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Purple Urine Bag Syndrome (PUBS) in a Patient with a Chronic Indwelling Foley

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Abstract:

Purple urine bag syndrome (PUBS) is a rare medical condition characterized by the appearance of purple discoloration in the urine collection bag of patients who use catheters for urinary drainage. PUBS is primarily seen in elderly, female, and institutionalized patients who have chronic indwelling catheters. The discoloration occurs due to the presence of certain bacteria that produce pigments, which react with the plastic materials of the catheter and urine collection bag, leading to the formation of a purple color. In addition to the aesthetic concerns, PUBS may also indicate an underlying urinary tract infection or other medical conditions that require immediate attention. This case report provides an overview of PUBS, including its etiology, pathogenesis, clinical manifestations, and management.

Introduction:

Purple urine bag syndrome (PUBS) is rare disease entity, occurs predominantly in constipated women, chronically catheterized and associated with bacterial urinary infections that produce sulphatase/phosphatase.[1] The etiology is due to indigo (blue) and indirubin (red) or to their mixture that becomes purple.[1] This change in gastrointestinal flora allow dietary tryptophan to be metabolized to indole, which is subsequently metabolized to indoxyl sulphate in the liver. [2] This compound is then excreted in the urine where the bacteria causing the infection catalyze the conversion of indoxyl sulphate into indoxyl.[2] In alkaline environments, the indoxyl is then further converted to the pigmented compounds indigo blue and indirubin, which combine to contribute to the purple discoloration.[2] Bacteria commonly grown in the urine culture of patients with PUBS include Escherichia coli, Proteus mirabilis, Klebsiella pneumoniae, Enterococcus species, Pseudomonas aeruginosa, Citrobacter species, and several others.[2]

Case Presentation:

A 46-year-old female with a history of cerebral palsy, chronic urinary tract infections, breast cancer with mastectomy, deep vein thrombosis, and osteomyelitis presented to the emergency department with complaints of a blocked foley catheter. The patient reported noticing leakage around the catheter on Friday and observed a purple discoloration in the catheter bag over the weekend. The patient had a prior history of klebsiella on urinary cultures and was scheduled for a catheter replacement on March 23, 2023.

Upon arrival, the patient's vital signs were stable, with a blood pressure of 159/83, heart rate of 79 beats per minute, temperature of 97.9°F, respiratory rate of 18, and SPO2 of 98% on room air. The patient's BMI was 22.71 kg/m².

Physical examination revealed a non-toxic, well-appearing female with an indwelling Foley catheter. The tubing was discolored with white sediment crystals, likely the cause of the obstruction, as well as a purple film lining the tubing. The entire Foley bag was filled with purple-colored urine. The patient had no significant social history, and her medication list did not appear to be causative of the discoloration.

The patient's lab results revealed mild leukocytosis with predominant neutrophils at 83.6%. The urine was brown in color and cloudy, with a specific gravity of 1.012 and pH of 7. It showed 2+ proteinuria, negative for glucose and bilirubin, and had one plus ketones and 3+ blood. The urine was nitrate negative, had a normal amount of urobilinogen, and showed 3+ leukocyte esterase with greater than 182 white and red blood cells on microscopy. Microscopy also revealed clumped white blood cells and moderate bacteria, as well as budding yeast on mycology. The urine culture grew over 100,000 colonies of E. coli and 50,000-99,000 colonies of mixed gram-positive and gram-negative flora, susceptible to ceftriaxone. The patient was eventually discharged with a prescription for Bactrim to be taken for seven days.

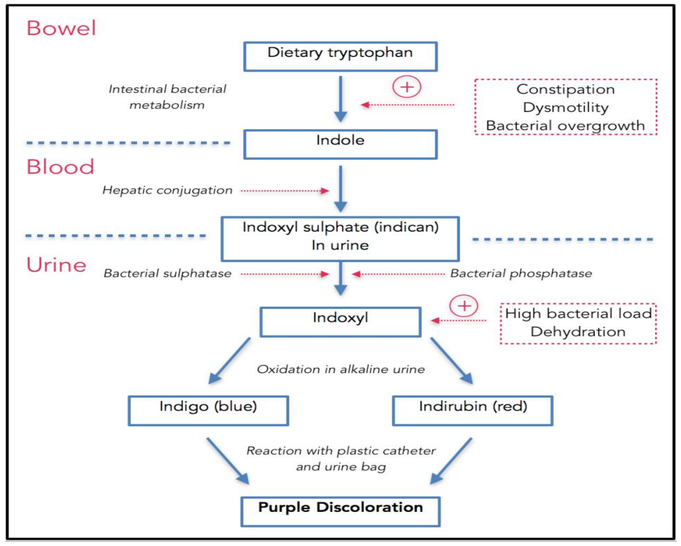

Figure 1: Metabolic Pathways of Purple Urine Bag Syndrome: Purple Urine Bag Syndrome: A Rare and Interesting Phenomenon. South Med J. 2007;100(10):1048-1050. [2,6]

Figure 2: Patient's urine in bag

Discussion:

Purple urine bag syndrome (PUBS) is a rare but potentially serious clinical entity characterized by the purple or blue discoloration of the urine in patients with long-term indwelling urinary catheters. Although relatively benign and easily treatable, it can be associated with significant morbidity and mortality. [1] The present case report describes a 46-year-old female with a history of cerebral palsy and chronic indwelling foley who developed PUBS secondary to a urinary out for obstruction. A urine culture showed the presence of E.Coli , a well-known sulphatase and phosphatase producing bacterium. Both Escherichia coli (E. coli) and the Enterococcus family can cause PUBS. The causative bacteria produce sulphatases and phosphatases, which through tryptophan metabolism results in the formation of indigo and indirubin pigments that, in combination, exhibit purple color.[4] One of the reasons for the occurrence of PUBS is the increased concentration of bacteria in the urine as the result of urinary outflow obstruction. [4] Treatment is directed at the underlying UTI as well as control of constipation and good urologic sanitation. Good care of the urinary catheters will prevent UTIs and hence this phenomenon as well.[5] In conclusion, PUBS is a rare but potentially serious clinical entity that can occur in patients with long-term indwelling urinary catheters. The pathophysiology of PUBS is complex and multifactorial, involving bacterial colonization, urease production, and other contributing factors. Early identification and prompt management of PUBS are essential to prevent complications and improve outcomes.

Conclusions:

Purple Urine Bag Syndrome (PUBS) is an important condition that healthcare professionals should be knowledgeable about due to its alarming presentation. Although a rare phenomenon, it can cause significant anxiety for both patients and treatment teams, leading to unnecessary workup and treatment. By being aware of this condition and its causes, healthcare professionals can effectively manage patients with PUBS, reduce the need for additional testing, and provide reassurance to patients and their families. Early identification and appropriate management of PUBS can significantly improve patient outcomes, decrease healthcare costs, and enhance the overall quality of care provided to patients.

References:

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3.Metabolic Pathways of Purple Urine Bag Syndrome: Adopted from chart originally published in Purple Urine Bag Syndrome: A Rare and Interesting Phenomenon. South Med J. 2007;100(10):1048-1050. (Image 1)

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