



Pan African Urological Surgeons' Association

African Journal of Urology

[www.ees.elsevier.com/afju](http://www.ees.elsevier.com/afju)  
[www.sciencedirect.com](http://www.sciencedirect.com)



## Short communication

# The 'purple urine bag syndrome': Where indigo and indirubin meet!



A. Adam<sup>1,\*</sup>

Registrar, Department of Urology, University of Pretoria, PRETORIA, South Africa

Received 16 September 2014; accepted 18 September 2014

An 83-year-old male resident of a local frail care centre presented with a background history of urinary retention, for which an indwelling latex urethral catheter had been inserted seven weeks before.

On examination, no significant abnormalities were detected, except for a purple-stained urine bag (Fig. 1). Further questioning relating to the patient's bowel habits revealed that he had been having significant episodes of constipation spanning over a period of two months. Haematological investigations failed to reveal any significant abnormality, while urine microscopy and culture revealed the presence of *Enterococcus faecalis* and *Kebsiella pneumonia*.

On the background of the chronic constipation in an elderly patient, the duration of the indwelling urethral catheter, purple discoloration of the urine collection bag and the urine culture result a diagnosis of the 'purple urine bag syndrome' (PUBS) was made.

The patient was successfully managed with oral ciprofloxacin, correction of his dietary and fluid habits, addition of a stool softener and changing the urinary collecting system under sterile conditions. We plan on initiating a trial of a prostate selective alpha-blocker, should the urinary retention persist after correction of the underlying constipation.

## Discussion

Since the first report of PUBS in 1978 [1], it has remained a rare and fascinating condition that has since proven to be associated with chronic constipation, an alkaline urinary pH, a bed-ridden state, advanced age, tryptophan rich foods, cognitive disorders, renal dysfunction and chronic urethral catheterization. Urinary tract infection with various bacterial strains including the *Enterococcus* species, *Escherichia coli* and *K. pneumonia* have been implicated [2–4].

This phenomenon is a manifestation of a cascade of metabolic reactions (Fig. 2), beginning with the intestinal bacterial interaction with the tryptophan in food. Once deaminated, tryptophan forms indole which is converted to indoxyl potassium sulphate in the liver. Bacterial phosphatases or sulfatases produced within the urinary tract convert indoxyl potassium sulphate to indoxyl, which after being exposed to alkaline urine is further converted into indigo (blue) and indirubin (red). It is the reaction of these two pigments that interact with the constituents of the urinary bag to form the alarming purple discoloration [2,5].

Although PUBS is mostly a benign process, some authors advise initiation of short course antibiotic therapy, with the changing of

\* Correspondence to: PO Box 322, Lenasia, 1820 Johannesburg, Gauteng, South Africa. Tel.: +27123541513; fax: +27123541513.

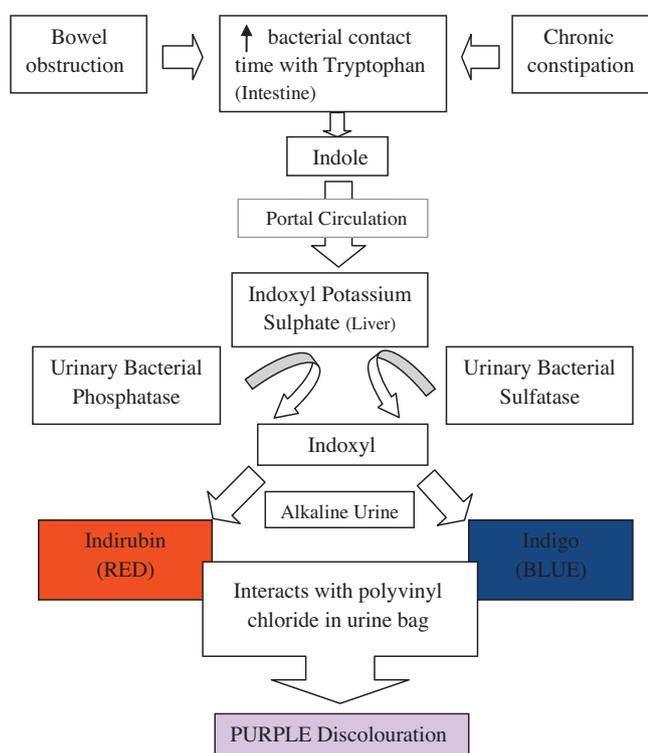
E-mail address: [aadam81@gmail.com](mailto:aadam81@gmail.com)

<sup>1</sup> Current Affiliation: Consultant Urologist, Adult and Paediatric Urology, Head Consultant, Department of Urology, Helen Joseph Hospital, & Head Consultant, Department of Paediatric Urology, Rahima Moosa Mother & Child (Coronation) Hospital, Division of Urology, Department of Surgery, University of the Witwatersrand, Johannesburg, South Africa. Tel.: +27114890118; fax: +27114890739.

Peer review under responsibility of Pan African Urological Surgeons' Association.



**Figure 1** The purple-stained urine bag.



**Figure 2** Diagram demonstrating the metabolic cascade responsible for the Purple Urine Bag Syndrome.

the urinary collecting system [2–4]. Optimisation of dietary habits and bowel function along with the prevention of catheter-associated urinary tract infection will also assist in avoiding this condition from occurring [5].

Close surveillance amongst immune-compromised patients with PUBS is advised, since the life-threatening complication of Fournier's gangrene has been previously reported amongst this subset of patients [6].

### Consent

Written consent had been obtained from the patient.

### Conflict of interest

None declared.

### Acknowledgement

We wish to thank Drs E. Hoosien and S. Muhammad, from the Medical Microbiology Department at the University of Pretoria, Pretoria, South Africa, for their assistance with the above microbiology reports.

### References

- [1] Barlow GB, Dickson JAS. Purple urine bags. *Lancet* 1978;311: 220–1.
- [2] Lin CH, Huang HT, Chien CC, Tzeng DS, Lung FW. Purple urine bag syndrome in nursing homes: ten elderly case reports and a literature review. *Clin Interv Aging* 2008;3:729–34.
- [3] Mantani N, Ochiai H, Imanishi N, Kogure T, Terasawa K, Tamura J. A case-control study of purple urine bag syndrome in geriatric wards. *J Infect Chemother* 2003;9:53–7.
- [4] Ga H, Kojima T. Purple urine bag syndrome. *JAMA* 2012;307: 1912–3.
- [5] Hadano Y, Shimizu T, Takada S, Inoue T, Sorano S. An update on purple urine bag syndrome. *Int J Gen Med* 2012;(5):707–10, <http://dx.doi.org/10.2147/IJGM.S35320>.
- [6] Tasi YM, Huang MS, Yang CJ, Yeh SM, Liu CC. Purple urine bag syndrome, not always a benign process. *Am J Emerg Med* 2009;27: 895–7.