

4 Presentation Outline

- Introduction
- Brief overview eating disorders in children and adolescents
- Case presentations
- Advances in the Field
- Levels of care and referrals
- Coordination of care
- Q & A

5 Eating Disorders Epidemiology

- ▷ Primarily affecting young women; yet 5-10% are male
- ▷ Peak onset: adolescence - more than 90% diagnosed before age of 25 years
- ▷ Incidence among adults - relatively stable in last 50 years
- ▷ In U.S., prevalence of anorexia nervosa is 0.5% making it the third most chronic disease in adolescence (after obesity and asthma)

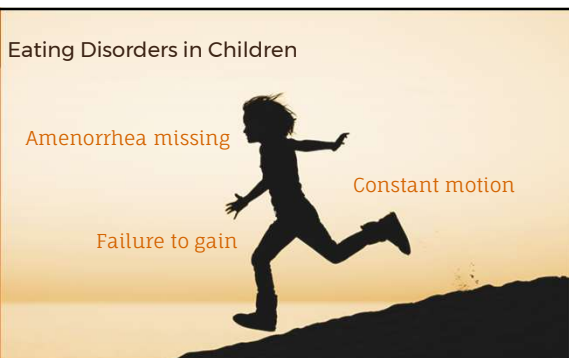
6 Etiology

- ▷ Multi-factorial disorder
- ▷ Genetics: a female relative of a patient with clinical EDO is 4x as likely to have BN, 10 x likely to have AN vs those with negative family history
- ▷ Genetics: twin studies (equivalent environment assumption) for AN - estimated heritability of 58% to 76%
- ▷ Environment: socio-cultural theories

7 DSM V and "new" diagnoses

- ▷ Broadened inclusion criteria for anorexia nervosa and bulimia nervosa: removed amenorrhea as criteria, body image distortion is included but not required for AN
- ▷ Binge eating disorder
- ▷ EDNOS: no longer used
- ▷ Avoidant/restrictive food intake disorder (ARFID)
- ▷ Other eating disorders: selective eating and food phobia - still not recognized
- ▷ Dilemma of atypical presentations

8 Eating Disorders in Children



Amenorrhea missing

Failure to gain

Constant motion

9 Physiological sequelae

- ▷ Electrolyte disturbances from restricting, purging or refeeding syndrome
- ▷ Cardiac complications: arrhythmias, syncope and/or cardiac arrest
- ▷ GI: enlarged salivary glands, delayed gastric emptying, esophagitis, esophageal tear from purging, constipation, diarrhea (from laxative abuse)
- ▷ Renal insufficiency

10 Physiological sequelae


- ▷ **Endocrine:** amenorrhea, thyroid dysfunction, hypoglycemia, osteopenia, osteoporosis (and associated stress fractures)
- ▷ **Bone marrow suppression:** anemia, leukopenia
- ▷ **Neurological:** seizures due to electrolyte disturbances, brain starvation and impaired cognitive function
- ▷ To name few

CASE 1

Elsa: 13 yo female

Presented with acute weight loss over the last 5 months

- Restrictive eating
- Became a vegetarian 4 months ago
- Calorie county (eats about 500 calories/day)
- Now wants to become a chef and reads cookbooks



12 Meal Plan

Breakfast Oatmeal or often skips

Lunch Skips

Snack "Whatever" or "an egg"

Dinner Cooked by patient or parents.
Last night: steamed vegetables.
Typically a salad without dressing & vegetables

CASE 1 (cont.)

13 REDS

Rating of Eating Disorder Severity (REDS)¹ - validated semi-structured questionnaire administered by MD → score of 37, moderate severity

¹Rating of Eating Disorder Severity Interview for Children: Psychometric Properties and Comparison with EDI-2 Symptom Index
Desocio, J.E., O'Toole, J.K., He, H., Crosby, R., Koeller, P., Baird, S.A., Lukach, M.; Eur Eat Disord Rev. 2012 Jan.

