Session Objectives

1. The learner will be able to describe the unique needs of families with young children (<six years old) diagnosed with Type 1 Diabetes (T1D).
2. The learner will be able to identify the types of insulin used in dosing young children and will be able to discuss the use of basal/bolus injections and subcutaneous insulin pumps in young children with T1D.
3. The learner will be able to identify the issues around childcare that T1D presents for families with young children with diabetes and will be equipped with some possible solutions.
Children’s Hospital of Philadelphia

- 546 beds
- Large city-based hospital
- CHOP Diabetes Center for Children
- ~2,200 patients with T1D
- Newly diagnosed patients with diabetes are admitted for 3 days of teaching. During T1Y1, patients are seen frequently and receive close CDE communication

CURRENT CHOP PATIENTS WITH T1D+AB: AGE OF DIAGNOSIS

<table>
<thead>
<tr>
<th>Age of Diagnosis</th>
<th>Number of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnosed &lt;6 years old</td>
<td>36%</td>
</tr>
<tr>
<td>Diagnosed &gt;6 years old</td>
<td>64%</td>
</tr>
</tbody>
</table>

Types of Insulin Used and Delivery Methods

- Basal/Bolus (method started routinely at CHOP)
  - Basal insulin:
    - glargine (*Basaglar—pres only, *Lantus)
    - detemir (*Levemir)
    - degludec (Tresiba—now in a vial, approved at age 1)
  - Bolus insulin:
    - lispro (Humalog** & Admelog—approved at age 3)
    - glulisine (Apidra—approved at age 4)
    - aspart (Novolog*—approved at age 2, *Fiasp
      *not approved for use in age <6
      **available in half-unit increment pens
Insulin Delivery Methods

- **Syringes**
  - Started routinely for newly diagnosed children at CHOP
  - 0.3 mL, 6mm, half-unit markings
  - Used inpatient and outpatient

- **Insulin pens**
  - Can be leaky with small doses
  - Cartridges vs. “junior” pen
  - Need to hold after injection for 10 seconds

- **Insulin pumps**
  - Medtronic 530g*, 630g* & 670g*
  - Omnipod—Classic or Dash (FDA approval all ages)
  - t:slim x2 with Basal IQ*
  - *not FDA approved in ages <6

CURRENT CHOP PATIENTS WITH T1D+AB

<6 YEARS OLD:
- PROGRAM TYPE
  - Basal Bolus
  - Insulin Pump
  - Pre-Mixed/NPH

>6 YEARS OLD:
- PROGRAM TYPE
  - Basal Bolus
  - Insulin Pump
  - Pre-Mixed/NPH

N=1,957
N=87
**Blood Sugar Monitoring Options**

- Glucometer (started routinely for newly diagnosed at CHOP)
- Continuous Glucose Monitor Options:
  - Dexcom (FDA use ages 2+)
  - Freestyle Libre*
  - Guardian*
  - Guardian Connect*
  - Eversense*
*not FDA approved for ages <6

83% 17%

Current CHOP Patients with T1D <6 years: Patients with a CGM (dx for >1 year)
- Prescribed CGM  83%
- No CGM  17%
N=47

Current CHOP Patients with T1D >6 years: Patients with a CGM (dx for >1 year)
- Prescribed CGM  60%
- No CGM  40%
N=1397

**Ketone Monitoring**
What are the Unique Needs of Families with Young Children (<6 years old) with T1D?

- Presentation at diagnosis varies
- Need for very small insulin doses
- Childcare and school settings
- Hypoglycemia unawareness
- Dusk phenomenon
- Developmental behavior considerations

Recognizing and Managing Unique Concerns: Presentation at Diagnosis of a Young Child with T1D

- Presenting symptoms appear as common illness (ex: GI virus or flu) and can be easily missed.
- Obtaining urine sample in PCP’s office can be difficult
- Children can become sick very quickly and waiting for lab work while BG increases allows dehydration to progress into DKA

Recognizing & Managing Unique Concerns: Small doses of insulin

Unique Concerns:

- Consistency of insulin measurement with small doses
- Wide fluctuation in sliding scales
- Concerns of “grazing”
- Post-dosing
- Split basal dosing

How to manage?

- Pre-meal bolusing is important
- Using 0.25-0.5u increments in measurement
- Continuous glucose monitor trend arrows help families make dosing decisions
- Insulin pumps are useful tools for consistency in measurement
Recognizing & Managing Unique Concerns:
How to Measure Small Doses of Insulin

Example of Using 0.3ml Syringe with Half-Unit Markings to Measure 0.25u Increments

Why Use Small Doses?

Better Control!

