CASE STUDY 2: FROM PAKISTAN TO PHILADELPHIA; MANAGING DIABETES IN A TODDLER

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Disclosures

No conflict of interest.

Objectives

- The learner will be able to state considerations for care and barriers to care in a young child (less than 6 years old) with diabetes during the first year of diagnosis.
- The learner will be able to recognize and problem solve health and math literacy barriers.
- The learner will be able to state the roles of various diabetes team members in diabetes management and recognize the importance of a team approach.
Importance of Religion

According to the World Health Organization:

- **Islam**: 96.03% - The national religion of Pakistan
- **Hindu**: 1.85%
- **Christian**: 1.59%

Initial Presentation - History

- On 2/15/18, 17 months old
- History of Present Illness:
  - 17-month-old female with no significant medical history who presents with constipation and polyuria.
  - **Two week history** of straining with bowel movements and abdominal pain, resolved with a glycerin enema 3 days prior to admission with minimal hard stool balls. She had no vomiting, but had **abdominal pain** and does not eat a diet rich in fiber.
  - A urinalysis was obtained due to concern for UTI and was positive for **500 glucose and >160 ketones**.
  - She subsequently had a POC glucose that was >600.
  - On further discussion with the family, she had a history of both **polyuria** and **polydipsia**, although no weight loss.
Initial Presentation – Physical Exam

- pH of 7.28/ 25.8/11.9/13.1 with an initial gap of 22
- Started on the DKA pathway and given a bolus of normal saline prior to starting on a two bag system with insulin drip.
- HgbA1c 10.5%
- pH normalized to 7.38/32.4 with HCO3 17, glucose 166 and ketones 1.5
- Mental status was appropriate throughout stay in ED without concern for cerebral edema.
- Started with a 1.5 unit dose of Lantus
- Admitted to endocrinology service for further management.

Labs associated with DKA Reference Values

<table>
<thead>
<tr>
<th>Lab Test</th>
<th>Reference Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood glucose</td>
<td>&gt;250 mg/dL</td>
</tr>
<tr>
<td>Arterial pH</td>
<td>≤ to 7.30</td>
</tr>
<tr>
<td>Anion gap</td>
<td>&gt;10</td>
</tr>
<tr>
<td>Serum bicarbonate</td>
<td>≤ to 18 mEq/L</td>
</tr>
<tr>
<td>Urinalysis</td>
<td>Ketones, glucose present</td>
</tr>
<tr>
<td>Serum Cr</td>
<td>Often elevated</td>
</tr>
<tr>
<td>Serum sodium</td>
<td>Often elevated or normal</td>
</tr>
<tr>
<td>Serum potassium</td>
<td>Often elevated or normal</td>
</tr>
<tr>
<td>Serum phosphate</td>
<td>Often elevated or normal</td>
</tr>
<tr>
<td>WBC</td>
<td>Mildly elevated</td>
</tr>
</tbody>
</table>

Initial Presentation - Demographics

- Family History:
  - Maternal grandmother and paternal grandmother with history of T2DM.
  - No family history of T1DM or other autoimmune disorders.

- Social History:
  - Lives with mother, father, older sister, and maternal grandmother.
  - Receives early intervention speech therapy (common in a bilingual household).
  - No pets or smoke exposures.

Social Situation

- Family recently moved from Pakistan—little support in the Philadelphia community
- Unclear if mom understood what was said or taught—refused an interpreter
  - English was a second language
  - First language is Urdu
- Difficult to manage a sick toddler and learn!
- During admission, left to look for a miracle by visiting multiple Philadelphia area Christian churches
Social Situation

- Significant difficulty coping with diagnosis
- Food stamps (no cash assistance)
  - At home, Pakistani food mainly served

Hospital Admission: Education

- Admitted for typical 3 days of instruction
- Mom and dad received teaching
  - Carb counting class
  - Social work
  - CDE
  - Child-life specialist
  - Skills taught by bedside nurses
- Family had to stay for 4 day admission due to difficult time with written exam
- Staff reported parents were overwhelmed and anxious

- Day 1 parents missed 1-2 test questions on assessment exam.
- Day 2 parents missed 4-6 test questions on assessment exam.
- Father needs reinforcement for treating lows.
- Both parents unsure about insulin and BG management with snacking within 3h of last dose—not always dosing.
- Mother reports "it's a lot."
- Father states that mother is quitting her job and "she's doing it all."
- Mom asks if diabetes is contagious by poking herself with daughter's needle by accident
- Multiple family teach-backs with bedside RN with plan for further skills practice.
- Family continues to need further practice using Accu-Check Meter, lancing device, and home blood ketone meter.
- Team recommends reinforcement of safety skills for home Diabetes Management with Day 3 class.
Hospital Admission: Diabetes Team

