

An Elderly Man with Purple Urine

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Dear Editor,

An 83-year old bedridden man with constipation and hemiparalysis due to subarachnoid hemorrhage was admitted for further examination of anemia and thrombocytopenia. On admission, a Foley urinary catheter, made of 100% silicon, had been placed to measure urine output. Moreover, the urine bag was made of medical-grade polyvinyl chloride. Regarding anemia and thrombocytopenia, the myelodysplastic syndrome was diagnosed based on the dysplasia of erythroblast, megakaryocyte, and chromosomal abnormality in bone marrow aspiration. Consequently, purple urine was first observed at 3 months after urinary catheterization. Urinalysis revealed a pH of 8.5, positive nitrites, and numerous leukocytes and bacteria. Microorganisms like *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, and *Escherichia coli* were found growing in the urine culture. Thus, the diagnosis of purple urine bag syndrome (PUBS) was made based on the aforementioned characteristic findings. Moreover, the patient had no fever or lower urinary tract symptoms. Furthermore, laboratory findings showed normal leukocyte count and C-reactive protein level. Therefore, no antibiotics were given.

PUBS occurs as a result of a chemical reaction in the urine bag. Tryptophan is the metabolite of dietary protein that is catabolized to indole by the intestinal bacteria, absorbed from the intestinal tract, and then converted into indoxyl-sulfate in the liver. Indoxyl-sulfate is excreted into the urine and converted into indoxyl by

sulfarase-producing bacteria (e.g., *K. pneumoniae*, *Proteus mirabilis*, *P. aeruginosa*, *E. coli*, *Providencia species*, and *Morganella morganii*) (1). Moreover, indoxyl is oxidated into indigo (blue pigment) and indirubin (red pigment) in the presence of alkaline urine. These two pigments do not make the urine purple until they react with the urine bag and tubing.



Figure 1. Purple discoloration of the urinary catheter and bag

The predisposing factors include advanced age, female gender, constipation, dementia, bedridden situation, institutionalization, end-stage renal disease, dehydration, chronic catheterization, use of polyvinyl chloride urinary catheter or bag, recurrent urinary tract infection, high urinary bacterial counts, and alkaline urine (2). In this case, the patient had many predisposing factors (such as advanced age, constipation, long-term care, use of polyvinyl chloride urinary catheter and bag, and alkaline urine).

PUBS is benign and does not need antibiotic treatment without signs and symptoms of urinary tract infection. Moreover, it commonly resolves with good catheter management (i.e., replacement).

Received: 15.03.2021,
Accepted: 07.09.2021
<https://doi.org/10.29333/jcei/11266>

Author contributions: All authors have sufficiently contributed to the study, and agreed with the results and conclusions.

Funding: No funding source is reported for this study.

Declaration of interest: The authors have no conflicts of interest associated with this article.

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