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CASE REPORT OPEN ACCESS

Purple urine bag syndrome in catheter associated urinary tract infection: A case report

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Abstract

Purple urine bag syndrome (PUBS) occurs in catheterized patients with bacterial urinary infections that produce sulphatase/phosphatase. The presence of indigo and indirubin pigments, which are tryptophan metabolites, causes the purple coloring. After antibiotic therapy, the purple colour reverts to normal. We present a case report of unusual phenomenon occurring in a 60-year-old woman with carcinoma cervix. She did not have fever, constipation or a history of medication administration. She presented with purple urine in her indwelling long term supra-pubic catheter bag and sought a consultation with an urologist because the urine in her urine bag had changed color to purple. Awareness about PUBS will prevent unnecessary investigation and over treatment.

Keywords: purple urine bag syndrome; urinary tract infection; indigo and antibiotic therapy

Introduction

The purple urine bag syndrome (PUBS) is a rare condition marked by the purple staining of an indwelling urinary catheter and other symptoms. While it was initially described by Dickson and Barlow in 1978, there is a report from 1812, of the urine of King George III being purplish-blue in color [1].

A PUBS is due to bacteria that convert tryptophan into indigo and indirubin and is linked to urinary tract infection [1, 2]. The purple coloring disappears after the infection is treated and the catheter is replaced [3]. Older patients, female's patients in long-term care facilities, constipation, and alkaline urine are all established risk factors (Table 1) [2, 4].

Table 1: Risk factors for catheter associated urinary tract infection (UTI).

Prolonged catheterization
Female gender
Catheter insertion outside operating room
Other active sites of infection
Diabetes
Malnutrition
Azotemia (creatinine >2.0 mg/dl)
Ureteral stent
Antimicrobial drug therapy

Intestinal bacteria convert dietary tryptophan to indole, which is found in foods such as red meat, poultry, seafood, eggs, beans, and oats. Intestinal bacteria metabolize it and produce indole. Indole is subsequently transported to the liver and conjugated to indoxyl sulphate, which is excreted in the urine and converted to indoxyl by sulphatases and phosphatases generated by bacteria [5, 6] (Figure 1). Patients and family members can be trained to avoid over treatment by recognizing and treating symptoms early [7]. We describe the case of PUBS in an elderly woman on suprapubic catheter.

Case report

A 60-year-old lady with relapsed squamous cell carcinoma cervix stage IV, post chemotherapy and

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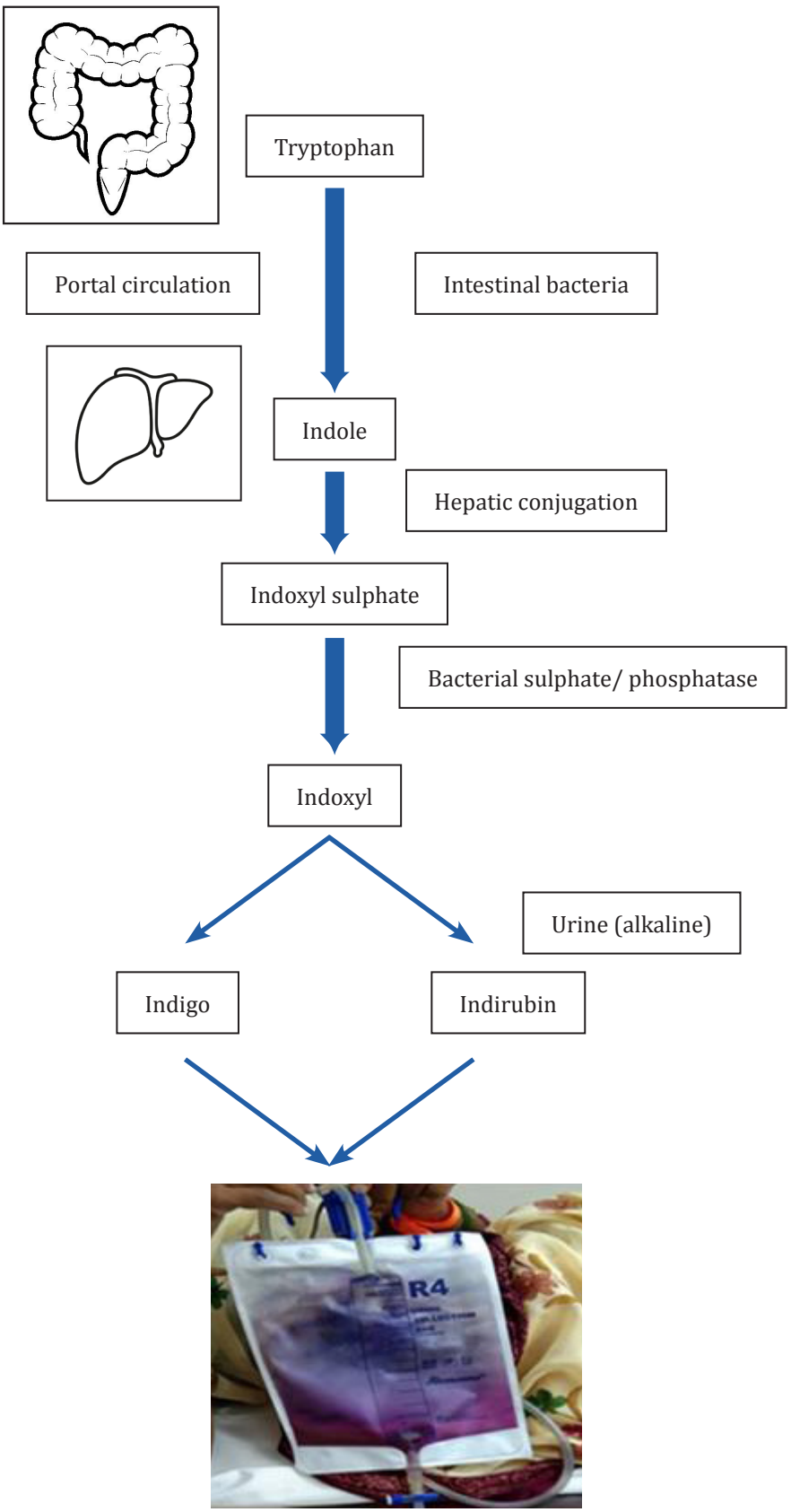

