

COMPLIMENTARY CE

# Successful Strategies for Managing Glucose and Nutrition Needs in a New Athlete

Jointly Provided by



Developed in collaboration with



## INTRODUCTION TO THE PATIENT

### Sara



- **Chief complaint:** interest in starting an exercise program for fitness, mental health, weight management, and glycemic control
- **History of present illness:** Sara is an 18 ½-year-old woman
  - T1D x 15 years, diagnosed Feb 2003 at age 4 years
- She has struggled with her weight since her mid-teen years, her BMI is now 32
- **Medical history:** mild anxiety and depression, sees therapist weekly or bi-weekly
- **Medications include:** insulin lispro via pump, fluoxetine 20 mg daily



## INTRODUCTION TO THE PATIENT

# Sara



- **Social history:** Sara graduated high school in June and started college away from home in August
- Has used CGM in past, not currently using
- **Interested in incorporating exercise into college schedule to:**
  - Benefit well-being (fitness and mental health)
  - Avoid additional weight gain (“Freshman 15”)
  - Improve glycemic control



## INTRODUCTION TO THE PATIENT

# Sara



- **Current diabetes treatment:** total daily dose 82 units
  - 0.92 unit/kg/day
  - 45% basal dose/TDD
- **Uses pump with tubing**
- **Basal rates:**
  - 12 a.m. 1.9 unit/hour
  - 6 a.m. 2.1 unit/hour
- **Insulin:carb ratio:** 1:6
- **Correction dose:** 1:20
- **Active insulin setting:** 3 hours
- **Target BG:** 100 days, 120 nights (12 a.m. to 6 a.m.)
- **HbA1c:** 8.1%



## INTRODUCTION TO THE PATIENT

# Sara



- Checks blood glucose levels by meter 3–4 times daily
- Encouraged to start CGM before college to:
  - Reduce frequency and severity of hypoglycemia
  - Monitor glucose during exercise
- Increase opportunities to correct hyperglycemia without additional fingersticks (non-adjunctive CGM use)



## Exercise History



- Usual physical activity related to high school PE, softball, and work as a summer camp counselor
- Has hypoglycemia awareness
- Has recognized some low blood glucose levels in the past at times during and after aerobic activity
- Has concerns about hypoglycemia during exercise that in past have required carbohydrate intake



## Current Eating Patterns



- Carbohydrate counting
- No dietary restrictions
- Often omits entering carbs into pump, mainly using experienced estimation
- Total calories 2300/day; 3 meals with 1 snack daily
  - Carbs: 178 g
  - Protein: 147 g
  - Fat: 108 g
- **Wants to lose weight:** her primary goal is to avoid college weight gain; she also wants to limit the need to treat low blood glucoses during exercise



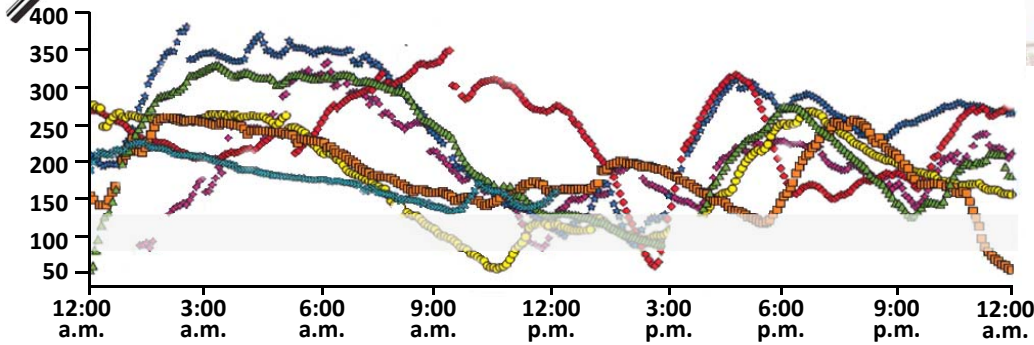
## Current Exercise Plan



- Modest exercise, works with children at day camp
- Plans to go to college gym twice weekly to use the elliptical machine
- May try weight lifting, too
- Sara agrees to resume CGM use
- **So what happens to Sara when she starts exercising?**



