

CASE REPORT

Purple Urinary Bag Syndrome can be a Presentation of Urinary Tract Infection

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ABSTRACT

Purple discoloration of a urinary catheter and urobag is indeed a very rare phenomenon known as the purple urine bag syndrome (PUBS). It is usually associated with urinary tract infections occurring in catheterized patients who are generally elderly females with significant comorbidities and constipation. The urine is usually alkaline. We are presenting the case of a 78-year-old female who presented to us with urinary catheter *in situ* for the previous 2 months and she complained of purplish discoloration of urine bag and tubing for the previous 4 days.

Keywords: *Proteus mirabilis* infection, Purple discoloration of urinary catheter bag, Purple urinary bag syndrome, Urinary tract infection.

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INTRODUCTION

Purple urine bag syndrome is a rare entity characterized by purple discoloration of urinary drainage bags. This clinical ailment was first described in 1978 and was believed to be related to the metabolism of tryptophan. The PUBS occurs primarily in the elderly who are bed-bound and have prolonged urethral catheterization. This ailment usually develops hours or days after catheterization and has been related to indicanuria and urinary tract infection caused by indicant (indoxyl sulfate) degrading

bacteria. This syndrome is reported to occur usually in alkaline urine.¹

CASE REPORT

A 78-year-old female was brought to our outpatient department with a history of fracture neck of right femur over the previous 2 months. She presented with complaints of decreased appetite, suprapubic pain, nausea, and fever over the previous 5 days. She also gave a history of chronic constipation. On examination, she had a urinary catheter *in situ* for the previous 2 months and she complained of purplish discoloration of urine bag and tubing over the previous 4 days. On systemic examination, her vitals were stable except for tachycardia and temperature of 100°F. On further investigation, her hemoglobin was 13 mg/dL, total leukocyte count was 12,900/cu mm, P 84 L 11 E0 M6; urine routine phosphate crystals were present, pus cell 25 to 30/hpf, leukocyte esterase positive; urine culture and sensitivity were determined, and *Proteus mirabilis* was isolated which was extended-spectrum β -lactamase negative and sensitive to amikacin, ceftriaxone, and cefexime. Her renal function test and liver function test were normal. Ultrasonography of abdomen was normal.

Tubing and urobag were changed and during hospitalization, she was given injection amikacin 500 mg daily and ceftriaxone 1 gm BD, syrup urine alkalizer BD for 5 days. Her urine color was changed after the second dose of antibiotics. She was discharged on 5th day with complete resolution of symptoms and was prescribed tablet cefexime 200 mg BD, urine alkalizer BD for 7 days.

DISCUSSION

The purple urine bag (Fig. 1) is visually striking and rarely seen in a patient with urinary tract infection. Due to *P. mirabilis* infection, the change in color is purely of the bag and tubing, whereas the color of the urine itself remains unchanged. The microscopic examination of the sediments deposited on the urine bag and tubing usually reveals the presence of phosphate crystals. The presence of phosphate crystals is due to biochemical reaction (indicanuria) taking place due to the presence of *P. mirabilis* infection. This condition most commonly occurs in patients with prolonged urinary catheterization, either urethral or suprapubic, in combination with a

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Fig. 1: Purple urine in urobag

highly alkaline urinary tract infection.² The pathogenesis involves multiple bacterial urinary tract infections most commonly with *Providencia stuartii*, *Providencia rettgeri*, *P. mirabilis*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, *Escherichia coli*, *Morganella*, *Citrobacter* species, *Enterococci*, and group B *Streptococci*. This is followed by a series of biochemical conversion starting from deamination of tryptophan to indole, pyruvic acid and ammonia, conjugation of indole to indoxyl sulfate (indican) and oxidation of indican to indigo (blue) and indirubin (red), which combine with the catheter tubing to give purple appearance.³

Although it is common to find patients with urinary tract infections along with risk factors for PUBS, this interesting syndrome is rarely encountered. The few possible reasons are: PUBS probably requires the simultaneous presence of various factors: The presence of urinary tract infection caused by sulfatase- and phosphatase-producing bacteria, the presence of high tryptophan in the diet for the formations of the essential pigments, and patient being catheterized for a prolonged

period. It has been shown that not all bacterial organisms of the same species produce the phosphatase and sulfatase enzymes required for the formation of the responsible pigments. Additionally, a certain concentration of the pigments may be required for the precipitations to become visible. The presence of alkaline urine and also the type of materials used to manufacture the urinary catheter and bag may be an important factor.⁴ The dehydration status or hypovolemia might also be an important factor. Lower serum levels of tryptophan and valine in patients with PUBS suggest abnormal absorption of amino acids secondary to constipation and intestinal bacterial overgrowth.⁵ A high tryptophan diet may increase the risk of developing this condition in susceptible patients. Though discoloration will develop faster when the urine is alkaline, it is also possible for this to occur in acidic urine.¹

Medical management of PUBS does not require any special treatment apart from changing the catheter and administering appropriate antimicrobial therapy to treat the underlying bacterial infection.²

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