

Purple Urine Bag Syndrome: A Case Report

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Abstract

Purple urine bag syndrome (PUBS) is characterized by the urinary drainage bag turning purple, which is a disease of people with chronic catheterized urinary tract infections, often in the elderly with constipation. Recognizing PUBS is an important indicator for a quick and accurate diagnosis that emergency physicians should be aware of. Management involves reassurance, antibiotics, and regular changing of catheters. The prognosis is generally good, but PUBS is associated with high morbidity and mortality due to the background of patients. We present the clinical case of a 82-year-old male patient with chronically catheterized prostate cancer, who presented with purple- urine.

Keywords: Catheter, purple urine bag, urine discoloration

Introduction

Purple urine bag syndrome (PUBS) is a rare syndrome in emergency services, characterized by purple staining of the urinary bladder after urinary tract catheterization. In the literature, PUBS was first described by Buist [1] in 1978 with the development of purple urinary bladder in a patient following long-term urinary catheterization.

Normal urine is clear and light yellow in color. Dehydration, food coloring consumption, certain foods such as beets, certain drugs such as rifampin, phenytoin, hydroxycobalamin, propofol, amitriptyline, metabolism disorders such as hemoglobinuria, myoglobinuria, chyluria, urinary tract infections, and alkaptonuria can change the color of urine. As can be seen, it can also be the first finding of an important clinical case.

Female gender, advanced age, increased tryptophan content in the diet, increased urinary alkalinity, constipation, chronic persistent urinary catheterization, urinary tract infections, and kidney failure are risk factors associated with PUBS. Although *Pseudomonas aeruginosa*, *Proteus mirabilis*, *Providencia* spp.,

Escherichia coli, *Klebsiella pneumoniae*, *Morganelli morganii*, *Citrobacter* spp., methicillin-resistant *Staphylococcus aureus*, group B *streptococci*, and *Enterococcus* spp. are the most common bacterial species that can be considered to cause PUBS [2].

During constipation, the tryptophan taken from the bacteria colonizing the intestine is converted to indole. Indole is sulfated in the liver and excreted in the urine as indoxyl sulfate. Bacteria in the urinary catheter convert indole sulfate to indoxyl through sulfatase and phosphatase enzymes. As a result of the oxidation of indoxyl, blue (indigo) and red (indirubin) colors are formed. Alkaline urine accelerates the oxidation of indoxyl. A purple color is formed when the synthetic components of the urinary catheter bag containing indigo and indirubin and polyvinyl chloride come into contact [3].

In this report, a case with chronic constipation who was diagnosed with PUBS while being followed up with a urinary catheter for a long-time and the related literature review is presented.



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Case Report

An 82-year-old male patient presented to the emergency department (ED) with complaints of deterioration in general condition, decreased oral intake, malaise, fatigue, and fever. In his history, he stated that his complaints had been for about 10 days and had increased for 2-3 days. He stated that he had been constipated for 2 days and had occasional constipation. It was learned in his history that he had been followed up for hypertension and prostate cancer for 10 years. For this reason, it was learned that he had long-term urinary catheterization and frequent urinary tract infections. There was no feature in his family history. He has used amlodipine for hypertension. Vital signs of the patient on admission to the ED; were fever: 37.2 °C, blood pressure: 142/83 mmHg, pulse: 82/min, and SO_2 : 93%, respiratory rate: 10/min. On physical examination, the oral mucosa was dry, and the prostate was palpable on rectal examination. Other system findings were normal. Laboratory findings were leukocytes: 11,700/ mm^3 (4,000-10,000/ mm^3), haemoglobin: 10.9 g/dL (12.00-14.00 g/dL), platelet: 339.000/ mm^3 (100.000-400.000/ mm^3), C-reactive protein: 1.489 mg/L (0-0.5 mg/L), creatinine: 0.8 mg/dL (0.75-1.25 mg/dL), blood urea nitrogen was 30 mg/dL (8.9-20.6 mg/dL). It was observed that the urine coming from the patient's urinary catheter stained the urinary bladder of the patient purple (Figure 1) and it was thought that he might have a urinary tract infection. In the sent complete urinalysis: 33 erythrocytes and 207 leukocytes were detected. Urine pH was measured as 7.5. The urine culture and antibiogram were taken from the patient. The patient was administered 2 grams of ceftriaxone intravenously. No feature was found in the abdominal imaging. Our patient was transferred to infectious diseases for further examination and treatment.



Figure 1. Purple discoloration of urine bag

There was no complication, and the patient was discharged three days after hospitalization.

Discussion

PUBS is a clinical syndrome that should be kept in mind because of the underlying pathological factors and urinary tract infection being an important cause of morbidity and mortality. Early diagnosis and initiation of treatment in patients with high comorbidity who had urinary tract infections, as in our patient, are of great importance for the patient's mortality. In a study conducted by Sabanis et al. [4], case reports and clinical studies in the literature between 1978-2017 were discussed. Evidence of urinary tract infection was found in all patients in their study. Hygiene measures and maintaining the general well-being of catheterized patients are essential in the prevention of this syndrome. It is also necessary to strengthen antibiotic management in the context of an individualized approach. Primary and secondary health clinicians involved in geriatric care should be highly aware of the syndrome, which may indicate serious underlying comorbidities [4].

In the urine culture of the patients; several bacterial strains associated with PUBS have been reported, including *Pseudomonas aeruginosa*, *Proteus mirabilis*, *Providencia* spp., *Escherichia coli*, *Klebsiella pneumoniae*, *Morganella morganii*, *Citrobacter* spp., methicillin-resistant *Staphylococcus aureus*, group B streptococci, and *Enterococcus* spp. Our urine culture results were similar to previous reports and revealed that it was *Escherichia coli* [5,6].

Another risk factor that triggered the development of PUBS in our patient was constipation. It is thought that it accelerates the development of PUBS because there is more time for bacterial deamination in the gastrointestinal flora [5]. In a study by Su et al. [7], constipation was found in 84.6% of 13 patients who developed PUBS.

Because of the risk factors, it is important to manage PUBS appropriately. Sanitation measures should be taken, including urinary tract infections, constipation, and urinary catheter replacement. Removal of an unnecessarily placed urinary catheter should be considered in the prevention of catheter-related urinary tract infections. Antibiotic use should be kept in mind according to the current condition of the patient. Non-plastic catheter bags are another alternative. It is essential to inform the patient, their relatives, and the clinical team dealing with the patient about the nature of the condition and its usual clinical course. In general, it is important to manage PUBS patients on a case-by-case basis [2].

Conclusion

PUBS is a disease that every emergency physician can easily diagnose and manage comfortably. Management includes

finding the underlying cause, identifying risk factors, treating urinary tract infections and constipation, and replacing the urinary catheter regularly. It is an important point that the clinician should not forget that PUBS is associated with high morbidity and mortality due to the history of the patient.

Ethics

Informed Consent: Written informed consent was obtained from the patients.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: D.T., Concept: M.K., A.Ö., D.T., Design: R.A., N.M.H., H.A., Data Collection or Processing: M.K., A.Ö., Analysis or Interpretation: R.A., N.M.H., H.A., Literature Search: R.A., N.M.H., D.T., Writing: M.K., A.Ö., H.A.

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