

## From Diabetes to Dialysis: Exploring the Acute Complications of Uncontrolled Pediatric Type 2 Diabetes during the Pandemic

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The COVID-19 pandemic strained the healthcare system and limited access to routine care. This led to severe, acute presentations of chronic disease not only in adults but also in children. This case series explores two patients with type 2 diabetes (T2DM) who developed severe acute renal failure requiring dialysis.

**Patient 1:** In January 2021, a 16-year-old female with history of obesity (BMI=46.1), metabolic syndrome, and recent COVID-19 infection (2 months prior) presented to the emergency department (ED) with diabetic ketoacidosis (DKA) and hyperosmolar hyperglycemic syndrome (HHS). She became unresponsive 3 hours later with GCS=10. At presentation, lab values were Amylase 1231 U/L, Lipase 4274 U/L, Glucose >2000 mg/dL, pH 7.080, HCO<sub>3</sub> 9 mmol/L, AST 20 U/L, ALT 27 U/L, BUN 45 mg/dL, Cr 6.1 mg/dL, and HbA1c 12.3%. CT scan of the abdomen and pelvis showed acute necrotizing pancreatitis. Despite 1.5x maintenance rate of fluids, creatinine continued to increase (6.1 to 7.2 mg/dL), and urine output was minimal (<50 mL). The patient required intubation and mechanical ventilation due to worsening hypotension (80-90s/50s) and respiratory failure. Continuous renal replacement therapy (CCRT) was initiated due to significant renal failure and electrolyte derangements. She received sustained low-efficiency dialysis (SLED) for 8 days before transitioning to a 3x per week dialysis schedule. Over the course of her 46-day hospitalization, renal function gradually improved with appropriate urine output and normalization of electrolytes; therefore, dialysis was discontinued after 23 days. She was discharged on amlodipine, gabapentin, and an insulin regimen. Four months after discharge, she was diagnosed with essential hypertension and started on lisinopril. She is followed by pediatric nephrology and endocrinology to manage her chronic conditions. Her blood sugars continue to remain elevated, and the patient reports occasional non-adherence to medications.

**Patient 2:** In April 2021, a 14-year-old female with a history of obesity (BMI=43.1) was admitted for hyperglycemia secondary to DKA. She had several episodes of emesis associated with fatigue and polydipsia the day prior. Her mother also noticed her worsening obesity since the COVID-19 pandemic but was unable to schedule an appointment due to virtual school and her work schedule. In the ED she was tachycardic (128 BPM) and tachypneic (RR=36). Initial labs showed WBC 17.9, pH 6.852, K 3.2 mEq/L, HCO<sub>3</sub> <5 mmol/L, Glucose 493 mg/dL, urinalysis glucose >1000 mg/dL with ketones 100. Her HbA1C was 12%, lactic acid 2.7 mmol/L, BUN 16 mg/dL, and Cr 1.47 mg/dL. Lipase 3901 U/L and triglycerides 392 mmol/L showed likely acute pancreatitis, but imaging was inconclusive. She was started on IV fluids and insulin and admitted for DKA. Overnight she had worsening acute kidney injury (Cr 2.77 mg/dL). She continued to have no UOP despite fluid adjustments, so she was taken to the operating room for a hemodialysis catheter placement. She remained intubated for a week due to poor respiratory

status. Her creatinine rose to from 4.77 to 5.32 mg/dL during that time. She underwent her first dialysis treatment on hospital day 2 and received intermittent dialysis treatments for three weeks until her acute kidney injury resolved. She was discharged home on hospital day 30 with amlodipine and an insulin treatment regimen. At her nephrology follow-up 11 days later, BUN/Cr was 8 mg/dL/0.74 mg/dL and she reported adherence to her medications. Now two years later, she has a controlled HbA1C of 5.6% on Victoza and works to improve her diet. She is followed by her PCP, a pediatric endocrinologist, and a pediatric nephrologist to prevent the recurrence of kidney failure and future complications.

These cases represent severe presentations of acute complications in two patients with type 2 diabetes during the COVID-19 pandemic. Providers need to be aware of these presentations that can result from untreated conditions.