

## Purple urine bag syndrome: An uncommon manifestation of urinary tract infection

María Fernanda Golzarri<sup>1</sup>, Juan Carlos Hernaiz-Leonardo<sup>1</sup>, Adriana Díaz-González<sup>2</sup>,  
Consuelo Velázquez-Acosta<sup>2</sup> and Diana Vilar-Compte<sup>1</sup>

<sup>1</sup>Infectious Diseases; <sup>2</sup>Laboratory of Microbiology, Instituto Nacional de Cancerología, Mexico City, Mexico

### Abstract

**Case Report:** A 57-year-old paraplegic male diagnosed with non-Hodgkin's lymphoma and complete spinal cord compression arrived at our clinic because of fever and purple discoloration of the urine. We diagnosed purple urine bag syndrome (PUBS) and treated him with oral ciprofloxacin and urinary catheter replacement. **Discussion:** PUBS is an unusual phenomenon that occurs predominantly in bedridden patients with long-term urinary catheters, presenting as a purple discoloration of the urine bag. Its pathogenesis involves the metabolism of indoxyl sulfate by sulfatase-producing bacteria. Knowledge of this entity is important in order to avoid unnecessary diagnostic workup and treatment.

**KEY WORDS:** Urinary tract infection. Bacteriuria. Urinary catheter.

### Case report

We present the case of a 57-year-old man with non-Hodgkin lymphoma and complete spinal cord compression secondary to bone invasion at the T5-T7 level, which derived in paraplegia. The patient had an indwelling urinary catheter and a derivative colostomy. Given his condition, he had been bedridden for the last 7 months. He was first seen at the Infectious Diseases Clinic due to a urinary tract infection (UTI) and infected pressure ulcers.

During a follow-up visit, the urine collecting bag was observed to have a purple discoloration (Fig. 1). The patient referred having fever on the previous week. The urinary catheter had been replaced in recent days without complications. On questioning, he denied the use of new medications, alternative treatments or having introduced dyes into the collecting bag. Neither had he ingested berries, fava beans, red beet or edible colorants. However, he referred chronic constipation. He had

concluded his sixth chemotherapy cycle with R-CHOP on the previous month, and at that moment he was receiving recombinant granulocyte colony-stimulating factor (rG-CSF). None of the above-mentioned drugs explained his symptoms. Physical examination was normal. The urinalysis showed turbid urine with a 7.2 pH, 250 WBC/ $\mu$ l and positive nitrites. In the urine culture, pan-sensitive *Klebsiella pneumoniae* was isolated.

We diagnosed purple urine bag syndrome (PUBS), replaced the catheter and initiated ciprofloxacin for 5 days. At treatment completion, the urine returned to its usual color and the patient remained asymptomatic. Currently, he is on palliative care and doesn't refer new UTI episodes or urine abnormal coloration.

### Discussion

PUBS is a rare and very striking manifestation of UTI or asymptomatic bacteriuria. Its prevalence is not

#### Correspondence:

Diana Vilar-Compte  
Avda. San Fernando, 22  
Col. Sección XVI, Del. Tlalpan  
C.P. 14080, Ciudad de México, México  
E-mail: diana\_vilar@yahoo.com.mx

