Endocrinology Guidebook
Children's National Health System

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Table of Contents:

Page

Helpful Links:

Resident Book:
http://www.childrensmedicaleducation.org/residents/course/view.php?id=8

Hospital Pathways:
http://intranet.cnmc.org/healthcareprofessionals/physicians/Pages/publications.aspx#18

Pediatric Endocrine Society:
http://www.pedsendo.org

Section 1 - Structure and Expectations for Medical Team on Endocrinology

Endocrinology Ward Team Structure

- Ward service includes Neurology and Endocrinology
- 4 interns (including night float intern) and 1 senior on service each month
    - 2 interns on wards each day from 6 AM to 5 PM Monday – Friday
    - 1 intern in Neurology or Endocrine outpatient clinic (float week)
    - 1 intern on night float from Monday night – Saturday morning (see below)
    - 1 senior (PL-3) on wards each month

Rounding Structure

- Intern pre-round cap is 10 patients (i.e. two interns cannot write more than 20 notes). Contact chief residents if total Neurology-Endocrine team census close to 10 patients per intern.
- Endocrinology will 'check-in' with the senior resident/interns from 8:15 – 8:30 AM daily with the exception of Wednesday. The daily check-in will be in person with the service attending and also NP/Fellow as applicable.
- Family Centered Rounds (FCR) will take place from 11:30 AM – 12:30 PM if there is afternoon Endocrine clinic or 1 PM – 1:30 PM if there is morning Endocrine clinic
- Rounds should be family centered as time permits. This allows for family questions to be dealt with during working rounds. Rounding will be presented in the following order: medical student – intern – nursing – ancillary services – fellow – attending – family – nursing (clarification and order read back)

Afternoon Structure

- Each ward intern will have one half day of continuity clinic each week and will be covered by another team member
- Each weekday afternoon will have at least 1 intern and 1 senior only covering Neuro/Endo

Weekend and Night Structure

- Night float intern will cover service Monday – Thursday (5 PM – 6 AM) and Friday night (6 PM – 9:30 AM)
- One of the ward interns covers the day shift on Saturday and Sunday (6 AM – 6 PM and 6 AM – 7 PM, respectively)
- One of the ward interns covers the night shift on Saturday and Sunday (6 AM – 9:30 AM and 7 PM – 6 AM, respectively)
- Neurology-Endocrinology will have a dedicated senior during weekend rounds and the day shift on Saturday and Sunday. Residents, Fellows, and Attendings should check in with the PL2 (x8299) or PL3 (x8300) on weekend nights for necessary updates on sick patients.

Admission Workflow

- Ward Admission: Emergency Room will notify Endocrinology Fellow or Attending of possible admission. Fellow or Attending will either accept or deny patient. During the weekday (Monday – Friday 6 AM – 5 PM) or weekend day (Saturday and Sunday 6 AM – 6 PM), the Fellow or Attending

will notify the senior resident at x8145. During the night, the Fellow or Attending will notify the Subspecialty Admitting Resident (SSAR) at x8298. The senior resident will then notify for the ward intern.

- PICU Transfer: PICU will notify Endocrinology Fellow or Attending of possible transfer. Fellow or Attending will either accept or deny patient. During the weekday (Monday – Friday 6 AM – 5 PM) or weekend day (Saturday and Sunday 6 AM – 6 PM), the Fellow or Attending will notify the senior resident at x8145. During the night, the Fellow or Attending will notify the PL3 at x8300. The senior resident will complete the PICU transfer and update the ward intern.

Discharge Workflow

- Complete a discharge summary for the patient, summarizing their hospital course. Be sure to record pending lab results and pertinent test results
- Discharge summary should include patient's weight, medication (form, concentration, instructions for families). Any titration schedule should be explicitly written out.
- For patients admitted on a holiday, the Diabetes team plans to teach the families on the following day early in the morning in order to send them home in a timely fashion. Therefore, if you do a priority discharge for the following morning, the diabetes educators (and families) will be appreciative as teaching begins at 9 AM.

Section 2: Lecture Schedule and Content

- In addition to attending morning report (Tuesday and Thursday 7:30 AM – 8 AM) and noon conference (Monday – Friday 12 PM – 1PM), attending teaching rounds will occur on Friday from 8:30 AM – 9 AM.

