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CASE REPORT

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# Purple urine bag syndrome in a young man with paraplegia in Bhutan: a case report

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**ABSTRACT**

Purple urine bag syndrome is an uncommon clinical phenomenon characterized by purple discolouration of the urinary catheter bag. It typically affects elderly, immobilized, and co-morbid patients on long-term urinary catheters. The purple discolouration is due to the production and mixing of pigments indirubin and indigo in the presence of bacteria in the urine. While often benign and asymptomatic, it can signal an underlying urinary tract infection and has been associated with severe complications. We present the case of a 20-year-old man with paraplegia on a permanent suprapubic catheter, who developed purple urine bag syndrome accompanied by systemic signs of infection. His urine culture identified *Staphylococcus aureus*, an organism not frequently associated with the condition. The patient achieved full recovery with no recurrence during follow-up. Healthcare providers need to be aware of this condition to ensure timely recognition, assessment, and appropriate management.

**Keywords:** *Purple urine bag syndrome; Staphylococcus aureus; Urinary catheter; Urinary tract infection.*

## INTRODUCTION

Purple Urine Bag Syndrome (PUBS) is an intriguing and uncommon clinical occurrence where the urinary catheter bag and tubing acquire a purple discolouration. The urine itself is not always noted to be purple[1]. It results from a series of reactions starting with dietary tryptophan and enzymes produced by bacteria in the urine[2]. PUBS itself is benign but can be a manifestation of an underlying urinary tract infection[3]. It predominantly affects comorbid elderly patients with long-term urinary catheters who are immobilized, institutionalized, and chronically constipated[1,4].

It can cause anxiety in patients and caregivers[1,3]. The diagnosis can be missed by unsuspecting healthcare providers[5]. We present the first reported case of PUBS in Bhutan to increase awareness among our healthcare providers. The patient presented to Phuntsholing Hospital but, as per his preference, was admitted to Gedu Hospital for treatment in December 2025.

## PATIENT INFORMATION

A 20-year-old male with paraplegia presented with a one-day history of fever associated with chills, rigor, vomiting, malaise, and poor oral intake. His caregivers were concerned about the sudden purplish discolouration of his urine bag, noted on the morning of presentation. The patient had not used any medications, including traditional remedies, prior to presentation. Despite reporting recent bowel movements upon presentation, the patient had a history of intermittent constipation.

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His paraparesis dates back to 2021 when he was diagnosed with an intramedullary spinal tumour extending from T8 to T12. Histopathological examination identified ganglioglioma, pilocytic astrocytoma, and diffuse midline glioma as differential diagnoses, with further immunohistochemistry required for confirmation. However, COVID-19-related travel restrictions prevented his referral abroad for further management, and he was subsequently lost to specialist follow-up.

Since 2021, the patient has been wheelchair-dependent and on a suprapubic urinary catheter. The catheter is replaced every four weeks, with the most recent change being one week prior to presentation.

## CLINICAL FINDINGS

On examination, he appeared ill but was conscious and oriented. His temperature was 37.4 degrees Celsius; pulse rate was 128 beats per minute; blood pressure was 141/90 mmHg. The abdominal examination revealed no tenderness. Respiratory and cardiovascular examinations were unremarkable. Neurological examination of the lower limbs revealed muscle wasting, joint contractures, and paraplegia with sensory level at T12. Both the urine bag and the drainage tube showed purple discolouration (Figure 1). However, the urine itself was dark red.

## DIAGNOSTIC ASSESSMENT

Laboratory investigations revealed neutrophilic leukocytosis with an elevated C-reactive protein and mild thrombocytopenia (Table 1). Urine microscopy showed significant pyuria and haematuria, while renal function was preserved. Screening for dengue, malaria and scrub typhus was negative.

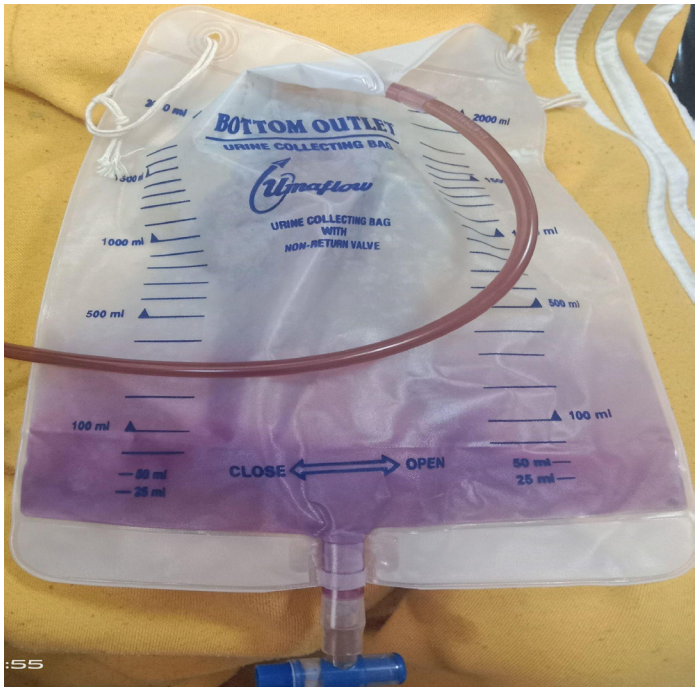


**Figure 1. Purple discolouration of patient's urinary bag and drainage tube.**

Our working diagnosis was PUBS due to complicated urinary tract infection.

## THERAPEUTIC INTERVENTION

The catheter was immediately replaced under aseptic conditions. Urine samples for microscopy and culture were obtained during the procedure. Following admission, he was managed with intravenous ceftriaxone (1 g every 12 hours), intravenous fluids, intravenous metoclopramide, and oral paracetamol.

