

## THE CLINICAL PICTURE

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# The color purple



**FIGURE 1.** Reddish-purple discoloration in one nephrostomy bag.

**A** 58-YEAR-OLD MAN with a history of cystoprostatectomy for prostate cancer, end-stage renal disease on hemodialysis, and distal ureteral obstruction requiring bilateral nephrostomy tubes noticed that one of the nephrostomy bags looked “purple” (Figure 1). A specimen collected from one bag was reddish purple (Figure 2). The urine in the other bag was normal. The condition was diagnosed as purple urine bag syndrome.

### ■ PURPLE URINE BAG SYNDROME

Purple urine bag syndrome, a relatively rare condition that appears after 2 to 3 months of indwelling urinary catheterization, is usually asymptomatic, the only signs being the purplish urine and staining of the urinary bags

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**FIGURE 2.** Specimen taken from one nephrostomy bag.

and catheters. However, it should be considered a sign of underlying urinary tract infection, which can disseminate causing local complications (Fournier gangrene), systemic complications (septicemia), and death.<sup>1-3</sup>

The syndrome, first described in 1978 in children with spina bifida and urinary diversion,<sup>4</sup> is more prevalent in women than in men, possibly because of the shorter urethra and closer proximity to the anus, which predispose women to bacterial colonization of the urinary tract. Predisposing conditions include dementia,<sup>5</sup> female sex, increased dietary tryptophan, bacteriuria, urinary tract infection, constipation, older age, immobility, and alkaline urine.<sup>6-8</sup>

### The cause of the discoloration

The purple color is from indigo and indirubin compounds in the urine, the result of the breakdown of dietary tryptophan. The color

**The syndrome is most often from bacterial colonization, not infection; in the absence of urinary symptoms, it should not be treated**

varies depending on the proportions of the two pigments.

Dietary tryptophan is broken down into indole by colonic bacteria. After reaching the portal circulation, it is excreted into the urine as indoxyl sulfate, which is broken down to indoxyl by sulfatase-producing bacteria (eg, *Klebsiella pneumoniae*, *Proteus mirabilis*, *Pseudomonas aeruginosa*, *Escherichia coli*, *Providencia* species, *Morganella morganii*). Indoxyl is then oxidized to indigo and indirubin.

These compounds do not discolor the urine directly, but rather precipitate after interacting with the lining of the urinary catheter and bags, thereby imparting a purple color.<sup>1,9-13</sup>

**Management**

Effective initial measures are improved urinary hygiene (eg, frequent, careful changing of the urinary catheter) and management of constipation, as constipation leads to increased colonization of the intestine by bacteria that metabolize dietary tryptophan into indoxyl. Antibiotics should be given for symptomatic urinary tract infection (fever, increased urinary frequency, dysuria, abdominal pain) but not for color change alone. Coverage should be for gram-negative bacilli, although methicillin-resistant *Staphylococcus aureus*, which is

gram-positive, has also been reported to cause purple urine bag syndrome.

In most cases, purple urine bag syndrome is benign and requires no therapy other than that mentioned above.<sup>3,13-15</sup> However, in rare cases, immunocompromised patients (eg, people with diabetes) can develop local complications and sepsis from dissemination of bacterial infection, requiring aggressive therapy.<sup>14</sup> Therefore, purple urine bag syndrome should be recognized as an indicator of an underlying urinary tract infection and should be treated if symptomatic. Nevertheless, the long-term prognosis is generally good.

**OUR PATIENT'S MANAGEMENT**

Our patient was confirmed to have urinary colonization with *P aeruginosa* and *E coli*, and alkaline urine. He underwent replacement of the nephrostomy tubes and urinary bag during his hospital stay (he was already in the hospital for another indication), but he continued to produce purple-colored urine from his right side and normal-colored urine from his left side. The unilateral involvement was likely from selective colonization of the right-sided nephrostomy tube with gram-negative bacteria.

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