Date of reception: 01-12-2015  
Date of acceptance: 25-12-2015

Gac Med Mex. 2017;153:252-4  
Contents available at PubMed  
www.anmm.org.mx

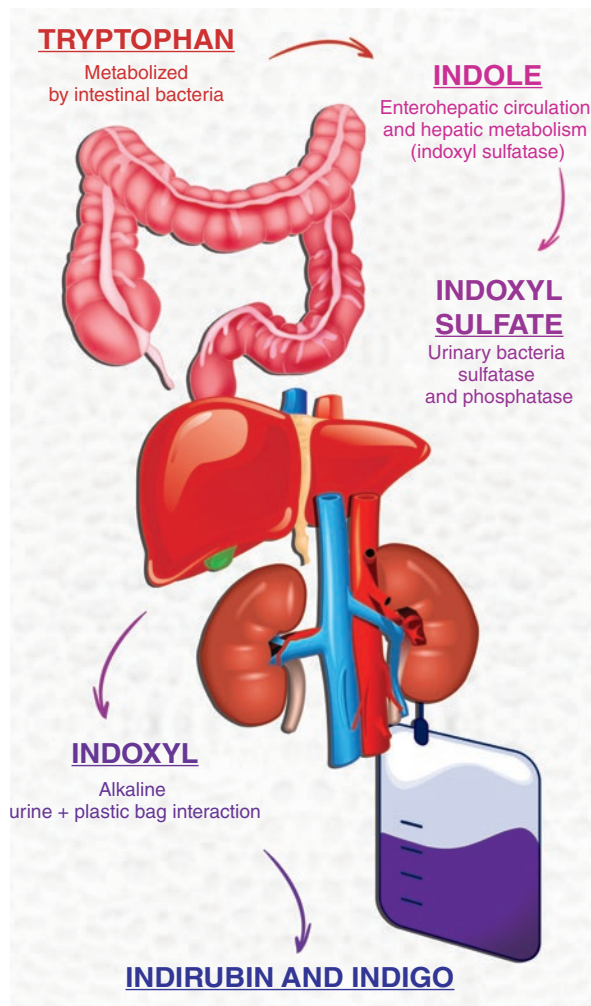


**Figure 1.** Urine collecting bag purple coloration in a 57-year-old paraplegic patient with non-Hodgkin lymphoma.

entirely known because it is rarely reported and there is wide variation between published studies. PUBS was first reported by Barlow and Dickson<sup>1</sup> in 1978 in a pediatric patient, and later, in 1988, Dealler et al.<sup>2</sup> described its pathophysiology. It is more commonly observed in older patients with long-term indwelling urinary catheters. Risk factors for this syndrome include female gender, chronic renal failure, prolonged immobilization, older age, nasogastric feeding, ileal conduit, dialysis, constipation and alkaline urine<sup>3</sup>.

Most PUBS cases are due to monomicrobial infections caused by proteobacteria, mainly *Escherichia coli* and *Proteus mirabilis*. Other reported microorganisms include *K. pneumoniae*, *Providencia stuartii*, *Providencia rettgeri*, *Enterococcus* spp., *Morganella morganii*, *Candida albicans*, *Serratia marcescens* and *Pseudomonas aeruginosa*<sup>3</sup>.

The pathophysiology of PUBS is depicted in figure 2. Tryptophan is deaminated by enteric bacteria to produce indole, which is hydroxylated into indoxyl, and later it is converted into indoxyl sulfate to be excreted by the renal route. Once in the urine, it is metabolized into indigo (blue) and indirubin (red) by



**Figure 2.** Pathophysiology of PUBS.

sulfatase-producing bacteria and, finally, these compounds react with the collecting bag polyvinyl chloride to produce the characteristic purple discoloration. It is important pointing out that only the bag becomes pigmented, since the urine remains with a turbid yellow color.

PUBS diagnosis is usually evident after complete history and physical examination, and doesn't require complementary tests other than those required to diagnose a UTI. Differential diagnoses include ingestion of berries, fava beans, red beet and medications such as amitriptyline, indomethacin, triamterene, flutamide, phenol and mitoxantrone<sup>4</sup>.

Most authors recommend urinary catheter change and a short course of antibiotics, only if there are symptoms of a UTI<sup>5</sup>. It is usually an indolent phenomenon that resolves without sequelae in most cases.

Considering the demographic and epidemiological transition occurring in our country, this syndrome is likely to occur more commonly in the future. Therefore, knowledge of this entity is important in order to avoid unnecessary diagnostic workup and treatment.

### Funding

None. The authors declare no conflicts of interest.

### References

1. Barlow GB, Dickson JA. Purple urine bags. *Lancet*. 1978;28:220-1.
2. Dealler SF, Hawkey PM, Millar MR. Enzymatic degradation of urinary indoxyl sulfate by *Providencia stuartii* and *Klebsiella pneumoniae* causes the purple urine bag syndrome. *J Clin Microbiol*. 1988;26:2152-6.
3. Peng TC, Wang CC, Chan JY, et al. Analysis of risk factors in elderly patients with purple urine bag syndrome: a retrospective analysis in a medical center in northern Taiwan. *J Med Sci*. 2014;34:110-4.
4. Agapakis DI, Massa EV, Hantzis I, Paschoni E, Satsoglou E. Purple urine bag syndrome: a case report of an alarming phenomenon. *Hippokratia*. 2014;18:92-4.
5. Delgado G, Martínez-Reséndez M, Camacho-Ortiz A. Purple urine bag syndrome in end-stage chronic kidney disease. *J Bras Nefrol*. 2014; 36:542-4.