During hospitalization, the patient remained afebrile. His appetite and general clinical condition improved, with no recurrence of the purple discolouration in the urinary collection system.

On the third day of admission, his urine culture revealed significant (>$10^5$ CFU/mL) growth of *Staphylococcus aureus.* The isolate was sensitive to cloxacillin, cefoxitin, nitrofurantoin, norfloxacin, and co-trimoxazole. Consequently, ceftriaxone was discontinued, and intravenous cloxacillin (1 g every 6 hours) was initiated.

Follow-up laboratory investigations on the fourth day of admission showed marked improvement in the leucocyte count and C-reactive protein and platelet counts (Table 1). After receiving intravenous cloxacillin for 48 hours, he was discharged on a 10-day course of oral cloxacillin (500 mg every 6 hours).

**Table 1. Summary of laboratory investigation findings**

| Test parameter | Day 1 | Day 4 | Reference Range |
|---|---|---|---|
| WBC | 15.38 | 6.30 | 3.61-9.56x$10^3$/µL |
| Neutrophil | 13.89 | 4.04 | 1.96-6.50x$10^3$/µL |
| Haemoglobin | 14.80 | 13.20 | 14.00-18.40 g/dL |
| Platelet | 137 | 313 | 138-450x$10^3$/µL |
| CRP | 146.21 | 34.91 | 0.00-6.00 mg/L |
| Urea | 44.75 | 17.74 | 10-50 mg/dL |
| Creatinine | 0.96 | 0.70 | 0.9-1.3 mg/dL |
| Urine culture | *Staphylococcus aureus* | | |

*CRP:c-reactive protein; WBC:white blood cell*

## FOLLOW – UP AND OUTCOMES

The patient was reviewed after completion of his oral antibiotic course. He remained asymptomatic, and the purple discolouration of the urine bag had not recurred. A repeat urine culture yielded mixed microbial growth, suggestive of contamination during sample collection. The patient and his caregivers were counselled regarding the nature of his spinal tumour, and were advised for follow-up assessment with a spine surgeon.

## DISCUSSION

PUBS was first reported in 1978 by Barlow and Dickson[6]. The purple discolouration was studied to be from mixing of two pigments: indirubin (red) and indigo (blue). Dietary tryptophan is metabolized into indole by intestinal bacteria and transported to the liver. There, indole undergoes hepatic conjugation and is excreted into the urine as indoxyl sulphate. Subsequently, bacteria with phosphatase and sulphatase enzymes catalyse the breakdown of indoxyl sulphate in urine to produce indirubin and indigo[2]. The most commonly identified bacteria in patients with PUBS are *Escherichia coli, Klebsiella pneumoniae, Proteus mirabilis and Pseudomonas aeruginosa*[1,4,5].

A 2017 systematic review with meta-analysis of 281 patients with PUBS, reported a prevalence of 11.7% among chronically catheterized patients[4]. While PUBS predominantly affects those with permanent urethral catheters, it has also been documented in patients with percutaneous nephrostomy and suprapubic catheters[1,4].

Global data from 2017 reported a mean patient age of 76.7 years, with a significant female predominance (70.9%).

Common risk factors identified were being bedridden (66.1%), institutionalization (67.1%), dementia (42.4%), constipation (53.6%), and alkaline urine (69.9%)[4]. In contrast, a 2023 observational study from India reported a younger mean age of 67.4 years and a male predominance (67.4%). Despite these demographic differences, the clinical profile remained consistent with a high prevalence of chronic constipation (73.9%) and alkaline urine (93.5%)[1].

Current literature indicates that 59.4% to 76.1% of patients presenting with PUBS are asymptomatic[1,4]. While the overall prognosis is generally favourable, severe complications have been documented, including nine deaths and two cases of Fournier's gangrene among 117 cases[4]. Consequently, the consensus among authors is that the need for antibiotic therapy must be assessed on an individual basis, prioritizing those with systemic symptoms or high risk for complications[1,4]. Other aspects of management include replacing the catheter, managing constipation, and reinforcing strict genitourinary hygiene and catheter care[1,3,4].

Although our patient is a young adult, he possessed significant risk factors, including chronic catheterization, immobility and intermittent constipation. While PUBS is typically associated with the elderly, it has also been reported in younger populations[3,7]. Although urinary pH was not documented in his initial urine sample, it was found to be acidic on the fourth day of admission. Notably, his urine culture identified *Staphylococcus aureus,* a relatively uncommon but previously reported causative organism in cases of PUBS[8,9]. Furthermore, our patient was symptomatic, in contrast to the majority of patients with PUBS. His outcome was favourable following prompt clinical assessment and initiation of appropriate management. This case underscores the importance of recognizing PUBS in younger, symptomatic patients and its association with *Staphylococcus aureus*, a Gram-positive coccus.

## CONCLUSION

PUBS can indicate an underlying urinary tract infection in patients on long-term urinary catheters. Although often benign, it can lead to unfavourable outcomes if overlooked by healthcare providers who are unaware of the phenomenon. Awareness of this condition is vital to ensure prompt recognition, appropriate clinical assessment and targeted management.

## INFORMED CONSENT

Informed written consent was obtained from the patient.

No identifying patient information or photographs that could lead to patient identification are presented.

## ACKNOWLEDGEMENT

We thank the patient for providing consent to publish this case report.

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## AUTHORS CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

KT: Conceptualization, literature review, editing, reviewing and original article

KZ: Literature review, editing,reviewing and original article

TZ: Literature review, editing, reviewing and original article

Authors agree to be accountable for all respects of the work in ensuring that questions related to the accuracy and integrity of any part of the work are appropriately investigated and resolved.

## CONFLICT OF INTEREST

None

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None