

CASE REPORT

A Fascinating Case of the 'Purple Urine Bag Syndrome'

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ABSTRACT

Purple urine bag syndrome (PUBS) is a rare presentation of urinary tract infections (UTIs). It is commonly seen in constipated patients. There is a deep purple discoloration of contents of urine bag due to presence of indigo and indirubin pigments which are metabolites of tryptophan. We would like to describe an interesting case of purple urine bag syndrome of 88-year-old woman who presented with catheter-related urinary tract infection. She had low-grade fever and suprapubic discomfort for three days duration. She had increased white cell count and C-reactive peptide (CRP). Urinalysis showed protein 2+, nitrite and leucocyte esterase positive. Urine culture grew *Escherichia coli* and *Klebsiella pneumoniae*. She was treated with oral cefuroxime and recovered. This case report may be the first case of PUBS reported in this region.

INTRODUCTION

Purple urine bag syndrome is uncommonly seen where there is purple discoloration of the urine, collecting bag, and tubing¹. This is first described by Barlow and Dickson in 1978, due to the indigo and indirubin producing bacteria in urine tract infections (UTIs)². Since the first report in 1978, PUBS remains a fascinating condition affiliated with chronic constipation, alkaline urinary pH, a bed-ridden state, advanced age, tryptophan rich foods, cognitive disorders, renal dysfunction and chronic urethral catheterization³. We would like

to describe a case of purple urine bag syndrome who presented with catheter-related urinary tract infection.

CASE PRESENTATION

An 88-year-old lady who was on long-term continuous bladder drainage (CBD) for diabetes cystopathy was presented with low-grade fever and suprapubic discomfort for three days duration. She also noticed a change in her urine colour from yellow to purple recently (Figure 1). The last change of her bladder catheter was one week ago at the local health clinic. Clinically, she was not septic, her blood pressure was 115/70 mmHg and heart rate of 92 beats per minute. She had a low-grade fever of 37.8 degree Celsius. Her suprapubic region was tender on palpation. Laboratory results showed an elevated total white cell count of $18 \times 10^9/L$ and raised C-reactive peptide (CRP) of 200 mg/dl. Urinalysis showed the following: pH7, specific gravity of 1.02, leucocytes of 500 μL , nitrite positive, protein 2+, ketone negative and leucocyte esterase positive. Urine culture grew *Escherichia coli* and *Klebsiella pneumoniae*. She had a negative blood culture result. She was treated with oral cefuroxime 500 mg twice daily for five days per local antibiotic protocol. She made a smooth recovery and was discharged. During her subsequent follow-up, her urine colour has returned to normal and repeated urinalysis was normal.



Figure 1 Purple discolouration of the urine in the urine collection bag

DISCUSSION

Purple urine bag syndrome is an uncommon case. It is more common among urinary catheterized elderly patients⁴. Bacterial enzymes in the urine trigger biochemical reactions that release metabolic products that make the urine purple in colour⁵. Amino acid tryptophan is broken down into indole by the gastrointestinal tract flora organism which is later converted into indoxyl sulfate in the intestines⁵. In the urine, the indoxyl sulfate is further broken down into indoxyl in the alkaline environment with the presence of bacterial enzymes (indoxyl sulfatase and indoxyl phosphatase). Indigo and indirubin are the breakdown products which makes the urine blue and red. Frequently, bacteria with these enzymes seen are *Providencia*, *Klebsiella* and *Proteus species*⁶.

In general, urinary catheters are placed for a number of reasons. Urine tract infection risks are increased with the presence of urine catheters⁷. The reported incidence of bacteriuria related to indwelling catheters

occurs at a rate of five per cent per day of urinary catheterization⁸. In patients with bacteriuria, around twenty per cent reported evidence of urinary tract infection symptoms^{7, 8}. There is a lack of overall consensus about the optimal approach to catheter-associated urinary tract infections (UTIs), apart from removing the catheters when it is no longer necessary. This leads to increase in healthcare burden of catheter-associated UTIs in hospitalized patients⁴.

In a systemic review done on purple urine bag syndrome (PUBS) by Llenas-Garcia, there were 169 PUBS cases reported: 63.5% woman, median age 78 years old, 59.4% asymptomatic. Outcome: 7.7% death and 21.4% recurrence. The only factor associated with recurrence was dementia (OR: 5.44; P = 0.046). *Escherichia coli* and *proteus mirabilis* were the organisms most often isolated².

Risk factors for catheter-related urinary tract infection include female gender, older age, diabetes mellitus, bacterial colonization of the drainage bag and errors in catheter care⁹.

The common complaints include flank or suprapubic pain, costovertebral angle tenderness, and catheter blockage. Elderly patients may present with new-onset delirium due to urinary tract infection¹⁰.

The best approach to urinary catheter management during urinary tract infection (UTI) is to minimize the usage of indwelling catheters. Strict aseptic technique when placing the catheter should always be adhered to. Practically, patients who do not require catheterization should have the catheter removed and receive appropriate antimicrobial therapy^{9, 10}.

CONCLUSION

Catheter-related urinary tract infection is a common healthcare-associated infection. Purple urine bag syndrome is an uncommon presentation of catheter-associated urinary tract infections.

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CONFLICT OF INTEREST

The authors declare that they have no competing interests in publishing this case.

CONSENTS

Written informed consent was obtained from the patient to publish the case. A copy of written consent is available for review by the Chief Editor.

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