Recommended Labs for Pediatric Endocrinology Specialty Clinics

Please remember that this is just a list of lab tests often recommend prior to seeing patients. These are not physician orders. However, they are recommended prior to specialty appointments.

ENDOCRINE REFERRALS/LABS&F/U RECOMMENDATIONS

1) **CAH-Congenital Adrenal Hyperplasia**-meds often adjusted based on labs/growth/bone age
- 17-OH-P (17-OH hydroxyprogesterone) often every 3-6 months Infants/toddlers often ordered q 2-3 months. (Goal: less than 1000)
- Androstenedione: Often every 3-6 months. Infants/toddlers often ordered every 2-3 months. (Goal: w/in normal range)
- Renin Activity: Often every 3-6 months. Renin hard to obtain in villages as must be sent frozen. (Goal: w/in normal range)
- Bone age after 2-3 years of age, then annually
- Accurate height and weight measurements
- F/u in endo clinic every 3 to 6 months

1a) Newborn with + FH of CAH but no ambiguous genitalia (ie no physical s/s of CAH):
- Newborn screen between 2 and 3 days of life (in all infants)
- Serum 17OHP around day 3-4 of life (17OHP levels are normally high during the first 2-3 days after birth but by the 3rd day, levels in healthy infants fall and levels in affected infants rise to diagnostic levels) – usually will get results faster than newborn screen
- Measure serum electrolytes prior to hospital discharge and at 7 and 10 days of age (hyponatremia and hyperkalemia are usually not present before 7 days of age and salt-losing crisis will typically occur in the second week of life)
- After newborn is sent home, parents should be cautioned to watch for signs of salt-losing crisis including vomiting, diarrhea, lethargy, dehydration, decreased PO intake
- If positive newborn screen or elevated 17OHP, patient should be seen immediately

2) **Congenital Hypothyroid/Hashimoto Thyroiditis/Goiter –** meds usu adjusted based on labs
- General Information
  - When a med dosage change is made, labs are usually repeated in 4-6 weeks and then again before the next clinic visit.
  - Under certain circumstances a Thyroid U/S is sometimes ordered-not routine.
  - **Growth records** on all children with any thyroid condition should be plotted.
  - Often other thyroid labs are done as part of initial workup, but depends on what the presumptive dx is. (TSI, Antithyroid peroxidase AB, etc.)
- Specific Labs – Goal: normal Free T4 and TSH (infants should have a free T4 at least ~1)

  Congenital Hypothyroid
  - FT4 & TSH 10days-2weeks after dose started.
  - 0-6 Months: FT4 & TSH every month
  - 6-12 Months: FT4 & TSH every 2 months
  - 1-3 Years: FT4 & TSH every 3 months

  Acquired Hypothyroidism
  - FT4 & TSH 4-6 weeks after starting med or after dose change
  - FT4 & TSH every 6 months routinely

Central Hypothyroidism (ie, hypopituitarism)

- Free T4 every 4-6 months routinely

3) **Hypopituitarism/Septooptic dysplasia**
(any combination of deficiencies of GH, TSH, ACTH, LH/FSH, ADH)

- Labs to follow depend on deficiency
- If panhypopituitarism
  - IGF-1 every 6-12 months if on GH (see below)
  - Free T4 every 4-6 months (see above)
  - May check BMP if concerns about inadequate adrenal hormone replacement
  - Na levels if DI depend on thirst—if intact thirst, Na level every 3-4 months; if non-intact thirst, may need Na every 2-4 weeks
  - LH/FSH, estradiol or testosterone at approx. age 12
- Accurate height and weight plotted on growth chart

Work-up of Short Stature

-X-ray: bone age

-bloodwork: TSH, free T4, TTG IgA, IgA, CMP, CBC, IGF-1, IGFBP-3, ESR. Also do karyotype if a girl.

-urine: urinalysis (looking for RTA)

4) **Children on Growth Hormone Injections**
(GH deficiency/Turners/Noonan's/Prader-Willi Syn/SGA/Panhypopituitarism/CRF)

- Free T4 and IGF-1
  - Usually obtained q 6 months. Other labs including these may be done for initial diagnosis which may include GH stimulation tests.
  - GH dose will be adjusted partially based on IGF-1 although mostly based on growth pattern and weight
- Bone age
  - Initially and approximately every 6 months to one year. (Often Medicaid pts need this q 6 months) "Bone Age" should include the left hand and the wrist.
- Accurate height and weight
  - Crucial to have correct plotting on growth record. (Lengths are done on infants & toddlers less than 2 years of age or if not able to stand well-heights are done when the child is over age 2 and plotted on the 2-20 growth chart.)

5) **Insulin Resistance/Obesity**-goal is to prevent these children from becoming diabetic

- ** refer to recent publication in Pediatrics (Expert Panel on integrated guidelines for cardiovascular health and risk reduction in children and adolescents: summary report. Pediatrics. 2011: 128 (suppl 5). Guidelines on lipids, BP, obesity, nutrition, diabetes, etc)
- Screening fasting plasma glucose (+ HbA1c) annually; if elevated, HbA1c, OGTT
- HbA1C, 2 hour Oral Glucose Tolerance Test (Fasting Insulin **not** routine)
  - OGTT-fasting plasma glucose, then drink 1.75g/kg (max 75 g) of glucola (within 10-15 min) and repeat plasma glucose in 2 hours.

