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Case Report

Purple Urine Bag Syndrome: A Case Report

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ABSTRACT: Purple urine bag syndrome (PUBS) is an uncommon phenomenon reported mostly in chronically constipated, institutionalized females on an indwelling catheter. It can often cause tremendous distress among health care providers. Though the condition is generally described as benign, it should draw immediate attention to the possibility of an underlying urinary tract infection. The sequential chemical reactions involving tryptophan from food in the gut is hypothesized as the mechanism for the event. We present a case of this unusual and interesting phenomenon with a brief discussion on PUBS.

KEY WORDS: ***Purple urine bag syndrome; Tryptophan metabolism; Urinary tract infection, Indigo, Indirubin pigment***

INTRODUCTION

Purple urine bag syndrome is a rare disorder causing discoloration of urine and urinary collecting bags due to presence of indigo and indibilirubin pigment produced by tryptophan metabolism. It is most commonly associated with female gender, constipation, alkaline urine, institutionalization and use of plastic urinary collecting bags. In presence of an underlying urinary tract infection, there is increased risk of morbidity and mortality. We present a case of this rare phenomenon in a 75 yr old female.

CASE DETAILS

A 75 yr old female was admitted with history of sudden onset, progressive left sided weakness involving both upper and lower limbs. Her past records included a history of type 2 DM, hypertension and recurrent urinary tract infection. On examination, her blood pressure was 190/110mm Hg with left sided hemiplegia. She had an altered sensorium with a GCS of 9/15. A computed tomography of the brain showed right basal ganglia hemorrhage. Her initial investigations included a complete blood count, renal functions which were within normal limits. She was started on anti-cerebral edema measures and her blood sugar was managed with short acting insulin.

On the 7th day of admission, the patient developed low-grade fever. A purplish discoloration of the urine as well as the urinary bag and tubing was noted. Complete blood counts revealed neutrophilic leukocytosis. Urine analysis showed pH 8.0, blood 1+, protein 1+, pus cells – 20-25, RBCs 8-10/hpf. Urine culture had a significant growth of *Klebsiella pneumoniae*. She was started on cefotaxime as per the sensitivity pattern. Fever subsided within 2 days with disappearance of purple color in the bag in 7 days. Patient's further stay in hospital was uneventful with gradual improvement in sensorium and left sided weakness. She was discharged on day 22. There was no recurrence of the discoloration.

Fig 1: Purple discoloration of the urinary bag

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DISCUSSION

First reported by Barlow and Dickson in 1978[1], purple urine bag syndrome (PUBS), is a rare clinical phenomenon, most commonly seen in bedridden, constipated and chronically catheterized patients, wherein the urine as well as the urine collecting bag and the tubing turns purple in color within hours to days after catheterization[2]. The prevalence rate of PUBS in literature ranges from 8-16% in different studies[3]. However, no local data has been found in previous studies.

According to the most commonly accepted hypothesis, the development of PUBS is believed to be related to tryptophan, an essential amino acid in the body. Tryptophan is converted to indole by intestinal bacteria which is then absorbed into the portal circulation via the intestinal wall. The liver converts indole to indoxylsulphate which is excreted in the urine. In presence of a sulphatase producing organism, the urinary bacteria break down the indoxyl sulphate to indoxyl via sulphatase enzyme. The indoxyl turns into indigo which is blue in color and indirubin which is red in color. A mixture of these two colours gives the characteristic purple color[4-6].

Gram negative bacteria producing sulphatase and phosphatase are important in the pathogenesis of PUBs[7,8]. The presence of constipation, bacterial overgrowth and a high bacterial load has also been reported to be an important risk factor. Commonly reported organisms include Providencia spp., *Klebsiella pneumoniae*, *E.coli*, Proteus spp., Morganella spp., Pseudomonas spp. and Enterobacter species[9]. It is occasionally difficult to differentiate which organisms are responsible, as the isolation of multiple organisms is not uncommon.

Even though the occurrence of urinary tract infection is commonly encountered in everyday practice, the presence of a purple bag is a rare clinical entity. The possible explanation can be the simultaneous presence of urinary tract infection with a sulphatase/phosphatase producing organism, high tryptophan in the diet and being catheterized[10]. The risk factors associated with PUBS with the possible mechanism include:

- Female gender – predisposing anatomy for UTI occurrence.
- Increased tryptophan in the diet – increased availability of substrate for conversion.
- Increased urine alkalinity[8] – facilitates indoxyl oxidation.
- Severe constipation[8] – increased time for bacterial deamination.
- Chronic indwelling urinary catheter – high risk for UTI.
- High bacterial load[8] – bacterial sulphatase and phosphatase availability.
- Renal failure – impaired clearance of indoxyl sulphate.

CONCLUSION

PUBS is a benign clinical condition with a favorable prognosis, however, the phenomenon itself can be a cause of anxiety among patients and their families. For a physician, it is therefore essential to recognize the risks of an underlying UTI and understand the prevention and treatment of the syndrome.

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