CASE 1 (cont)

14 Medical History

Past Medical history Unremarkable

Gyn history Menarche at 10 yo, now amenorrheic (3 months prior to presentation)

Family Medical history Mother was adopted, recently met birthmother who has likely EDO, dx with pancreatic cancer (hospice care with family)

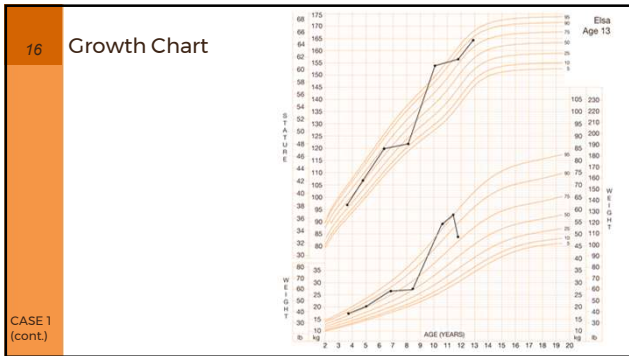
CASE 1 (cont)

15 Physical Exam

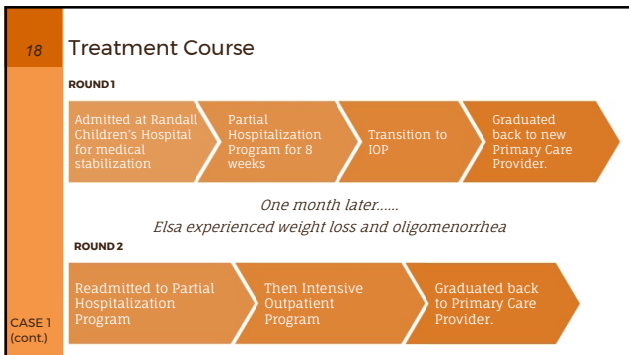
Vital signs:

- ▶ Pulse: 48 BPM (supine), 88 BPM (standing)
- ▶ Blood Pressure: P 94/70 (supine), 88/68 (standing)
- ▶ Weight 96.8 lbs. Highest premorbid weight 132 lbs
- ▶ Thin, atrophic breast tanner stage IV, predominant lanugo, extremities cold to touch

CASE 1 (cont)



- 17 Diagnoses
- ▷ Anorexia nervosa, restricting subtype
 - ▷ Amenorrhea, secondary
 - ▷ Bradycardia
 - ▷ Orthostatic hypotension
- CASE 1 (cont.)



19 Questions

▸ If you were seeing this patient - what would be your next recommendation?

CASE 1 (cont)

Tools for primary care providers



21 Tools for Primary Care Providers

- Common presentations
- Screening tools, e.g. Rating of Eating Disorders Severity (REDS)
- Initial labs
- Using individual biology to set goal weights
- Additional laboratory testing ("metabolic testing")
- Follow up


22 Common Presentations

- Most children and adolescents will not present with chief complaint of weight loss
- Common symptoms include: fatigue, headaches, low mood, amenorrhea, etc

23 Common Presentations

What do you commonly see as chief complaints?

Screening Tools




25 Screening Tools

- ▶ Multiple screening tools exist: SCOFF questionnaire, the Eating Disorders Examination-Questionnaire (EDE-Q), and the Female Athlete Screening Tool (FAST).
- ▶ We use a semi-structured questionnaire: Rating of Eating Disorder Severity, Childhood version - REDS-C (adopted from Dr. Elliott Goldner, Vancouver, BC)

→ 16 questions along with a confidence rate

Initial labs/workup



27 Initial labs/workup


- ▶ Obtaining a full set of vital signs including orthostatic vital signs is more important than extensive labs!
- ▶ 12 lead ECG
- ▶ Can obtain baseline CBC, CMP, thyroid function, ESR to rule out other illness e.g. Addison's disease, IBD etc.

→ typically labs are **within normal limits**


28 Follow up

- ▶ Clinical pearl: **close follow up** is the next best step for any patient suffering from eating disorder in primary care setting
- ▶ What about confidentiality?
- ▶ What about family declining treatment or lack of insurance coverage?


Using individual biology to set goal weights



30



Never use *"100 lbs for 5' and 5 lbs for each subsequent inch"* or similar rules of thumb



31 The necessary tools




- ▶ Must include physical exam
- ▶ Should include growth chart
- ▶ Premorbid weights are critical. Ask yourself: at what weight did he/she function well? NOT what should he/she weigh?













32 Take note!

There is no weight low enough to satisfy anorexia; down that path lies madness




33 Tanner Stages

I		I		9	125
II		II		11	150
III		III		13	180
IV		IV		15	200
V		V		17	220


34 Stages of development critical to weight goals		
Tanner I This child is prepubertal; no one menstruates at this stage Growth is slow but steady Goal weight is a moving target	Tanner II & III These are peak height growth velocity stages Weight suppression is especially harmful here Goal weight is a fast moving target	Tanner IV If a girl has no period @ this stage she probably needs to gain more weight Height growth will now slow down and stop

Metabolic Testing:
"state not weight"



36 We stumbled across a troubling problem:

Despite clear weight restoration, a cohort of girls (all Tanner III-IV/III-IV) did *not* resume menstruating or initiate menarche.



