

CLINICAL VIGNETTE

Unexpected Diagnosis of Type 1 Diabetes in Toddler

Gifty-Maria Ntim, M.D., MPH

A 20-month-old boy presented to urgent care for evaluation of polydipsia and polyuria over the past three days. Parents were concerned because two nights in a row, the child had awakened with soaked diapers and a wet bed. He was also asking for more fluids than usual. The mother reported the child and his older brother both had upper respiratory infection (URI) symptoms a week ago. The child had rhinorrhea, nasal congestion, and decreased appetite but was otherwise behaving like his usual self. He did not have vomiting, any behavioral disturbance, or poor sleep. On physical exam, he was awake, alert, and playful. He had moist mucous membranes, and there were no remarkable exam findings. He was born at 35 weeks via C-section due to a non-reassuring fetal heart strip and was in the neonatal intensive care unit for 8 days due to problems with feeding and possible sepsis. He has since done well with no chronic medical problems or daily medications. He did not receive any medications for recent URI symptoms. He lives with his mother and two older siblings who are all in good health. His parents are not married and share custody. He has no other significant social or family history. Due to the completely benign exam, a shared decision made was with parents to do a bag urinalysis, which showed large glucose and ketones. Additional blood tests included blood glucose of 393 with an anion gap of 22 and a bicarbonate level of 18. The child was admitted for new onset diabetes mellitus and started on insulin. His hemoglobin A1c was 7.8.

Although type 1 diabetes mellitus is a common chronic disease of childhood,¹ it is rare in infants and toddlers.² Age of presentation peaks between 5-7 years and at or near puberty.¹ At diagnosis, younger children often do not present with classical symptoms such as nocturia, polydipsia, polyuria, and weight loss.³ In infants and toddlers, these symptoms are usually overlooked or ascribed to other causes until the disorder has progressed to overt diabetic ketoacidosis.² The diagnosis may be missed in young children.³ Our patient's disease may have been missed if a urinalysis was not done. His laboratory studies were consistent with new onset type 1 diabetes without clinical or laboratory evidence of diabetic ketoacidosis.

Type 1 diabetes mellitus (T1DM) is characterized by insulin deficiency due to destruction of pancreatic β -cell, which leads to hyperglycemia.⁴ Toddlers with T1DM pose a

challenge to both their families and healthcare providers. A major issue is the difficulty in achieving metabolic control without hypoglycemia.⁵ Toddlers do not have the communication tools to effectively communicate their needs.⁵ Nocturnal hypoglycemia is more common in toddlers and concerns about hypoglycemia causes stress and reduces adherence to strict metabolic control. Insulin administration and adjustment can be challenging due to pain, fear, refusal, and frequent inter-current illness.⁵ Although glucose monitoring is crucial, it can be distressing to the child and difficult to adhere to due to commitment or financial reasons. Insulin pump therapy is effective and safe for toddlers but requires intensive training, resources, and long-term support.⁵ Our patient was started initially on both long-acting and short-acting subcutaneous insulin injections and was transitioned to an insulin pump with continuous glucose monitoring due to hypoglycemia and pain concerns. Finding suitable childcare was a major hurdle for his family and all caregivers and parents had to be educated on his medical devices. His mother also needed to take time off work when patient was first diagnosed so she could care for him.

Studies suggest a trend toward diagnosis of T1DM at a younger ages⁶ and medical providers must keep their differentials broad and consider it in toddlers with appropriate clinical scenarios. Healthcare providers need to be aware of the enormous burden and distress that families face when toddlers are diagnosed with diabetes. Multidisciplinary team care with special expertise with toddlers with diabetes is essential. In addition, providing more physiological insulin regimens and customized technology improves treatment compliance and diabetes control.⁵

REFERENCES

1. **Atkinson MA, Eisenbarth GS, Michels AW.** Type 1 diabetes. *Lancet*. 2014 Jan 4;383(9911):69-82. doi: 10.1016/S0140-6736(13)60591-7. Epub 2013 Jul 26. Review. PubMed PMID: 23890997; PubMed Central PMCID: PMC4380133.
2. **Katte JC, Djoumessi R, Njindam G, Fetse GT, Dehayem M, Kengne AP.** New-onset diabetic ketoacidosis in a 13-months old african toddler: a case report. *Pan Afr Med J*. 2015 Nov 24;22:293. doi: 10.11604/pamj.2015.22.293.7581. eCollection 2015. PubMed PMID: 26966489; PubMed Central PMCID: PMC4769064.

3. **Daneman D, Frank M, Perlman K, Wittenberg J.** The infant and toddler with diabetes: Challenges of diagnosis and management. *Paediatr Child Health*. 1999 Jan;4(1):57-63. PubMed PMID: 20212991; PubMed Central PMCID: PMC2828228.
4. **Katsarou A, Gudbjörnsdóttir S, Rawshani A, Dabelea D, Bonifacio E, Anderson BJ, Jacobsen LM, Schatz DA, Lernmark Å.** Type 1 diabetes mellitus. *Nat Rev Dis Primers*. 2017 Mar 30;3:17016. doi: 10.1038/nrdp.2017.16. Review. PubMed PMID:28358037.
5. **Deeb A.** Challenges of Diabetes Management in Toddlers. *Diabetes Technol Ther*. 2017 Jul;19(7):383-390. doi: 10.1089/dia.2017.0130. Epub 2017 Jul 7. PubMed PMID: 28686045.
6. **Gardner SG, Bingley PJ, Sawtell PA, Weeks S, Gale EA.** Rising incidence of insulin dependent diabetes in children aged under 5 years in the Oxford region: time trend analysis. The Bart's-Oxford Study Group. *BMJ*. 1997 Sep 20;315(7110):713-7. PubMed PMID: 9314756; PubMed Central PMCID: PMC2127500.

Submitted September 9, 2017