<td>1800</td>
<td>1250</td>
</tr>
<tr>
<td>≥350</td>
<td>2000</td>
<td>≥1500</td>
</tr>
</tbody>
</table>

Cardinal Behaviors of Successful Long-term Weight Management
National Weight Control Registry Data

- **Self-monitoring:**
  - Diet: record food intake daily, limit certain foods or food quantity
  - Weight: check body weight ≥1 x/wk

- **Low-calorie, low-fat diet:**
  - Total energy intake: 1300-1400 kcal/d
  - Energy intake from fat: 20%-25%

- **Eat breakfast daily**

- **Regular physical activity:** 2500-3000 kcal/wk (ex: walk 4 miles/d)

What is success?

- Don’t gain any more weight
- Work on getting fit
- Achieve 5% to 10% body weight loss over 12 months
- For a 240 pound person:
  - = 12 to 24 pounds over 12 months
  - = 1 to 2 pounds per month
  - = ½ to 1 pound per week
How to begin

- Define your weight goal
- Identify obstacle(s) to this goal
- Determine the change(s) required to meet the weight goal
- Set a date by which to achieve your weight goal
So, Why Lose Weight?
To Prevent, Treat, & Even Cure Diabetes!!!!
Preventing Complications of Diabetes

- Know your ABCs
  - A is for A1c: goal 7%
  - B is for Blood Pressure: goal <130/80
  - C is for Cholesterol: LDL <100
  - S is for smoking cessation
Preventing Complications of Diabetes

- Control your ABCs
- Get regular eye exams
- Get regular dental exams
- Get regular foot exams & do good foot care
- Take your baby aspirin
- Quit smoking
- Control your weight
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“When all the trees have been cut down, when all the animals have been hunted, when all the waters are polluted, when all the air is unsafe to breathe, only then will you discover that money cannot be eaten”
-Cree Prophecy
Hope is Medicine

“What would life be if we had no courage to attempt anything?”
-Vincent Van Gogh