# CGM Trial What's Notable?

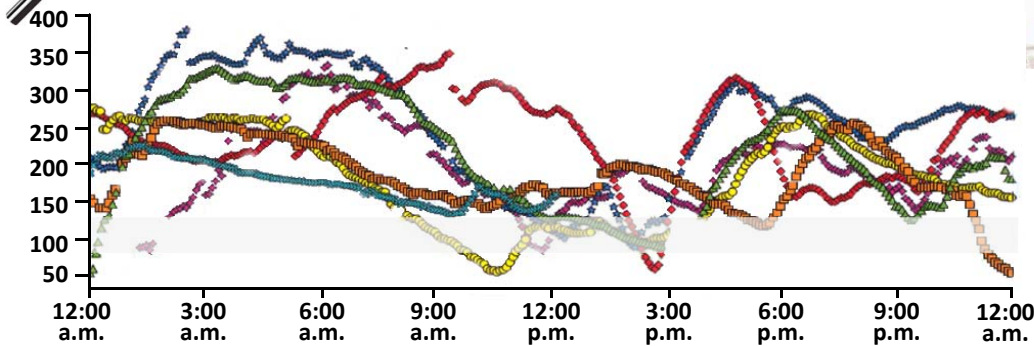


- ◆ Friday, Aug. 25
- ★ Saturday, Aug. 26
- ◆ Sunday, Aug. 27
- Monday, Aug. 28
- Tuesday, Aug. 29
- ▲ Wednesday, Aug. 30

- Hypoglycemia with exercise
- Hyperglycemia after exercise
- Nocturnal hyperglycemia
- Why?



# CGM Trial What's Notable?

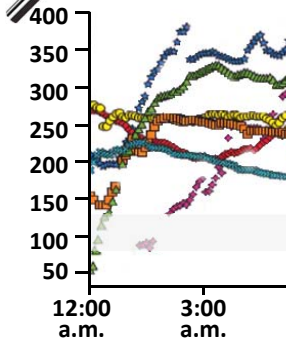


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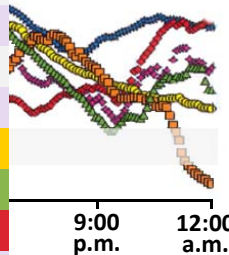
**Overall glucose high glucose levels due to fear of hypoglycemia (FOH)**



# CGM Trial What's Notable?



Statistics	
Average glucose	208 mg/dL
Sensor Usage	7 of 7 days
Calibrations/day	2.0
Standard deviation	± 64 mg/dL
	<b>88% high</b>
	<b>10% target</b>
	<b>1% low</b>
Target range	80–130 mg/dL
Nighttime	10:00 p.m. to 6:00 a.m.



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**Overall glucose high glucose levels due to fear of hypoglycemia (FOH)**

