

## The Color Purple

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## 1. Clinical Image

Urine colour has been a useful diagnostic tool, including dark, straw-colored, maple-syrup-colored, cola-colored, and red. We report here a case of purple-colored urine.

An 88-year-old female with a medical history of dementia, hypertension, chronic renal failure (creatinine 3.5 mg/dl), ischaemic heart disease and hypothyroidism presented to our emergency department due to several days of shortness of breath, nausea and general deterioration.

Laboratory investigations revealed a haemoglobin of 10 g/dl, total leukocyte count of  $11 \times 10^3/l$ . The blood urea was 202 mg/dl, serum creatinine 4.07 mg/dL, and sodium, potassium and chloride levels were normal. There was a metabolic acidosis of PH 7.1, with serum bicarbonate 17 mEq/L, pCO<sub>2</sub> 49 mmHg, and anion gap of -14. The patient underwent intubation due to acute pulmonary edema and urine catheterization was performed to monitor her urine output. She was afebrile during her hospitalization. During the next 3 days the blood pH remained around 7-7.1 and the serum bicarbonate 15-18 mEq/L.

On the 3rd hospitalization day the color of her urine turned purple, and she died the next day (Figure 1).



Figure 1:

Purple urine bag syndrome was first described in 1978 [1]. A recent literature review described 112 patients in 88 articles [2].

In patients with decreased intestinal motility, tryptophan is converted by gut coliforms to indole and then conjugated in the liver to indoxyl sulfate. Indoxyl sulfate is catalyzed by sulfatases or phosphatases from bacteria in the urine to indoxyl which may be converted to indigo if there is a high pH or indirubin if there is a low oxygen. Although bacteria such as *Klebsiella pneumoniae*, *Providencia stuartii*, *Enterobacter* spp., *Proteus mirabilis*, *Morganella morganii*, and *Escherichia* are implicated, no bacterial growth was obtained from the urine.

Risk factors include advanced age, female gender, constipation, dementia, bedridden situation, chronic- hospitalization, end-stage renal disease, dehydration, chronic catheterization, use of polyvinyl chloride urinary catheter or bag, recurrent UTI, high urinary bacterial counts and alkaline urine [2].

The incidence of this syndrome is unclear but this is the first case we have encountered during 30 years, during which we have treated more than 100,000 acute medical admissions.

#### References:

1. 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(10): 2152-6.
2. Sabanis N, Paschou E, Papanikolaou P, Zagkotsis G. Purple Urine Bag Syndrome: More Than Eyes Can See. *Current Urology.* 2019; 13(3): 125-32.