Adolescent Obesity

GOALS

1. Be familiar with updated obesity trends for adolescent
2. Understand complications of obesity and recommendations for screening
3. Identify basic strategies for treating obese adolescent patients

BODY MASS INDEX (BMI)

- BMI = Weight in Kilograms / (Height in Meters x Height in Meters)

- For Adults:
  Overweight  BMI >25
  Obesity  BMI > 30

- But adolescents are still growing!
  - in height and weight
  - different growth in boys and girls

CDC Reference Standards
ADOLESCENT BMI

Underweight – <5th percentile  
Normal weight – 5th - 85th percentile  
Overweight – 85th - 95th percentile  
Obese – ≥95th percentile  
Severely obese – ≥120 percent of 95th percentile BMI OR BMI ≥35 – 99th percentile


PREVALENCE OF U.S. ADOLESCENT OBESITY, 2008 AGES 12 TO 19 YEARS

SOCIAL DISPARITIES IN OBESITY

- Higher prevalence of obesity:
  - American Indian
  - Non-Hispanic blacks
  - Mexican Americans

- 12.4 % overall pre-school aged children are obese

- 14.6% low income pre-school aged children are obese

WILL OBESE CHILDREN BECOME OBESE ADULTS?

PREDICTORS OF ADULT OBESITY

- National Longitudinal Study of Youth 1979 (CDC) showed 82 percent of individuals (1309 adolescents, 12 to 15 years) who were obese as children remained obese as adults 23 years later
- Predictors:
  - Age at obesity
  - Severity of obesity
  - Parental obesity


PREDICTORS OF ADULT OBESITY

- Important Predictor:
  1) severity and 2) adolescence age 16/17
- Severely obese adolescents become severely obese adults (BMI >40):
  - 75% of severely obese
  - 8% moderately obese


PREDICTORS OF ADULT OBESITY

- Important Predictor: Obese Parent
- Washington, 874 obese subjects: 80 percent of obese 10- to 14-year-olds who had one obese parent are obese as adults
- Parental obesity more than doubles the risk of adult obesity among both obese and non-obese children under 10 years of age

Why so much obesity?

ENVIRONMENTAL FACTORS (78%)

- TELEVISION/VIDEO
- Increasing glycemic index
- Sugar-containing beverages
- Larger portions
- Fast food
- Fewer family meals
- Decreasing physical activity
- Decreased sleep
- Fewer sidewalks and playgrounds

GENETIC FACTORS

- 40-50% of variation in adipose
- Molecular factors not yet determined
  - Melanocortin 4 receptor mutation (4% of severely obese people)


ENDOCRINE FACTORS

- Less than 1%
- Usually mild obesity
- Examples:
  - Hypothyroid
  - Cushing's
  - Pseudohypoparathyroid
  - Growth hormone deficiency


METABOLIC PROGRAMMING

- LGA and SGA babies have increased rates of insulin resistance later in life
- Pregnant moms with weight gain or GDM have higher rates of obese kids into adulthood
- Kids born after gastric bypass have lower rates of obesity


COMPLICATIONS OF CHILDHOOD OBESITY

- Psychosocial
  - Poor self-esteem
  - Depression
  - Eating disorders

- Pulmonary
  - Sleep apnoea
  - Asthma
  - Exercise intolerance

- Gastrointestinal
  - Gallstones
  - Steatohepatitis

- Renal
  - Glomerulosclerosis

- Musculoskeletal
  - Slipped capital femoral epiphysis
  - Blount's disease
  - Forearm fracture
  - Flat feet

- Cardiovascular
  - Type 2 diabetes
  - Precocious puberty
  - Polycystic ovary syndrome (girls)
  - Hypogonadism (boys)

- Endocrine
  - Dyslipidaemia
  - Hypertension
  - Coagulopathy
  - Chronic inflammation
  - Endothelial dysfunction
COMPLICATION: DIABETES

- The prevalence of type 2 diabetes increased 21% among American youth from 2001-2009.

- Youth with diabetes who watched television for 3+ hours per day had higher A1C and triglyceride levels than those who watched less television.


