Purple Urine Bag Syndrome in a Patient with an Indwelling Suprapubic Catheter

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Introduction

- Purple urine bag syndrome, or PUBS, is a rare occurrence in adults who are chronically catheterized.[1]
- Normal gut flora metabolizes tryptophan into indole, which is absorbed by the liver and further converted to indoxyl sulfate that is then excreted in the urine.[1]
- When indoxyl sulfate is mixed with alkaline urine, it oxidizes and forms indigo and indirubin, giving the urine a purple hue when mixed with the polyvinyl chloride plastic of the catheter bag.[1]
- Common causes of purple urine bag syndrome are Gram-negative bacteria, most commonly *Providencia spp*., *E. coli*, *Proteus spp*., and *Enterococcus spp.*[1]
- Leading risk factors for developing purple urine bag syndrome include chronic constipation and long-term catheterization.[1]
- Most cases of PUBS presents concurrently with alkaline urine. Few cases have been reported with acidic urine, and these patients present with multiple other risk factors.[2]

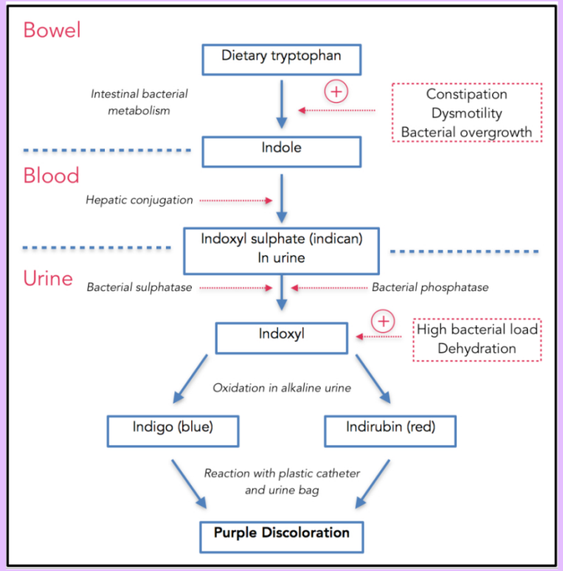

Figure 1: Etiology of Purple Urine Bag Syndrome[7]

History of Present Illness

"My urine is purple!"

- A 63-year-old Caucasian male with a complex past medical history including subdural hematoma with residual right sided hemiparesis requiring long term urinary decompression with a suprapubic catheter which has been complicated by chronic infections presented to the emergency department with abdominal pain and "purple urine"
- He reported that he noticed abdominal discomfort, particularly suprapubic discomfort, and then noticed that his urine had turned to a purple hue
- He denied any prior history of this occurring
- He denied any associated symptoms including no fevers, chills, nausea, vomiting, or flank pain

Physical Exam

General: No acute distress.
Cardiovascular: Tachycardic.
Pulmonary: No accessory muscle use
Abdomen: Soft. Nondistended. Tender to palpation in suprapubic region. No CVA tenderness bilaterally.
Genitourinary: No discharge from urethra. No penile edema or ecchymosis.
MSK: Muscular atrophy in bilateral LE. RUE contracted. Nonedematous..
Skin: Skin is warm and dry.
Foley Catheter:

Diagnostic Testing and Results

CBC, BMP, LFTs WNL

Urinalysis: + pyuria, + bacteriuria; many triple phos crystals noted

Urine Culture: + for *Providencia rettgeri* and *Morganella morganii;* sensitive to sulfamethoxazole-trimethoprim

Medical History

Illnesses

- Aphasia
- BPH with elevated PSA
- Congestive heart failure
- Chronic suprapubic catheter
- Hypertension
- Gastrostomy tube
- GERD
- Hypercholesterolemia
- Hyperlipidemia
- Cardiomyopathy
- Pulmonary embolism
- Subdural hematoma
- Supraventricular tachycardia

Medications

- amantadine HCL
- carvedilol
- sacubitril-valsartan
- atorvastatin
- acetaminophen
- baclofen
- bisacodyl
- citalopram
- melatonin
- metoclopramide
- oxycodone
- polyethylene glycol
- senna-docusate

Surgical History

- Cardiac defibrillator placement
- Colonoscopy
- IVC filter placement
- Left decompressive hemicraniectomy
- Suprapubic catheter placement

Patient Management and Outcome

- Suprapubic catheter immediately changed
- Oral double strength sulfamethoxazole-trimethoprim was initiated for 7 days total
- Educated patient and caregiver on importance of monthly catheter exchange to prevent recurrent infection.

Discussion

- Most associated microorganism isolated in PUBS was *E. coli*.[3]
- Possible misdiagnoses of purple urine include hematuria, hemoglobinuria, myoglobinuria, nephrolithiasis, food dyes, and drug reactions.[4]
- Treatment occurs in 3 steps: treating the UTI, treating the constipation, and sanitization efforts including catheter replacement.[4]
- Fournier's gangrene can be caused by PUBS.[4]
- Non-plastic catheter bags could be an option to prevent PUBS from developing.[4]
- As the population ages, patients continue to develop comorbid conditions, including those that predispose them to PUBS (dementia, constipation, renal failure).[5]
- PUBS can result even with absence of fever or dysuria.[6]
- The Oxford Urine Chart illustrates the different causes of each color that may be seen. On this chart, PUBS is the only cause for a purple hue listed.[3]
- Antibiotic stewardship is even more necessary to prevent resistant infections.[5]
- While constipation can be a risk factor for PUBS, laxatives or suppositories can be damaging to the gut mucosa.[5]
- Chronic kidney disease can lead to uremia, which provides a better environment for indican to be derived. Transit of urine also is slowed in CKD, leading to more concentrated urine with indican in it.[5]

Figure 2: Oxford Urine Chart[4]

Conclusion

- Purple urine bag syndrome can be managed by changing urinary catheters and the administration of appropriate antibiotics.
- Standard warning factors for UTIs may be absent in PUBS due to catheter use, making it harder to identify with history taking and physical exam.
- Important risk factors to be aware of include alkaline urine, constipation, being bedridden or having reduced mobility, female gender, and chronic catheterization.

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