- Fasting 101-125 = impaired fasting glucose; over 125 = diabetes
- 2 hour 141-199 = impaired glucose tolerance; over 199 = diabetes

♦ HbA1c: 5.7% to 6.4% = increased risk for future diabetes; >6.4%, likely diabetes but not necessarily diagnostic in children

➢ Fasting lipids initially and then per recommendation
  ♦ If abnormal, repeat after 2 weeks but before 3 months (see below)
  ♦ If still abnormal, dietician referral
➢ Liver function tests-AST/ALT/Cr for all children (Screen annually for fatty liver disease.)
➢ Growth records with accurate height & weight plotted-also calculate and plot BMI.
  ♦ Obtain TSH & Free T4 initially if patient is showing any growth deceleration.
➢ All patients should have initial evaluation and then monthly appointments with a RD-dietician whenever possible.
  ♦ Daily activity, one hour/day with lifestyle change.
  ♦ The more they see their primary provider and dietician, the more likely they are to comply with changes in dietary and activity levels.

5) **Type 2 Diabetes**

♦ At diagnosis: HgbA1C. Other labs depend on the individual case.
  - Criteria for dx of diabetes (per ADA):
    - FPG > 125 (no caloric intake for 8 hrs)
    - OR 2-hr glucose >199 during an OGTT
    - OR HbA1c >6.4% (**controversial for dx in children)
    - **the above 3 criteria require repeat testing in the absence of unequivocal hyperglycemia)
    - OR classic symptoms of hyperglycemia or hyperglycemic crisis and a random plasma glucose >199

♦ HbA1c every 3 months: Goal A1c <7%
♦ Fasting lipid panel soon after diagnosis and every 5 years if normal
  - If abnormal, repeat after 2 weeks but before 3 months (see below)
  - If still abnormal, dietician referral
♦ Random urine microalbumin/creatinine soon after diagnosis and annually
  - If abnormal, repeat with first morning urine MA/Cr or overnight collection; if still abnormal, referral to nephrology
♦ Eye exam soon after diagnosis and annually
♦ Dental exam annually
♦ Dietician visit q 3-6 months
♦ RN-CDE for education

Table 8–1. Acceptable, Borderline-High, and High Plasma Lipid, Lipoprotein and Apolipoprotein Concentrations (mg/dL) For Children and Adolescents*

NOTE: Values given are in mg/dL; to convert to SI units, divide the results for TC, LDL-C, HDL-C and non-HDL-C by 38.6; for TG, divide by 88.6.

Category	Acceptable	Borderline	High+
TC	< 170	170-199	≥ 200
LDL-C	< 110	110-129	≥ 130
Non-HDL-C	< 120	120-144	≥ 145
ApoB	< 90	90-109	≥ 110
TG			
0-9 years	< 75	75-99	≥ 100
10-19 years	< 90	90-129	≥ 130

Category	Acceptable	Borderline	Low*
HDL-C	> 45	40-45	< 40
ApoA-I	>120	115-120	<115

*Values for plasma lipid and lipoprotein levels are from the National Cholesterol Education Program (NCEP) Expert Panel on Cholesterol Levels in Children. Non-HDL-C values from the Bogalusa Heart Study are equivalent to the NCEP Pediatric Panel cut points for LDL-C. Values for plasma apoB and apoA-I are from the National Health and Nutrition Examination Survey III.

†The cut points for high and borderline-high represent approximately the 95th and 75th percentiles.

6) **Type I Diabetes Mellitus**

New Diagnosis: HbA1c, BMP, other labs depending on patient and presentation (for diagnostic criteria, see above; type 1 distinguished from type 2 based on presentation, physical exam, sometimes on labs such as c-peptide and diabetes antibodies)

- Hemoglobin A1C: Every 3-4 months (lifetime standard of care for DM)
  - This lab helps determine the overall status of blood glucose readings over a 3 month period and gives an average of all readings.
  - A1c goal is generally 7%; infants and toddlers, tolerate A1c goal of ~8%
- Fasting Lipid Panel
  - Initial check soon after diagnosis, once blood sugars stabilized, if over 2 y.o.
  - Repeat fasting lipid panel every 5 years if initial is normal (starting at 9 y.o.)
  - If abnormal, fasting lipid panel should be repeated at least 2 weeks later but less than 3 months later to confirm
  - If confirmed abnormal, referral to dietician for lifestyle/diet modification
- Thyroid and Thyroid Auto Antibodies
  - Obtain Free T4 & TSH at diagnosis and annually
  - Antibodies not routine, but if done it includes thyroid peroxidase AB
- Celiac screening
  - TTG IgA and total serum IgA soon after diagnosis
  - Annually for the first 5 years
    - More frequent if symptoms
- Eye exam
  - Initial eye exam soon after diagnosis to detect cataracts or major refractive errors
  - Annual eye exam should start at
    - 9 y.o. if 5-year duration diabetes
    - 11 y.o. if 2-year duration diabetes
    - After 2 years duration if diabetes diagnosed in an adolescent
- Urine microalbumin/creatinine screen

- Spot urine microalbumin/creatinine annually after age 12 y.o.
- If abnormal, repeat with first morning void or an overnight urine collection

- Flu Vaccine recommended yearly
- Dental recommended yearly
- RN CDE referral for all aspects of Diabetes education. Work closely with CDE if patient is on Lantus + rapid acting insulin intensive regimen-ideally.
- Dietician CDE for dietary/CHO counting/activity/insulin (learning to count carbs)
- All children should see either their Pediatrician or Pediatric Endocrinologist every 3 months (may alternate depending on needs of family/primary provider)
    - Families need to know when to do Urine Ketones: if BS over 300 or if ill