

Child With Suspected Type 1 Diabetes

Suggestive history and physical findings	Initial laboratory and/or radiologic work-up can include:	When to refer	Items useful for consultation	Additional information
<p><u>Symptoms:</u> Polyuria, nocturia, enuresis, increased thirst, increased appetite, weight loss, fatigue.</p> <p>*Vomiting, Rapid/deep breathing, Abdominal pain, lethargy may suggest DKA</p> <p><u>Past history:</u> Other autoimmune diseases like hypothyroidism</p> <p><u>Family history:</u> History of diabetes (not as likely as Type 2) and other autoimmune disorders</p> <p><u>Physical signs:</u> Vital signs: tachypnea, tachycardia, hemodynamic instability</p>	<p><u>Blood tests:</u></p> <ul style="list-style-type: none"> • Random blood glucose <p><u>Urine tests:</u></p> <ul style="list-style-type: none"> • Urine glucose and ketones <p><u>Other tests to consider after consultation with Pediatric Endocrinologist:</u></p> <ul style="list-style-type: none"> • Fasting blood glucose • CMP • Hemoglobin A1c • Complete blood count • Oral glucose tolerance test • c-peptide • Diabetes antibodies: islet cell, IA-2, insulin, GAD-65, ZnT8 	<p><u>Urgent:</u> All cases of diabetes, defined as fasting blood glucose > 126 mg/dl, random blood glucose > 200 mg/dl or 2 hour post prandial glucose > 200 mg/dl after glucose load of 1 gm/ kg, or HbA1c > 6.5% should be immediately referred to a multidisciplinary diabetes center or to pediatric endocrinologist.</p> <p><u>Emergent:</u> <u>If child is:</u></p> <ul style="list-style-type: none"> -Ill appearing -has ketones in urine or -Suspected to have diabetic ketoacidosis, <p>They should be referred emergently to the nearest emergency department for stabilization, initiation</p>	<p>Previous growth data/growth charts</p> <p>Pertinent medical records</p> <p>Recent laboratory and radiologic studies</p>	<p><u>Additional Information</u></p> <p><u>Type 1 Diabetes: A Guide for Families</u></p> <p><u>References</u></p>

<p>(in DKA) General appearance: variable degrees of dehydration Respiration: Fruity breath smell, Kussmaul breathing (in DKA) Skin: acanthosis nigricans can be seen in obese children with Type 1 or Type 2 DM</p> <p>Differential Diagnosis</p>		<p>of treatment and transportation to nearest hospital with a diabetes center/pediatric endocrinologist.</p> <p>Find a Pediatric Endocrinologist</p>		
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Differential diagnosis for diabetes

- Type 1 diabetes (T1DM),
- Type 2 diabetes (T2DM)
- Chemical/medication induced diabetes
- Stress induced hyperglycemia
- Monogenic onset diabetes of young / Maturity onset diabetes of Young (MODY)

Additional Information:

Laboratory Abnormalities:

- Diabetes is defined as fasting blood glucose ≥ 126 mg/dl, 2 hours post prandial glucose ≥ 200 mg/dl after glucose load of 1 gm/kg (maximum dose: 75 gm), HbA1c $\geq 6.5\%$, or random blood glucose ≥ 200 mg/dl in patient with classic symptoms of hyperglycemia.
 - In the absence of unequivocal hyperglycemia, result should be repeated.
- Simultaneous c-peptide level is inappropriately low.
- Presence of pancreatic auto-antibodies : islet cell antibodies (ICA), GAD-65, insulin antibodies, IA2A and ZnT8.

- Most commercial laboratories may have the assays to test for some/most of the autoantibodies accurately.
- Should be done after discussion with the endocrinologist.
- Electrolyte abnormalities are common and may include pseudo-hyponatremia (secondary to blood glucose elevation), metabolic acidosis, elevated blood urea nitrogen and creatinine (secondary to dehydration), and hypokalemia or hypophosphatemia (total body depletion)
- Other tests to screen for simultaneous autoimmune disorders: Serum TSH, free T4, T3, and anti-thyroid antibodies (thyroid peroxidase antibody, thyroglobulin antibodies), tissue transglutaminase IgA antibodies, total IgA concentration

Diabetes care involves close supervision, intensive education and frequent monitoring. It involves:

- Insulin administration by multiple daily subcutaneous injection or insulin pump.
 - Rapid acting analogs (Lispro, Aspart, Glulisine)
 - Long acting insulin (NPH),
 - Basal insulin analogues (Glargine, Detemir)
- Sulfonylurea, gliptins, gliflozins, and Metformin are **not indicated** for individuals with T1DM
- Glycemic control is monitored with multiple daily self-monitoring of blood glucose (SMBG), continuous subcutaneous glucose monitoring system and quarterly hemoglobin A1c.
- All patients with DKA should be admitted to in-patient or ICU set up and treated with IV fluids, IV insulin infusion, frequent blood glucose, and electrolyte monitoring.
- Patients and their care givers should receive diabetes self-management education including medical nutrition therapy, self-monitoring of blood glucose, insulin administration, need for monitoring of chronic complication, management of lipid abnormality, and hypertension.

Suggested References and Additional Reading:

- American Diabetes Association. Standards of medical care in diabetes-2021 abridged for primary care providers. Clinical Diabetes: a publication of the American Diabetes Association. 2021;39(1):14-43.
- American Diabetes Association. Children and adolescents: Standards of medical care in diabetes-2021. Diabetes Care 2021;44(suppl 1):S180-S199.

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