



Catheterized urine color change

What caused the abrupt change in color of catheterized urine after several days of Foley catheter placement?

AN 81-YEAR-OLD MAN was admitted to our skilled nursing facility (SNF) after hospitalization for an acute kidney injury secondary to bladder outflow obstruction. While at the hospital, he received hemodialysis for the acute kidney injury, underwent transurethral resection of the prostate for benign prostatic hyperplasia (BPH), and had lithotripsy for nephrolithiasis. He was admitted to our SNF with an indwelling urinary catheter that had been placed 3 days prior to discharge from the hospital for urinary retention and a serum creatinine level of 3.28 mg/dL (normal range, 0.7-1.3 mg/dL [male]). Four days after his admission, the nursing staff reported acute onset of purple urine in his catheter and collection bag (FIGURE).

Physical examination revealed an older man whose vital signs were normal and who

had a regular heart rate and rhythm. He denied any pain, and his abdomen was soft and nontender with normal bowel sounds. There was no suprapubic or costovertebral angle tenderness, and his urinary catheter was correctly placed. His urine output was within normal limits, but the urine in the catheter and collection bag was purple.

The patient's medical history was remarkable for mild cognitive impairment, BPH, and hypertension. A urine culture was significant for > 100,000 CFU/mL pan-sensitive *Pseudomonas aeruginosa*.

- WHAT IS YOUR DIAGNOSIS?
- HOW WOULD YOU TREAT THIS PATIENT?

FIGURE

Purple urine was visible in the catheter and collection bag^a



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DEPARTMENT OF FAMILY MEDICINE, CHARLESTON, SC

^aThe purple urine in the collection bag appears red tinged due to poor lighting.

Russ Blackwelder, MD, MDiv, CMD; Jessica Li Eason, MD; Ruth Weber, MD, MEd, CMD; Alexander W. Chessman, MD
Department of Family Medicine (Drs. Blackwelder, Weber, and Chessman) and Department of Internal Medicine (Dr. Li Eason), Medical University of South Carolina, Charleston

blackwr@musc.edu

DEPARTMENT EDITOR

Richard P. Usatine, MD
University of Texas Health, San Antonio

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**Diagnosis:
Purple urine bag syndrome**

The diagnosis of purple urine bag syndrome (PUBS) was made based on the patient’s clinical presentation and medical history. PUBS is generally a benign condition that can occur in patients who have urinary catheters for prolonged periods of time and urinary tract infections (UTIs), often with constipation.¹

PUBS was first described in the literature in 1978.² Its prevalence has been estimated to be 9.8% in long-term wards and higher in patients with chronic catheters.³⁻⁵ PUBS is reported more often in institutionalized older women, although it has been documented in men as well.¹ Risk factors include having a chronic indwelling urinary catheter; alkaline urine; the use of plastic, polyvinylchloride urine bags³; chronic constipation⁶; renal failure^{4,5}; and dementia.¹ In many cases, patients with PUBS have been found to have stable vitals and lack systemic symptoms, such as fever, that could indicate an infection.^{1,5}

The pathogenesis of PUBS has been associated with tryptophan.³ Gut bacteria metabolize tryptophan to indole, which is converted to indoxyl sulfate in the liver.^{3,7} Then certain bacteria associated with UTIs, including *Pseudomonas*, *Escherichia coli*, *Proteus mirabilis*, *Providencia* spp, *Enterococcus faecalis*, and *Klebsiella*,⁵⁻⁷ which contain indoxyl phosphatase and sulfatase enzymes, can convert indoxyl sulfate into indirubin (red) and indigo (blue) compounds; this results in a purple hue in the urine seen in a Foley catheter and bag.

Differential is generally limited to medication and food consumption

Clinical presentation and a detailed history and review of medication and/or food ingestion may distinguish PUBS from other conditions.

■ **Medications and foods**, such as rifampicin or beets, may discolor urine and need to be ruled out as a cause with a thorough history.³

■ **Cyanide toxicity in those taking vitamin B₁₂** can result in purple-tinged urine.⁸ Signs and symptoms can also include reddening of the skin, dyspnea, nausea, headache,

erythema at the injection site, and a modest increase in blood pressure.⁸

Identify the infection and treat as needed

There have been some case reports regarding the progression of PUBS to Fournier gangrene,⁴ but such cases are rare and associated with immunocompromised patients.⁹ PUBS is generally a benign condition associated with UTIs. Management involves identifying the underlying infection, treating with antibiotics if indicated (ie, patient is symptomatic or immunocompromised),³ providing proper treatment of constipation if needed, and replacing the Foley catheter.⁴ Some studies suggest that simply exchanging the catheter may resolve PUBS, particularly in asymptomatic patients.⁵

■ **In light of his complicated urologic history**, our patient was treated with a 10-day course of renally dosed intravenous cefepime (500 mg every 24 hours based on calculated creatine clearance of 21 mL/min) and Foley exchange. The patient’s urine color returned to normal after Foley exchange and 24 hours of antibiotics. His kidney function continued to improve and normalized by the time he was discharged from the facility approximately 2 weeks later. JFP

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