

Case Report

Purple Urine Bag Syndrome: A Benign Condition Seen in a Young Patient with Hematological Malignancy

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Abstract

Purple urine bag syndrome (PUBS) is a rare benign condition seen mainly in elderly female patients who are immobilized or have chronic kidney diseases and have a long-standing urinary catheterization. Very rarely PUBS has been noted in patients with hematological malignancies. Here, we highlight a rare case of a young female patient with Acute Lymphoblastic Leukemia who developed PUBS. Understanding this entity is important as this often leads to undue concern among patients and their caregivers.

Keywords: Purple urine bag syndrome, Hematological malignancies, Young

Abbreviation: PUBS: Purple urine bag syndrome

1. Introduction

Purple urine bag syndrome (PUBS) is a benign condition, rarely seen in patients on long term catheterization with associated urinary tract infection (UTI) [1, 2]. This entity had been first described as long back as 1978 [3]. PUBS is common among patients with chronic kidney disease or patients with terminal diseases, all associated with chronic catheterization and UTI, but it is rarely reported among patients with hematological disorders [4, 5]. Here we report a case of a young female patient admitted in the Hematology department with acute leukemia.

2. Case Report

A 22-year-old female had been admitted to the Medicine Department in our hospital, with a history of generalized petechiae, gum bleeding, hematuria, intermittent fever and generalized weakness for a month. She was initially treated with supportive therapy, prior to being transferred to the Hematology department. Patient had been transferred to our department with an in-situ urinary catheter. Patient had been catheterized in view of abdominal distension and anuria about 12 days prior to being transferred. After being transferred, she was started on intravenous antibiotics and Packed red blood cells and platelet transfusions. Patient had developed hyperkalemia, rising creatinine levels and anuria: tumor lysis syndrome. She was planned for dialysis. On evaluation, the peripheral blood, bone marrow examination and immunophenotyping revealed T-cell Acute Lymphoblastic Leukaemia (ALL).

She was planned to be started on chemotherapy. On the second day of admission, her caregiver informed us about the purple colored urine in the urobag (Figure 1). On examination, the urine in the catheter tubing and the urobag were found to be purple in color. A urine culture however, was suggestive of contamination and revealed *Bacillus subtilis*. After changing her catheter and urine bag, her urine became normal colored again. Unfortunately, the very next day the patient left against medical advice, and we do not have any follow up data on the patient.



Figure 1: Photograph showing the bluish-purple discoloration of the catheter and urobag.

3. Discussion

PUBS is a rare disorder and occasional cases have been described from India [2, 6, 7]. This condition has been rarely seen in patients with hematological disorders [2, 8]. The patients were elderly females with Acute Myeloid leukemia or Non-Hodgkins lymphoma. Patients with hematological malignancies often require admission and need to be given supportive therapy, which may sometimes include, catheterization. Our patient was a young female with Acute Lymphoblastic leukemia. PUBS is commonly seen in older female patients who are constipated, immobilised

and have a urinary catheter for a long duration. Quite often such cases have been reported from nursing homes where the patients have been admitted for a long duration for chronic debilitating diseases [5, 9]. Patients with chronic kidney disease also have been found to develop PUBS [4, 10]. King George III had a bout of blue urine during constipation [11]. Unlike published literature stating that elderly females with long-standing catheterization are commonly affected, our patient is a young female who had been catheterized for 12 days [6]. The mean age of PUBS patients was 78.9 ± 12.3 years in a review by Sabanis et al [6]. Our patient was immobilized and had developed renal failure, possibly as a result of tumor lysis syndrome.

PUBS is a benign condition and is merely a manifestation of purple to indigo colour in the plastic urobag and catheter tubing, visible to the naked eye [1, 10]. This occurs due to urinary tract infections by bacteria such as, *Providencia*, *Escherichia coli*, *Proteus mirabilis* or *Klebsiella pneumoniae*, which contain sulphatase and/or phosphatase enzymes [12]. Tryptophan, which is metabolized in the gut to indole is further metabolized in the liver to indoxyl sulphate. The indoxyl sulphate is metabolized by bacteria in the alkaline urine to indoxyl by sulphatase enzyme, and Indoxyl further transforms to indigo (blue) and indirubin (red) pigments, which being insoluble, precipitate in the catheter and urobag [1, 10, 13]. The blue and red colors mix to produce a purple color. The urine itself is normal in color. It is not in all cases with the above-mentioned bacterial infections, that PUBS develop. This may be due to insufficient quantity of pigments produced or lack of the required enzymes in even the same bacterial species [14]. Sometimes, even without indicanuria the violet discoloration is seen [1].

In our case, *Bacillus subtilis* was detected. Once the urinary catheter and urobag were changed, the discoloration disappeared. Though PUBS evokes alarm among the family members and caregivers, it is essentially a benign condition, and can be treated by changing the urinary catheter and urobag, and treating the urinary tract infection. Maintaining good urinary sanitation and treating constipation also aid in treatment [10].

4. Conclusion

PUBS is a benign condition but knowledge regarding cause and pathogenesis is important, so that undue concern can be avoided. Contrary to published literature, PUBS may also be seen in younger individuals, provided the causative factors are present. Proper urinary hygiene and hygiene of the urinary catheter or urobag are important in preventing PUBS.

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Conflicts of Interest of each author/ contributor

Not applicable.

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