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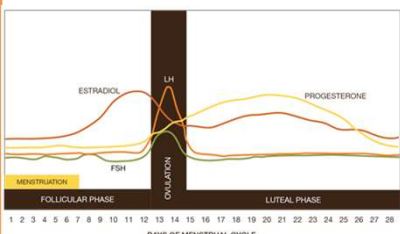
What was happening?

38 Individualizing care

- Learning from our patients
- Small cohort despite weight restoration **did not resume menses**
- In collaboration with a colleague specializing in sports medicine - we are now **focusing beyond sex hormone suppression**
- Leptin suppression → causes of **leptin suppression** - such as excessive movement, lack of sleep, or post prandial hypoglycemia

CASE 1 (cont.)


39 Consult with Dr Emily Cooper




She pointed to leptin and its permissive effect on the LH surge needed for ovulation

CASE 1 (cont.)

40



We looked at leptin in weight-restored girls with no menses.
It was low.




41 So what suppresses leptin?




3 THINGS:

1. Even short lived fasting / dieting (with or without weight loss)
2. Exercise
3. Post-prandial hypoglycemia (verbal report, Dr. Cooper)

42 Could it be Hypoglycemia?




- Our kids were eating on meal plan + not exercising.
- We were skeptical. But we decided to check.
- We worked with the hospital lab to order 30, 60, 90 minute glucose AND insulin following a defined and balanced breakfast.
- As leptin levels (and other labs) may show diurnal variation, ALL of our labs are early morning fasting.




43 Our Findings

Startling post-prandial hypoglycemia

- Some were dropping within the first 30 minutes, some later
- Occasionally a patient was symptomatic (headaches, tired, sweats), but mostly they were *asymptomatic*
- Some had **critically low** values (in the 30's-40's!!!) -- surprised us!




44 Metabolic Labs



	1/15	2/21	3/15
Cortisol	21.8	9.3	8
LH	0.2	<0.1	5.8
FSH - Follicle Stimulating Hormone	2.4	4	3.8
Estradiol 17-B	26	26	125
Testosterone	34		
TSH	3.257	2.633	2.361
T3 Total	37 (L)	84	125
Free T4	0.87	1.04	1.17
C3 Complement	68 (L)	91	104
Insulin Fasting Lvl	1.8 (L)	3	6
ACTH		6	11
T3 Free	2.5	3.6	4.8
Zinc	107	109	108
Leptin	0.4	1	3.3

CASE 1 (cont.)

45 Metabolic Labs



	A	B	C
Fasting insulin	6	6.2	4.2
Insulin 30 min	24.6	25.9	57.1
Insulin 60 min	25.4	18.3	29.6
Insulin 90 min	19.5	21.5	35.7
Fasting Glucose	67	69	69
Glucose 30 min	41	57	76
Glucose 60 min	60	57	54
Glucose 90 min	47	75	69

CASE 1 (cont.)

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“Our patients are our teachers”
But sometimes, important colleagues teach us too.
Many thanks to Dr Emily Cooper for her inspiration
and teaching about metabolic labs

“

47 **Clinical Pearls: Anorexia Nervosa**

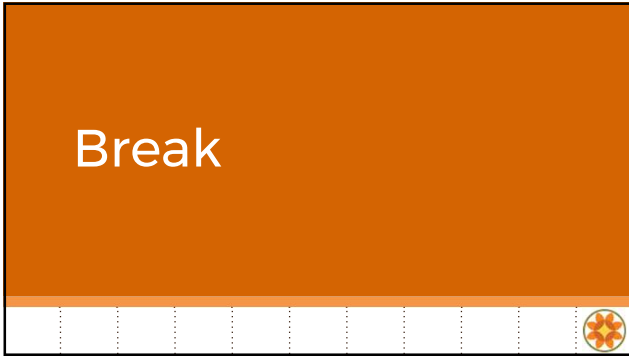
- ▶ *Weight loss* OR *lack of weight gain* in children clearly NEEDS to be addressed - even with the current epidemic of obesity
- ▶ What is “*ideal body weight*”? - particularly in pre-pubertal children
- ▶ Higher body weight child can also be diagnosed with AN
- ▶ The extremes: by the time of referral, most either had a very *expensive work-up*, or were asked to return in 3 months!
- ▶ Misdiagnosis or under-diagnosis can lead to *severe sequelae* - both *temporary AND permanent*

CASE 1 (cont.)

48 **Clinical Pearls: Physiological vs Psychological remission**

- ▶ Without weight restoration + resumption of menses - *cannot achieve physiological remission*
- ▶ Without physiological remission > cannot achieve psychological remission:
 - ▶ serotonin + memory function + estrogen modulating 5HT2 receptors in cerebral cortex + limbic system

CASE 1 (cont.)



