Case Report

Purple Urine Bag Syndrome

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Abstract

Purple urine bag syndrome (PUBS) is rare disease entity, occurs predominantly in constipated women, chronically catheterized and associated with bacterial urinary infections that produce sulphatase/phosphatase. The etiology is due to indigo (blue) and indirubin (red) or to their mixture that becomes purple. We present a case report of this rare phenomenon occurring in an 86-year-old woman.

Keywords: Chronic urinary catheterisation, indigo, indirubin, purple urine bag syndrome, urinary tract infection

Introduction

Purple urine bag syndrome (PUBS) is rare and was first reported in 1978.[1] and is signified by purple discoloration of the urine usually seen in women and chronically debilitated patients with long term indwelling urinary catheters.[2,3] PUBS can be distressing for patients, family members and healthcare workers who are unaware of this association. This condition is often associated with urinary tract infection. Discolouration of the urine bag is due to the presence of indigo and indirubin pigments which precipitate and react with the synthetic materials of the catheter and urinary bag. We present a case report of this rare phenomenon.

Case Report

An 86-year-old woman had a history of osteoporosis and bilateral fracture of neck femur for two years. Her daily activity was limited and she was bedridden most of the day. She could sit for a while with a caregiver's help [Figure 1].

She had Foley catheterization for one year because of neurogenic bladder. She was also suffering from constipation from her early age and it became severe enough in last two years. Urine with purple sediment was found in the urine bag one day before admission [Figure 2].

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She did not have fever or a history of drug administration before admission. The patient had a history of recurrent urinary tract infections (UTIs) in the past. Physical examination revealed diffuse tenderness on palpation of the abdomen. Other examinations did not indicate any other noteworthy symptoms. The urinalysis showed alkaline urine with the urinary sediment contained 5-7 white blood cells/high-power-field. She was admitted under the impression of urinary tract infection and constipation. The patient was empirically started on oral cefuroxime. Urine cultures yielded *Escherichia Coli* and growth was greater than 10^5/mL. The antibiotic therapy was changed to ceftriaxone 1 gm intravenous injection every day and gentamicin 80 mg intravenous injection 8 hourly according to antibiotic sensitivity tests of the urine cultures. A glycerol containing oral preparation was given for her constipation. The Foley catheter was also changed. The purple urine disappeared and the following urinalysis was sterile. She was discharged in stable condition.

Discussion

PUBS is rare and was first reported in 1978.[1] It is a rare manifestation of urinary tract infection. It is an uncommon occurrence, but prevalence of PUBS has been reported to be as high as 9.8% in institutionalized patients with long-term indwelling urinary catheter use.[2,3,4] PUBS have been shown to be associated with the female gender, alkaline urine, constipation, institutionalization and the use of plastic urinary catheter and bag.[2,4,5] Higher bacterial load in urine, in combination with the above factors, facilitates the development of PUBS. Most

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Figure 1: Patient having purple urine bag syndrome

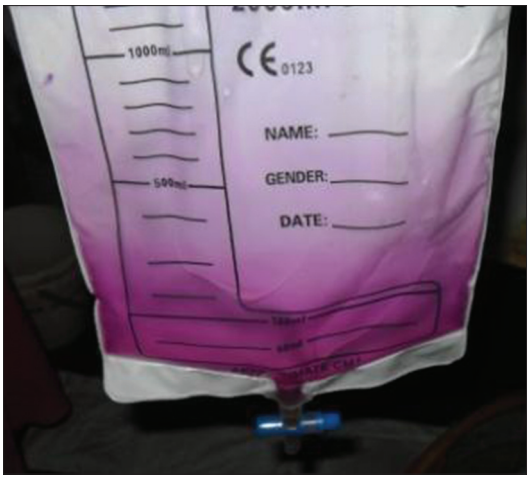

Figure 2: Purple colored urine in urine bag

authors believe that purple urine is a mixture of indigo and indirubin which are derived from the metabolites of tryptophan. Tryptophan is metabolized in the gastrointestinal tract by gut bacteria and it produces indole that is absorbed into portal circulation. Indole is converted into indoxyl sulphate in the liver. Most indoxyl sulphate is excreted into the urine and digested into indoxyl by indoxyl sulphatase produced by some bacteria. Indoxyl turns into indigo (blue color) and indirubin (red color) in alkaline urine, and these colors then mix to form a purple color.[3,4] However, there were some patients who presented with a purple urine bag without indicanuria and the violet pigment may be either a steroidal or bile acid conjugate.[4] Chronic constipation is commonly associated with bacterial overgrowth in the colon which increases the conversion of tryptophan into indole. Catheter associated urinary tract infection increases the conversion of indoxyl sulphate into indoxyl. So, PUBS is most often observed in chronically catheterized and constipated people.[4,5] Several bacterial species have been reported in association with PUBS including *Providencia stuartii, Providencia rettgeri, Klebsiella pneumoniae, Proteus species*, *Escherichia coli*, *Enterococcus species, Morganella morganii,* and *Pseudomonas aeruginosa*.[5,6] In our case, the patient had chronic constipation and the urine culture yielded *Escherichia coli*. It is interesting to note that despite the common occurrence of urinary tract infections in patients with risk factors for PUBS, this interesting syndrome is rarely encountered. There are a few possible reasons. PUBS probably require the simultaneous presence of various factors: The presence of urinary tract infection caused by sulphatase-and phosphatase-producing bacteria, the presence of high tryptophan in the diet for the formations of the essential pigments, and being catheterised. It has been shown that not all bacteria organisms of the same species produce the phosphatase and sulphatase enzymes required for the formation of the responsible pigments.[5,7] Furthermore, 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 important factors.[5,7] Interestingly, PUBS in the presence of acidic urine has also been reported.[6] PUBS is generally a benign process. Despite this fact, it is distressing for family, friends, and healthcare workers who are unaware of this phenomenon and tend to become unusually alarmed because of the sudden inexplicable discoloration of the urine and sometimes the urine bag. Nevertheless, physicians should be aware of the fact that this syndrome signals underlying recurrent UTIs, due to improper care of the urinary catheters and improper sanitation. Although relatively benign and easily treatable, it can be associated with significant morbidity and mortality.[1,2,7]

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