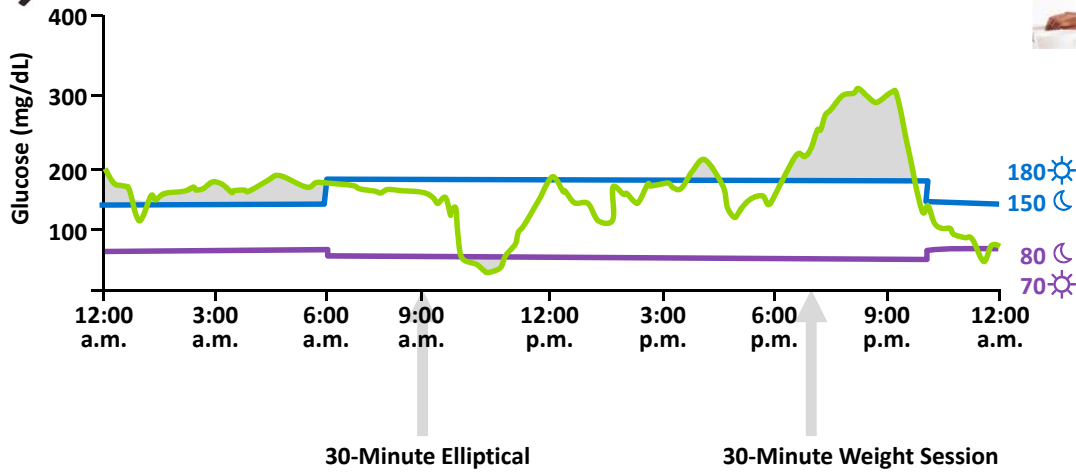


## EXERCISE AND GLUCOSE LEVELS



**CASE STUDY**

## CGM Use

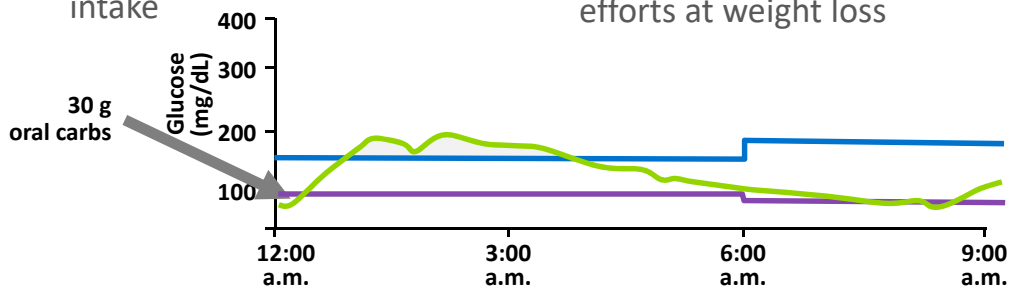


**CASE STUDY**

## CGM Overnight and More



- Following an afternoon weight lifting session, a drop in overnight blood glucose required overnight carb intake
- Evidence of overtreatment of low at night
- Need to treat with carbohydrates counters efforts at weight loss





## Next steps?



- Recognize that FOH with exercise leads Sara to start exercise with high glucose levels
- Consider that Sara also wants to avoid carbs with exercise as she hopes to reduce calories to lose weight
- Encourage consistent CGM use to help manage FOH
- Review CGM alert settings, including low, high, and trends alerts AND encourage retrospective review of CGM patterns to detect trends



## Summarizing



- With exercise:
  - Hypoglycemia after 30-minute aerobic session
  - Hyperglycemia after 30-minute weight session
  - Nocturnal hypoglycemia 7–11 hours after exercise





## Exercise Recommendations



- For planned 30 minutes of elliptical at gym:
  - Decrease pump basal rate by 50% 1 hour before, during, and 1 hour after exercise
  - Reduce carbohydrate bolus by 50% for meals and correction doses within 2 hours of planned exercise—both before and after—to limit the need for extra carbohydrates to prevent hypoglycemia while working on weight management and glycemia
- Reduce basal rate 20% x 4–6 hours at bedtime after exercise in the afternoon to avoid nocturnal hypoglycemia



## Eating Plan Recommendations



- Continue carbohydrate counting
- Aim for modest calorie restriction of 1800–2000/day; eat 3 meals and 1 snack each day, shooting for the following ratios:
  - Carbohydrates: 50% of calories
  - Protein: 20% of calories
  - Fat: 30% of calories
- For exercise (pre or post), aim for 2:1 ratio of carbs-to-protein in snack bars



## Case Study Summary



- **Follow-up diabetes treatment after 1st semester:** Total daily dose 96 units
  - 1.06 unit/kg/day
  - 46% basal dose/TDD
- **Uses pump with tubing**
- **Basal rates:**
  - 12 a.m. 2.0 unit/hr
  - 6 a.m. 2.1 unit/hr
  - 6 p.m. 2.0 unit/hr
- **Insulin: carb ratio**  
1:4 days, overnight 1:5
- **Correction dose:** 1:16
- **Active insulin 3 hours**
- **Target BG:** 100 days, 120 nights (12 a.m. to 6 a.m.)
- **HbA1c:** 6.7% and her weight is stable—next to lose weight