<table>
<thead>
<tr>
<th>Using 0.5 units</th>
<th>Insulin &gt;320</th>
<th>Same dose with BG 320 to 519</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Insulin &gt;30g</td>
<td>Same dose with carbs 30 to 39g</td>
</tr>
<tr>
<td>This is our Correction Factor</td>
<td>Your Correction Factor is 0.5 units</td>
<td>Your ratio is 1:10 in every 10 grams of carbs</td>
</tr>
<tr>
<td>This is our Insulin to Carb Rate</td>
<td>0.5 units</td>
<td>Your ratio is 1:10 in every 10 grams of carbs</td>
</tr>
<tr>
<td>Using 0.25 units</td>
<td>Insulin &gt;220</td>
<td>Same dose with BG 220 to 319</td>
</tr>
<tr>
<td></td>
<td>Insulin &gt;15g</td>
<td>Same dose with carbs 15 to 29g</td>
</tr>
<tr>
<td>This is our Correction Factor</td>
<td>Your Correction Factor is 0.25 units</td>
<td>Your ratio is 1:10 in every 10 grams of carbs</td>
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<tr>
<td>This is our Insulin to Carb Rate</td>
<td>0.25 units</td>
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Rounding up or Rounding Down?

The chart says …
3.5 units

The math says…
BG 375 = 1.96 units
Carbs 48 = 2.4 units
Total dose = 4.36 units
When using small doses, look at the detailed blood glucose logs to make insulin adjustments. Logs impact your dose decisions.

Why are CGM Arrows So Important for Dosing Small Amounts of Insulin?

Using Arrows
Correction Dose Now = 0.25 units
(difference of 100 blood sugar points)
Recognizing Unique Concerns: Dusk Phenomenon

- Need for high basal insulin between 9pm-1am
  - Standing bolus prior to blood sugar rise
  - Increase basal rate on the pump
  - Parents to monitor CGM or check BG and correct

Managing Unique Concerns: Dusk Phenomenon

- Need for more frequent testing throughout the day and night
- Recognizing behavior related to high and low sugars
- Can be managed effectively with sensors

Treatment

- May not need a full 15g for low, each child is unique
- Need to be careful not to overtreat

Recognizing & Managing Unique Concerns: Hypoglycemic Symptom Unawareness
Overtreating and Overreacting to CGM → Rebound Highs?

- BG may take 15 minutes to rise
- SG may take 30-40 minutes to rise back into range
- Unclear if dose adjustment needed when overreacting/overtreating
  - May only need 5-10g carb

Need to be patient

Unique Concerns:
Childcare and School Settings

- Daycare
  - Most daycares do not have a nurse
  - Some daycares are eligible for funding through state resources
  - Parents and product representatives can educate staff

- Medical daycares
  - May not be covered with insurance
  - Split up siblings
  - Developmentally appropriate learning

- Skilled nursing at daycare, school or home
  - Insurance dependent

- Babysitters
  - Parents can train
  - BeyondT1 Safesitters

Recognizing Unique Concerns:
Behavior

- Variable parenting experience
- Developmental testing of boundaries
- Parent perception of developmental expectations

- Ages 1-3 unable to recognize signs of hypoglycemia
- Ages 4-6 start to recognize signs of hypoglycemia
Managing Unique Concerns: 
*Behavior*

- Include the Diabetes Management team
  - Child life specialist—inpatient/outpatient
  - Clinical psychologist

Managing Unique Concerns: 
*Behavior*

- Discuss developmental expectations
- Teach parents not to refer to BGs as “good” or “bad”, rather “in range/normal” or “out of range/high or low”
- Encourage caregivers to have consistent expectations
- Show parents how to give positive feedback for requested behaviors

Conclusion

Details

Consistency

Technology

Support
Nobody saw you

At 3 am, headlamp on, sneaking into her room
Praying she doesn’t wake as you bleed her finger for the 10th time today

68. Shit.
Too low for 3 a.m.
Get the juice box
Nobody saw you

Holding your screaming child down to give them their 5th shot of the day, or change their pump site for the 3rd time this week
“She needs this to survive,” you repeat to yourself
“Will she be able to handle this life?”
“Will I?”
Nobody saw you cry
Because you always had to be so strong
You can’t let her see your broken heart
You must keep going
She has to be so brave, you must set the example
Soldier on

Nobody saw you desperately shoving sugar in your shaking and confused child
“One more sip, baby”
“One more gummy bear for mommy, please”

Staring a hole through the Dexcom
Waiting for the arrows to stop going down
Waiting for the alarm to shut up
Nobody saw you…”

For more, visit:
https://type1toddler.com/2016/12/06/nobody-saw-you/

Sources

- Minimed 630g. Retrieved April 04, 2019, from https://www.medtronicdiabetes.com/products/minimed-630g-insulin-pump-system