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Case Report

Surgery Section

Purple Urine Bag Syndrome- An Alarming Situation

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ABSTRACT

Purple urine bag syndrome (PUBS) is an uncommon condition that occurs mainly in chronically catheterized patient and associated with urinary tract infection. It is characterised by purple discolouration of urine bag which leads to significant stress and anxiety to patient, care takers and health workers, so awareness regarding this condition is of utmost importance. In our report, an old gentleman with Benign Prostate Hyperplasia (BPH) on per urethral catheter (PUC) with past history of recurrent urinary tract infection developed burning micturition of urine with purple discoloration of urine bag. After proper antibiotic and catheter changed, discoloration subsided. In India, as life expectancy and geriatric care is improving, more patients are on PUC for various diseases. So, the incidence of PUBS will increase and awareness is required about the condition and its management.

Keywords: Indirubin, Urinary catheterisation, Urinary tract Infections

CASE REPORT

A 76-year-old male patient with a diagnosis of benign prostate hyperplasia on per urethral catheter (PUC) came to emergency with purple discoloration of urine bag and catheter since 4 days [Table/Fig-1]. He had a history of burning micturition for 8 days but not associated with any fever, abdominal pain, constipation, vomiting or any features suggesting of systemic infection. Genitalia examination was normal. Patient had a past history of recurrent urinary tract infections.

Urine analysis showed alkaline urine (pH-7.6) with 20-30 white blood cells/high-power-field. Patient was started on oral nitrofurantoin, empirically. PUC was changed. Urine culture report showed *Escherichia coli* and growth was greater than 10^5/mL. So the antibiotic was tailored according to culture sensitivity to injection ceftriaxone 1gm intravenous twice daily. After this, the purple discolouration of urine bag disappeared and following urine culture came out be sterile. Patient and his care takers were anxious about the condition. So, counselling and reassurance about the harmless nature of discoloration was done at the time of discharge.

[Table/Fig-1]: Purple discoloration of urine bag

DISCUSSION

Purple urine bag syndrome (PUBS) is yet an unusual condition but distressing for the patient and family members. It was first reported in 1978, usually in females with long term indwelling urinary catheter where urine colour turns purple [1]. Recurrent urinary tract infections (UTI) by the bacteria containing enzymes like sulphatase and phosphatase, results in the formation of pigments, indirubin (red) and indigo (blue). The mixture of these pigments lead to discoloration of urine colour to purple [2].

PUBS are an uncommon manifestation of urinary tract infection but the prevalence is increasing now-a-days [3]. It is associated with the female gender, alkaline urine, constipation, UTI, chronic kidney disease, dementia and use of polyvinyl chloride urinary catheter and bag [4].

The common organisms responsible for UTI are *Providencia stuartti, Providenci rettgeri, Escherichia coli, Proteus mirabilis, Klebsiella pneumoniae*, *Pseudomonas auruginosa*, *Morganella, Enterococci*, and Group B *Streptococci*. Literature has shown that purple discoloration of urine is due to mixture of indigo and indirubin which are derived after deamination of tryptophan to indole that is absorbed into portal circulation. Indole is converted to indoxyl sulphate by hepatic conjugation and indoxyl sulphate is converted into indoxyl by indoxyl sulphatase enzyme produced by gut bacteria. The oxidation of indoxyl leads to formation of indigo (blue colour) and indirubin (red colour) in the urine and mixture of these colours impart a purple discolouration of urine [5,6].

Higher bacterial load facilitates the development of PUBS. Chronic constipation is usually associated with bacterial overgrowth in the colon which increases the likelihood of conversion of tryptophan into indole. Similarly, PUC associated UTI increases the conversion of indoxyl sulphate into indoxyl. So, PUBS is likely to observe in chronically catheterized and constipated individuals [6,7].

It is worth to note that despite of common occurrence of UTI in patients with risk factors for PUBS, this entity is not frequent in all patients of UTI. It could be due to simultaneous presence of

multiple factors organism producing sulphatase and phosphatase enzyme, chronically catheterised or constipated patients, intake of diet rich in tryptophan.

Studies showed that not all organisms of the same species produce the phosphatase and sulphatase enzymes [7]. Moreover, a specific concentration of the pigments may be required for discoloration to become visible.

It has been seen that PUBS had progressed to Fournier's gangrene in immunosuppressed patients and rates of morbidity and mortality increased [8]. Moreover in patients of chronic kidney disease (CKD) with PUBS, removal of Indoxyl sulphate during dialysis is limited as it is bound to albumin and which leads to exponential increase in serum indoxyl sulphate concentration. So when treating patients of CKD with PUBS, clinicians must always keep in mind about increased serum and urinary concentration of indoxyl sulphate, and that this uremic toxin is not only involved in the progression of CKD, but also leads to cardiovascular disease [9].

CONCLUSION

In India, as life expectancy and geriatric care is improving, more patients are on PUC for various diseases and the incidence of PUBS will increase. The condition is distressing to patient, family, and health care providers due to unawareness of this phenomenon and they usually become anxious by the discolouration of urine bag. So, clinician should be well verse with the condition and its treatment and can counsel the patient and family members about the disease and how to prevent it. Moreover, clinician should have in mind about its association with significant morbidity and mortality, if PUBS is associated with chronic kidney disease or in immunosuppressed patients.

REFERENCES

[1] Barlow GB, Dickson JAS. Purple urine bags. *The Lancet*. 1978;28:220–21.
[2] Khan F, Chaudhry MA, Qureshi N, Cowley B. Purple urine bag syndrome: An alarming hue? A brief review of the literature. *Int J Nephrol*. 2011;2011:419213.
[3] Abubacker NRT, Jayaraman SMT, Kannan R, Sivanesan MK, Mathew R. Purple Urine Bag Syndome. *J Clin Diagn Res*. 2015;9(8):OD01-OD02.
[4] Stanfel LA, Gulyassy PF, Jarrard EA. Determination of indoxyl sulfate in plasma of patients with renal failure by use of ion-pairing liquid chromatography. *Clin Chem*. 1986;32:938-42.
[5] Su FH, Chung SY, Chen MH, Sheng ML, Chen CH, Chen YJ, et al. Case analysis of purple urine-bag syndrome at a long-term care service in a community hospital. *Chang Gung Med J*. 2005;28:636-42.
[6] Lin HH, Li SJ, Su KB, Wu LS. Purple urine bag syndrome: A Case Report and Review of the Literature. *J Intern Med Taiwan*. 2002;13:209-12.
[7] Dealler SF, Hawkey PM, Millar MR. Enzymatic degradation of urinary indoxyl sulfate by Providencia stuartii and Klebsiella pneumoniae causes the purple urine bag syndrome. *J Clin Microbiol*. 1988;26:2152-56.
[8] Tasi YM, Huang MS, Yang CJ, Yeh SM, Liu CC. Purple urine bag syndrome, not always a benign process. *The American Journal of Emergency Medicine*. 2009;27:895-97.
[9] Delgado G, Resendez MM, Ortiz AC. Purple urine bag syndrome in end-stage chronic kidney disease. *J Bras Nefrol*. 2014;36:542-44.

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