Clinical Report

Patient Information

- **Name:** Brian Miller
- **Date of Birth:** 01/15/2011
- **Age:** 14
- **Gender:** Male
- **Contact Information:** (555) 999-0000 (Contact via parent, Mrs. Susan Miller)
- **Address:** 15 Oakwood Terrace, Anytown, USA

Referring Physician

- Dr. Rachel Green, MD
- Pediatrician
- Anytown Pediatrics Group

Medical Institution

- Anytown Children's Hospital - Division of Endocrinology
- **Report Date:** 07/18/2025

Clinical History and Background

Brian Miller is a 14-year-old male who was brought into the pediatric emergency department by his mother with a two-day history of nausea, vomiting, abdominal pain, and increasing lethargy. This acute illness was preceded by a three-week period of more subtle symptoms, including excessive thirst, frequent urination, and unexplained weight loss, which the family had attributed to a recent growth spurt and increased activity with his school's cross-country team. The acute worsening of his condition, including rapid, deep breathing noted by his mother this morning, prompted the urgent visit to the ED. Brian has no significant past medical history and all developmental milestones have been normal. His family history is negative for diabetes but is notable for an older sister with celiac disease.

Current Symptoms & Patient-Reported Outcomes (PROs) (Reported by Patient and Parent)

- **Polydipsia (Excessive Thirst):**
    - **Parent's Description:** "For the last few weeks, he's been insatiable. He chugs a whole bottle of water and is immediately looking for more. We couldn't keep liquids in the house."
    - **Severity:** Severe.
    - **Duration:** Progressively worsening over three weeks.
    - **Clinical Note:** A classic symptom of hyperglycemia, where the body attempts to dilute high blood sugar levels.

- **Polyuria (Frequent Urination):**
    - **Parent's Description:** "He was getting up 3-4 times a night to use the bathroom, which he never does. He even started wetting the bed again, which was very embarrassing for him."
    - **Severity:** Severe, causing sleep disruption and emotional distress.
    - **Duration:** Worsening over three weeks.
    - **Clinical Note:** The direct result of osmotic diuresis, where excess glucose in the urine pulls large volumes of water with it.
- **Unexplained Weight Loss:**
    - **Parent's Description:** "He's a growing boy and always hungry, but he looked like he was wasting away. He lost about 10 pounds, and he looked thin and gaunt."
    - **Severity:** Significant and rapid.
    - **Duration:** Over the past three weeks.
    - **Clinical Note:** In a state of absolute insulin deficiency, the body cannot use glucose for fuel and begins to break down muscle and fat, leading to weight loss despite increased appetite (polyphagia).
- **Nausea, Vomiting, and Lethargy:**
    - **Parent's Description:** "For the last two days, he couldn't keep anything down. Today, he was so tired he could barely stay awake, and his breathing seemed really fast and deep. That's when I knew something was seriously wrong."
    - **Severity:** Acute and severe, representing a medical emergency.
    - **Duration:** 48 hours, with acute worsening in the last 12 hours.
    - **Clinical Note:** These are ominous signs of Diabetic Ketoacidosis (DKA), a life-threatening complication of insulin deficiency.

Clinical Findings (on admission to PED)

- **Vital Signs:**
    - **Blood Pressure:** 90/50 mmHg (hypotensive)
    - **Heart Rate:** 130 bpm (tachycardic)
    - **Respiratory Rate:** 30 breaths/min (deep, labored Kussmaul respirations)
    - **Temperature:** 99.2°F (37.3°C)
- **Physical Examination:**
    - **General:** Patient is very drowsy but arousable to painful stimuli. Signs of severe dehydration are present (sunken eyes, dry mucous membranes, poor skin turgor).
    - **Respiratory:** Deep, sighing (Kussmaul) respirations are noted, with a distinct fruity odor (acetone) on his breath.
    - **Abdomen:** Diffuse abdominal tenderness to palpation.
- **Laboratory Results (Point-of-Care and Stat Labs):**
    - **Blood Glucose (fingerstick):** 620 mg/dL (markedly elevated).
    - **Venous Blood Gas (VBG):** pH 7.10, Bicarbonate (HCO3) 8 mEq/L - *Consistent with severe metabolic acidosis*.
    - **Urinalysis:** Large for both ketones and glucose.