Figure 1: Pathogen of purple urine bag syndrome.

post radiotherapy had local recurrence in the pelvic floor with meatal involvement. She had suprapubic catheterization (SPC) for the urethral involvement with bladder outlet obstruction about a year back. She did not have fever, constipation or a history of medication administration. She had purple urine in her urobag which was persistent and recurred even after changing the bag (Figure 2).

Figure 2: Purple urine bag.

This discoloration was first noticed by her son at home approximately one day before the hospital consultation. The patient had a 20-Fr SPC *in situ*.

There were no abnormalities observed upon physical examination. Laboratory tests, including complete blood picture, and electrolyte levels, with other test results within normal limits. The urine culture showed significant growth of *Escherichia coli*, which was sensitive only to meropenem and amikacin. She was prescribed inj. meropenem 1000 mg IV twice daily for 7 days after which the purple urine color vanished and the urine became clear. Repeat urine culture showed no growth. Further antibiotics were not prescribed.

Discussion

Purple urine bag syndrome is caused by a urinary tract infection by bacteria that metabolize tryptophan metabolites to produce red and blue pigments [6]. The widely recognized PUBS hypothesis involves a series of responses that begin with the ingestion of tryptophan in the diet [7]. Long-term catheterization, urinary tract infection, and elevated tryptophan levels in the gut due to intestinal stasis or food consumption are all possible causes of PUBS.

Purple urine bag syndrome is associated with female gender, increased dietary tryptophan, increased urine alkalinity, severe constipation, prolonged catheterization, high urinary bacterial load, and renal failure [8]. These two pigments react with the polyvinyl chloride (PVC) in the tubing and urine bag, resulting in a purplish color in the urine. Common pathogens of PUBS include indoxyl sulfatase- and phosphatase-producing bacteria such as *Escherichia coli, Proteus* spp., *Klebsiella pneumoniae, Providencia* spp., *Pseudomonas* spp., *Morganella* spp., *Enterococcus* spp., and *Citrobacter* spp. [9]. Despite the fact that the illness is easily detected and treated, it is nevertheless a neglected entity, implying a significant underlying pathology

Good catheter care and providing information to the patient and family about the nature and history of the problem is important [6, 10]. Although PUBS is normally a harmless condition, it can cause considerable morbidity as a result of urinary tract infections. The formation of a biofilm around the indwelling catheter, predisposing the patient to the condition [11].

Despite the fact that UTI is a risk factor and colonization in patients with long term indwelling catheter is common PUBS remains relatively rare [12]. This is attributable to a number of factors: Only when a certain amount of precipitation has been achieved will the purple discoloration become noticeable. The pH of the urine is also important, as alkalinity aids the discoloration process. However, PUBS has also been reported in patients without Indic anuria and acidic urine as well [13]. To increase the accuracy of urine culture results and remove the biofilm holding germs, the catheter should be changed before collecting urine.

Conclusion

Awareness about PUBS will prevent unnecessary investigation and over treatment. Good catheter care and education of patients with long term indwelling catheters is imperative for improved patient care. Obtaining a properly collected sample for urine culture is necessary for specific treatment. Empirical broad spectrum antibiotic therapy should be avoided.

Conflicts of interest

Authors declare no conflicts of interest.

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