

Photo Quiz: Purple Urine Bag Syndrome

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COMMENTARY

An 83-year-old white male with past medical history of cerebrovascular accident, urinary incontinence with indwelling Foley catheter, atrial fibrillation, hyperlipidemia, systolic cardiomyopathy was brought by family for purple discoloration of Foley tubing and urinary bag for last 2 days (Figure 1). Patient complained of malaise and mild constipation. He had no history of trauma to the catheter. He denied fever, chills or dysuria. Physical examination was unremarkable with no suprapubic tenderness.



Figure 1) Purple urine bag

QUESTION

Based on the patient's history and physical examination findings, which one of the following treatment options for purple urine is most appropriate?

- A) Evaluate patient for rhabdomyolysis.
- B) Refer patient to urologist for cystoscopic evaluation to rule out bladder malignancy.

C) No further intervention required.

D) Evaluate patient for underlying liver disease.

E) Patient needs Foley catheter change along with treatment of urinary tract infection (UTI).

ANSWER: E

DISCUSSION

Change of Foley catheter and treatment of underlying urinary tract infection form the mainstay of treatment of Purple Urine Bag Syndrome (PUBS). It is an interesting but unusual presentation of UTI [1,2]. Proposed risk factors include old age, chronic indwelling Foley catheter, high bacterial load in the urinary tract, an alkaline urine environment, constipation, female gender, renal failure and a diet rich in tryptophan. The gastrointestinal tract bacterial flora deaminates dietary tryptophan to produce indole. Indole undergoes hepatic conjugation to indoxyl sulphate. This is secreted into urine where bacterial enzymes convert it to indoxyl. In alkaline urine, indoxyl is oxidized to indigo (a blue pigment) and indirubin (a red pigment). These pigments combine causing striking purple staining of the catheter tubing and urinary bag [1].

Table 1 Differential diagnosis of discoloured urine.

Color	Common associated medical conditions
Purple	Purple Urine Bag Syndrome
Red	Nephrolithiasis, malignancy, trauma, renal disease, rifampin
Orange	Liver disease, dehydration, UTI, isoniazid, phenazopyridine
Black (Cola)	Rhabdomyolysis, iron, metastatic melanoma, porphyria
Amber	Dehydration
White	Chyluria, urinary TB, lymphatic fistula, filariasis
Blue-green	Methylene blue, propofol, pseudomonas UTI, food dye
Dark yellow	Normal-possible dehydration
Clear yellow	Normal

There are several bacteria, mostly Gram negative, which are associated with PUBS. These include *Providencia stuartii* and *Providencia mirabilis*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, *Escherichia coli*, *Morganella Morgagni*, Group B *Streptococci*, *Enterococcus* and *Citrobacter* species [3]. Elderly and debilitated patients with multiple comorbidities more often require long-term indwelling catheters which increases their risk of UTIs.

PUBS is an important clinical sign of UTI especially in elderly patients with dementia who have limitation in their ability to communicate and

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may not have typical symptoms of fever, chills and dysuria. It is important to manage PUBS as it is associated with high morbidity and mortality. Left untreated, PUBS can potentially progress to sepsis. Persistent PUBS can even lead to Fournier's gangrene which requires surgical debridement.

Good urologic sanitation, changing long term catheters and urinary bag on regular basis, treatment of UTI and underlying constipation if any are important steps in management and prevention of PUBS [1-3]. Table 1 lists the common medical conditions associated with discolored urine [4].

Rhabdomyolysis is typically associated with tea colored or cola colored urine. Urine dipstick test typically shows positive urine blood with no red blood cells. Underlying bladder malignancy can present with microscopic or frank hematuria which can cause red urine. Liver disease with associated cholestasis is typically associated with dark or orange colored urine [1].

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