

Purple Urine Bag Syndrome: A rare manifestation of Catheter Associated Urinary Tract Infection

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Abstract

Purple Urine Bag Syndrome (PUBS) is an infrequent manifestation associated with urinary tract infection in patients with long term catheterisation where the catheter bag and tubing turn a striking purple colour. It is a benign phenomenon but alarming for the patients, families and healthcare providers. We present a case report of this rare phenomenon occurring in an asymptomatic 83 year old lady, who was brought in for consultation at the Geriatric clinic.

Keywords: Purple urine bag syndrome, Urinary tract infection, Geriatric

Introduction

Urine discolouration is a very common clinical sign encountered in daily clinical practice especially in patients on long term catheterisation [1]. Purple discolouration of the urine, though, is uncommon and usually seen in women and chronically debilitated patients with long term urinary catheters [2].

This phenomenon is due to the presence of indigo (a blue pigment) and indirubin (a red pigment) in the collected urine [3,4]. PUBS was first reported in 1978 [5]. Some academics would argue that PUBS was reported even earlier historically as an observation in Sir Henry Halford's bulletin in 1811 [6]. Despite being rarely reported, it's prevalence has been seen to be as common as 9.8% in institutionalized patients with long term urinary catheterisation [1,7,8,9].

Case Report

An 83 year old lady, pre-morbidly chair-bound and requiring assistance in all basic activities of daily living, with a background of dementia, hypertension, hyperlipidaemia, diabetes mellitus complicated by nephropathy and chronic constipation, was brought in for a consultation at the geriatric clinic. She was on a long term urinary catheter for detrusor hypotonia and the family noted that her urine appeared dark and blackish for the past 3 days. There was no associated complaint of fever or abdominal discomfort.

She was afebrile and haemodynamically stable. With the exception of a purple stained urine bag and tubing (See Figure 1), physical examination was unremarkable.



Figure 1

Urine sent for routine examination and microscopy showed RBC (red blood cell) – 5, WBC (white blood cell) – 38, nitrite – positive, esterase – positive, pH – 7.5. Urine culture revealed 10^5 colony-forming units or more per millilitre for both *Klebsiella pneumoniae* and *Proteus* species. After discussion with the microbiologist, antibiotics were not prescribed as the patient was asymptomatic and otherwise well. Both the urinary catheter and bag were changed; catheter care and perineal hygiene advice were reinforced. At the clinic review a month later, the patient remained well and there was no further discolouration of her urine.

Discussion

PUBS is a consequence of urinary tract infection (UTI) with certain bacteria which metabolise the products of tryptophan to produce red and blue pigments [10].

The generally accepted hypothesis of PUBS involves a sequence of reactions beginning with the dietary intake of tryptophan [1]. Dietary tryptophan, common in foods like red meat, chicken, fish, eggs, beans and oats, is metabolised by intestinal bacteria producing indole. Indole is then transported to the liver and conjugated to indoxyl sulphate, which is secreted into urine where sulphatases and phosphatases, produced by certain bacteria, convert it to indoxyl [1,10]. Upon further substrate oxidation in the urine, particularly in alkaline urine, indoxyl is degraded to form indigo (a blue pigment) and indirubin (a red pigment), the mixture of which results in purple discolouration of the urine bag [1,3,10-12].

Numerous bacteria species have been reported in association with PUBS including *Providencia stuartii*, *Providencia rettgeri*, *Klebsiella pneumoniae*, *Proteus species*, *Escherichia coli*, *Enterococcus species*, *Morganellamorganii* and *Pseudomonas aeruginosa* [2,11,13]. It is important to note that not all bacteria of the same species can cause PUBS and that is the reason it is so rare [7,10].

Established risk factors associated with PUBS include female gender, long term urinary catheterisation, alkaline urine, chronic constipation, high dietary tryptophan, renal failure and the use of a polyvinylchloride(PVC) plastic catheter [2,7,10].

PUBS has also been reported to be associated with cognitive impairment, old age, dependency and institutionalization [3,9,12,14,15].

Although our patient is cared for at home, she has a history of recurrent urinary tract infections, chronic constipation, renal impairment, dementia and have significant functional impairment. Her meals consisted mainly of fish, eggs and oats and that would have resulted in higher levels of dietary tryptophan.

PUBS is distressing for the patient, family and health providers who are oblivious of this phenomenon and tend to become unusually alarmed by the sudden discolouration of the urine in the urine bag and tubing [2].

Good catheter care, management of constipation and the provision of information on the nature and course of the condition to the patient and family, constitute acceptable treatment for PUBS [9,10]. Antibiotic therapy is considered if the patient has symptoms suggestive of an acute urinary tract infection [9].

Our patient exhibited no such symptoms and therefore, antibiotics were not prescribed. She was managed with a catheter change, reinforcement on proper urological sanitation, control of constipation and dietary advice [12].

Although PUBS is generally a benign process, some cases have been reported to be associated with significant morbidity and mortality, as a consequence of urinary tract infections. It is imperative that healthcare providers are aware of the association and institute aggressive treatment where appropriate [10,12].

Conclusion

PUBS is a unique phenomenon in patients on chronic catheterisation and recurrent urinary tract infections [2]. It is usually considered harmless but there have been reports of associated alarming complications [7]. There are currently no established guidelines

on treatment of asymptomatic PUBS and management will need to be tailored according to patient circumstances [7,10,12].

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