- **Serum Chemistry:** Sodium 130 mEq/L, Potassium 5.8 mEq/L (falsely elevated due to acidosis), BUN 35 mg/dL, Creatinine 1.5 mg/dL (indicating acute kidney injury from dehydration).
- **Autoantibody Panel (sent upon admission):**
  - **Glutamic Acid Decarboxylase Antibodies (GAD-65):** Positive.
  - **Islet Antigen 2 Antibodies (IA-2A):** Positive.
  - **Zinc Transporter 8 Antibodies (ZnT8A):** Positive.
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- **C-Peptide:** <0.1 ng/mL (critically low, confirming profound insulin deficiency).

Diagnosis

Brian Miller presents with a classic and life-threatening case of new-onset **Type 1 Diabetes Mellitus (T1D)**, complicated by severe **Diabetic Ketoacidosis (DKA)**. The diagnosis is unequivocally confirmed by the hyperglycemia, ketosis, and severe acidosis. The positive autoantibodies confirm the autoimmune nature of the disease, which has destroyed the insulin-producing beta cells in his pancreas.

Treatment Strategy

The immediate and absolute priority is the management of his DKA in the Pediatric Intensive Care Unit (PICU). This will be followed by a transition to lifelong insulin therapy and comprehensive diabetes education.

1. **DKA Management (in PICU):**
   - **Fluid and Electrolyte Resuscitation:** This is the first step. Careful intravenous administration of isotonic saline will begin immediately to correct his severe dehydration and restore circulatory volume. Electrolytes, especially potassium, will be monitored hourly.
   - **Insulin Therapy:** After the initial fluid bolus, a continuous intravenous insulin infusion will be started at a low, steady rate. This will gradually lower blood glucose, stop ketone production, and allow the body to correct the acidosis. Blood glucose will be lowered slowly and carefully to avoid cerebral edema.
   - **Potassium Replacement:** As insulin begins to work and acidosis corrects, potassium will move from the blood back into the cells, causing serum potassium to drop rapidly. IV potassium will be added to his fluids early in the course of treatment to prevent life-threatening hypokalemia.
2. **Transition to Lifelong Management (once DKA resolved):**
   - **Subcutaneous Insulin:** Brian will be transitioned to a basal-bolus insulin regimen using an insulin pen or an insulin pump. This involves taking a long-acting (basal) insulin once a day and rapid-acting (bolus) insulin with every meal and to correct high blood sugars.
   - **Diabetes Education:** This is the cornerstone of his future health. Brian and his parents will begin intensive "survival skills" training with a Certified Diabetes Educator (CDE) and a registered dietitian. This will cover blood glucose

monitoring, carbohydrate counting, insulin administration, and the recognition and treatment of high and low blood sugar.

Summary and Plan

Brian Miller is a 14-year-old male with a new diagnosis of Type 1 Diabetes, presenting in severe DKA. He is currently admitted to the PICU for careful correction of his metabolic derangements. The focus is entirely on stabilizing him and then providing him and his family with the knowledge, skills, and support needed to manage this chronic condition effectively. The autoimmune nature of the disease and the need for lifelong insulin have been explained to his parents. The family will be connected with our full multidisciplinary pediatric diabetes team.

Follow-up

Brian will remain hospitalized until his DKA is fully resolved and his family is competent and comfortable with the basics of diabetes management. He will have his first outpatient follow-up appointment in the pediatric endocrinology clinic within 3-5 days of discharge. Frequent communication (phone calls, patient portal messages) and clinic visits will be necessary over the first several months to fine-tune insulin doses and provide ongoing education and support as they adapt to their "new normal."