50

CASE 2

Ben: 11 yo male

- From Sutherlin, OR, self referred by parents
- Onset of weight loss - 10 months ago at beginning of last football season
- Followed by increased sadness and social withdrawal
- Was eating smaller amounts of food
- Noted to be "scratching his stomach" after each meal and complaining of fullness
- Shared with parents "something telling me that I am fat"
- Saw PCP who discussed healthy diet and "RTC in 3 months" despite weight loss

51

Meal Plan

Breakfast A small bowl of cereal with 2% milk


Lunch Parents pack him a half of PBJ sandwich and a fruit. Admits that to skip lunches at school

Snack Refused to eat. May a spoonful of PB. Used to have a granola bar or cheese/crackers with brother

Dinner Meals cooked by parents. Very small portions of meat which tries to "defat", minimal grains, and refuses to drink milk, to have any desserts or fast food

CASE 2 (cont.)

52 Physical Activity



- ▶ Engaged in compulsive/compensatory exercising - 2 to 4 times per day
- ▶ Crunches, push-ups, etc
- ▶ Alone in his room or bathroom
- ▶ Parents hear him and are unable to make him stop

CASE 2 (cont.)

53 Reel Dx



Eating Disorders in Boys - Kartini has partnered with ReelDx to create online resources to study and treatment of pediatric eating disorders

54 Body Image Distortion

- ▶ Unlike most boys at his age, Ben felt "fat", guilty after eating any meals, and "hated his body"
- ▶ Initially denied comparing his body shape or weight to that of others
- ▶ Yet endorsed obsessive thoughts about calorie counting, meal planning and compulsive exercising

CASE 2 (cont.)

55 REDS

Rate of Eating Disorder Severity (REDS) - validated semi-structured questionnaire administered by MD → score of 46, significantly high severity given patient's age.

Rating of Eating Disorder Severity Interview for Children: Psychometric Properties and Comparison with EDI-2 Symptom Index.
Desocio, J.E., O'Toole, J.K., He, H., Crosby, R., Koeller, P., Baird, S.A., Lukach, M.; Eur Eat Disord Rev. 2012 Jan.

CASE 2 (cont.)

56 Medical History

Past History

- ▷ Born via c-section to 30 yo G1 P0 to 1
- ▷ s/p tonsillectomy at 12 yo for recurrent streptococcal pharyngitis and "sleep apnea" per parents
- ▷ No hospitalizations

Family History

- Mother** History of depression. Perfectionistic & tidy. No EDO
- Father** s/p back surgeries, good health. No EDO
- Halfbrother** Depression - ? activated while on fluoxetine
- Brother** Healthy
- PGM** Alcoholism
- PGF** Deceased from brain aneurysm

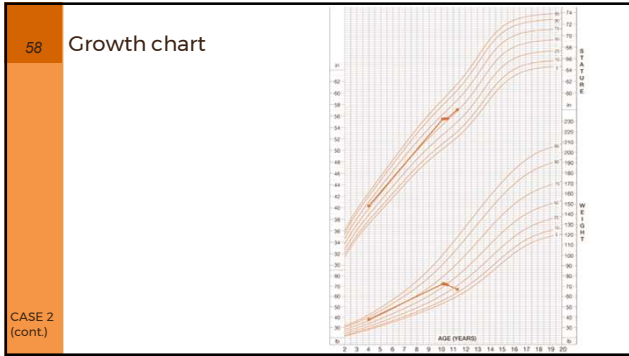
CASE 2 (cont.)

57 Physical Exam

Vital Signs

- ▷ Temp: 36.7 C
- ▷ Pulse 66 BPM (supine), 77 BPM (standing)
- ▷ Blood Pressure 107/65 (supine), 96/53 (standing)
- ▷ Weight 65.8 lbs and height 144.4 cm (4 ft 8.8 inches). Highest premorbid weight 79 lbs
- ▷ BMI 14.3
- ▷ On exam: cachectic appearing, extremities cold to touch, tanner stage I

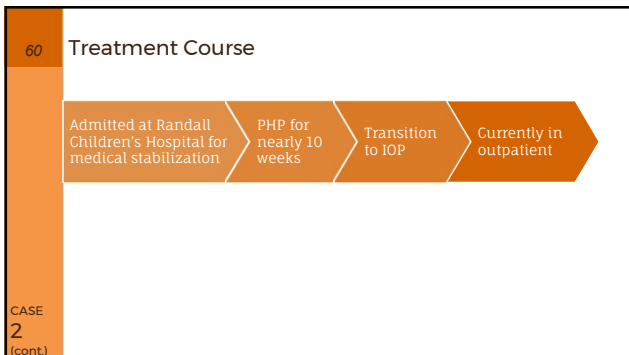
CASE 2 (cont.)