COMPLICATION: DIABETES

Adolescents develop complications rapidly

- At New Adolescent Diagnosis:
  - 13.0 percent had microalbuminuria
  - 80.5 percent had dyslipidemia
  - 13.6 percent had hypertension


COMPLICATION: DIABETES

AAP Recommendation: Aggressive, early treatment may slow progression of micro and macro-vascular complications

Tight glycemic control HbA1C <7
- benefit for adults with DMII
- benefit for adolescents with DMI
- need more data for adolescents with DMII


COMPLICATION: DIABETES

1. Lifestyle modification for 3 months

2. Medications
   - If 3 month lifestyle modification fails
   - If patient is symptomatic at time of diagnosis

3. Surgery: weight loss if the best treatment Decreases peripheral insulin resistance

SCREENING: DIABETES

- Definition: HbA1C (6.5) or Fasting glucose (126)
- Who to screen:
  - All Kids with BMI >95% (4% have asymptomatic DM)
  - >85% with other risk factors (over 10 years)
- Every 2 years


SCREENING: HTN

- All children with BMI >95th percentile
- 3X higher risk of hypertension than those with BMI <95th percentile for age and sex
- Predicts HTN in adulthood, even after adjusting for BMI. (will be high in adulthood even if the adolescent loses weight)


SCREENING: HYPERLIPIDEMIA

- Fasting lipids: All kids BMI> 95th, also 10 years with BMI > 85%
- every 3-5 years


SCREENING: FATTY LIVER

- Nonalcoholic fatty liver disease
- NASH may lead to fibrosis, cirrhosis, and ultimately liver failure if it is not treated
- Screen with Liver Function Tests:
  - All kids with BMI >95%
  - >85% with other risk factors (over 10 years)
  - Every 2 years
TREATING OBESITY IN PRIMARY CARE
AMERICAN ACADEMY OF PEDIATRICS (AAP)

- Limited RCT
- Only environmental factors are modifiable
- Focus on Behaviors
  - Excessive energy intake
  - Insufficient energy expenditure


TREATMENT: GUIDING PRINCIPLES

1. Track BMI
2. Assess risk factors
3. Perform clinical interventions routinely
4. Implement staged approach


GUIDING PRINCIPLE: TRACK BMI

Plot BMI chart to track changes over time


GUIDING PRINCIPLES: ASSESS RISK

- Routine assessment of all children for obesity-related risk factors, to allow for early intervention

ASSESS NUTRITION

- Detailed nutritional history
- Screen for food insecurity
- Include family culture in discussion

ASSESS ACTIVITY

- School: Physical education
- Lifestyle: safety, availability of transport
- Home
  - Television in bedroom
  - Family physical activity routines
  - Outdoors (assess safety)
  - Organized sports

GUIDING PRINCIPLES: INTERVENTIONS

Routine brief clinical interventions

- Education of patient and family
- Family centered communication
- Long term behavior changes

GUIDING PRINCIPLE: STAGED APPROACH

- Stage 1: Prevention plus
- Stage 2: Structured weight management
- Stage 3: Comprehensive multidisciplinary eval
- Stage 4: Tertiary care intervention

MOTIVATIONAL INTERVIEWING

- Formally assess patient and family readiness for change
- Avoid scare tactics: not effective for long term change


COUNSEL FOR BEHAVIORAL CHANGE: BEHAVIORAL STRATEGY

1. Self-monitoring: food log
2. Stimulus Control: chips out of the house
3. Goal Setting (SMART): target behavior
4. Contracting
5. Positive Reinforcement: rewards


GOALS FOR WEIGHT MANAGEMENT

- Specific weights are not effective
- Mildly Obese: maintain weight over time
- BMI > 95%: weight loss
- Comorbidities: 1-2 lbs per week
- Reality: 1-2 lbs per month
COUNSEL FOR INCREASED ACTIVITY

• Increase healthy activity
• Decrease sedentary activity
  - No TV in child’s bedroom
  - No TV during meals
  - Maximum time: 2 hours daily

![Image of children exercising]

PREVENTION: HIGH INTENSITY INTERVENTION

Behavioral interventions of moderate or high intensity work!

• 26 to 75 hours or >75 hours of provider contact, respectively is effective in achieving short-term weight improvements in children (up to 12 months)

• “A 5-month, medium-intensity, primary care-based, multicomponent behavioral intervention was associated with significant and sustained decreases in BMI scores among obese adolescent girls compared with those receiving usual care”


PREVENTION: LOW INTENSITY INTERVENTION

• <25 hours of provider contact - more feasible
• Recommended...though limited data – so far there are weak / inconsistent effects

PREVENTION: NEED PROGRAMS

Cochrane Review of 55 Obesity Prevention studies:

“We found strong evidence to support beneficial effects of child obesity prevention programs on BMI, particularly for programs targeted to children aged six to 12 years.”


PREVENTION: MORE STUDIES NEEDED

- Review of 29 studies around the world
- “Outcomes are generally modest...No universal prevention program for childhood obesity meets criteria for a well established intervention of the American Psychological Association.”

Universal Childhood and Adolescent Obesity Prevention Programs, Haynes et al, 2011