- Six lecture topics were selected by residents. The topics should be covered during the rotation period of the resident (4 – 6 weeks):
    - Insulin basics: different types, mechanism of action, calculation of starting doses (classic basal bolus, correction factor, carbohydrate ratio, insulin pump)
    - Precocious puberty work-up and management
    - Hypocalcemia work-up and management
    - Short Stature
    - Thyroid Disorders
    - DKA management from the Endocrinologist perspective

Section 3: Outpatient Clinic Schedule

- 1 intern rotates through Endocrine Clinic during weeks 2, 3, and 4 of a rotation (float week)
- Interns are preferentially assigned to Endocrine Clinic given significant exposure to Neurology during the inpatient rotation
- Interns will receive an email from the chief resident at the start of the rotation indicating the clinic assignments

Location

- Children's National On-Site morning clinics are from 8:20 AM – 11:40 AM on 1 Main across from the main atrium security desk (x3508)
- Children's National On-Site afternoon clinics are from 1 PM – 4:20 PM on 1 Main across from the main atrium security desk (x3508)
- If you are scheduled for an off-site clinic, you will be at one of the following locations:
    - Fairfax: 3023 Hamaker Court, Suite 300, Third Floor, Fairfax, VA 22031 571-226-8380
    - Fredericksburg: 231 Park Hill Drive, Fedricksburg, VA 22401
    - Rockville: Shady Grove Medical Park, 9850 Key West Avenue, Rockville, MD 20850 301-765-5400
    - Spring Valley: 4900 Massachusetts Ave, NW Suite 320, Washington, DC 20016
    - Laurel: 13922 Baltimore Ave, Laurel Lakes Coroporate Center, Laurel, MD 20707
    - Annapolis: 888 Bestgate Road, Suite 320, Annapolis, MD 21401 410-266-6582
    - Upper Marlboro: 9440 Pennsylvania Avenue, Upper Marlboro, MD 20722 301-297-4000
- If you are not assigned to an Endocrinology clinic or your clinic was cancelled, you should attending Neurology clinic located on the 1st floor (Room 1300) between the main atrium and ER (x2120)

Section 4: Tips for Inpatient Management

Diabetes Mellitus: Inpatient Management

New Onset Type 1 Diabetes:

Indications for floor admission:	**Indications for PICU admission:**
Venous pH > 7.25 and Bicarb>15	Venous pH < 7.25, Bicarb <15
Ketonuria	Need for insulin drip
Dehydration and vomiting	Altered mental status
Significant electrolyte or renal fxn abnormalities	

Acute Management on the floor: Follow the pathway! Here are some basics:

Labs

- **In the ED**: BG Q1H, UA, BMP, Phosphorus, Blood gas, CBC, HbA1C
- **For new diagnosis**: GAD65 +/- TSH, thyroid peroxidase antibody, tissue transglutaminase IgA (for suspected type 2) CMP, Insulin/c-peptide
- **Once on floor**: BG QIDACHS, urine dips every void until ketones are cleared (small, trace or negative), +/- daily BMP

IVF: Rehydrating is most important part of management!

- **In the ED**: Bolus NS 10 – 20 mL/kg x 1 hour
- **Once on floor**: ½ NS + 20mEq KCl + 20mEq(13.6mmol)KPO4 @ 1.5 X maintenance rate
- **If Sodium > 145**: Use NS instead of ½ NS to avoid correcting too rapidly
- **If IVF with KPO4 not available**: Use 40mEq KCl
- **Dextrose**: Once off insulin drip and tolerating PO, should NOT be on dextrose-containing IVF

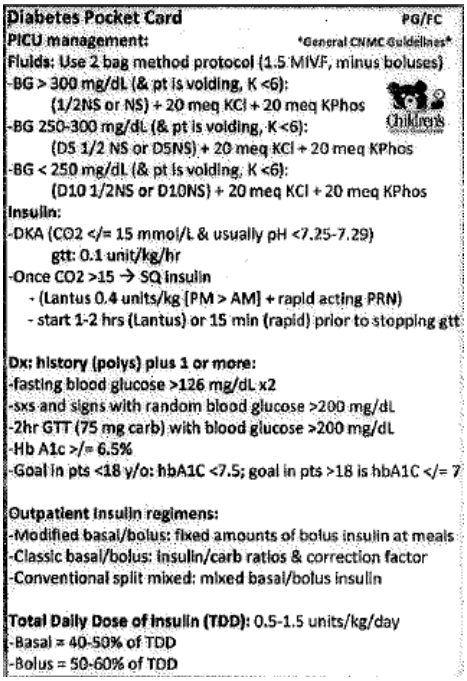
- **Duration**: Most attendings will continue IVF until ketones have cleared (small, trace, negative); others will stop when taking good PO, sugars controlled and otherwise meeting discharge criteria.

Insulin during DKA

- **Insulin drip only in the PICU!**
- During transition in PICU, should always begin with subcutaneous (SQ) insulin before stopping insulin drip. SQ options include basal/bolus with Lantus/short acting or NPH/short acting. Current DKA pathway allows for giving Lantus 0.4 units/kg at 9 PM for new Type 1 > 5 years old and in the morning for new Type 1 < 5 years old
- **Patients in DKA with an established diagnosis should receive Lantus at their appropriate home dose times**

