

Purple Urine Bag Syndrome

A 74-year-old male with a history of type 2 diabetes mellitus, hypertension, and coronary artery disease was admitted with seizures and altered sensorium. He was detected to have stroke with urinary incontinence. The patient had a past history of chronic kidney disease due to diabetic nephropathy (baseline serum creatinine: 3.0 mg/dL). The patient was started on antiepileptics along with other supportive care. During the hospital stay, he developed chest infection and sepsis with hypotension, leading to deterioration in renal function, requiring hemodialysis. His blood and urine culture grew *Klebsiella*, for which he received antibiotics as per sensitivity for 2 weeks. He remained bedridden, requiring Ryle's tube feeding and supportive care. Foley's catheter was removed; however, the patient developed urinary retention; thus, catheter was reinserted. He also developed constipation.

His clinical course was complicated by a slow recovery requiring prolonged hospitalization and recurrent urinary tract infection. He was discharged with a urinary catheter *in situ* with advice for catheter change in 3 weeks' time. The patient was continued on dialysis on OPD basis, and the urinary catheter was periodically changed under sterile conditions.

During one of the visits for dialysis, purple-colored urine was noted in the catheter bag; however, patient was asymptomatic with no history of fever or dysuria [Figure 1]. Urine dipstick showed protein ++, glucose +, and pH 8.0. Urine microscopy showed leucocytes 20–30/hpf, RBC 2–4/hpf, and no casts. Urine microscopy was consistent with an infection, and the culture subsequently grew *Klebsiella*. The catheter and urinary bag were changed, and he was treated with antibiotics. Urine discoloration cleared with this.



Figure 1: Purple-colored urine in the urinary bag

Purple urine bag syndrome was first reported in 1978.^[1] It is not uncommon to see this condition. Patients are usually elderly, typically female patients, with chronic debilitating comorbidities, with a history of constipation, and catheterized with urinary catheters. These patients are generally dehydrated with recurrent history of UTIs. In a study by Sabanis *et al.*,^[2] the mean age of PUBS patients was 78.9 ± 12.3 years, and 70.7% were female. While 90.1% were suffering from constipation, 76.1% were in a bedridden situation, 45.1% were experiencing long-term catheterization, 42.8% had been diagnosed with dementia, 14.3% had recurrent urinary tract infections, and 14.1% were CKD patients. In 91.3% of patients presenting with PUBS, alkaline urine was observed, and the most common microbe in urine cultures was *E. coli*. Our patient was male, with multiple comorbidities, bedridden, chronically unwell, constipated, had history of urinary tract infections, and had been catheterized. There are only few case reports of PUBS in dialysis patients.^[3]

This phenomenon of purple discoloration is attributed to the presence of indigo and indirubin in the collected urine. The formation of these pigments is related to the metabolism of tryptophan in the intestine. Bowel stasis and dysmotility in the presence of bacteria causes accumulation of tryptophan in the intestine, leading to production of indole. After hepatic conjugation, it is converted to indoxyl sulphate and excreted in the urine. In the presence of urinary bacterial indoxyl phosphatase and sulfatase enzyme activities, indoxyl sulphate is degraded to form a mixture of indigo and dissolved indirubin, especially in the alkaline urine. These react with the catheter coating and urinary bag and produce purple color.^[4]

Gram-negative bacteria producing sulfatase and phosphatase are important in the pathogenesis. Commonly reported organisms are *Providencia*, *Klebsiella*, *E. coli*, *Proteus*, *Morganella*, *Pseudomonas*, and *Enterobacter* species.^[5] There can even be multiple organisms in a given case. Bacteria of the same species may not cause this syndrome if they lack these enzymes. Management includes catheter change and antibiotic therapy for bacterial eradication. Good catheter care and prevention of infection reduce the occurrence of PUBS.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that his name and initial will not be published and due efforts will be made to conceal his identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

**Ashish Nandwani, Pranaw K. Jha,
Ashwini Gadde, Manish Jain**

*Department of Nephrology, Medanta Institute of Kidney and Urology,
Medanta – The Medicity, Sector 38, Gurugram, Haryana, India*

Address for correspondence:

*Dr. Pranaw K. Jha,
Department of Nephrology, Medanta – The Medicity, Sector-38,
Gurugram, Haryana - 122 001, India.
E-mail: dr.pranaw@gmail.com*

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