Milky Urine in a Patient with Poorly Controlled Type 2 Diabetes

William Butler,[a] Christina C. Pierre,[b,c,*] Bruce E. King,[b] and Brian Young[d]

[a]Department of Pathology and Laboratory Medicine, Hospital of the University of Pennsylvania, Philadelphia, PA, United States; [b]Department of Pathology and Laboratory Medicine, Penn Medicine Lancaster General Health, Lancaster, PA, United States; [c]Department of Pathology and Laboratory Medicine, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, United States; [d]Department of Family Medicine, Penn Medicine Lancaster General Health, Lancaster, PA, United States.

* Address correspondence to this author at: Department of Pathology and Laboratory Medicine, Penn Medicine Lancaster General Hospital, 555 North Duke St., Lancaster, PA 17604-3555, United States. Tel 717-544-5934; e-mail christina.pierre@pennmedicine.upenn.edu.

CASE DESCRIPTION

A 72-year-old female with a long-standing history of poorly controlled type 2 diabetes mellitus (T2DM), hypertension, high cholesterol, and recent onset proteinuria (<6 months) presented to her primary care provider (PCP) with increased urinary frequency and vaginal discharge that she had experienced for 7 to 10 days. Her urine was cloudy in appearance (Fig. 1), and urinalysis (UA) revealed glucosuria (>1000 mg/dL; >56 mmol/L), moderate hematuria, and proteinuria (>300 mg/dL). Her estimated glomerular filtration rate (eGFR) was >60 mL/min/m2. Nitrites were negative with only trace leukocyte esterase (Table 1). The patient was treated with ketoconazole for a presumptive yeast infection and advised to return if her symptoms persisted or worsened.

Three days later, the patient presented to the emergency department with dark, foamy urine. The results of a comprehensive metabolic panel and complete blood count tests were within normal limits, with the exception of an elevated random plasma glucose result of 173 mg/dL (9.6 mmol/L). UA was negative for nitrites and leukocyte esterase. A computed tomography (CT) scan of the abdominal and pelvic regions was unremarkable, with no anatomical signs of infection, abnormal growths, or obstructing calculi. Given the persistence of her symptoms, the patient was treated for a presumptive bacterial infection with cephalexin while awaiting culture results, which ultimately returned negative with no signs of bacterial growth after 24 h.

Her symptoms persisted for 2 months after initial onset, and the patient returned to her PCP to discuss her ongoing dysuria and the abnormal appearance of her urine. She described the appearance of the urine as clear in the morning but noted that it became increasingly “skimmed milk-like” in appearance throughout the day (Fig. 1). UA findings and eGFR remained similar to those obtained at her previous visit (Table 1). She had experienced significant weight loss. The patient reported that her symptoms would temporarily improve when treated with ketoconazole in the past. She was treated with oral fluconazole for 1 week but returned 1 month later reporting no significant improvement in symptoms. Clinical pathology was consulted to review and advise on the next steps for further workup.

QUESTIONS TO CONSIDER	
1.	Which clinical conditions are associated with milky urine?
2.	Which clinical conditions are associated with significant proteinuria?
3.	What testing can be performed to help determine the etiology of milky urine?

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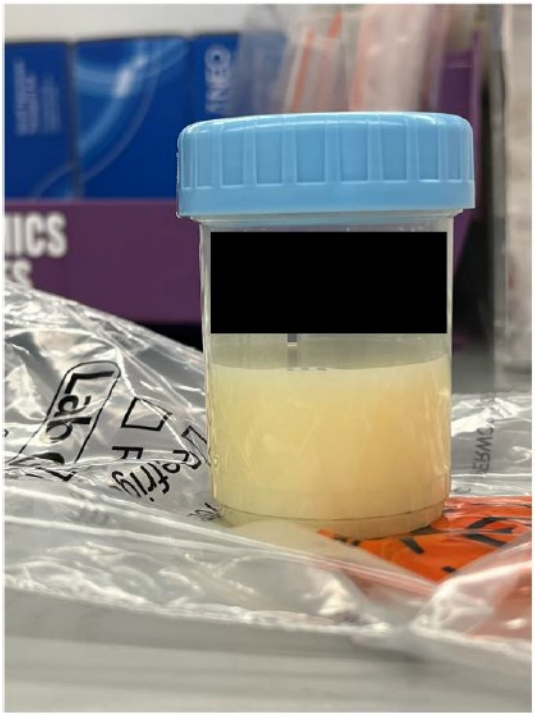

Fig. 1. Representative image of the patient's urine specimen.

Table 1. Urinalysis parameters of patient on separate encounters.

Analyte	Encounter 1	Encounter 2
Glucose	>1000 mg/dL (>56 mmol/L)	>1000 mg/dL (>56 mmol/L)
Bilirubin	Negative	Negative
Ketones	Trace	Negative
Blood	Moderate	Trace
pH	6.5	6.5
Protein	≥300	≥300
Urobilinogen	0.2 mg/dL (32 μmol/L)	0.2 mg/dL (32 μmol/L)
Nitrites	Negative	Negative
Leukocyte esterase	Trace	Negative
Color	Yellow	Pale yellow
Appearance	Cloudy	Cloudy
Specific gravity	1.025	1.020

Final Publication and Comments

The final published version with discussion and comments from the experts will appear in the September 2024 issue of *Clinical Chemistry*. To view the case and comments online, go to https://academic.oup.com/clinchem/issue/70/9 and follow the link to the Clinical Case Study and Commentaries.

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