Insulin Management

- **Total Daily Dose (TDD):** 0.5-1 unit/kg day [(½ long acting (basal), ½ short acting(bolus divided in three doses)]
- **NPH and Regular/Analog**
  - 2/3 of TDD in a.m. (2/3 NPH, 1/3 short acting)
  - 1/3 of TDD in p.m. (2/3 NPH, 1/3 short acting)
- **Basal/Bolus (Lantus/Analog vs. Pump)**
  - **Insulin to Carbohydrate Ration (rule of 500):** Carbohydrate coverage ratio = 500 ÷ TDD= units of insulin per gram of Carbohydrate
  - **Correction Factor (rule of 1800) or sliding scales:** Correction Factor = 1800 ÷TDD = 1 unit of insulin will reduce the blood sugar by so many mg/dl
  - **Pump patients:** Always put pump back on a new site after recovery from DKA. If supplies not available can change to Lantus for time being (consult Endocrine team)



Diabetes Pocket Card PG/FC

PICU management: *General CNMC Guidelines*

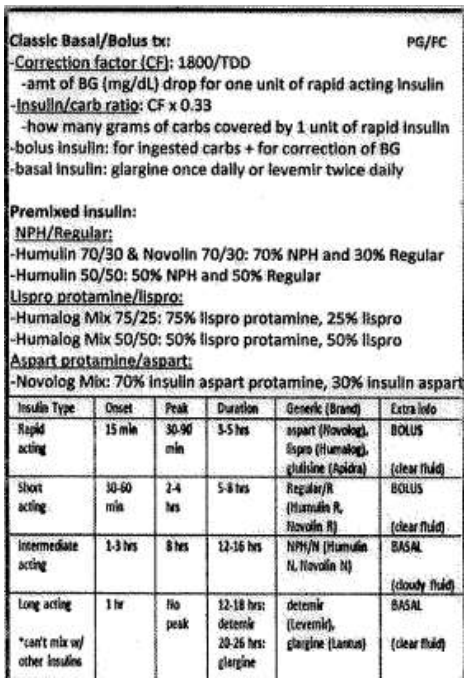
Fluids: Use 2 bag method protocol (1.5 MIVF, minus boluses)
-BG > 300 mg/dL (& pt is voiding, K <6):
(1/2NS or NS) + 20 meq KCl + 20 meq KPhos
-BG 250-300 mg/dL (& pt is voiding, K <6):
(D5 1/2 NS or D5NS) + 20 meq KCl + 20 meq KPhos
-BG < 250 mg/dL (& pt is voiding, K <6):
(D10 1/2NS or D10NS) + 20 meq KCl + 20 meq KPhos

Insulin:
-DKA (CO_2 </= 15 mmol/L & usually pH <7.25-7.29)
gtt: 0.1 unit/kg/hr
-Once CO_2 >15 → SQ insulin
- (Lantus 0.4 units/kg [PM > AM] + rapid acting PRN)
- start 1-2 hrs (Lantus) or 15 min (rapid) prior to stopping gtt

Dx: history (polys) plus 1 or more:
-fasting blood glucose >126 mg/dL x2
-sxs and signs with random blood glucose >200 mg/dL
-2hr GTT (75 mg carb) with blood glucose >200 mg/dL
-Hb A1c >/= 6.5%
-Goal in pts <18 y/o: hbA1C <7.5; goal in pts >18 is hbA1C </= 7

Outpatient insulin regimens:
-Modified basal/bolus: fixed amounts of bolus insulin at meals
-Classic basal/bolus: insulin/carb ratios & correction factor
-Conventional split mixed: mixed basal/bolus insulin

Total Daily Dose of Insulin (TDD): 0.5-1.5 units/kg/day
-Basal = 40-50% of TDD
-Bolus = 50-60% of TDD



Classic Basal/Bolus tx: PG/FC
-Correction factor (CF): 1800/TDD
-amt of BG (mg/dL) drop for one unit of rapid acting insulin
-Insulin/carb ratio: CF x 0.33
-how many grams of carbs covered by 1 unit of rapid insulin
-bolus insulin: for ingested carbs + for correction of BG
-basal insulin: glargine once daily or levemir twice daily

Premixed insulin:
NPH/Regular:
-Humulin 70/30 & Novolin 70/30: 70% NPH and 30% Regular
-Humulin 50/50: 50% NPH and 50% Regular
Lispro protamine/lispro:
-Humalog Mix 75/25: 75% lispro protamine, 25% lispro
-Humalog Mix 50/50: 50% lispro protamine, 50% lispro
Aspart protamine/aspart:
-Novolog Mix: 70% insulin aspart protamine, 30% insulin aspart

Insulin Type	Onset	Peak	Duration	Generic (Brand)	Extra info
Rapid acting	15 min	30-90 min	3-5 hrs	aspart (Novolog), lispro (Humalog), glulisine (Apidra)	BOLUS (clear fluid)
Short acting	30-60 min	2-4 hrs	5-8 hrs	Regular/R (Humulin R, Novolin R)	BOLUS (clear fluid)
Intermediate acting	1-3 hrs	8 hrs	12-16 hrs	NPH/N (Humulin N, Novolin N)	BASAL (cloudy fluid)
Long acting *can't mix w/ other insulins	1 hr	No peak	12-18 hrs: detemir (Levemir), glargine (Lantus) 20-26 hrs: glargine	detemir (Levemir), glargine (Lantus)	BASAL (clear fluid)