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Case Report

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Purple urine bag syndrome

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ABSTRACT

Purple bag syndrome (PUBS) is a rare condition in which urine color appears purple in the urobag. Purple coloured urine occurs due to the accumulation of indigo and indirubin, which are the end products of tryptophan metabolism due to the action of sulfatases and phosphatases formed by bacteria like *Providencia*, *Citrobacter*, *Enterobacter*, *Klebsiella* etc. We present this interesting phenomenon of purple urine in a female who was on prolonged urinary catheterization. The urine culture was positive for *Klebsiella oxytoca*.

Keywords: Purple urine, *Klebsiella*, Tryptophan

INTRODUCTION

Purple bag syndrome (PUBS) is a rare condition in which the urine collected in the urobag appears purple in colour due to the presence of indirubin and indigo in urine. Because of bowel stasis, tryptophan accumulates in the body which leads an increase in urinary indoxyl sulphate. In the presence of indoxyl phosphatase and sulphatase enzyme activities, which collected in urine, urinary indoxyl sulphate is degraded to form indigo and dissolved indirubin in urobag which gives a purple

appearance. The common risk factors are old age, females, constipation, alkaline urine and usage of plastic urinary catheters.

CASE REPORT

A 67 year old female patient presented with chief complaints of generalized weakness, urinary incontinence and giddiness. She gave a history of constipation for the past one week. She was a known diabetic and cerebro-vascular accident resulting in right hemiplegia and disability. There

was no history of associated fever, abdominal pain, vomiting or loss of weight. She had no history of previous urinary problems. On examination, she was comfortable and haemodynamically stable. Systemic examination was normal. Neurological examination revealed weakness of right upper limb and lower limb. The urine in the bag was strikingly purple in colour [Figure 1].

Urine examination showed 14 to 16 pus cells/HPF with no RBC's. Urine analysis for

glucose and albumin was negative. Her renal function test was found to be normal. Urine culture revealed the presence of klebsiella oxytoca which was sensitive for piperacillin - tazobactam. She was started on the same for a period of seven days and urinary catheter was also changed. After treatment with antibiotics as well as change of the urinary catheter, the purple urine returned to its normal colour.



Figure 1- Urinary bag showing purple coloured urine

DISCUSSION

Purple urine bag syndrome (PUBS) is a rare condition which was first observed by Barlow and Dickson where the urine attains a purple color [1]. It is commonly seen in elderly women, who have been catheterized for a long time [2]. Constipation and usage of plastic urinary bags for bladder catheterization are the usual predisposing factors [3]. Dehydration, alkaline urine and constipation together greatly increase the risk of PUBS. The pathology behind PUBS is the accumulation of the metabolites of tryptophan in urine. Dietary tryptophan is normally metabolized to indole by the bacteria present in the gastro intestinal tract. Indole is converted to indole sulfate in the liver. Certain bacteria in the urine possess enzymes like indole sulfatase and indole phosphatase which have the ability to metabolize indole sulfate. The presence of these bacteria in the intestinal tract favors the metabolism of indole sulfate, resulting in the formation of indirubin (red) and indigo (blue). These metabolites then concentrate in the plastic tubing and the catheter producing an intense purple

colour [4], giving rise to the purple urine bag syndrome

Constipation plays an important role in leading to PUBS as it interferes with the gut motility leading to the alteration of the intestinal bacterial flora. PUBS have been even reported in patients with intussusceptions [5]. This along with dehydration and alkaline urine greatly increases the risk of developing PUBS. Our patient was on a urinary catheter for a long period with a history of constipation, which contributed to the development of purple colored urine. The urine culture report of our patient was positive for *Klebsiella oxytoca* which was sensitive to piperacillin-tazobactam.

Except for the alarming nature of the purple colour of the urine, the patients with PUBS are usually asymptomatic. [6] Symptoms like fever, abdominal pain and other features of urinary tract infection are present in only a minority of patients [7]. PUBS was detected incidentally in our patient and she was asymptomatic without any complications which is concurrent with the reported cases. Complete urine examination with

culture and sensitivity are the usual investigations required for these patients. Blood investigations are generally not contributory. Numerous organisms have been associated with this syndrome, notable being *Providencia*, *Citrobacter*, *Enterobacter*, *Klebsiella*, *Morganella*, *Staphylococcus* and *Streptococcus*. As this condition is asymptomatic and usually does not lead to complications, some authors have evolved a consensus that change of the urinary catheters and the bags are sufficient enough to solve the problem [8]. Antibiotics may be prescribed based on the culture and sensitivity of the urine. Treatment of the underlying medical problem is of paramount importance including frequent change of the indwelling urinary catheter. A similar case of PUBS caused by *Providencia* was reported by Rizwan et al [9]. Measures should also

be taken to correct dehydration and relieve the constipation. Antibiotics and change of urinary catheter relieved the purple urine in our patient and she improved symptomatically.

CONCLUSION

Purple urine bag syndrome is a rare and interesting condition which is increasingly seen nowadays. PUBS is a benign condition and patients are usually asymptomatic. The purple urine alerts the patient for treatment though it remains a harmless condition. Our patient was an elderly female with constipation. Simple measures like antibiotics, changing urine bags and catheters are sufficient to solve the problem in most of the cases.

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