59 Questions

▸ Where would you refer this patient?
▸ What level of care does he need?

CASE 2 (cont.)

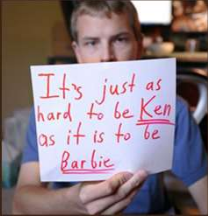


61 Diagnoses

- ▷ Anorexia nervosa, restricting subtype
- ▷ Orthostatic hypotension

CASE 2 (cont.)

62 Clinical Pearls: Anorexia Nervosa and Boys



- ▷ Often under-diagnosed
- ▷ Many present with over-exercising
- ▷ May or may not complain of body image distortion e.g. wanted to build muscles, improve sports' performance
- ▷ By the time of the referral: usually quite ill, bradycardic, malnourished, often osteopenic or osteoporotic

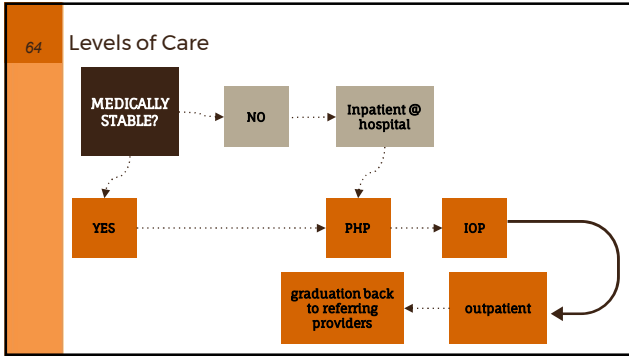
CASE 2 (cont.)

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WHO ARE WE?

Medical & mental health team





- 65 Inpatient Hospitalization
- ▷ Using the American Academy of Pediatrics for inpatient hospitalization
 - ▷ At a children's hospital (not a psychiatric ward!)
 - ▷ Daily physician visits
 - ▷ Focus is *medical stabilization*

- 66 Partial Hospitalization Program
- ▷ Five days a week, currently with 1 long day (8 am to 6 pm, 8 am to 3:30 pm)
 - ▷ Three separate "units" – Earth, Wind, and Fire!
 - ▷ Family-based approach
 - ▷ Structured eating
 - ▷ Emphasis on mental health (with continued medical supervision)
 - ▷ Age appropriate
 - ▷ Includes group therapy, individual therapy, milieu therapy, art therapy, school time, and movement therapy among others

67 Intensive Outpatient Program

- ▷ 5 days per week: 3-5 hours per day in group therapy
- ▷ 2 tracks: morning and afternoon tracks. Focus is on returning to school, practical skills, and seamless transition ("softer landing")

68 Outpatient Program

- ▷ Brief transition of care with our medical team (medical visits)
- ▷ Transition to outpatient family therapy
- ▷ Transition to outpatient individual therapy

69 Family-Based Therapy at Kartini

- ▷ Each family is assigned a family therapist and doctor that work with them through all levels of care
- ▷ Parents have orientation with their child's milieu therapist, nutritional counselor, and school teacher
- ▷ Weekly family therapy to provide parent education and coaching
 - ▶ Siblings and other caregivers are drawn into family therapy when appropriate
 - ▶ All caregivers are required to get meal plan training
- ▷ Parents meet with the doctor every two weeks and the nurse weekly
- ▷ At least weekly check-in with milieu therapist

70 Family-Based Therapy at Kartini

- Parents are in charge!
 - Kartini meal plan
 - Supervision
 - Activity plan
- Parental alignment with treatment recommendations
- Parent support through classes, groups, and online resources

71 Coordination of Multidisciplinary Care



72 Coordination of Care

- Direct communication with providers from the time of referral, throughout treatment and discharge planning
- Weekly treatment/concurrent review to "care team": weekly summary of patient's treatment objectives
- Discharge summary at the time of graduation

73 **Coordination of Care**

- Beyond our patients' graduation - providers have access to the Kartini clinical staff
- Online resources - e.g. Dr. O'Toole's blogs, etc.

74 **Referral**


Sources

- PCP ▸ Therapist ▸ Dietician ▸ Parent(s)

Process

- Early recognition + assessment
 - Formal evaluation from specialist identify level of care + related recommendations
 - PHP/IOP/OP
 - Graduate + return to provider(s)

Q + A



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THANK YOU!

Any final questions?
You can find us at help@kartniclinic.com

