Case Report

Purple urine bag syndrome: a case report

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Abstract

Purple urine bag syndrome (PUBS) is a unique disease entity characterized by an alarming purple discoloration of the urine secondary to bacterial urinary tract infection with indigo- and indirubin-producing bacteria. This syndrome occurs particularly in alkaline urine due to reaction of infected urine with catheter tubing or urine bag. Here, we report a case of 60-year-old diabetic woman with neurogenic bladder and acute kidney injury who was diagnosed to be having PUBS.

KEY WORDS: Purple urine bag syndrome, urinary catheter, urinary tract infection

Introduction

Purple urine bag syndrome (PUBS) is a rare disease entity first reported in 1978.[1] In this condition, urine present in urine bag is found to be purple in color. It is usually seen in chronically catheterized, constipated, bedridden elderly women. The phenomenon is known to occur with alkaline urine in patients having urinary tract infection (UTI) with indigo- and indirubin-producing bacteria. This occurs by a series of biochemical reactions when urine infected with these bacterial strains interacts with catheter tubing or urine bag. PUB syndrome is considered to be harmless and does not influence the outcome of patients. It disappears after treatment of UTI and no special investigation is required.[2,3]

Case Report

A 60-year-old elderly female with long standing history of diabetes mellitus, hypertension, coronary artery disease, hypothyroidism, and recent history of ischemic stroke presented with pain abdomen, decreased urine output, decreased appetite associated with nausea and vomiting. Her daily activities were limited and patient was almost bedridden following her neurological illness. She had a significant history of constipation with stool frequency of once every 4–5 days, even with regular use of laxatives. There was no history of fever, chills, burning micturition, and urinary frequency. Past history was significant for type 2 diabetes mellitus of 20 years duration and hypertension of 3 years duration. She had coronary artery disease and was hypothyroid for last 2 years. She suffered from ischemic stroke (left MCA territory) 2 months back and since then she was bedridden. She was catheterized in previous admission, when she was admitted for her neurological illness and subsequently remained catheterized during her hospital stay of 1.5 months. Patient was on insulin, aspirin, beta blocker, ACE inhibitors, statins, and thyroxin.

Physical examination revealed diffuse tenderness on palpation of abdomen and suprapubic dullness. Rest of physical examination was unremarkable and did not reveal any abnormality apart from findings suggestive of long standing diabetes, hypertension, hypothyroidism, and CVA. On basis of history and physical examination, she was suspected to be having acute urinary retention probably due to blockage of indwelling Foleys catheter. Urinary catheter was removed immediately and she was recatheterized with about 1 l urine draining in urine bag. After 2 days of hospital stay, color of the urine in urinary bag was noted to be purple. Notably, when the urine was collected in a glass tube it was not purple in color. Complete urine examination and urine for culture and sensitivity was sent. Patient was empirically started with broad spectrum antibiotics (piperacillin and tazobactum) for gram-negative bacterial infection as per hospital antibiotic policy and sensitivity pattern.

Baseline renal function test were deranged with blood urea of 185 mg/dL and serum creatinine of 5.84 mg/dL. Total leukocyte count was normal. Ultrasonography KUB carried out before recatheterization showed normal-sized kidneys

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with grade 1 increased echogenicity and grade 1 hydronephrosis. Urinary bladder was distended showing echogenic debris in its lumen and bladder volume was 845 cc. The urine analysis showed pH of 7, full field pus cells with albumin 2+ and blood 3+. Urine culture revealed *Klebsiella pneumoniae* that was sensitive to piperacillin and tazobactum.

During antibiotics course, purple color disappeared in urinary bag after 5 days. Urine analysis performed thereafter yielded sterile urine and renal functions started improving. Patient was discharged in stable condition.

Discussion

PUBS is an uncommon phenomenon in which purple discoloration of catheter bag is due to the presence of blue pigment indigo and red pigment indirubin.[2,4] The proposed mechanism for pigment production is through altered metabolism of tryptophan.[5] Owing to altered gut motility or intestinal bacterial overgrowth associated with chronic constipation, tryptophan is exposed to intestinal flora before it can be absorbed. Bacteria deaminate tryptophan to yield indole that is absorbed into portal circulation and converted in liver to indoxyl sulphate after conjugation. Levels of indoxyl sulphate in the urine are usually elevated above the normal range.[2] Urine bacteria with indoxyl sulphatase activity convert indoxyl sulphate into indoxyl. In alkaline environment, indoxyl turns into indigo and indirubin pigments that combine with catheter tubing to give purple appearance.[6] PUBS has been associated with multiple pathogens including *Pseudomonas*, *Morgenella*, *Proteus*, *Providencia*, *Klebsiella*, and *Enterobacter* species.[7,8] Gram-negative bacteria producing phosphatase/sulphatase are important in pathogenesis.[8]

Although PUBS is rare, it is usually observed in chronically constipated and catheterized bedridden elderly patients and predominately affects females. It is a benign condition. Treatment is directed at the underlying UTI by antibiotics as well as control of constipation. Good urologic sanitation by good care and frequent change of urinary catheters may help in preventing this uncommon entity.

Conclusion

PUBS is a benign condition and has a higher incidence in patients who have recurrent UTIs and are catheterized for prolonged duration. Bedridden status, alkaline urine, and chronic constipation are other risk factors. The condition is treated with appropriate antibiotics and resolves once infection is treated. Proper care of urinary catheters and control of constipation are important measures to avoid this condition.

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