Inpatient team member roles:
- Endocrine attending and fellows
  - Responsible for primary medical management
- Clinical nurse specialist
  - Care coordination
- CDE and coach
  - Initial teaching and point of contact for families
- Bedside nurse
  - Provides ongoing monitoring of patient and family including supplemental teaching and holistic care
- Social worker
  - Assess patient and family coping, insurance issues, assist with case management
- Dietitian
  - Assess nutrition status and provides education
- Child Life
  - Provides developmentally appropriate support for patient and siblings around diagnosis and treatment

Plan for management:
- Started on basal bolus regimen
  - 0.8u/kg=7.5u/d
  - Titrated during stay
- Split dose basal
- Using syringe/vial
- Monitor blood sugars pre-meal, bedtime, 2am
- Bolus coverage for carbs and high blood sugars

Follow up during T1Y1:
- 2 weeks: NP/MD and CDE
  - Initial meeting with the outpatient team
  - Review admission labs and identify issues
  - Introduce technology options
- 2 month: NP/MD and dietitian, SW
  - Evaluation of progress
- 5-6 month: NP and CDE
  - Assess use of technology
  - Advanced Home Management education
- 8-9 months: NP and dietitian
  - Assess problem solving ability
  - Plan for follow up in year 2
- 12 months: NP and CDE
  - Assess year one and plan for year 2
T1Y1 Follow Up: Team Roles

- **CDE (four scheduled visits the first year)**
  - Contacts the family daily, weekly and as needed for coaching

- **Endocrinologist (once per year) & NP (all other visits)**
  - NP is the coordinator for the team, labs, medical management, dose adjustment

- **Dietitian (two times per year)**
  - Assesses nutrition management & education

- **Social Worker & psychologist (one time and PRN)**
  - Assess family coping and social issues

- **Child Life Specialist (PRN)**
  - Developmentally appropriate support for patient and siblings around treatment

T1Y1 Follow Up: Challenges

- Continued search for a “miracle”
- Patient starts passing out with injections due to fear
- Mom’s anxiety increases
- **Mom driving with patient on her lap**
- Lacking support at home
- Challenging clinic visits
CDE Follow-up during T1Y1

- Frequent contact and appointment with CDE post-discharge
- Challenges–
  - Difficult to communicate on the phone in the beginning, refusal of interpreter and thick accent
  - Mom fearful of hypoglycemia
  - Low health literacy
    - Unable to use sliding scale
    - Unclear if able to carb count appropriately
    - No computer at home to upload devices

Timeline of Insulin Delivery and Blood Sugar Monitoring

- Basal-bolus using syringes, post-dosing
- Finger checks

2/18/18

- Basal-bolus using syringes
- Dexcom G5
- Loaner since personal was denied due to age <2

4/18/18

- Basal-bolus using syringes
- Dexcom approved

8/18/18

- Omnipod insulin pump started
- Pre-meal bolusing more
- Able to cover all carbs
- Continues with G6

9/18/18
T1Y1 Follow Up: Solutions

- Quickly moved to a continuous monitoring system
  - Dexcom G5—used loaner until age 2
  - Anxiety with insertion—but fewer fingersticks!
- Quickly started an insulin pump
  - Omnipod allowed mom to remote bolus

T1Y1 Follow Up: Solutions

- Support, support, support
  - Frequent phone calls
  - Use of patient portal for communication
  - Photos sent of blood sugars and food
  - More frequent visits

T1Y1: Clinical Progression

- HbA1c during the year
- Growth & development
- Insulin requirements doubled from diagnosis
T1Y1: One Year Later

- HbA1c = 8.5%
- Mom feels empowered to be able to manage diabetes while still searching for a "miracle"
- Mom understood basic concepts
  - carbs=BG up, insulin=BG down
- Patient completely cooperative during the visit and for the physical exam!

How did this work?

- Mom and team developed a strong bond
  - Mom trusted team
- Team empowered mom to make independent dose adjustments that were unconventional
- Mom had transportation to get to CHOP and a working cell phone to communicate
- Mom able and willing to come to clinic frequently to upload pump or sensor
  - Mom eventually able to use cell phone to upload sensor data remotely
- Mom had family at home to help when patient did not want to cooperate with diabetes care
References


- Photos:
  - Slide 1: Pakistani flag: https://timesofindia.indiatimes.com/india/this-flag-reminds-some-of-pakistan-should-it-be-knapped/articleshow/65021831.cms
  - Love: https://wwwassociationforpublicart.org/artwork/love/


- Slide 18: http://www.escapetheisland.com/team-building.html

- Slide 20: https://www.google.com/search?q=car+b+counting&oq=car+b+counting&gs_l=img.3..0l10.33568.36687..36747...5.0..90.1123.17......1....1..gws-wiz-img.......35i39j0i67j0i5i30j0i8i30.-2iD3lUFpX8#imgrc=3K51IyUEOzi2sM: